

Monitoring and Evaluation Report

USDA Forest Service Land Between the Lakes National Recreation Area

Western Kentucky and Middle Tennessee
Fiscal Year 2017



Fiscal Year 2017

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.

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All program areas were consulted in the development of this report.

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A. Forest Supervisor's Certification

This report presents the results of our Land and Resource Management Plan (Area Plan) implementation during Fiscal Years 2016 and 2017, ending September 30, 2017. You can find our Area Plan on our website at www.landbetweenthelakes.us/stewardship/land-resource-management/planning/.

This report reviews the past two full fiscal years of the Area Plan implementation. We put the highlights in this report to show the accomplishments achieved with the help of our partners.

The key finding of this evaluation demonstrates we managed resources at Land Between the Lakes per the Area Plan direction. We plan to conduct an area wide assessment to identify opportunities for future focus areas. When funding becomes available through the regional office we will begin data collection for possible plan revision.

This report is submitted to our Regional Office and posted on our website with reports from previous years at www.landbetweenthelakes.us/stewardship/land-resource-management/planning/.

After reviewing our Monitoring and Evaluation Report for Fiscal Years 2016 and 2017, I find we are in compliance with our Land and Resource Management Plan. I look forward to working with members of the public, regional leaders, and our partners on how to move forward in the future on implementing this area plan.



TINA R. TILLEY

Area Supervisor

Land Between the Lakes

National Recreation Area

4/12/18
Date



B. Introduction

Our biennial Monitoring and Evaluation (M&E) Report summarizes the last two fiscal years' efforts of implementing our Land and Resource Management Plan (Area Plan). 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/. We include the 2016 and 2017 fiscal year's accomplishments and trends for the United States Department of Agriculture, Forest Service, Land Between the Lakes National Recreation Area.

This report emphasizes the findings and conclusions compiled from various monitoring activities and data sources available on Land Between the Lakes. 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; and
- Discovery of emerging or unanticipated issues.

The heart of the report is the narrative in [Section D](#) focusing on significant items that have driven the conclusions presented. Section D is broken up into eight pieces, one for each of the Area Plan's eight goals.

Each goal includes a table combining, in one location, the desired condition and trend statements, and relevance discussed in the Area Plan. In an effort 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 that members of the public understand our efforts to achieve the vision in our Area Plan and our land and resource management outcomes.

We did not receive any comments about last year's Monitoring and Evaluation report.

Submit comments about our Monitoring & Evaluation Report by mail to: Area Supervisor, 100 Van Morgan Drive, Golden Pond, KY, 42211; by electronic mail to [**comments-southern-land-between-lakes@fs.fed.us**](mailto:comments-southern-land-between-lakes@fs.fed.us); or by phone to Barbara Wysock, Area Planner, at 270-924-2131. We welcome thoughts and comments about this report or any aspect of our management.

C. Executive Summary

This report serves as a review of Fiscal Years 2016 and 2017 and contains the additional monitoring questions we added in May 2016. The end of Fiscal Year 2017 completes the twelfth year of implementation of the Area Plan.

Find Monitoring and Evaluation Reports for Fiscal Years 2005 through 2017 on our official website at <http://www.landbetweenthelakes.us/stewardship/land-resource-management/planning/> Read our Area Plan at <http://www.landbetweenthelakes.us/wp-content/uploads/2015/05/LBLAreaPlan.pdf>.

Highlights in this report include, but are not limited to:

Goal 1 – Prioritize Projects to Provide Greatest Benefits

- Provided educational opportunities and recreational activities for over 1.6 million visitors to Land Between the Lakes in 2017.
- Collaborated with the public and partners on land management, including the Fox Hollow Project and the Hematite Trail Improvements.
- Improved recreation facilities, environmental education facilities, trails, and roads throughout Land Between the Lakes.
- Increased the total number of identified heritage sites to 2,507 and the total of number of officially recorded sites to 776. Managed 69 Priority Heritage Assets, addressed needs at cemeteries, and completed the Golden Pond Overlook heritage interpretation site.
- Hosted over 75,000 visitors for three days around the total solar eclipse on August 21, 2017.

Goal 2 – Emphasize Partnerships and Cooperators

- Regional tourism economic impact reached \$871.8 million in 2015.
- Supported the surrounding communities with over 1.52 million visitors in Fiscal Year 2016 and 1.67 million visitors in Fiscal Year 2017 to Land Between the Lakes National Recreation Area.
- Visitation at Land Between the Lakes remained higher than most regional destinations in the last five years.
- Partnered with non-profit, educational, governmental, and local community groups.
- Completed more than nine special heritage projects with a variety of organizations.

Goal 3 – Provide Environmental Education Messages

- Reached over 346,000 visitors in 2017 with environmental education and programs at Brandon Springs Group Center, Woodlands Nature Station, Golden Pond Visitor Center &

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Planetarium, The Homeplace 1850s Working Farm and Living History Museum, and the Elk & Bison Prairie.

- Land Between the Lakes consistently has more dedicated volunteers than any other Forest Service unit in the Southern Region. An average of 106,282 hours were contributed since 2005.
- Incorporated environmental educational messages into visitor experiences across Land Between the Lakes National Recreation Area.
- Provided fee free days throughout each year to over 10,000 visitors in each of 2016 and 2017. These days included free opportunities for veterans and educators.

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

- Improved watershed conditions across Land Between the Lakes by completing road maintenance on 134 miles of roads in 2016 and 156 miles of roads in 2017.
- Completed facility improvements to prevent erosion at a number of recreation facilities.

Goal 5 – Use Collaborative Approach to Maintain and Restore Habitat to Support Wildlife Diversity and Recreation

- Completed population surveys of white-tailed deer on Land Between the Lakes National Recreation Area.
- Continued to maintain over 6,700 acres of open lands for wildlife and recreation.
- Instituted the first managed wildfire on Land Between the Lakes under the Wildfire Decision Support System.
- Improved habitat and reduced fuels with prescribed fire each year, although weather conditions limited the number of acres burned.
- Improved wildlife habitat and forest resiliency through treatment of non-native invasive plant species, control of feral hogs, and treatment of imported fire ants on Land Between the Lakes.

Goal 6 – Demonstrate and export innovative management techniques

- Partnered with our Friends Group to deliver visitor services at Land Between the Lakes and met with the Friends Group at San Bernardino National Forest to share our experiences.
- Continued to improve use of electronic media and applications to market Land Between the Lakes and to provide visitor services such as reservations and permits.

Goal 7 – Enhance Dispersed Recreation and Environmental Education

- Developed the Land Between the Lakes Regional Water Trail with federal, state and local organizations.
- Provided facilities and interpretive programs for over 75,000 visitors to Land Between the Lakes over three days for the total solar eclipse.
- Completed improvements or maintenance at Golden Pond Target Range, Basic and Dispersed Campsites, Piney Campground, Energy Lake Campground, Cravens Bay Campground, Nickell Branch Campground and Boat Ramp, Sugar Bay Campground and Boat Ramp, Gatlin Point, and Hillman Campground.
- Completed the trail connector between the Central Hardwoods Trail and the Kentucky Lake Bridge Trail, improvements in Turkey Bay Off-Highway Vehicle Use Area, and repairs and maintenance on Canal Loop Trails. Conducted assessments and design for Hematite Trail improvements. Collaborated and constructed Wranglers Trail 11 as mitigation for the trail decommissioned by Highway 68/80 construction.
- Reduced deferred maintenance for sites by over \$2.6 million.
- Restored facilities, roads, and trails after severe weather events during 2016 and 2017.

Goal 8 – Remain effective in supporting National Goals

- Continue to support national goals by implementing the Area Plan.

D. Monitoring Results and Evaluations

Goal 1:	Prioritize projects to provide the greatest recreation, Environmental Education (EE), and resource stewardship benefits.
Sub-element NFS Generic Desired Condition	“LBL will play a pivotal role in supplying and supporting the recreational and EE experiences people seek.” “All vegetation management activities will be designed to sustain or improve wildlife habitats, forest health, recreation opportunities, or EE experiences.” [Area Plan, Vision]
Example Area Plan Desired Condition Statement	“The responsibility for meeting this (recreational and environmental education) increasing demand will fall to those areas and entities capable of providing outdoor recreational opportunities while sustaining natural environments.” “Vegetation management activities will incorporate environmental education messages, themes, and information in programs and projects as much as practical.” [Area Plan, Vision]
Desired Trend Statement	“Eighty percent of all special projects will have identified and demonstrated benefits to recreation, EE, and resource stewardship.” [Objective 1a]
Monitoring Questions	1. Has the Forest Service (FS) made progress toward providing satisfactory recreational and EE experiences to visitors while providing for resource stewardship? 2. Have resource management projects been integrated?
Area Plan Performance Measures	1. Trends in segmented visitation in comparison to numbers of related resource stewardship projects completed 2. Number of integrated projects being completed
Data Sources Utilized	--Summary of visitor satisfaction surveys or personal letters and notes received; visitation; and focused area accomplishments --Objective accomplishments, summary of integrated projects completed
Importance	This goal contains key emphases of the LBL Protection Act and reinforces the key purposes described for LBL when created in 1963. Optimizing efficiency and integration of resources are also primary objectives of both LBL and the agency.
What It Tells Us	The results related to this goal will provide key information about whether LBL is meeting its legislated objectives and tiering to national strategic goals.

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Goal 1: Prioritize projects to provide the greatest recreation, Environmental Education, and resource stewardship benefits.

The end of fiscal year 2017 completes 12 years of moving toward the desired conditions in the Area Plan. Recreation, Environmental Education, and resource stewardship continue to be the priorities for the work we accomplish.

Q1.1. Has the Forest Service made progress toward providing satisfactory recreational and EE experiences to visitors while providing for resource stewardship?

Land Between the Lakes and our partners made progress implementing the Area Plan. This section of the report highlights the progress made while the remaining report describes results in greater detail.

M Q1.1. Trends in segmented visitation in comparison to numbers of related resource stewardship projects completed.

We completed numerous projects in every program area. These projects improved facilities, roads and trails while restoring wildlife habitat. This all supported visitation to the National Recreation Area.

We present visitation trends under Goals [2.3](#), [3.4](#), and [7.32](#) of this report.

Q1.2. Have resource management projects been integrated?

The work described in this report demonstrates integration of programs and partners for completion of projects. Specifically, natural and physical resources, recreation, engineering, environmental education, heritage, business, and communications areas accomplish work together at Land Between the Lakes National Recreation Area. We began different ways of gathering public input on projects during Fiscal Year 2016 using collaboration tools.

M Q1.2. Number of integrated projects being completed

We completed two environmental assessments during Fiscal Year 2017: Treatment of Imported Fire Ants and Fox Hollow Project.

- Treatment of Imported Fire Ants Environmental Assessment evaluated the impacts of treating known and future fire ant mounds area wide using approved insecticides. See the invasive species discussion in Goal 5 for more information.
- Fox Hollow Project Environmental Assessment evaluated improvements to watershed conditions on 560 acres of Fox Hollow in Tennessee, bordered by Forest Service Roads 100, 219, 220, and 382. We developed the alternatives analyzed in the environmental assessment in collaboration with individuals, organizations, and agencies interested in the management of Land Between the Lakes. The action alternative eliminates causes of erosion on user-made accesses to dispersed campsites and the lakeshore, maintains Roads 219 and 220, closes Road 382, and provides limited daylighting of Road 220 by cutting and leaving trees.

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Read more about the project on the internet at <https://www.landbetweenthelakes.us/fox-hollow-collaborative-effort/>.

- Hematite Trail work began addressing deteriorating infrastructure and enhancing wildlife viewing opportunities for persons with disabilities. Public provided input and staff conducted site surveys. We completed the environmental review.
- Many improvements addressed deferred maintenance, infrastructure needs, and repairs at recreation facilities and trails. See the extensive description in Goal 7 of this report.
- Signs installed in the large campgrounds encourage campers to stop and explore nature throughout Land Between the Lakes. Learning opportunities continue at the environmental education facilities and outreach efforts to local communities.
- The total solar eclipse on August 21, 2017 required coordination of all staff and resources at Land Between the Lakes during preparation and the day of the eclipse.
- Natural resource management efforts focused on collaboration with the advisory board and interested groups to determine future direction of vegetation management at Land Between the Lakes.

Heritage

The Heritage Program participates in projects to ensure compliance with federal and state cultural resource management and preservation laws. The 2014 Programmatic Agreement outlines Heritage Program oversight of undertakings at Land Between the Lakes.

During 2016 and 2017, heritage resource stewardship efforts with immediate benefit to the public took priority. We plan to complete a Heritage Program Plan in the coming years as a collaborative effort between the Heritage Program and those communities and organizations interested in the heritage of Land Between the Lakes. We discuss heritage at Land Between the Lakes here and in Goals 2, 3, and 7 of this report.

The Heritage Program staff surveyed 126.6 acres across Land Between the Lakes during Fiscal Year 2016. We surveyed 153 acres during Fiscal Year 2017. This is up considerably from the 24 acres we surveyed during Fiscal Year 2015. Much of this survey increase can be attributed to the increase in staff over the previous year and favorable survey conditions. Field surveys are conducted when weather and ground conditions are favorable and when labor is available.

At the end of Fiscal Year 2017, our total number of identified heritage sites increased to 2,507 while our total number of officially recorded heritage sites increased to 776. We identify sites using data acquired in the field and/or from historic maps while we record sites by mapping and documenting sites in the field. We recorded 60 of the 776 heritage sites during Fiscal Years 2016 and 2017.

We continue to add cemeteries to the Land Between the Lakes list of Priority Heritage Assets as we protect and/or assist cemetery contacts with maintenance and repairs. We currently have 69 Priority Heritage Assets in the Forest Service heritage database. [Appendix 3b](#) lists the Priority Heritage Assets to date at Land Between the Lakes and this list continues to grow. In Fiscal Year 2016, we

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recorded 11 cemeteries as new Priority Heritage Assets and completed condition assessments on them. In Fiscal Year 2017, we recorded an additional 17 cemeteries as Priority Heritage Assets and completed condition assessments on them. At the time of this report we know of 270 historic cemeteries on Land Between the Lakes and so far we recorded 63 of these as Priority Heritage Assets.



Figure 1.1: Forest Service personnel monitor and protect Bass Cemetery during a prescribed burn.

We protected from fire, cleaned, or completed road work at 22 Priority Heritage Asset Sites during Fiscal Year 2016 and 24 Priority Heritage Asset Sites during Fiscal Year 2017. We discuss these stewardship activities in greater depth under Goal 7 where we describe accomplishments about dispersed recreation the public enjoys.

Heritage resource stewardship is an important part of all projects at Land Between the Lakes. Many of these projects can be simple and occur over a one to two day period. An example of this would be the installation of the vault toilet at Turkey Bay Off-Highway Vehicle Area. During this project, trained archaeologists excavated one shovel test pit in the proposed location of the toilet to make sure no heritage resources would be impacted. The archaeologists then monitored the mechanical excavation of the vault toilet pit. Heritage resource stewardship was achieved and the recreation at Turkey Bay was enhanced.

Other projects take much more time and effort, such as the Fox Hollow project. This

collaborative project between the Forest Service and other interested groups and publics was implemented to explore the land management possibilities of the Fox Hollow area in Tennessee. During that project, archaeology staff performed shovel tests in five pine stands (totaling 46 acres), along a ridgeline, and on a road marked for closure. We mapped and flagged in the field ten exclusion zones around surveyed historic properties to prevent potential damage during proposed work. A historic cemetery was located and through collaborative discussions and field visits with a descendant of the former residents of the area, we made plans about future stewardship and research at the cemetery. No matter the size of the project, whether it's a vault toilet or a landscape, implementation projects are important to the mission of Land Between the Lakes and are therefore prioritized accordingly.

Goal 2:	Emphasize partnerships and cooperation with citizen groups, community businesses, private corporations, tourism organizations, and government agencies.
Sub-element NFS Generic Desired Condition	“LBL will continue to be a destination point for visitors throughout the region and nation, thereby contributing to the local and regional economy.” [Area Plan, Vision]
Example Area Plan Desired Condition Statement	“Maintaining and developing partnerships will be important to keeping LBL positioned as a premiere recreation/EE destination.” “The public will continue to play an important role in project-level actions and decisions.” [Area Plan, Vision]
Desired Trend Statement	“Establish at least one local partnership for tourism, economic development, or EE; and at least one new cooperative with a regional, state, and federal agency or organization annually in support of the LBL mission.” [Objective 2a] “Increase visitation to more than 2 million visitors per year by the end of 2015 to support local and regional economies. [Objective 2b]
Monitoring Questions	3. Has the Forest Service (FS) made progress toward supporting vitality of gateway communities and maintaining/enhancing relationships with its neighbors and regional organizations?
Area Plan Performance Measures	3. Trends in visitation, levels of community participation
Data Sources Utilized	--Summary of visitation results, community participation in meetings, programs provided, grants sponsored, cooperative gateway projects, feedback from elected officials and business leaders, and visitation --Number of Memorandum of Understandings (MOUs), partnership agreements, and challenge cost share agreements with local, regional, and state agencies
Importance	This goal contains important strategies for the collaborative delivery of goods and services at LBL. It also reinforces several of the key purposes described for LBL when created in 1963, namely to work cooperatively with the gateway communities in support of their strategic direction.
What It Tells Us	The results related to this goal will provide key information about whether LBL is meeting its stated objectives to work closely with partners and communities and developing strong relationships with local, state, and regional organizations and the public.

Goal 2: Emphasize partnerships and cooperation with citizen groups, community businesses, private corporations, tourism organizations, and government agencies.

Q2.3. Has the Forest Service made progress toward supporting vitality of gateway communities and maintaining/enhancing relationships with its neighbors and regional organizations?

Since 1999 with the transition of management to the USDA Forest Service, the men and women of Land Between the Lakes continue to make progress toward supporting the vitality of our gateway communities.

Economic Impact

Land Between the Lakes National Recreation Area continues to serve the region as a major tourist destination with over 1.52 visitors in Fiscal Year 2016 and 1.67 million visitors in Fiscal Year 2017. A spike in visitation occurred in August of 2017 during the solar eclipse as most of Land Between the Lakes was within totality. During this event, Land Between the Lakes became a destination for many visitors across the U.S. and in some cases the world. It is estimated that more than 75,000 people visited Land Between the Lakes for the weekend of the eclipse.

Land Between the Lakes remains the number one tourist attraction in Kentucky and among the top ten tourist destinations in Tennessee.

In Kentucky, our regional tourism economic impact reached **\$871.8 million** in 2015 according to the most recent assessment by a July 5, 2016 Lane Report.

In Tennessee, Land Between the Lakes falls under the Middle Tennessee tourism region. Five Tennessee Counties reside within an area in and around the southern portion of Land Between the Lakes. Land Between the Lakes has a significant economic impact on these counties. These five counties account for **\$306.91 million** of Tennessee's tourism impact in calendar year 2017, the latest Tennessee Tourism Economic Impact report as of this writing. One of our biggest blocks of visitors comes from Montgomery County.

- Benton \$25.52 Million
- Henry \$56.03 Million
- Houston \$5.92 Million



Figure 2.1: Area lakes support tourism.

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- Montgomery \$211.16 Million
- Stewart \$8.28 Million

Sources

2015 Economic Impact of Kentucky's Travel and Tourism Industry

<http://www.kentuckytourism.com/industry/research.aspx>

Tourism: Cumberland's back; Kentucky's big lakes help state tourism

<http://www.lanereport.com/65102/2016/07/tourism-cumberlands-back-kentuckys-big-lakes-help-state-tourism/>

Forest Service National Visitor Use Monitoring Survey

www.fs.fed.us/recreation/programs/nvum/

Tennessee Tourism Economic Impact

https://industry.tnvacation.com/sites/industry/files/component/pod/EI_2017_Share.pdf

Community Outreach and Professional Memberships

The region looks to the Forest Service and Land Between the Lakes National Recreation Area as the centerpiece of a billion dollar annual tourism industry. We recognize the importance of tourism partnerships in order to remain a destination of choice for visitors throughout the region and the nation. We know that working together with our communities makes us all stronger.

Chamber of Commerce Membership – 10 counties

- Cadiz-Trigg County, KY
- Grand Rivers, KY
- Hopkinsville-Christian County, KY
- Lake Barkley-Lyon County, KY
- Marshall County, KY
- Murray-Calloway County, KY
- Paducah Area, KY
- Clarksville Area, TN
- Paris-Henry County, TN
- Stewart County, TN

Member of Local Tourism Organizations – 5 regional organizations

- Kentucky's Western Waterland www.kentuckylakebarkley.org
- Kentucky Travel Industry Association www.KTIA.com
- Land Between the Lakes Region Tourism Coalition www.visitlbl.com
- Middle Tennessee Tourism www.middletennesseetourism.com
- Land Between the Lakes Regional Water Trails
<https://www.landbetweenthe lakes.us/regional-water-trails/>

Environmental Education and Interpretation Memberships – 5 professional organizations

- Kentucky Environmental Education Association <http://kaee.org>
- Tennessee Association for Environmental Education <http://eeintennessee.org>
- North American Association for Environmental Education www.naaee.net
- National Association for Interpretation www.interpnet.com
- Association for Living History Farms and Agricultural Museums <http://www.alhfam.org/>

Our staff supports other areas of community interest on a personal level. These include youth organizations, schools, school boards, local theater, historical groups, local fire and rescue squads, and church activities. Land Between the Lakes also provides speakers for community groups such as Rotary, Lions and Sportsmen Clubs.

The Executive Director, Director of Operations, and Director of Sustainability & Outreach for the Friends of Land Between the Lakes act as our representatives at civic and tourism organizations. In this capacity the Friends Group represented us at over 50 meetings of civic organizations such as Chambers of Commerce, Rotary Clubs, Kiwanis Clubs, Kentucky's Western Waterland, Land Between the Lakes Region Coalition and others to present informational programs, serve on Boards of Directors, or be the official representatives of Land Between the Lakes.

Familiarization Tours

In Fiscal Year 2013, Land Between the Lakes conducted its first official Familiarization Tour. Familiarization Tours, "Fam Tours", give interested industries, special interest groups and other organizations a quick peek at what Land Between the Lakes and the area communities offer.

The unit continued expanding upon the familiarization tours in Fiscal Year 2016 and Fiscal Year 2017 with participation including new groups from the tourism and tour bus industry. The overall number of tours declined slightly due to the vacancy in the Public Affairs staff officer position during the reporting period.

Exhibits and Conferences

Over the past few years Land Between the Lakes attended several conferences in our region to promote tourism, environmental education, and wildlife habitat management -- these included:

- West Kentucky Boat and Outdoor Show in Murray, KY
- Health and Safety Day at Ft. Campbell, KY
- Environmental education programs at our four gateway State Parks
- The National Wild Turkey Federation Convention and Sports Show Nashville, TN
- Kentucky State Fair through Kentucky's Western Waterland each August
- Tourism Day events at Kentucky I-24 Visitor Centers first week in May
- Travel South Showcase with the Land Between the Lakes Region Tourism Coalition each February reaching out to tour bus operators

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- American Bus Association Marketplace with the Land Between the Lakes Region Coalition
- Bass Masters Classic Pro Series held at Paris Landing State Park
- Hopkinsville Home Builders Association Home and Garden Show

Improving Customer Service Through Technology

Every year we work to improve our connection with visitors. We continued to improve the online campground reservation and online quota hunt application systems in Fiscal Years 2016 and 2017. Visitors obtained free Christmas cedar tree permits online during December of 2016 and 2017.

Visitors plan their vacations to Land Between the Lakes using our website. The website contains an interactive calendar and works on desktops, tablets and smartphones.

In 2017, we invested in a new gate for the Elk and Bison Prairie. The new technology within this system will provide much more efficient and better customer service. Issues with gate operations are expected to decrease substantially, thus providing more reliable access to the Elk and Bison Prairie.

Also in 2017, we partnered with Murray State University's Computer Science Department and hired an intern responsible for maintaining and improving our website (www.landbetweenthelakes.us). This partnership led to much improved customer service due to streamlining the website with a goal of making the site much more user friendly.

Partnerships, Agreements and Memoranda of Understanding

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.

Our partnerships have grown throughout the years. Over the past years we have collaborated with:

- Central Hardwoods Joint Venture to restore grassland birds' habitats. <http://www.chjv.org/>
- Western Kentucky Amateur Astronomers who work with Friends of Land Between the Lakes on Star Parties at our observatory in the summer and our annual National Astronomy Day free event in the spring. www.wkaa.net
- National Wild Turkey Federation to enhance habitat management. <http://www.nwtf.org/>
- Kentucky Interagency Coordination Center to mobilize resources provided by cooperating federal and state agencies in the state of Kentucky to respond to incident needs throughout the United States. Cooperating agencies included National Park Service, USDA Forest

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Service, U.S. Fish & Wildlife Service, National Weather Service, and State Division of Forestry units. <http://gacc.nifc.gov/sacc/dc/kykic/>

- Land Between the Lakes Sportsman's Club to maintain our Kuttawa Landing lake access area. We work together on improvements while their volunteers mow and pick up trash regularly. A new sign was installed in 2015 recognizing our partnership.
- Fort Campbell on shared resources. <http://www.campbell.army.mil>
- USDA Animal and Plant Health Inspection Service to control feral hogs on Land Between the Lakes.
- Murray State University, Austin Peay State University and Southern Illinois University on a variety of projects ranging from environmental and recreation assistance to computer science and archiving partnerships.
- Fort Donelson National Battlefield to share resources. <https://www.nps.gov>
- The States of Kentucky and Tennessee tourism departments on promotional efforts.
- Operation RubyThroat at the Nature Station to promote environmental cooperation and understanding. www.rubythroat.org
- Red Wolf Coalition at the Nature Station centered toward connecting people with red wolves and ensuring the survival of red wolf populations. www.redwolves.com
- Southern California Mountains Foundation to share expertise for partners, promotions and strengthening Land Between the Lakes Association.
- Land Between the Lakes Association. Non-profit organization essential to the operation, promotion and day-to-day visitor services at Land Between the Lakes. www.friendsoflbl.org
- Between the Rivers, Inc. to maintain the heritage of St. Stephen Church and Cemetery.

Regional Universities include multiple disciplines like biology, forestry, engineering, geographic information systems, computer science, archiving and other departments in their curriculum:

- Alabama Agricultural and Mechanical University, Huntsville, AL
- Southern Illinois University in Carbondale, IL
- Murray State University in Murray, KY
- Austin Peay State University in Clarksville, TN
- Tennessee Tech University in Cookeville, TN
- University of Tennessee at Knoxville, TN
- University of Tennessee at Martin, TN

Many of the following organizations have agreements with us. We worked with them over the past several years and continue to partner on various programs.

- Conservation organizations include:
 - Cumberland River Compact
 - Ducks Unlimited

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- Frogwatch AZA
- Kentucky Waterwatch
- Kentucky Bowfishermen
- Living Lands & Waters
- Monarch Watch
- Monitoring Avian Productivity and Survivorship MAPS
- National Audubon Society
- National Wild Turkey Federation
- National Wildlife Federation
- North American Butterfly Association
- North American Bluebird Society
- Purple Martin Conservation Association
- Operation Rubythroat
- Red Wolf Coalition
- The Nature Conservancy
- Children's Organizations
 - Boy Scouts of America
 - Girl Scouts of America
 - Joshua Tree Home Educators Association
 - Trigg County High School Environment Club
 - West Kentucky 4-H
- State and Local Organizations
 - Caldwell County Conservation District
 - Chattanooga Nature Center
 - Kentucky Department of Fish & Wildlife Resources
 - Nashville Zoo
 - Public and Private Schools
 - Public Libraries
 - § Logan County
 - § McCracken County
 - § Marshall County
 - § Murray/Calloway County
 - Tennessee Wildlife Resources Agency
 - Tennessee Aquarium; Louisville Zoo
 - WKDZ and WKMS radio stations

Environmental Education

Partnerships enhance our Conservation and Environmental Education programs. We rely on our partners for delivery of our educational and interpretive programs. We also support our communities in many ways through partnerships and agreements to bring environmental education to our region.

- Our biggest partner is the Friends of Land Between the Lakes group. They provide staff at our facilities, and interpreters to reach visiting children and adults. Our Friends Group raises additional funds for our interpretive programs through managing our gift shops and the Golden Pond Planetarium. They also manage and distribute grant funds in our School Field Trip Grant Program which helps children within 100 miles experience outdoor classroom learning and unstructured play. Find more information following this section.
- A pragmatic partnership with the Western Kentucky Recycling Corporation helps our Respect the Resource Program. Western Kentucky Recycling processes our recyclables. In return they provide grant monies to purchase on-site containers and design educational materials for us to use. In 2016, we renewed the agreement for another 5 years.
- In 2017, we served on the National Park Service Fort Donelson National Historic Battlefield planning team developing their new Interpretive Plan.
- Through the years, our Environmental Education staff and volunteers supported the National Wild Turkey Federation's annual convention. We encourage kids to get outside, into outdoor activities and recreation with hands on activities at our Forest Service booth. This conference continues to grow. In 2016 and 2017, we reached over 5000 members of the public, 2,000 students, and 50 teachers.
- We continue to strengthen our working relationship with Paducah's River Discovery Center to extend our outreach to local schools focusing on River Ecology. Over the last 2 fiscal years, we presented 12 programs, reaching over 350 participants. A Paducah area business funded these programs as part of the special Animal Habitats field trips for 2nd graders.



Figure 2.2: 2015 National Wild Turkey Federation Conference

- Every year we host college classes to review habitat management.
 - Southern Illinois University brought their forestry students annually. Our recreation area was one of the stops.
- The Woodlands Nature Station partners with Tennessee National Wildlife Resources, Fort Donelson National Battlefield, Kentucky state parks, Kentucky Fish and Wildlife Resources and the National Wild Turkey Federation to provide a variety of programs.

Friends of Land Between the Lakes

In 1983, Land Between the Lakes Association (LBLA) formed to support the national recreation area programs and activities through serving as a membership 501 (c) (3) nonprofit organization, obtaining private gifts and managing Land Between the Lake's volunteer program. Since management changed in 1999, LBLA has expanded the areas of responsibility for the Association now operating as Friends of Land Between the Lakes. The Friends Group now functions as a vital cooperative partner managing over 50 employees in service to the USDA Forest Service at Land Between the Lakes National Recreation Area. They maintain a website at www.friendsoflbl.org.

In several areas, such as the educational programs and information services, employees of our Friends Group serve as the primary contact for our visitors. In 2016 and 2017, volunteers other than Resident Attendants and the Public Land Corps, contributed the equivalent of over 7 full time positions at Land Between the Lakes.

The cooperative partnership between the Forest Service and Friends of Land Between the Lakes provides critical support in accomplishing the unit's mission by:

- Providing educational programming at three visitor facilities
- Providing information services at five locations
- Developing and conducting volunteer activities
- Managing the Friends of Land Between the Lakes Facebook page
- Engaging in funds development activities for specific programs and projects
- Providing administrative support enabling our intern, apprentice, resident attendant and school grant programs
- Public promotion of operations at Land Between the Lakes through talks to civic groups, Chamber of Commerce Board Memberships and radio talks on a weekly basis
- Providing a variety of other administrative, public relations and staffing services that include food service and housekeeping at Brandon Spring Group Center
- Maintaining working relationships with other government agencies and non-government organizations in support of our environmental education mission

Some of our Friends Group Accomplishments over the last several years include:

- Managing Golden Pond Planetarium and Observatory as a fundraiser for our Friends Group. Professionals completely restored the dome in 2017.
- Raising funds, submitting grant proposals and securing in kind donations for a variety of programs including our school Field Trip Grant Program, Golden Pond Target Range, trail rehabilitation, talent funding and visitor enhancements at special events, public photo contest events and benches for our Central Hardwoods Scenic Trail.
- Organizing cleanups of our shoreline and undeveloped areas with hundreds of volunteers that included Explorer Scouts, Boy Scouts, Girl Scouts, the U.S. Coast Guard, churches and other organized groups in addition to individual volunteers.
- Identifying and developing opportunities for young people to get involved in their public lands through third-party volunteer programs like alternative break programs for college students and Eagle Scout projects.
- Managing our volunteer program to consistently provide over 100,000 hours of service touching all our programs, from habitat management to environmental education to heritage and camping in addition to trash pickup and trail repairs. In 2016 and 2017, our volunteer activities produced over 25,500 hours of volunteer service. When we add the hours of resident attendants, apprentices and student interns to the volunteer activities, the volunteer service time totals over 246,000 hours. Based on 2016 values obtained from the Independent Sector website at <https://www.independentsector.org/> , the value of the contributed hours is \$5,259,480.
- Providing volunteers through our Bugle Corp program. These volunteers work with our Environmental Stewardship Department on observing and managing the Elk & Bison Prairie herds. Additionally they help visitors in the prairie to assure they have a safe visit and enjoy this prairie ecosystem experience. The Elk & Bison Prairie had 92,920 and 148,927 visitors in 2016 and 2017 respectively.
- Assisting our visitors with timely and accurate information about Land Between the Lakes and the surrounding region. In Fiscal Years 2016 and 2017, our Friends Group information clerks and receptionists assisted 286,097 visitors.
- Presenting educational programs at
 - Golden Pond Planetarium and Observatory which is open 362 days a year with seven programs presented daily, one of which is a live presentation. In Fiscal Year 2016 and 2017, the planetarium educated and entertained 51,014 guests. Laser light shows and star parties help enhance the programming for our visitors from Memorial Day through the end of December.

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- Woodlands Nature Station where our interpretive naturalists develop and present over 1,000 programs annually. They also hosted multiple special events. Their programming efforts attracted 91,298 visitors in Fiscal Years 2016 and 2017.
- Homeplace 1850s Working Farm, whose interpreters also develop original programming, presents over 500 educational programs annually. They also hosted multiple special events. These programs attracted 72,682 visitors in Fiscal Years 2016 and 2017.
- Local schools, state parks, U.S. Fish and Wildlife refuges, and civic organizations to broaden the reach of our educational programs and promote us as a destination for educational experiences in wildlife and habitats, history, and earth science.
- Facilitating educational field trips to Land Between the Lakes for schools located within a 100 mile radius. Since its inception in 2001, this program has helped over 25,000 school children. See the details about the field trip grants program in Goal 3 of this report.
- Playing an active role and holding leadership positions in the Land Between the Lakes Regional Water Trails Working Group. See the discussion about water trails in Goal 7 of this report.

Heritage

Transition Monitoring Question 44. How is Land Between the Lakes making progress towards creating and implementing a Heritage Program? Indicators include Land Between the Lakes Heritage Annual Report containing Programmatic Agreement implementation and Heritage Program Update.

Land Between the Lakes continues to make progress toward implementing a successful Heritage Program that emphasizes partnerships and cooperation with citizen groups and government agencies. Collaborative projects build a great amount of goodwill with the surrounding community and also provide the most enjoyment to the staff while contributing to the success of the heritage program at Land Between the Lakes.

Heritage Program Collaborative Projects

In Fiscal Years 2016 and 2017, the Heritage Program at Land Between the Lakes partnered with a number of different organizations on projects big and small. The list below represents the variety of projects we collaborated on.

- *Savells Cemetery Cleanup.* In November of 2015, a member of the public, and descendant of former residents of Land Between the Lakes, asked for assistance with the maintenance of a cemetery that became overgrown with brush and cluttered with fallen debris. The Heritage Program gathered a team from the various departments at Land Between the Lakes to clear brush and debris and fell dead trees. The cemetery contact was pleased and can now adequately maintain their cemetery.

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- *Cravens Bay Excavation.* March of 2016, former residents from Between the Rivers had concerns that there was an unmarked cemetery in the Craven's Bay Campground at Land Between the Lakes. After doing the historical research, we began a collaborative archaeological project. The Heritage Program staff and former residents conducted a metal detector survey over the area first, began a shallow trench excavations, and eventually brought in a backhoe to investigate deeper. No cemetery was located. The collaborative effort demonstrated Land Between the Lakes' concern for the heritage of the area, appreciation of the concerns of the former residents, and willingness to partner with the public.
- *Golden Pond Overlook.* A long term collaborative project between the Forest Service at Land Between the Lakes and former residents of the town of Golden Pond, KY, was completed in October 2016 with the design, installation, and dedication of the Golden Pond Interpretive Overlook. The former residents provided photos, stories, timelines, and historical information to help design a seven panel interpretive destination that combined outdoor recreation with cultural resource public education.



Figure 2.3: Dedication of the Golden Pond Interpretive Overlook. Pictured here from left to right: Donnie Holland (Commissioner of the Kentucky Department of Parks and former resident), Tina Tilley (Forest Service Area Supervisor), Reverend Elijah Balentine, Jim Wallace (former resident, author, and Committee co-Chair), Bill Miller (retired educator and minister), and Hollis Alexander (Trigg County Judge Executive).

- *Fox Hollow Project.* During the cultural resource management portion of the Fox Hollow Project, the Heritage Program partnered with a member of the public who was a descendant of the former residents of the Fox Hollow Area. Field visits included the exchange of

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valuable historical information and a collaborative spirit in how to move forward with maintenance of a cemetery in the project area.

- *2017 Heritage Geocache Challenge.* In March of 2017, the Heritage Program initiated the second annual Heritage Geocache Challenge. The Heritage Program partnered with Between the Rivers, Inc., a local organization of former residents and concerned citizens who care for and advocate for the cemeteries and heritage at Land Between the Lakes. Members of Between the Rivers, Inc. provided a list of important heritage locations and six new locations were chosen from the provided list. Each geocache included a history of the location reviewed by Between the Rivers, Inc. The Challenge was a great success, drawing people from the surrounding states to explore and learn about the heritage of the area while focusing on the history our partners felt was important.
- *Murray State Boyd House Survey.* In April of 2017, an archaeology professor from Murray State University, in search of fieldwork opportunities for her students, began work with the Heritage Program on the exploration of the Boyd Farm, a historic landmark that had originally been an Indian fort during the earliest days of westward expansion into the area by Americans of European descent. The students received hands-on experience while the heritage program gained valuable data.
- *Bridge to the Future.* In July of 2017, the Heritage Program and the Fire Program at Land Between the Lakes partnered with the Shawnee National Forest and the Mark Twain National Forest to develop a program to help diversify the Forest Service workforce by recruiting and intensively training Native Americans in Fire and Cultural Resource Management. The Partnership received a grant and we are currently in the recruitment process.
- *Clarks River Survey.* In May of 2017, the Heritage Program conducted an archaeological survey for Clarks River National Wildlife Refuge in neighboring Marshall County. The Wildlife Refuge planned to expand a managed wetlands area and needed approval from the State Historic Preservation Office. Not having a Heritage Program of their own, Clarks River contacted us and we gladly provided our services to assist them with their project. After the survey was completed and no historic or prehistoric material was found, the State Historic Preservation Office approved the project and the project moved forward.
- *Saint Stephens Church Special Use Permit.* After months of meetings and negotiations, we finalized a special-use permit between our partners at Between the Rivers, Inc. and Land Between the Lakes National Recreation Area. The permit officially allows Between the Rivers, Inc. to lovingly maintain the only historic church building to remain standing on Land Between the Lakes.

Outreach

The Heritage Program meets and talks with interested groups in our surrounding communities. The Heritage Program sent representatives to Camper's Fair at Piney Campground, Between the Rivers, Inc., Trigg County Rotary Club, Trigg County Intermediate School, the Calloway County

Genealogical and Historical Society, and the Stewart County TN Historical Society on historic cemetery maintenance practices. This outreach to diverse groups in the surrounding community is building a network of partners to create a stronger Heritage Program and develop a new heritage resource management plan.

Heritage Programmatic Agreement Annual Report

In 2014, a collaborative effort was completed to develop a Programmatic Agreement (between Land Between the Lakes, State Historic Preservation Offices, Tribal Governments, and local community organizations) to streamline compliance with Section 106 requirements of the National Historic Preservation Act of 1966, as amended (NHPA). The Heritage Annual Report we complete each year summarizes compliance and program work as part of the agreement and can be found at the following link:

<https://www.landbetweenthelakes.us/stewardship/heritage/>

Heritage Resource Management Plan

Land Between the Lakes plans to develop an updated and viable Heritage Resource Management Plan. We made progress developing the trusting relationships needed to work together on the upcoming Heritage Resource Management Plan by completing projects with our partners in recent years. These partners included local and regional community members and groups, former residents and descendants, Heritage Programmatic Agreement consulting parties, our Tribal Partners, and Between the Rivers, Inc. We hope to sit down with our partners and develop a draft Heritage Resource Management Plan within the next two years.

Land and Natural Resources

Land and natural resources management at Land Between the Lakes benefits outdoor recreation and environmental education opportunities throughout the National Recreation Area. We focused on collaboration about land management with the Land Between the Lakes Advisory Board, Kentucky Heartwood, Tennessee Heartwood, Tennessee Sierra Club, and Between the Rivers, Incorporated during Fiscal Year 2016 into Fiscal Year 2017. We continue to maintain almost 7,000 acres of wildlife habitat through Special Use Permits with individual farmers, a Challenge Cost Share Stewardship Agreement with the National Wild Turkey Federation, and our local contract.

We completed habitat improvement and species monitoring as described under [Goal 5](#) in partnership with non-profit groups, governmental organizations, and local universities, including:

- Austin Peay State University
- Friends of Land Between the Lakes
- Kentucky Department of Fish and Wildlife
- Kentucky State Nature Preserves Commission
- Murray State University
- National Wild Turkey Federation

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- Tennessee Wildlife Resources Agency
- Tennessee Department of Environment and Conservation
- University of Tennessee at Knoxville
- U.S. Fish and Wildlife Service
- USDA Animal and Plant Health Inspection Service

We continue to serve on the Kentucky Prescribed Fire Council, which includes state, federal, non-profit, and private sector partners. These resource management partnerships help us share expertise, resources, and information on how to manage land and natural resources as effectively and efficiently as possible while working together with others.

Collaborative Working Groups

In order to successfully meet our mission we work formally and informally in collaborative groups. Sometimes they are topic specific, others are long term support teams. Over the years these included:

- **2017** Worked with Friends of Land Between the Lakes to begin a working relationship with the Southern California Mountains Foundation to improve the strength of our Friends group. Team travelled to Southern California to meet with Foundation leadership to forge this partnership.
- **2010-2017** Jointly promoted the USDA Forest Service at Paducah Regional Airport with Shawnee National Forest.
- **2010-2017** Jointly promoted public lands at the Stewart County Visitor Center with Fort Donelson National Battlefield, Cross Creek National Wildlife Refuge and Stewart County Chamber.
- **2016-2017** Founding member of the Land Between the Lakes Regional Water Trail. Partners include: Tennessee Valley Authority, Land Between the Lakes Association, U.S. Army Corps of Engineers, National Park Service, U.S. Fish and Wildlife Service, Tennessee Fish and Wildlife, Tennessee State Parks, Kentucky State Parks, and chambers of commerce and visitor bureaus in five Kentucky and ten Tennessee counties.
- **2014-2017** Founding member of the Lakes Region Coalition along with Tennessee State Parks, Kentucky State Parks, numerous area Chamber of Commerce and Tourism Boards.
- **2016-2017** Collaboration with Between the Rivers, Incorporated, Land Between the Lakes Coalition, Kentucky Heartwood, Tennessee Heartwood, Land Between the Lakes Advisory Board, and other members of the public on Fox Hollow Environmental Assessment.
- **2016-2017** Jointly worked with Rocky Mountain Elk Foundation concerning the unit's resident Elk herd.
- **2016-2017** Partnered with the State of West Virginia to move some elk from Land Between the Lakes for open release in West Virginia.

- **2016-2017** Continued partnership with National Wild Turkey Foundation to improve habitat.
- **2015-2017** Partner group of Habitat Managers: this group was formed to coordinate our land and natural resource management intentions using plain language in explanations, key messages, and more. This group meets quarterly and includes Murray State University, National Bobwhite Conservation Initiative, University of Tennessee Knoxville, U.S. Army Corp of Engineers, U.S. Army Fort Campbell, Fort Donelson National Battlefield, U.S. Fish and Wildlife Services National Wildlife Refuges – Clarks River, Cross Creeks, and Tennessee National Wildlife Refuge, Kentucky Department of Fish and Wildlife Resources, Tennessee Wildlife Resources Agency, Tennessee Division of Forestry, Central Hardwoods Joint Venture, The Nature Conservancy, Friends of Land Between the Lakes, Land Between the Lakes Sportsman Club and National Wild Turkey Federation.

Community Involvement

We continue to host a significant number of regional events and weekend programs that contribute greatly to visitation to the region. Some examples include weekend drag boat races, our Hummingbird Festival, Pickin' Party Old-time Music Festival, mountain bike races, equestrian events, civil war re-enactments, Snap Apple Night, Piney Campground Campers Fair, eagle viewing weekends and many more. We participate in safety days throughout the region. Since 2013 we have promoted our recreational activities and environmental education opportunities to military families at the June *Ft. Campbell Passport to Safety* event. We also distribute military passes and explain how they can be used to participate in our environmental education activities at no charge on weekdays. Smokey Bear continues to make appearances at various community events.

2017 Total Solar Eclipse

The largest event that took place at Land Between the Lakes over the past two years was the total solar eclipse on August 21, 2017. The unit laid within the path of totality and very close to the longest point of totality which occurred in Hopkinsville, Kentucky. The turnout of visitors was the largest Land Between the Lakes has ever experienced. Over 75,000 people from all over the United States and several foreign countries converged on Land Between the Lakes to take part in the event. Developed campgrounds, basic camping sites as well as dispersed camping areas filled to capacity. The extensive preparation for the event resulted in an extremely smooth and issue free weekend that the public thoroughly enjoyed. Land Between the Lakes collaborated with area communities to make certain that the Lakes Region put its “best foot forward.”



Figure 2.4: Child safely viewing the sun using glasses with solar filters

Capital Christmas Tree

The U.S. Capitol Christmas Tree stopped in Paducah, Kentucky on Monday November 21, 2016, and Tuesday November 22, 2016, as it made its way from Payette National Forest in Idaho to the U.S. Capitol in Washington D.C. A large community event showcased the tree in Noble Park. The Forest Service provided information tables about USDA Forest Service and the U.S. Capitol Christmas Tree, hosted meet and greet with Smokey Bear and Woodsy Owl, provided premade tree ornaments, and provided educational programs on trees and wildlife. Partners hosting the event included Choose Outdoors, Friends of Land Between the Lakes, USDA Forest Service (Land Between the Lakes National Recreation Area and Shawnee National Forest), Paducah Bank, Paducah Civic Beautification Board, Paducah Convention & Visitors Bureau, Paducah Hospitality Association, Paducah Parks & Recreation, and Paducah Power System.

Natural and Unnatural Events

Some of our strengthening ties to our communities came from working together in times of natural and unnatural events, often disrupting normal operations.

- **2016:** Flood event along with high water caused damage and clean-up along shoreline recreation facilities including major campgrounds.
- **2016:** During the week of July 2-8, 2016, Land Between the Lakes experienced several rounds of severe weather resulting in over 13 inches of rainfall. The severe storm event caused numerous downed trees property wide including damage to trails, facilities roads, and bridges.
- **2016:** Tornado event in Lyon County, Kentucky on July 6, 2016 required temporary closure of recreational opportunities at Birmingham Ferry and Cravens Bay.
- **2017:** Small high water event affected boat ramps.
- **2017:** Extremely high visitation in late August for the solar eclipse caused significant strain on facilities and resources.

Visitation

Transition Monitoring Question 40. What does visitation look like at Land Between the Lakes and its facilities? Indicators include Annual Visitation trends collected by campground registrations, back country and backpacking permits, traffic counters, and admissions to Environmental Education Facilities.

M Q2.3 Trends in visitation, levels of community participation

Land Between the Lakes hosts a significant number of regional events and weekend programs that continue to draw people to the area. Site and facility visits remained strong and continued to grow in the developed recreation areas. Attendance surged during 2017 due to the total solar eclipse crossing Land Between the Lakes.

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Land Between the Lakes overall visitation and facility visits increased in Fiscal Years 2016 and 2017. These increases indicate the public participated in direct activities more often. See Figures 2.5 through 2.9.

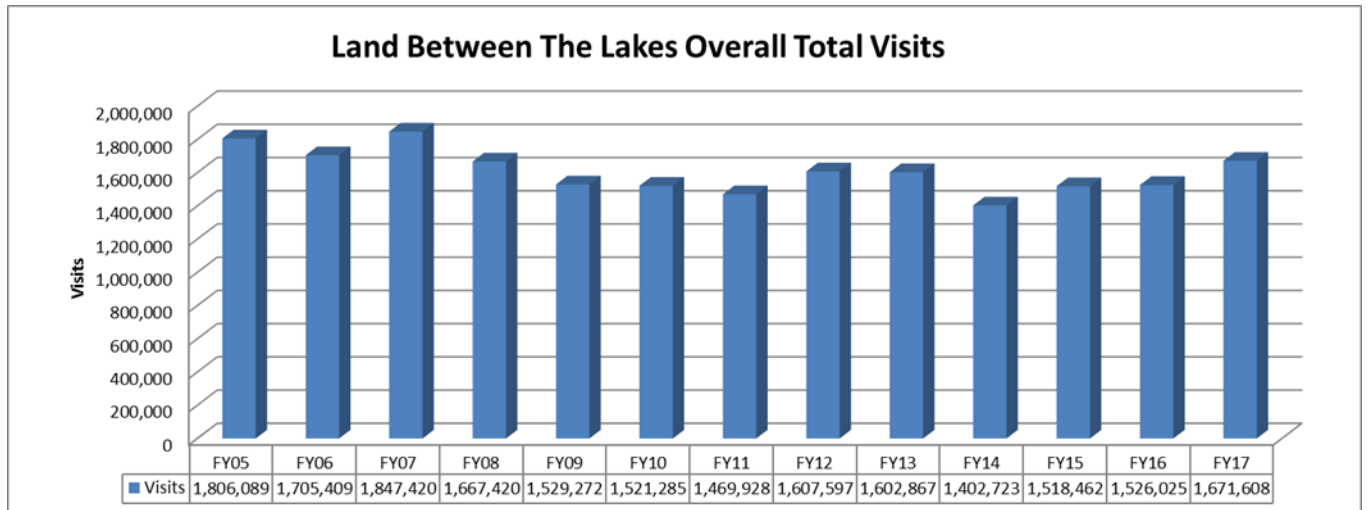


Figure 2.5: Visitation at Land Between the Lakes: Overall visitation derived from traffic counts

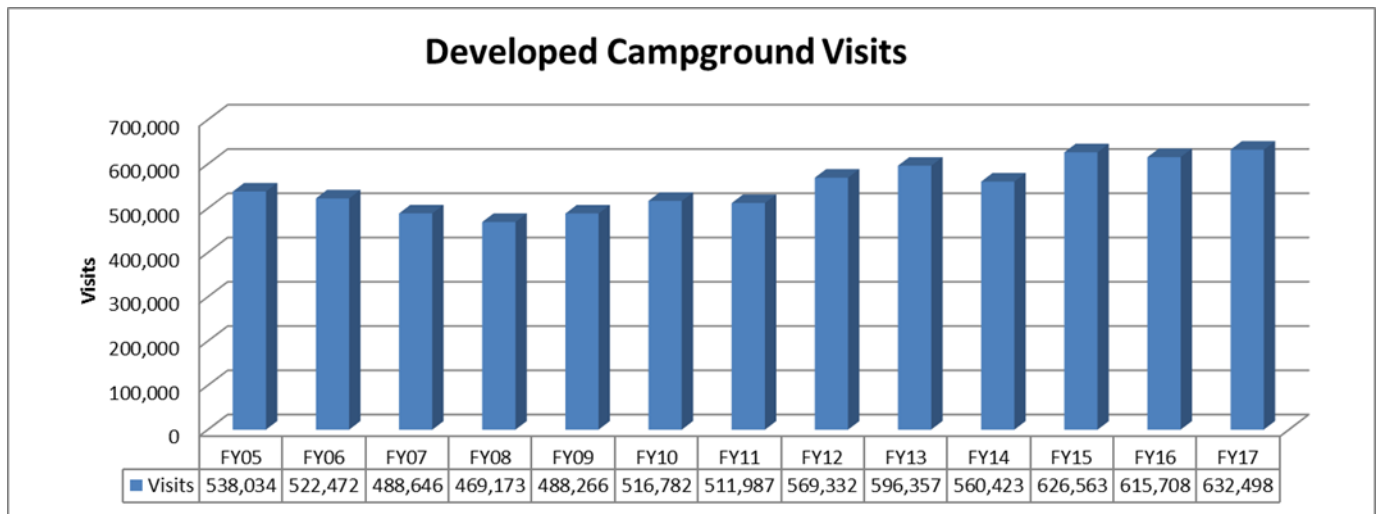


Figure 2.6: Recreation Dynamics (Source: Land Between the Lakes Reservation/POS system)

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Over the past five years, visitation at Land Between the Lakes remained higher than most regional destinations. See Figures 2.7 and 2.8.

Location [Calendar Year]	2012	2013	2014	2015	2016	5 Year Avg.
Hillman Ferry	263,132	233,410	253,624	258,046	262,254	254,093
Energy Lake	23,653	19,722	21,452	21,245	21,845	21,583
Wranglers	69,080	51,171	60,190	63,169	62,044	61,131
Piney	215,669	252,620	266,477	271,156	286,355	258,455
Basic Campgrounds	54,220	48,983	55,768	56,124	61,025	55,224
Land Between The Lakes	625,754	605,906	657,511	671,755	693,523	650,890
Great Smoky Mountains	294,000	253,000	288,000	290,161	338,524	292,737

Figure 2.7: Developed camping overnight usage comparison

Sources:

Recreation Dynamics (Land Between the Lakes Reservation/POS system)

Land Between the Lakes Traffic Counters

National Park Service Visitor Use Statistics <https://irma.nps.gov/Stats/>

Fiscal Year 2017

Visitors at Tennessee and Kentucky National Park Service facilities

Abraham Lincoln Birthplace NHP		Mammoth Cave NP		Cumberland Gap NHP		USDA FS Land Between The Lakes NRA [Fiscal Year]	
2012	169,515	2012	508,054	2012	853,998	2012	1,607,597
2013	163,928	2013	494,541	2013	768,363	2013	1,602,867
2014	241,264	2014	522,628	2014	879,934	2014	1,402,723
2015	148,605	2015	643,135	2015	840,601	2015	1,518,462
2016	252,495	2016	586,514	2016	820,387	2016	1,526,025

Stones River National Battlefield		Obed Wild & Scenic River		Great Smokey Mountain NP		Shiloh NHP	
2012	260,537	2012	212,446	2012	9,685,829	2012	587,620
2013	258,242	2013	198,367	2013	9,354,695	2013	536,206
2014	272,499	2014	215,767	2014	10,099,276	2014	409,086
2015	264,925	2015	214,441	2015	10,712,674	2015	356,535
2016	346,213	2016	231,390	2016	11,312,786	2016	421,862

Fort Donelson National Battlefield		Big South Fork NRR		Andrew Jackson NHS	
2012	284,762	2012	600,161	2012	51,261
2013	247,734	2013	565,063	2013	42,929
2014	262,317	2014	599,906	2014	42,863
2015	260,744	2015	643,135	2015	43,357
2016	259,343	2016	684,715	2016	45,937

Figure 2.8: Area National Park visitation comparison

Source: <https://irma.nps.gov/Stats/>

* Fort Donelson began major renovations on their visitor center in 2015

Source: <https://irma.nps.gov/Stats/>

* Fort Donelson began major renovations on their visitor center in 2015

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Environmental Education Participation

Staff continually examine participation at facilities where Environmental Education is deeply rooted at Land Between the Lakes. Visitation numbers for The Homeplace 1850s Working Farm and Living History Museum and Woodlands Nature Station grew in Fiscal Years 2016 and 2017.

Additional emphasis on advertising and developing new programs contributed to the growth.

Brandon Springs Group Center continues to struggle with outside variances that dramatically influence visitation. Challenges include school budgets and policies, rise in transportation costs, no internet connection to user groups who grew up on digital interactions, and other similar factors.

% Change from Previous Year													
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Participation/Visitation													
The Homeplace (% Change Admissions)		7	9	-2	4	-3	-8	9.5	-5.6	-16.9	14	1	20
The Homeplace (Admissions)	33,661	36,195	39,775	38,995	37,495	36,403	33,368	36,542	34,481	28,668	32,675	33,085	39,587
Woodlands Nature Station (% Change Admissions)		8	10	0	10	2	-7	7	-1	-7.9	9.3	9.8	10.2
Woodlands Nature Station (Admissions)	29,909	32,510	36,121	35,738	38,179	39,533	36,854	39,309	39,261	36,163	39,511	43,414	47,884
Brandon Sprig Group Camp (% Change Overnights)		9	2	-6	-4	-9	6	0	-6	-10	-4	14	4
Brandon Sprig Group Camp (Overnights)	16,444	17,950	18,343	17,281	16,624	15,182	16,084	16,078	15,064	13,576	13,043	14,878	15,512
Total	80,014	86,655	94,239	92,014	92,298	91,118	86,306	91,929	88,806	78,407	85,229	91,377	102,983

Figure 2.9: Environmental Education Facility Participation in Programs

Source: Visitation for The Homeplace and Nature Station are based on the point-of-sale or retail management system. Brandon Spring Group Center visitation is provided by the center's housing reports.

Basic/Dispersed Camping Permits Sold	
FY11	7,049
FY12	7,718
FY13	7,518
FY14	7,574
FY15	8,135
FY16	7,489
FY17	12,178

Basic and Dispersed Camping Permits

Online sales of basic and dispersed camping permits increased the number of permits sold. Fiscal Year 2017 was a record year for permits sold, likely due to the increased visitation associated with the total solar eclipse.

Figure 2.10: Camping Permits Sold

Fiscal Year 2017

Goal 3:	Utilize a variety of methods and opportunities to provide an Environmental Education message to every visitor.
Sub-element NFS Generic Desired Condition	“EE messages, information and principles will be incorporated into all projects on LBL through diverse cooperative, interdisciplinary efforts designed to potentially reach every visitor to LBL.” [Area Plan, Vision]
Example Area Plan Desired Condition Statement	<p>“EE will emphasize more non-facility-based messages, programs, and projects. The current EE facilities will remain hubs for expansion of the reach and effect of the EE programs and projects. EE programs will be integrated with recreation activities and will provide messages and information to recreational visitors that make them more aware of the importance of sustaining their environmental surroundings while participating in their desired activity.”</p> <p>“Self-guided loop trails, road pull-offs, viewing blinds, and EE messages in these areas (Nature Watch Demonstration Areas) will engage visitors with the natural environment. “EE will be an integral component of activities in the Oak Grassland Demonstration Areas. Visitors will be able to watch and learn about the application of various vegetation management practices used to restore native ecological communities.” [Area Plan, Vision]</p>
Desired Trend Statement	<p>“Ensure that 80% of LBL communications, programs, and activities have an interwoven EE message.” [Objective 3a]</p> <p>“An average of one to two user impact challenges will be addressed annually through EE.” [Objective 3b]</p>
Monitoring Questions	4. Has the FS made progress toward successfully changing behaviors as a result of EE experiences to visitors?
Area Plan Performance Measures	4. Trends in on-site visitor behaviors and visitor comment surveys.
Data Sources Utilized	--Summary of visitor information surveys or personal letters and notes received, project accomplishments, annual monitoring results, programs, and communication products completed
Importance	This goal contains one of the key emphases of the LBL Protection Act and reinforces the key purposes described for LBL when created in 1963. Effective delivery of conservation education messages is also a primary objective of both LBL and the agency.
What It Tells Us	The results related to this goal will provide key information about whether LBL is meeting its legislated objectives.

Fiscal Year 2017

Goal 3: Utilize a variety of methods and opportunities to provide an Environmental Education message to every visitor.

In 2007, our Master Plan for Environmental Education was completed and signed. It has influenced our efforts since then, guiding us through goals, objectives, and action items.

There are many avenues for visitors to receive conservation messages as they enjoy Land Between the Lakes. The overarching environmental education program for incorporating environmental educational messages into visitor experiences is called “Respect the Resource.” It is a theme based message campaign focused on helping visitors understand their role in protecting the very resources they come to enjoy.

Any time a resource management project is implemented on the ground, we look for an opportunity to explain the conservation goals of the project, and enlist the cooperation of visitors to comply with temporary disruptions in activities in order to accomplish the goals of the project(s). Projects include labeling restored areas and active restoration projects that may temporarily restrict access at Turkey Bay. Other opportunities at Turkey Bay continue to be relevant such as the “Ride 4 Keeps” message of sustainability, the Turkey Trot Trail children’s riding and learning area. The program helped communicate messages about prescribed fire and management for threatened and endangered species also. Other environmental education programs encouraged people to plant native plants at home, consider organic gardening, build bluebird and bat roosting boxes, and turn their yards into backyard habitat for monarch butterflies, birds, bats and other wildlife. In 2017, Land Between the Lakes received a microgrant from the region to improve and expand pollinator gardens and messaging. We design our programs so visitors can apply what they learn at Land Between the Lakes to their homes and communities.

Q3.4 Has the Forest Service made progress toward successfully changing behaviors as a result of Environmental Education experiences to visitors?

Transition Monitoring Question 43. How has Environmental Education become an integrated program targeted at helping individuals become aware of their relationship with natural and cultural resources while supporting stewardship of these resources through individual visitor action? Indicators include the amount of interpretation and environmental education opportunities provided through Schools, Special Events, Outreach, Volunteer Activities, and Facilities.

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. Trained interpretive staff provide

periodic programming at the campgrounds and host training sessions for campground interns and apprentices.

Our customers' unsolicited ratings continue to reflect their high level of satisfaction.

Fire Prevention Teams

Excessive rainfall in July 2016 led to substantial vegetation growth across Land Between the Lakes National Recreation Area. This vegetation growth increased fuel loading. Land Between the Lakes recorded historic fire indices. We bolstered our initial attack and fire prevention capabilities with additional fire personnel. Fire prevention technicians and fire fighters made over 400 personal contacts with visitors during a three week period. They suppressed 57 abandoned campfires. Land Between the Lakes educated visitors and the surrounding communities about the fire danger using local media interviews, highway signs, and flyers. No wildfires resulted.

The Land Between the Lakes National Recreation Area anticipated increased visitation associated with the total solar eclipse of 2017. With increased visitation the level of risk to our visitors rises. A National Fire Prevention Education Team assisted Land Between the Lakes staff to proactively manage safety of visitors during late August 2017. They developed and distributed materials to increase the public awareness and reduce human caused ignitions in relation to the eclipse.

The sociological benefits of positive public messaging extends beyond a simple fire prevention message. Visitors remember the solar eclipse for the rest of their lives. They also remember the fire prevention messages, Smokey Bear banner, sticker, and poster they received. This has the impact to change human behavior. The outcome reduces human caused ignitions and ultimately influences firefighter exposure, saves suppression dollars, and has the potential to save human lives.

Environmental Education

Woodlands Nature Station continues to serve as a Mission Site for Discovery Agents, which is an electronic game for young visitors. Roadside signs along Highway 68/80 that were installed in 2015 to encourage visitors to stop and explore nature were duplicated in the large campgrounds to encourage campers to explore other areas of Land Between the Lakes.

Other messages and opportunities include our Environmental Education Facilities: Brandon Spring Group Center, The Homeplace 1850s Working Farm, Golden Pond Planetarium, Woodlands Nature Station, the Elk & Bison Prairie, North & South Welcome Stations and Golden Pond Visitor Center. The visitation for these facilities is shown later in this section in Figure 3.11. Student and other groups can schedule visits and programs here. Our day use facilities are open to the public with The Homeplace 1850s Farm and Woodlands Nature Station offering special events on one weekend each month from March through November. We combine events with special theme months such as Homeschoolers' Month and Hummingbird Month. We also outreach to libraries, pre-schools, and senior centers.

Volunteers:



Figure 3.1: Volunteers picked up trash during Public Lands Day.

Volunteers demonstrate their enthusiasm for Land Between the Lakes year round by supporting Forest Service staff at the campgrounds, Brandon Spring Group Center, Homeplace 1850s Working Farm, and Woodlands Nature Station. Some volunteers participate by pulling weeds, picking up trash, rebuilding trails, building bird and bathhouses, conducting wildlife surveys and habitat improvement, helping with communications, and supporting business operations. Volunteers absorb and experience environmental messages first hand throughout their time at Land Between the Lakes performing all of these activities. They contributed over 100,000 hours of time most years, totaling over 1.4 million hours over 13 years.

<u>Year</u>	<u>Volunteer Hours</u>
2017	118,508
2016	122,134
2015	97,113
2014	115,027
2013	112,447
2012	108,346
2011	103,189
2010	123,579
2009	106,824
2008	112,827
2007	92,014
2006	93,047
2005	104,686

Figure 3.2: Volunteer Hours

Woodlands Nature Station

The [Woodlands Nature Station](#) provides an ongoing menu of activities and special events throughout the year from March through November. The emphasis is on our relationship with nature and how our actions impact the environment upon which we depend. This facility interprets the native plants and animals that make Land Between the Lakes unique and helps positively shape visitors' behaviors.



Figure 3.3: Hummingbirds on Feeder, Staff Photo

To draw over 51,000 visitors per year back into the woods in Fiscal Year 2017, the Nature Station hosts forty native wildlife exhibits. The wildlife are all rescued and we incorporate their conservation story into every program. Unique elements of the backyard wildlife demonstrations include 200 hummingbirds a day during the summer, an active maternity colony of little brown bats, monarch way station, and 170 documented birds. Native plants thrive in gardens among the exhibits.

In July of 2016 and 2017, we provided an up-close look at birds, bugs, snakes, turtles, and more during [Cool Critters Day](#) at [Woodlands Nature Station](#). Visitors experienced live tropical birds up-close, posed for pictures with a snake, touched a tarantula, and stared down a snapping turtle. A variety of live animal programs and exhibits, as well as kids' games, crafts, visits from Smokey Bear, and other animal-inspired activities were available throughout the day.

[Woodlands Nature Station](#) hosted their annual [Hummingbird Festival](#) in August 2016 and 2017. Ruby-throated Hummingbird migration peaks for Land Between the Lakes National Recreation Area in August. Up to 200 hummingbirds visit our feeders in a single day. This festival provides a fun atmosphere for people to see and learn about these powerful birds. Highlights include hummingbird banding demonstrations, a wildlife art show, staff-led programs, a native plant sale, live animal encounters, local wildlife experts, activities for kids and a special evening "Dinner

with the Hummingbirds” where a limited number of participants enjoy an outdoor catered dinner among the Hummingbird Feeders.



Figure 3.4: Get up close and personal with some cool critters at Woodlands Nature Station



Figure 3.5: Natural History Educational Company of the Midsouth with Black-headed Python

Homeplace 1850s Working Farm and Living History Museum

The [Homeplace 1850s Farm](#) offers more than a glimpse into the past. It transports visitors through time to compare life today with that in the 1850s. Heritage crops and domesticated animals are used to demonstrate the seasonal chores and celebrations that were commonplace in the past in this region.

[Children’s Day on the Farm at the Homeplace](#) program in May allows children to step back-in-time and try farm chores and play in typical fashion for children in the 1850s. This day contains programs representative of the daily programs offered at the Homeplace.



Figure 3.6: Homeplace 1850s offers fun for all ages.

Children learned the importance of chores on an 1850s farm. These chores include making a bed, weaving, and attending an 1850s school. They also learned how to work mules and oxen at teamster training. Children earned credits for their hard work that were used at the Children's Day General Store for 1850s-style goodies or to play with 1850s-style games and toys. The Homeplace hosts Home Educator month in September each year with special activities to encourage this group to take advantage of age appropriate history lessons.

Golden Pond Planetarium and Observatory

The [Golden Pond Visitor Center](#) provides information and orientation for all of Land Between the Lakes National Recreation Area, contains the Planetarium & Observatory and sells passes, basic and dispersed camping permits and gift shop items. Interpretive exhibits explain the human history of this area and our interaction with nature. The planetarium offers shows multiple times during the day. Special observatory programs occur seasonally. During the summer, astronomers from the West Kentucky Amateur Astronomers, <http://wkaa.net/>, volunteer and host night sky viewing using their telescopes. On August 21, 2017 the visitor center hosted over 1,700 visitors that came to experience the total solar eclipse.

Elk & Bison Prairie



Figure 3.7: Bugling elk; photo by Sherry Bailey

The [Elk & Bison Prairie](#) provides native grassland habitat common in Kentucky more than a century ago. Elk and bison roam freely within this 700-acre enclosure. Visitors travel in their enclosed vehicle via a 3.5-mile paved loop road. Numerous other wildlife species such as wild turkeys, a variety of birds, small game, butterflies, and prairie mammals also find sanctuary in the Elk & Bison Prairie. This exhibit offers different experiences each season. In the spring visitors may see newborn calves and in the fall visitors may hear the elk bugling.

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Brandon Spring Group Center

Brandon Spring Group Center provides the opportunity for more immersion into nature by eliminating the need to rush away. Students stay in the dormitories, and have time to visit our day use facilities, take a night hike, have a campfire program, and navigate a trail with compass or GPS. Other opportunities include a pond prowler or stream stroll, pontoon boat rides, canoe excursions, swimming, field sports, and outside study. In Fiscal Year 2016, the staff at Brandon facilitated 590 programs for 9,285 students and in Fiscal Year 2017, they did 548 programs for 8,287 students.

Figure 3.8: Exploring a stream ecosystem

Figure 3.9: Brandon Spring Programs and Visitation		
Fiscal Year	Number of Programs	Number of Students
2010	482	6,744
2011	461	6,853
2012	585	8,527
2013	570	8,726
2014	585	8,529
2015	534	8,150
2016	590	9,285
2017	548	8,287

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Programs Highlights and Messages for our General Visitors

Land Between the Lakes staff offer interpretive programs tied to academic standards for school groups that align with their respective state requirements. The following tables depict our general programming. This may include some school topics.

Nature Station Program/Activity	Frequency	Environmental Education Message/Take-a-way
Parade of Raptors	Daily	Owls and Hawks Increase knowledge of species Habitat needs Highlight endangered species
Cool Critters Day	Annual	Bats, reptiles, and insects Community information booths, tours, and special programs Increase appreciation for these species and the role they play in our environment – pest control, pollinators, etc.
Wolf Week	Annual	Centered on our pair of red wolves in the Red Wolf Recovery Project and their new pup born in May of 2014 Focus around habitats and causes for declining species
Howl-O-Ween	Annual	Focuses on various native animals found in the forests in a fun learning atmosphere catering to young children focuses on friendly forest attitudes and introduction to wildlife
Scout, Homeschool, and Jr. Forest Ranger Days	Multiple	Multiple events designed to encourage adult mentors (parents/teachers/leaders) to work with youth on various environmental topics April is Homeschool Month
Hummingbird Festival and Month	Annual	Weekend celebration of humming birds and pollinators Multiple partners help with bird banding, demonstrations and other activities Focus on migratory birds, habitat needs, preparation, etc.
Eagle Tours	Annual	Two-month window for viewing eagle nesting Conduct van and boat tours
Wildlife tours	Multiple	Focus on plants and animals along water and hiking trails in certain areas
Nature and Wildlife special events	Multiple	Special events often introduce visitors to our forests and wildlife Fall Frolic, Spring Break Week, Wildflower Celebration, Summer Finale, Birding Bonanza, and more
Backyard plants and animals	Daily	Focus on native wildlife, their habitats, eating habits, and needs teaches backyard gardening for pollinators and native plants

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The Homeplace Program/Activity	Frequency	Environmental Education Message/Take-a-way
Period Celebrations and Demonstrations	Multiple, Annually and Daily	Includes various celebrations and demonstrations that teach about life in the 1850s including handcrafts, stove cooking, music, quilt making, agriculture, woodworking, etc. These historic and cultural demonstrations tie people to the land; linking the past to the present. Visitors compare and contrast the use of the land and natural resources in the 1850s with modern times.
Civil War Program	Annual	Ties into the Civil War heritage of the area provide historical presentations around Ft. Henry work with Fort Donelson National Battlefield
Old-time Music Festival	Annual	Focus on music of the area including blue grass encourages people to bring instruments for jam sessions
Independence Day Celebration	Annual	Focus on historical times through an entertaining Chautauqua sponsored by the Kentucky Humanities Council and the National Endowment for Humanities
Children's Day	Annual	Helps children experience childhood in the 1850s through interactive play and chores washing, sewing, gardening, and ball games
Sheep Shearing	Annual	Conservation; all about use of wool, from sheep to shawl
Cooking and gardening	Multiple	Garden to table demonstrations; conservation measures and heirloom plants
Scout/Homeschool	Multiple	Multiple events designed to encourage adult mentors (parents/teachers/leaders) to work with youth on various historical activities April is Homeschool Month
Period Programs	Multiple	Various events like Sundays in the parlor, blacksmithing, and Arts & Crafts Fairs focus on historic people, families, and economics of the times
Heritage Breeds	Daily	Focus on the breeds of then to now care and feeding daily program animals as workers
Farm Activities	Daily	Farm techniques and original organic living off the land

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Planetarium & Observatory Program/Activity	Frequency	Environmental Education Message/Take-a-way
Planetarium Shows	Daily	Various 45-minute shows about the moon, sun, planets, stars, basic science, earth sciences, and space exploration. These full motion videos show the connection to space, weather, and our daily lives
Star Parties	Multiple	Night sky Allow visitors to look through powerful telescopes and interact with astronomers from West Kentucky Amateur Astronomers www.wkaa.net
National Astronomy Day	Annual	Sun Teach visitors about telescopes and binoculars for looking into space Talk to astronomers Family activities Powerful telescopes to view the sun
Night Sky	Daily	Help visitors recognize star patterns, planet positions, etc.

Elk & Bison Prairie Program/Activity	Frequency	Environmental Education Message/Take-a-way
Self-guided Tour and Displays	Daily	Focuses on wildlife and natural resource management in a prairie environment Focuses on songbirds, turkeys, prairie birds, reptiles, pollinators, wildflowers, and native grasses in addition to elk and bison
Celebration	Annual	Offers free access and interpretive stations and community wildlife booths Prairie ecosystem
Brandon Spring Group Center Program/Activity	Frequency	Environmental Education Message/Take-a-way
	Overnight Groups Only	
Water Activities	As requested	Provide various water activities centered around safety, habitats, watersheds, and water quality Lake and stream
Land Activities	As requested	Focus on habitats, wildlife, plant/tree identifications, prescribed fire, ecosystems, and natural resources using activities like orienteering, survival skills, night hikes, beaver programs, and animal adaptations
Team Building	As requested	Activities built to strengthen team productivity in an environmental framework with certified instructors

Figure 3.10: Table of educational programs and activities at environmental education facilities

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Program Participation

Environmental Education Facilities are the heart of our environmental education efforts to reach students and families. Brandon Spring, The Homeplace 1850s Working Farm, Golden Pond Planetarium, Woodlands Nature Station, the Elk & Bison Prairie, North & South Welcome Stations and Golden Pond Visitor Center's visitation is shown in Figure 3.11. Student and other groups can schedule visits and programs at the first four.

Many visitors get their message at one of our three visitor centers (North or South Welcome Station, and Golden Pond Visitor Center) where they can get basic and dispersed camping or OHV passes and information about all of the facilities and opportunities here at Land Between the Lakes. The past two fiscal years saw an increase in participation, possibly attributed to the promotional campaign surrounding the 2017 solar eclipse. Promotions began in 2015. Our facility based education programs continue to grow in popularity as we make every effort to keep them relevant to our schools and other groups. Our programs are correlated to Tennessee and Kentucky state education standards which continues to be well received by teachers. Programs are continuously evaluated by staff and teachers in order to offer the best experience possible. Word of mouth regarding the program experiences also helped build program attendance. Expanded offerings of outreach programs (taking some of our programs to audiences that cannot visit Land Between the Lakes), and improved opportunities such as birthday parties, helped also. Staff at Nature Station currently work with the River Discovery Center in Paducah to provide recurring river themed programs for schools visiting the Center.

Figure 3.11: Visitation at Facilities for FY12 through FY17

Facilities and Contacts	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17
<u>Brandon Spring Group Center</u>						
# attended	7,157	6,450	5,880	5,416	9,285	8,287
# overnight stays	16,078	15,064	13,576	13,053	12,862	13,495
Groups	109	106	89	76	76	81
Programs	585	570	580	534	590	548
<u>Woodlands Nature Station</u>						
# attended	44,764	37,537	35,718	35,813	43,976	51,003
# off site	511	128	624	1,612	2,107	1,278
Students	6,561	5,568	5,325	3,698	4,032	4,433

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Figure 3.11: Visitation at Facilities for FY12 through FY17 (continued)

Facilities and Contacts	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17
<u>Golden Pond Planetarium & Visitor Center</u>						
Visitors	71,258	70,098	70,219	71,551	80,332	97,355
# attended shows	19,034	20,321	17,453	17,742	22,884	30,158
Students	2,909	3,487	2,680	1,093	2,692	4,907
<u>Homeplace 1850s Working Farm</u>						
# attended	37,791	30,999	26,938	30,735	31,979	40,498
# off site	782	120	60	0	425	225
Students	5,901	4,863	3,656	1,940	4587	4393
<u>Elk & Bison Prairie</u>						
# of visitors	84,415	83,115	77,010	108,085	92,920	148,927

Teacher Appreciation Weekend

Teachers received free general admission to the [Homeplace 1850s Working Farm and Living History Museum](#), [Golden Pond Planetarium](#), and [Woodlands Nature Station](#) during the annual Teacher Appreciation Weekend. Current and retired teachers, home educators, and their immediate families qualified for free entry. We invited teachers and their families to visit our day-use facilities, see what we have to offer, and pick up an educator resource packet. Our environmental education programs encourage critical thinking and hands-on learning about nature, history, and space.

Fee Free Days and Free Pass Entries

Many sectors of society are encouraged to come to our facilities with special passes. These include the America the Beautiful Military, Senior, and Access passes and the Every Kid in a Park 4th Grade passes. We offer fee free days throughout the year, including special days for veterans and educators. We tracked free admissions in Figures 3.12 and 3.13 for Fiscal Years 2016 and 2017. These days included Veterans Day, National Public Lands Day, Get Outdoors Day, Martin Luther King, Jr. Day, and Presidents' Day. We also offer free entry to the Nature Station, the Homeplace 1850s Farm, and the Golden Pond Planetarium for military families and their guests. Over 10,000 visitors took advantage of the programs described here.

Land Between the Lakes once again participated in the [Every Kid in a Park](#) initiative that started in September of 2015. Fourth graders earn a special 4th Grade Pass by completing activities on-line

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or with their class. They print paper passes which can be redeemed for a hard plastic card to gain free admittance to Woodlands Nature Station and/or The Homeplace 1850s Farm. They can get their whole family in for free through the August following their 4th grade year. Also, all National Parks, and other federally managed public lands offer this program. Visit <http://everykidinapark.gov/>. Nationwide promotion of the Every Kid in a Park initiative resulted in a dramatic increase in 4th graders and their families taking advantage of the free opportunity. Less than 100 visitors using this 4th Grade Pass came to Woodlands Nature Station or The Homeplace 1850s Farm in 2015 compared to 1,428 visitors in 2017.

**Figure 3.12: Free Admissions
Fiscal Year 2016**

Free Admission	Nature Station	Homeplace	Planetarium
Adults	1,035	895	NA
Children	3,729	1,951	NA
Military Adults	367	267	NA
Military Children	235	120	NA
4 th Graders	325	264	NA
4 th Grader Adults	368	341	NA
4 th Grader other	281	270	NA
TOTAL: 10,448	6,340	4,108	NA

**Figure 3.13: Free Admissions
Fiscal Year 2017**

Free Admission	Nature Station	Homeplace	Planetarium
Adults	1,283	589	NA
Children	3,872	2,323	NA
Military Adults	308	296	NA
Military Children	148	150	NA
4 th Graders	229	140	NA
4 th Grader Adults	353	278	NA
4 th Grader other	229	199	NA
TOTAL: 10,397	6,422	3,975	NA

Campground Programs

Piney and Hillman Ferry Campgrounds offer educational programming during the summer months. The Homeplace and Heritage staff provide programs at Piney Campground's Campers Fair. Our Junior Forest Ranger program is well received in the campgrounds, particularly at Piney and Energy Lake. Children can learn about Land Between the Lakes' natural and cultural history to become a Junior Forest Ranger and earn a patch.

Field Trip Grants

The Field Trip Grant Program for Title I schools was managed by our friends group, Friends of Land Between the Lakes. Monies from the Trust Fund, from national initiatives such as More Kids in the Woods, and grants and donations brought over 19,000 students to our facilities over the past ten years. See Figure 3.14. This program brings the underserved to our recreation area to experience nature through hands on programs designed to enhance classroom teaching, giving them new experiences they will always remember. The Friends of Land Between the Lakes raised more money in 2017 which allowed several more students to participate in Environmental Education Programs at Land Between the Lakes. Based on the number of applicants, most groups received a slightly higher allocation to offset expenses associated with their trip.

Fiscal Year	Schools/Groups	Students	Total \$ allocated
2006	16/19	1,249	\$13,078
2007	17/21	1,444	\$13,078
2008	21/32	2,493	\$12,580
2009	20/25	1,983	\$16,123
2010	22/24	1,771	\$17,271
2011	22/24	2,121	\$18,124
2012	26/29	2,380	\$19,846
2013	15/15	1,388	\$16,124
2014	19/26	2,062	\$14,129
2015	16/19	2,125	\$10,262
2016	18 schools	2,342	\$17,370
2017	18 schools	2,455	\$26,359

Figure 3.14: School grant program funding

Heritage Education

Land Between the Lakes uses a variety of methods to educate the public about local heritage and heritage stewardship both at Land Between the Lakes and out in the community.

Heritage Education on the Landscape. One of the most effective ways to educate, and to learn, about the local heritage is through educational interpretive displays on the landscape. Whether a visitor searches out the information or just happens upon it, the public seems to enjoy our on-the-ground

educational installations. The Golden Pond Interpretive Overlook, overlooking the site of the former town of Golden Pond, KY, was a collaborative effort between Land Between the Lakes and the former residents of Golden Pond. Interpretive panels border a large map of the town inscribed into a large concrete pad to explain the people, places, events, and lifestyles of the town through time. The Overlook was completed and dedicated on October 22, 2016.



Figure 3.15.Visitors admiring the Golden Pond Interpretive Overlook on day of dedication.

In addition to the overlook trail, Land Between the Lakes also offers the Iron Furnace Interpretive Trail at Center Furnace (which includes several interpretive signs, displays, and a kiosk, discussing the local iron industry), the Hillman Heritage Trail (also with a multitude of interpretive signs discussing the heritage of the Hillman Ferry area), and the Fort Henry Trail System (which travels along earthwork fortifications built by the Confederate Army during the Civil War prior to an attack by U.S. Grant).

The 2016 and 2017 Heritage Geocache Challenges also involved heritage education that incorporated outdoor recreation. At each geocache location, information was provided about the historical significance of the area and visitors were incentivized to visit all of the Heritage Geocache locations by receiving a Challenge Coin after completing the challenge.

Another landscape-sized education project completed in Fiscal Year 2017 was the installation of marker posts at every known church and school location on Land Between the Lakes. These markers allow visitors to understand more about the history of the area as they explore the recreation area. In the 2015 Monitoring and Evaluation Report, we reported members of the

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communities worked with us to install 90 church and school marker posts and had nine posts left to install. Three more markers were installed in 2016 and the final six were installed by the Heritage Program in 2017, completing the installation process for the known churches and schools. When the Heritage Program staff notice markers knocked down or discolored due to the growth of lichens and moss, we repair and clean the markers as soon as possible.

Heritage Education Online. Occasionally throughout the year, staff members of the Heritage Program write blog posts about interesting heritage topics at Land Between the Lakes. In Fiscal Year 2017, the Heritage Program wrote posts on the dedication of the Golden Post Overlook, the excavation of, and heritage behind, a historic mill stone found eroding out of the lake edge, and the varieties of daffodils found growing at historic homesites across Land Between the Lakes.

Heritage Education through Speaking Events. Staff members of the Heritage Program speak publicly to organizations in the surrounding community. In Fiscal Years 2016 and 2017, the Heritage Program spoke to campers at Piney Campground, the Trigg County Rotary Club, Trigg County Intermediate School, Murray State University students, Callaway County Genealogical and Historical Society, and the Stewart County Historical Society.

Heritage Education through Collaboration with Partners. The Heritage Program finds it productive to work with partner organizations to provide heritage education opportunities to the public. In January of 2017, in preparation for the anniversary of the Twin River's Campaign of the Civil War in which the battles for Fort Henry and Fort Donaldson took place, the Heritage Program accurately mapped the earthwork fortifications located on Land Between the Lakes and then provided that data, along with maps previously unseen by Fort Donaldson Interpreters, to staff members of Fort Donaldson National Battlefield. Staff members from Fort Donaldson then presented an on-site program to the public at the Fort Henry Trail System for the anniversary. The Heritage Program has also partnered with Murray State University to provide fieldwork experience and research opportunities to Murray State students.

Nature Watch Demonstration Areas

2017 Woodlands Nature Watch Area received attention this year during the planning phases for Hematite Trail restoration. Members of Trails Unlimited (Enterprise Team) conducted site surveys for the eventual replacement of the existing boardwalk. See the discussion in Goal 7 for details.

Our easy trail system around the Woodlands Nature Station offers hiking for novices and families. The trails include Long Creek, Hematite, Woodlands Walk, and Honker. These allow visitor access into the woods without getting too far from civilization -- a benefit to many people who visit the recreation area.

Oak Grassland Restoration Demonstration Areas

We continue to demonstrate land and natural resource management practices in both our north and south Oak Grassland Restoration Demonstration Areas with 8,630 combined acres. In both areas we seek to promote an understory of native grasses and wildflowers created by opening up the

canopy in our oak/hickory forested areas. We manage the open lands within the oak grassland areas. This ecosystem, with its abundant plants, seeds, and insects, heartily supports wildlife.

The two oak grasslands also support studies on forestry, natural resources, environment ecosystems, and habitat management. The southern area surrounds the Homeplace 1850s Working Farm and operates as an oak grasslands classroom for forestry and wildlife students from the University of Tennessee at Knoxville. The students are studying land management practices on oak grasslands that include the effects of fire on native wildlife and their habitats. The northern area lies north and east of the Elk & Bison Prairie. Austin Peay State University in Clarksville, TN and Murray State University in Murray, KY use the area for various wildlife and environmental studies including research on reptile and amphibian populations.

Kentucky Association for Environmental Education Excellence Awards

The Kentucky Association for Environmental Education recognized the outstanding achievements of individuals, organizations, agencies, community efforts, schools and businesses in the field of environmental education. To be eligible for an award, each nominee demonstrated exemplary service to the field of environmental education in Kentucky. One local recipient was Woodlands Nature Station Naturalist Tim Johnson who received the outstanding new interpreter award. Woodlands Nature Station serves as a hub for nature viewing at Land Between the Lakes.

M Q3.4. Trends in on-site visitor behaviors and visitor comment surveys.

Respect the Resource

A success story surrounds our Respect the Resource program. On the advice of our Advisory Board in 2003, we established this environmental message and used it throughout many campaigns. As a result we continue to observe changing behaviors. See the introduction to Goal 3 above for more details.

- **Turkey Bay Off-Highway Vehicle Area:** the staff continues to promote the local “Respect the Resource” and regional “Ride 4 Keeps” interpretive messaging when advocating responsible OHV use on public lands. During Fiscal Years 2016 and 2017, off-highway enthusiasts continued to respect boundaries established around a known bald eagle nest in



Figure 3.16: Eagle nest in Turkey Bay in winter Fiscal Year 2014

Turkey Bay. While no confirmed fledglings were documented, temporary fencing and interpretive signage were installed to protect the nest and known perch trees in the immediate area. Members of the Southern Four-Wheel Drive Association (SFWDA) sponsored a “meet-and-greet” trail ride in conjunction with the 2016 volunteer cleanup day at Turkey Bay. A high-school cross-country team and coaches volunteered during the 2017 cleanup day, some of whom

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had never heard of Turkey Bay. These opportunities along with implementing wet weather trail closures, maintaining the youth-only riding trail, and conducting informal visitor interactions continue to serve as measures to proactively communicate ethical and responsible riding behaviors.

- **Recycling Program:** Respect the Resource also reinforces our recycling program at campgrounds and day-use facilities. Our recycling program kept 24,090 pounds and 25,812 pounds of recyclables out of landfills in Fiscal Year 2016 and Fiscal Year 2017 respectively. Some visitors use re-usable water containers instead of disposable water bottles. Visitor facilities offer water fountains with bottle fillers. The bar chart in Figure 3.18 illustrates the amount of plastic, aluminum, glass, and batteries accounted since Fiscal Year 2009. Figure 3.19 shows all of the material recycled in Fiscal Years 2016 and 2017. We received a \$750 grant to purchase a loading dock plate to allow heavy equipment to drive into the cardboard recycling trailer. Land Between the Lakes also received a \$2,700 microgrant to improve the safety and effectiveness of the glass recycling efforts. We created a glass container holding area that allows a longer accumulation time for glass bottles which will then be handled only by heavy equipment. It will also allow us to haul more glass in fewer trips to the recycling area. The glass is utilized by a local company that grinds it into material used in sandblasting.



Figure 3.17: New Glass bottle collection area paid for with Region 8 microgrant

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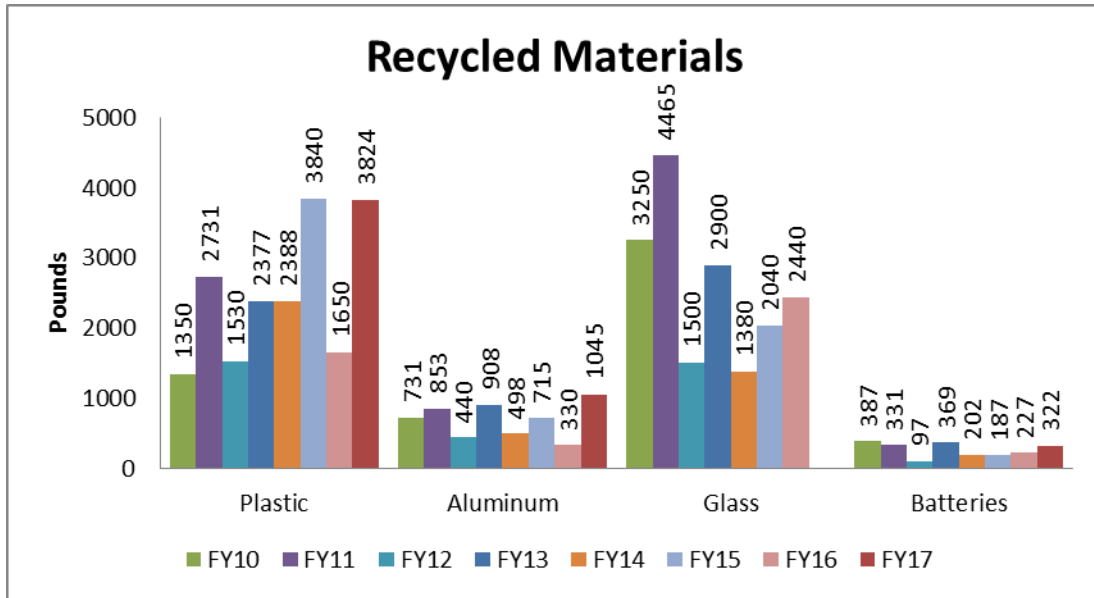


Figure 3.18: Recycled materials from Land Between the Lakes

Figure 3.19: Recycled Material Amounts		
Type	Pounds in FY16	Pounds in FY17
Plastic Bottles	1,650	3,824
Aluminum Cans	330	1,045
Glass	2,440	Holding
Scrap Metal	11,374	690
Batteries	227	322
Fishing Line	Holding for recycling	Holding for recycling
Cardboard	3,136	11,629
Paper	2,842	7,309
Electronics	2,091	1,043



Figure 3.20: Fishing line collection tube at pier

• **Fishing Line Collection Tubes:** In fiscal year 2005 our Youth Conservation Corps student enrollees and other volunteers installed fishing line collection tubes to protect wildlife in popular fishing areas. These tubes continue to collect unwanted fishing line in 2017. Volunteers maintain the tubes by emptying them and keeping them in good repair. One un-intended effect of this program is that visitors place other recyclable materials in the tubes which is easily sorted out for recycling. To date we recycled 52 pounds of monofilament with another 15 pounds waiting to be shipped. In addition, area state parks also installed their own tubes modeled after our conservation efforts to respect the resource.

Ride 4 Keeps

Turkey Bay Off-Highway Vehicle Area: We use the Ride 4 Keeps regional initiative to help to reinforce that rider behavior serves as the key to keeping the area available for motorized recreation. Staff observed this helped our riders to be safer out on the trail. Our four key points include:

1. Keep it Safe.
2. Keep it Legal.
3. Keep on Trails.
4. Keep the Privilege.

Backyard Habitat

Other environmental education programs continue to encourage people to plant native plants at home, consider organic gardening, build bluebird and bat roosting boxes, and turn their yards into backyard habitat for monarch butterflies, birds, bats and other wildlife. Native plant sales were held at several events this year. We have partnered with a small local nursery that grows native plants from seed or cuttings taken from the native gardens at the Nature Station. Our programs are designed so that visitors can apply what they learn at Land Between the Lakes to their homes and communities. Several more bat roosting boxes were installed by Eagle Scouts working with Nature Station staff. This ongoing opportunity provides roosting habitat for several bat species and encourages more natural insect control in several recreation areas. Land Between the Lakes received an \$1800 micro-grant from the region to enhance several pollinator gardens at Woodlands Nature Station, Golden Pond Visitor Center, Brandon Spring, and the South Welcome Station.

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Recognition and Awards

Two recognitions stand out from the last couple of years at Land Between the Lakes. The first was the 2016 USDA Forest Service Regional Forester Volunteer Service Individual Award. This volunteer service award was given to a long time recreation volunteer who assists with fleet management and recreation facility patrols. The second was TripAdvisor's Certificate of Excellence received in 2016 and 2017. This recognition was given to Land Between the Lakes for receiving 4 star ratings or better on Trip Advisor places for families to visit.

Online Reviews and Comments

Trip Advisor – Fiscal Year 2016 and Fiscal Year 2017

Certificate of Excellence 2014, 2015, 2016 and 2017

In 2016 and 2017 we received the Certificate of Excellence with a 4.5 rating out of 345 reviews.

- “For the bargain price of \$5.00, a car can drive right into an Elk and Bison range and witness the majesty of the best of North American nature. You can drive around this refuge dusk ‘til dawn. It's fascinating!” February 8, 2017
- “The Land Between the Lakes is a wonderful recreation area that is all about getting back to nature. There is an 1850's working farm where you can actually see how people lived day to day in the 1850's. The Nature Station is an awesome hands on learning experience for young and old alike. The Planetarium is truly an educational and awe-inspiring adventure into space and the heavens. Lots to do and the area is surrounded by Kentucky Lake and Lake Barkley.” January 11, 2017
- “We had a wonderful visit to the 1850's Homeplace today in the Land Between the Lakes. We've been to the Nature Station many times and have seen every show at the Planetarium, however we had yet to visit the Homeplace. Talk about saving the best for last. I can't say enough about what a special and magical place this is and how very fortunate we are to have a place like this to visit. We toured the working 1850's farm and saw what life was like for a middle class working farming family. I felt transported back in time. My children got to see blacksmithing and woodworking, weaving and spinning. The workers were very informative and kindly answered all of our many questions. There were free ranging sheep, chickens and ducks. There were mule and oxen in pens. It was spectacular! We loved every minute and can't wait to return.” September 17, 2017
- “My primary plans/destination in Illinois for the eclipse had cloud forecasts so I switched to plan B. I had never been to the Land Between the Lakes, but I knew its large area would provide numerous spots to view the eclipse. I was especially appreciative that their website had a special eclipse list of all their sites with info on parking and where the best viewing would be. This helped ease my anxiety about my last minute plan change. I ended up at the Moss Creek Day Use Area, and it turned out to be a perfect spot! It's large rocky beach by the lake provided ample space for everyone (and it was a LARGE crowd) to picnic, sunbathe, cookout, swim, or relax in the shade in addition to eclipse watching without ever

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feeling crowded, and I'm sure this was the most people this place had or will ever have on a single day! Clouds threatened to spoil the day just before totality, but we all lucked out and got a great view! Now that I know about this spot I'm definitely going to try to come back and spend another beautiful day at Moss Creek!" August 23, 2017

Source: https://www.tripadvisor.com/Attraction_Review-g3450976-d253284-Reviews-Land_Between_the_Lakes_National_Recreation_Area-Golden_Pond_Kentucky.html

Google Reviews – Fiscal Year 2017

In 2017 we had 4.5 stars in Google Reviews with 142 reviews.

- “Visited for the 2017 Solar Eclipse. The area was well staffed, clean...and beautiful. I wish we had more time to explore other areas but the visitor center was a great stop. Several animals are kept on site and I have never seen so many hummingbirds before in my life.”
- “I have been visiting the KY portion of Land Between the Lakes for many years. Always something new to enjoy. Each season makes it look new. Live that it encourages people to enjoy the outdoors more.”
- “Hidden gem for certain! Explore the park as much as possible, the trails are great for hiking, biking, riding. Kayaking the local inlets, lakes, boating on the river, camping, there is plenty to do and see for all.”

Source: <https://business.google.com/b/108392081213394407301/reviews/l/15397295711260595331/1?hl=en>

Yelp – Fiscal Year 2017

Communications staff also claimed some Yelp locations in 2015. This allowed us to update information, and directly respond to reviews.

In 2017 we had 4.5 stars on Yelp with 14 reviews.

- “The planetarium is a nice touch, and the staff at the visitor's center was friendly and helpful.”
- “Is there anything more American than watching Elk and Bison graze in their former natural habitat!”
- “Two Buffalo and Elk Herds, you can see them up close, and drive the two mile loop round one, lovely in Winter with the snow.”

Source: http://www.yelp.com/biz/land-between-the-lakes-golden-pond?page_src=related_bizes

National Visitor Use Monitoring Program

The National Visitor Use Monitoring (NVUM) program provides science-based estimates of the volume and characteristics of recreation visitation to the National Forest System, as well as the benefits recreation brings to the American public. Program staff conducted interviews during Fiscal Year 2017. Results will be available within the next year.

Goal 4:	Manage natural and physical resources, and authorized FS activities, to reduce erosion or deterioration of riparian areas and watershed conditions.
Sub-element NFS Generic Desired Condition	“Restoration of riparian area functioning and improvements of priority watersheds will be another focus of the resource improvements.” [Area Plan, Vision]
Example Area Plan Desired Condition Statement	<p>“Damage to natural resources caused by unmanaged recreation activities will be reduced...”</p> <p>“Roads will continue to be integral to many activities at LBL, but will be kept to the minimum number needed to meet the needs of multiple use management. The road system and its road segment maintenance levels will continue to be evaluated and modified, as appropriate. Evaluations will result in reconstruction or decommissioning of roads, when necessary, to improve watershed condition, facility and activity access, and wildlife habitat.” [Area Plan, Vision]</p>
Desired Trend Statement	<p>“Within a 10- year period, improve two watersheds by one condition class.” [Objective 4a]</p> <p>“The 10-year trend will be to reconstruct 10 to 15 miles of trail annually.” [Objective 4b]</p> <p>“Unneeded roads will be decommissioned to improve watershed condition and wildlife habitat. The 10-year trend will be one to three miles per year.” [Objective 4c]</p> <p>“Maintain to objective maintenance level, 75% of system roads and 75% of trails annually.” [Objective 4d]</p>
Monitoring Questions	<p>5. Has the FS made progress in reducing erosion and improving watershed conditions and how was this accomplished?</p> <p>6. Has the FS established baseline data for channel classification of its major intermittent and perennial streams?</p>
Area Plan Performance Measures	<p>5. Sediment transport, stream bank stability, water quality parameters, properly functioning riparian areas, watershed condition class.</p> <p>6. Completion of stream classification and determination of channel function process.</p>
Data Sources Utilized	<p>Watershed Watch program, stream and riparian surveys, number of improved or relocated roads and trails, summary of watershed improvement projects; sample projects during program reviews to determine and document where riparian values, and soil and water resource considerations were implemented through BMPs and design criteria.</p> <p>--Stream inventory of substrate, Level II Rosgen channel type, average water flow (discharge), and stream bank vegetation.</p>
Importance	This goal emphasizes LBL legislated multiple use mission and the need to direct resources and policies to sustain critical soil and water resources.
What It Tells Us	The results related to this goal will provide key information about whether LBL is meeting its legislated objectives and tiering to national strategic goals.

Goal 4: Manage natural and physical resources, and authorized Forest Service activities, to reduce erosion or deterioration of riparian areas and watershed conditions.

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. In doing so we follow the design criteria in the Area Plan and USDA Forest Service policy such as the *Forest Service National Best Management Practices for Water Quality Management on National Forest System Lands* found at:

www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf

Q4.5 Has the Forest Service made progress in reducing erosion and improving watershed conditions and how was this accomplished?

In 2016 and 2017 we made progress in reducing erosion and improving watershed conditions. This section describes how Land Between the Lakes applies many approaches to monitor and improve watershed quality.

MQ4.5 Sediment transport, stream bank stability, water quality parameters, properly functioning riparian areas, watershed condition class.

Monitoring of watershed improvement projects using Best Management Practices (BMPs) and Design Criteria ensures that sediment transport and water quality objectives were met. We made steady progress by reducing erosion and sediment transport to improve watershed conditions. Below we describe much of the work we completed during fiscal years 2016 and 2017.

Watershed Improvement

We chose two watersheds from the 2011 watershed analysis for improvement. Both watersheds were rated *Functioning at Risk* and *Watershed Condition Class 2*.

- Dry Creek/Cumberland River in the Prior Creek Project Area:
Dry Creek/Cumberland River watershed received an *Improved Watershed Condition Class* rating in 2015. We completed erosion work in Wranglers Campground in this watershed during 2017.
- Ledbetter Creek/Kentucky Lake contains the Turkey Bay Off Highway Vehicle (OHV) area:
Ledbetter Creek/Kentucky Lake Watershed was on track to receive an Improved Watershed Condition Class ranking in 2017; however, in July 2016, a 200-year rainfall event occurred and damaged much of the restoration work completed at that time. This watershed contains the Turkey Bay Off-Highway Vehicle Area. Turkey Bay was closed for over a month to make the necessary repairs, as described in Goal 7. The restoration work should be completed in Fiscal Year 2018. We plan to continue restoration work within the Turkey Bay Off-Highway Vehicle Area as necessary to reduce soil erosion and sedimentation and

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improve water quality. The Ledbetter Creek/Kentucky Lake, Watershed Restoration Action Plan is being revised at this time.

We collaborated with several interested parties and groups on watershed improvements in the Fox Hollow Area in the Bards Lake/Cumberland River Watershed. In 2017, we completed the Fox Hollow Environmental Assessment. This project will allow more sunlight and wind to reach the road surface allowing it to dry more rapidly. Other erosion issues were addressed in the environmental assessment, such as decommissioning Forest Service Road 382 (0.28 miles) due to erosion, sediment movement and the road's close location to Lake Barkley.

We completed deferred maintenance in recreation facilities in a number of watersheds. See Goal 7 for a description of the work.

- Dry Creek/Cumberland River Watershed – Wranglers Campground erosion work in 2017
- Pisgah Creek/Kentucky Lake Watershed – Hillman Ferry Campground road drainage and erosion work, Sugar Bay Campground gully restoration, and removal of closed well house at Birmingham Ferry Campground
- Bards Lake/Cumberland River Watershed – Gatlin Point erosion and drainage repairs
- Demumbers Creek/Cumberland River Watershed – Nickell Branch Campground and Boat Ramp drainage repairs
- Kentucky Lake/Kentucky Lake Watershed – Piney Campground erosion and drainage work
- Turkey Creek/Kentucky Lake Watershed – Decommissioning of closed facilities at Rushing Creek Campground, decommissioning of closed facilities at Jones Creek Campground, and erosion and drainage work on Colson Hollow Road
- Ledbetter Creek/Kentucky Lake Watershed – off highway vehicle (OHV) erosion and drainage work
- Crooked Creek/Cumberland River Watershed – Decommissioning of closed facilities at Bacon Creek Boat Ramp and erosion and drainage work on Road 165
- McNabb Creek/Cumberland River Watershed – Cravens Creek Campground erosion and drainage work.

During 2016 and 2017, we performed restoration work on erosion caused by bison in the Elk & Bison Prairie and the South Bison Range located in the Crooked Creek/Cumberland River and the Dry Creek/Cumberland River Watersheds. The areas were shaped, seeded and mulched. Large woody material was placed over the restored areas to discourage the bison from re-using them. The Elk & Bison Prairie is the head of the Crooked Creek drainage and the South Bison Range drains into Prior Creek. These are two of Land Between the



Figure 4.1: Typical bison wallow

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Lakes perennial streams. By controlling the erosion up slope from the streams we improve the water quality.

Best Management Practices Monitoring

We conduct best management practices (BMP) monitoring to check for water quality management. This includes monitoring soil erosion and sediment runoff into our streams and lakes plus monitoring chemical use near streams. Land Between the Lakes monitored six sites in 2016 and seven sites in 2017. All sites had ratings for overall effectiveness of “excellent” per the Forest Service protocols.

Demumbers Creek/Cumberland River Watershed

- Ground Based Skidding (moving logs) and Harvesting (2016 and 2017)

Crooked Creek/Cumberland River Watershed

- Chemical Use Near Water Bodies (2017)
- Road Operation and Maintenance (2016)

McNabb Creek/Cumberland River Watershed

- Developed Recreation Sites (2016)

Turkey Creek/Kentucky Lake Watershed.

- Chemical Use Near Water Bodies (2016)

Panther Creek/Kentucky Lake Watershed.

- Use of Prescribed Fire (2016)
- Chemical Use Near Water Bodies (2017)

Ledbetter Creek/Kentucky Lake Watershed

- Wildfire Management Actions (2017)
- Motorized or Nonmotorized Trail Operation and Maintenance (2017)



Figure 4.2: BMP of rock armored ditch and culvert on the Central Hardwoods Scenic Trail



Figure 4.3: Stream monitored for application of BMP for chemical use

Potable Water Monitoring

McCoy and McCoy laboratories regularly analyze water samples from 17 potable water wells. In 2016 and 2017, as in past years, all potable water for public consumption in the national recreation area met state regulations and requirements. This indicates our ground water is of good quality.

Watershed Watch

Watershed Watch volunteers have monitored two sites on tributaries draining into Lake Barkley, Crooked Creek and Demumbers Creek. The website <http://kgs.uky.edu/wwky/main.htm> contains results from the Watershed Watch program.

Kentucky Lake Monitoring Program

Murray State Hancock Biological Station monitors 12 sites for water quality on Kentucky Lake and its tributaries. Objectives of the monitoring program include documentation of long-term changes, spatial variability in water quality, and integration of field observations with remotely sensed data for physical, chemical, and biological characteristics.

(http://www.murraystate.edu/wsi/wsi_database.html)

The bays bordering Land Between the Lakes monitored by Murray State are Ginger Bay, Turkey Bay, Vickers Bay, and Duncan Creek. Panther Creek in the Panther Creek-Kentucky Lake watershed, a pristine/forested watershed, and its embayment, is considered the baseline for watershed monitoring by Murray State Hancock Biological Station. Over the years, results from all of the sites indicate good water quality lies within Land Between the Lakes. In addition to the physicochemical parameters listed under the Kentucky Lake monitoring program, additional data on discharge, water chemistry, benthos, and algae can be found at

<http://www.murraystate.edu/qacd/cos/hbs/hbs.htm>

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Hematite Lake Water Quality

In 2010 The Clean Water act 303(d) list included Hematite Lake due to “Impaired use(s): Warm Water Aquatic Habitat (Nonsupport) and Pollutant(s): Nutrient/Eutrophication Biological Indicators and Dissolved Oxygen. Suspected Sources are “Agriculture, Source Unknown.” This designation requires the Kentucky Department of Environmental Protection Division of Water to develop a monitoring plan. Due to lack of resources, a plan has not been developed by the state.

Vegetation Management

Vegetation management treatments improve watershed conditions across the recreation area. These treatments improve watershed conditions by allowing new tree and herbaceous vegetation (plants and wildflowers) regeneration. Vegetation treatments slow runoff velocity, trap sediments and reduce the amount of runoff to improve watershed conditions and water quality.

Open Lands

In 2016 and 2017 Land Between the Lakes, our partners, and special use permit holders managed a total of 12,367 acres of open lands. See the discussion in Goal 5.

Timber Treatments

We closed the Old Ferry Road timber sale in 2016 and the Paradise timber sale in 2017. We conducted Best Management Practices monitoring at these timber treatment projects. Best management practices include rolling dips, slash scattered for ground cover and to slow the runoff velocity, and seeding and mulching to minimize erosion. Also, as the canopy is opened, sunlight is able to reach more of the forest floor allowing new tree and herbaceous vegetation regeneration. This new growth helps prevent erosion and sedimentation, thus improves water quality.



Figure 4.4: Timber skid road after seeding and mulching in Ledbetter Creek Watershed

Non-native Invasive Species Treatments

In 2016 and 2017, we treated 1,564 acres of non-native invasive species in open lands across Land Between the Lakes. This action will reduce the spread of non-native invasive species and contribute to an improved watershed condition by promoting native vegetation. We work with the USDA Animal and Plant Health Inspection Service to eradicate feral hogs to reduce watershed damage. See the discussion about non-native invasive species treatments in Goal 5.

Prescribed Fire

In 2016, we conducted prescribed fires on 2,034 acres in the Dry Creek/Cumberland River Watershed. In 2017, we conducted prescribed burns on 985 acres in facility areas in the following

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watersheds: Crooked Creek/Cumberland River, Pisgah Creek/Kentucky Lake, Dry Creek/Cumberland River Watershed, Kentucky Lake/Kentucky Lake, Bear Creek/Kentucky Lake, and McNabb Creek/Cumberland River. This improved watershed conditions by controlling fuel loads and non-native invasive species, and releasing native species. In 2017, there was a managed burn in the Ledbetter Creek/Kentucky Lake Watershed.

For more information on our prescribed fire program go to the fire and fuels management section in [Goal 5](#) of this report.

Trails

Trail maintenance and improvements, using Best Management Practices, closure of user made trails, and weather related closures contributed to reduced soil erosion and sediment movement, which also helped improve water quality and watershed condition. In 2016 and 2017, the trails program staff maintained 139 miles of trails each year. In 2017, the trails program staff improved two (2) miles of trails. See Goal 7 for a description of all of the trail work.

We describe the construction of Trail 11, a 2.8 mile designated pack and saddle stock trail, in Goal 7. We completed this trail work in the Crooked Creek/Cumberland River Watershed in 2017.

Roads

We manage approximately 465 miles of Forest System roads. Public roads include 148 miles of paved roads, 180 miles of gravel roads and 113 miles of natural surface roads on Land Between the Lakes. Of those, 344 miles are considered passenger car roads. Improving, maintaining, and reconstructing roads reduces erosion and sediment runoff, improves water quality and improves the condition class of watersheds. Land Between the Lakes completed maintenance on 134 miles of roads in 2016 and 156 miles of roads in 2017.

Some examples of road work in different watersheds we completed in 2016 included:

- Crooked Creek/Cumberland River Watershed - two severely eroded roadside ditches were shaped and rock lined.
- Turkey Creek/Kentucky Lake Watershed- two roadside ditches were shaped and rock lined.
- Ledbetter Creek/Kentucky Lake Watershed - eight road culverts were installed.

Work we completed in 2017 included:

- Bards Lake/Kentucky Lake Watershed - one temporary road culvert was installed.
- Turkey Creek/Kentucky Lake Watershed - one permanent culvert was installed.

Every year we conduct maintenance on some cemetery access routes at Land Between the Lakes. In 2016, we repaired 14 cemetery accesses with severe erosion with excessive downcutting in the drains crossing the access areas. In 2017, we addressed 17 cemetery accesses with the same types of resource issues. The work included tree/debris removal, spot graveling, creek crossing repair, vegetation trimming, and mowing.

Atmospheric Monitoring

We host a National Atmospheric Deposition Program site in the Nature Watch Demonstration Area. Site KY99 is jointly operated by Murray State University, Hancock Biological Station/Watershed Studies Institute and the Forest Service. The site is a member of the National Atmospheric Deposition Program/National Trends Network administered by the Illinois State Water Survey. The National Trends Network is the only network providing a long-term record of precipitation chemistry across the United States. In addition to raw data, the National Atmospheric Deposition Program provides many data products such as maps of annual precipitation-weighted mean concentrations and deposition to scientists, decision makers, and the public. Parameters measured include free acidity, conductance, calcium, magnesium, sodium, potassium, sulfate, nitrate, chloride, and ammonium. Data exists for site KY99 from December, 1994 to present. Information and data from the National Atmospheric Deposition Program/National Trends Network program will be used for assessing climate change during plan revision and are located at:

- <http://nadp.sws.uiuc.edu>
- <http://nadp.sws.uiuc.edu/data/ntn/>

Q4.6 Has the Forest Service established baseline data for channel classification of its major intermittent and perennial streams?

We establish baseline data for intermittent and perennial streams as we complete environmental assessments in project areas. Panther Creek in the Panther Creek-Kentucky Lake watershed and its embayment provides the baseline information for watershed monitoring. The Panther Creek monitoring is described in the Watershed Watch section above.

M Q4.6 Completion of stream classification and determination of channel function process

Completion of stream classification and determination of channel function process are done on a project level basis. Land Between the Lakes averages one project area per year. In 2017 we evaluated portions of the Fox Hollow Creek using the Rosgen stream classification system. Fox Hollow Creek, as with most streams in the Land Between the Lakes, is showing some recovery within the middle reaches of stream. Channels that are wider than they are deep are forming within narrow, deep channels of the creek. Many reaches of the upper watershed are incised with active headcuts retreating up-channel. Deposition of bedload and sediments loads is highest at the lower reaches of the channel. Changing lake levels, controlled by the U.S. Army Corps of Engineers, re-deposits the load and repositions the channel on an annual basis making the lowest reaches unstable, multiple thread channels.

Goal 5:	Use a collaborative approach to maintain and restore: 1) a diversity of plant and animal communities that support viability of associated plants, fish, and wildlife; and 2) sustainable levels of habitat and wildlife populations to support public demand for wildlife-related recreation.
Sub-element NFS Generic Desired Condition	“Visitors to LBL will see active management of forests and other vegetation designed to support ecological needs for forest health and wildlife habitat, in addition to supporting recreational and EE goals.” [Area Plan, Vision]
Example Area Plan Desired Condition Statement	<p>“Much of the vegetation management program will be aimed at restoring ecological conditions to those best suited for sustaining native wildlife species. Vegetation management will target restoration and maintenance of oak woodlands and open oak forests, native short-leaf pine forests, canebrakes, and diverse structures characteristic of old growth forests.”</p> <p>“Sustainable open land management will be demonstrated through ecological restoration of native grasslands, maintenance of hayfields, and rights-of-way, and continued agricultural practices. Open lands management is directed at providing habitat for wildlife, especially those species in demand for hunting and viewing. Open lands located on sites incompatible with sustaining other resources (such as in riparian corridors) will be allowed to revert to forest, or will be maintained in native grassland or canebrake.”</p> <p>“Active management techniques will include the increased use of prescribed fire, which is documented to sustain native ecological communities and improve habitat for many wildlife species.”</p> <p>“Habitats will be provided for native and desired non-native plants, fish, and wildlife. All vegetation management activities will be designed to sustain or improve wildlife habitats, forest health, recreation opportunities, or EE experiences. The public will continue to play an important role in project-level actions and decisions.” [Area Plan, Vision]</p>
Desired Trend Statement	<p>“In mature oak forests, provide open forest structure on approximately 19,000 acres by the end of the first decade with a long-term objective of 31,000 acres.” [Objective 5a]</p> <p>“In mature oak forests, provide woodland structure on approximately 6,000 acres by the end of the first decade with a long-term objective of 30,000 acres.” [Objective 5b]</p> <p>“Provide a sustained supply of regenerating forest habitats totaling approximately 5,400 acres at any point in time. Regenerating forest will be treated predominantly within oak forests although other forest types and natural disturbances will be included.” [Objective 5c]</p> <p>“Increase the abundance of mature forest habitats toward achieving the long-term objective of approximately 123,000 acres of mature forest, of which 52,000 acres will meet old growth criteria.” [Objective 5d]</p> <p>“In mature forests on moist sites, provide canopy gaps on a minimum of 1,600 acres by the end of the first decade with a long-term objective of a minimum of 9,000 acres.” [Objective 5e]</p>

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	<p>“Create and maintain at least 250 acres of short-leaf pine forests by developing desired mature open forest and woodland structural conditions over the first decade with a long-term objective of 450 total acres of shortleaf pine forest.” [Objective 5f]</p>
	<p>“Restore 50 acres of canebrake over the first 10 years of Area Plan implementation, with a long-term objective of 240 total acres of canebrake.” [Objective 5g]</p> <p>“In addition to the approximately 600 acres of open lands currently in native grasses, restore native grasses and forbs to another 750 acres of current open lands within the first 10 years of Area Plan implementation, with a long-term (50-year) objective of 2,600 total acres of native grassland.” [Objective 5h]</p> <p>“Maintain approximately 10,600 acres in open lands-cultivated and grassland cover types to support game species, early successional species, and watchable wildlife. Approximately 1,100 acres of this 10,600 will be converted from cultivated field to grassland within riparian corridors over a 10-year period to improve riparian functions.” [Objective 5i]</p> <p>“Restore and maintain fire regimes and fire return intervals in fire dependent communities by prescribed burning an average of approximately 10,000 acres per year by the end of the first decade, with a long-term objective of 21,000 acres per year on average. Some acres will incur repeat fire application during the planning period.” [Objective 5j]</p>
Monitoring Questions	<p>7. How well are species of viability concern being maintained on LBL?</p> <p>8. Are non-native invasives an increasing threat to LBL?</p> <p>9. How is management of LBL affecting recovery of threatened and endangered species? (Duplicate questions for Measures 9-10)</p> <p>11. How is management of LBL affecting demand for wildlife-related recreation? (Duplicate questions for Measures 11-14)</p> <p>15. How is management of LBL affecting special habitats and major biological communities? (Duplicate questions for Measures 15-25)</p> <p>26. Is the forest less likely to be affected by insects, disease, and wildfire? (Duplicate questions for Measures 26-28)</p> <p>29. Has the FS made progress towards identifying old growth stands on the ground?</p>
Area Plan Performance Measures	<p>7. Trends in key habitats and/or populations of viability concern species.</p> <p>8. Trends in highest risk species.</p> <p>9. Trends in Price’s potato bean populations in relationship to Threatened & Endangered (T&E) Recovery.</p> <p>10. Trends in bald eagle populations in relationship to T&E Recovery.</p> <p>11. Trends in Eastern bluebird populations as a Non-game Demand species.</p> <p>12. Trends in white-tailed deer populations as a Demand Game species.</p> <p>13. Trends in Eastern wild turkey populations as a Demand Game species.</p> <p>14. Trends in Northern bobwhite quail populations as a Demand Game species.</p> <p>15. Trends in pileated woodpecker populations in relationship to Snags in Forested Situations.</p>

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	<p>16. Trends in Eastern bluebird populations in relationship to Snags in Open Forested Situations.</p> <p>17. Trends in Acadian flycatcher populations in relationship to Mature Riparian Forests.</p> <p>18. Trends in Northern bobwhite quail populations in relationship to Grasslands.</p> <p>19. Trends in prairie warbler populations in relationship to Oak Woodlands.</p>
	<p>20. Trends in Great-crested Flycatcher populations in relationship to Mature Open Oak Forest.</p> <p>21. Trends in wood thrush populations in relationship to Mesophytic and Riparian Forests with Canopy Gaps and Mature Forest Interior.</p> <p>22. Trends in Eastern meadowlark populations in relationship to Grassland.</p> <p>23. Trends in Yellow-breasted chat populations in relationship to All Forest Type Regeneration.</p> <p>24. Trends in composition of aquatic communities dependent on clear water and stable channels.</p> <p>25. Trends in bat population levels.</p> <p>26. Trends in early, mid-, and late-successional forests by prescription group.</p> <p>27. Trends in species diversity, structural diversity, age class, and stocking levels.</p> <p>28. Trends in native insect and disease effects.</p> <p>29. Completed inventory of old growth stands.</p>
Data Sources Utilized	<p>--Habitat trends for key factor indicators used in the species viability analysis assessed through ongoing inventory of vegetation cover and structure types; population status for selected species inventoried and monitored as appropriate for species or species group; species selected based on priorities identified and modified throughout plan implementation using improving information about threats and risks, and in cooperative efforts with conservation partners</p> <p>--Periodic survey and assessment of highest risk species occurrences; project level survey information and accomplishments</p> <p>--Periodic assessment of status of known occurrences; new occurrence inventory</p> <p>--Breeding Bird Survey/Point counts occurrence trends for the bird communities</p> <p>--Summary of data received in deer surveys, harvest statistics; summary of comments related to recreational uses of white-tailed deer</p> <p>--Summary of data received in Breeding Bird Surveys/Point counts, harvest data, and poult summaries; summary of comments related to recreational uses of Eastern Wild Turkey</p> <p>--Surveys similar to those done by the CATT</p> <p>--Collection and analysis of area bat survey data-map and update changes through routine inventories; monitor acres by successional stage and trend; fuel monitoring following regional protocol and condition classes</p> <p>--Acres of hazardous fuels treated through wildland fire use, prescribed fire, and mechanical treatments</p> <p>--Sample for specific insects or disease as evidence of infestations occurs following established protocols for the organisms of concern; track forest health monitoring results to identify emerging concerns</p>

	--Collection and analysis of old growth characteristics data, locations, and patch size
Importance	This goal contains key emphases of the LBL Protection Act and reinforces the key purposes described for LBL when created in 1963, as well as those legislated for the FS in 1998. Managing LBL under a multiple use plan should lead to many on the ground accomplishments and support primary objectives of both LBL and the agency.
What it Tells Us	The results related to this goal will provide key information about whether LBL is meeting its legislated objectives, managing ecosystems in a healthy and sustainable way, and are tiering to national strategic goals.

Goal 5: Use a collaborative approach to maintain and restore: 1) A diversity of plant and animal communities that support viability of associated plants, fish, and wildlife; and 2) Sustainable levels of habitat and wildlife populations to support public demand for wildlife-related recreation.

We continue to manage our natural resources to improve sustainability, wildlife diversity, and forest health as a multi-use national recreation area. We paused some active timber management in 2016 and 2017 to rebuild understanding and trust with the public. As a result, we expect to increase active habitat management in the future in forested acres as guided by the Area Plan and project level environmental analysis.

During fiscal years 2016 and 2017, we tracked habitat management accomplishments for enhancing wildlife habitat and plant diversity conditions across Land Between the Lakes.

Open Lands

In 2016, we completed open lands management on a total of 5,644 acres and in 2017, 6,723 acres to enhance wildlife habitat diversity through partnership agreements, cooperative farming special use permits, and local contracts. Open lands activities provide green forage, flowers, seeds, and habitat diversity throughout the year for a variety of species. Pictures of some open lands areas are shown in Figure 5.1.

Of the 5,644 acres open lands management in 2016, our partners and special use permit holders for cropland and hayfield management accomplished 4,691 acres of habitat improvement, restoration, and maintenance. Approximately 3,923 of these acres are considered “In-Kind” accomplishments in cropland, hayfields, and wildlife plantings. We accomplished the remaining 1,721 acres through local contracts for wildlife and recreation resource benefits.

In 2017, our partners and special use permit holders accomplished habitat improvement, restoration, and maintenance on 4,857 acres of the total 6,723 acres in open lands. Approximately 3,686 of the 4,857 acres are considered “In-Kind” accomplishments in cropland, hayfields, and wildlife plantings.

Fiscal Year 2017

We accomplished the remaining 1,171 acres through local contracts for wildlife and recreation resource benefits.



Figure 5.1: L1 – Restoration of a wildlife planting field that includes mowing, followed by an herbicide application and planting of wheat in fall 2017. In 2018 this field will be planted into wheat and clover. L2 – A National Wild Turkey Federation (NWTf) adopted wildlife planting established in clover in the fall after being mowed in summer 2017. R1 – Cooperatively managed cropland in soybeans with a maintained field border. R2 – Cropland field border with an Eastern black swallowtail butterfly feeding on a common aster species. The NWTf helped the Forest Service manage these areas in 2016 and 2017. Photos taken by Matt Weegman, NWTf wildlife biologist.

In 2016, we established and maintain six acres of river cane within the Demumbers Creek project area. We continue to maintain 20 acres of river cane established in 2014 and 2015 within a median of State Routes 68/80. River cane is a warm season grass and rare community type. It can take up to five years to see cane growth beyond the initial site where the roots, rhizomes, and culm masses were planted. Last year we observed culm (grass blade growth above ground) at about two inches high and within one to two feet of the plant sites for cane planted in two median fields of State Routes 68/80. We will not know the effects of our disking for these two fields and the other fields planted in cane until spring 2018 at the earliest.

We maintained or restored 242 acres in 2016 and 374 acres in 2017 of existing native warm season grasses. We mowed, burned, applied herbicides to, or disked these acres.

In 2016 and 2017, the cooperative farmers maintained 425 acres of field borders with mowing and light disking. The field borders implemented in 2015 enhance soil and watershed health. Additional benefits for wildlife include forage, cover, and nesting sites, and promotion of native plant species growth (Figure 5.1, R1 and R2). Field borders are primarily located on the stream side of a field and adjacent to riparian corridors that were implemented in 2007. Field border sizes range from a minimum of 30 feet wide from the field edge to an entire field taken out of cultivation. Field borders are primarily located in areas with poor soil and site conditions.

Our cooperative farmers established cover crops on 318 acres during fall, 2016. Wheat is the primary cover crop planted to help control invasive species between crop seasons. Cover crops provide wildlife benefits, and enhance soil and watershed health conditions in the crop land production areas during the winter months.

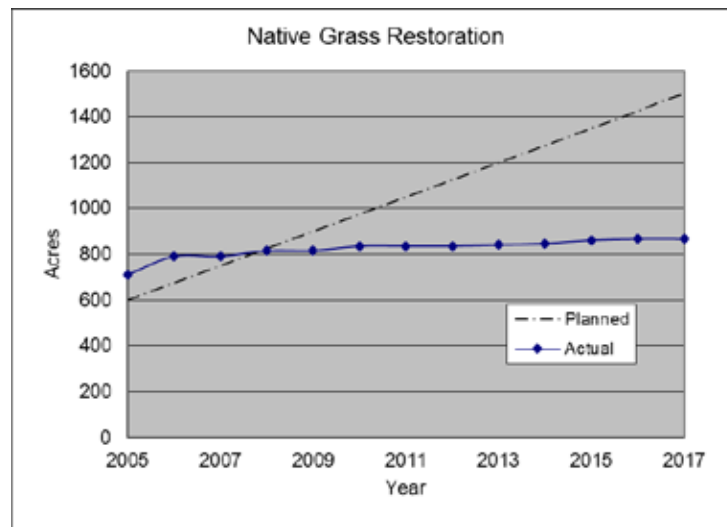


Figure 5.2: Native Grass Restoration Chart

Fire and Fuels Management

Land Between the Lakes National Recreation Area (LBF) is a new acquisition for the Forest Service, therefore long term Forest Service monitoring and conditions are not available before 2007. Fuels treatments since acquisition focused primarily on habitat management, ecosystem health, and hazardous fuels reduction around high population and value areas (76 facilities and 1,200 recreational sites).

Historical annual accomplishments range from 65 acres to almost 10,000 acres. This fluctuation is attributed to unique weather influences (rainfall and storm severity / frequency) associated with both geographic location and hydrologic influences. Political and socio-economic challenges caused us to review with the public the fire and timber programs in 2015 and 2016. We re-established trust and working relationships through strong collaboration and education efforts.

Prescribed fire at Land Between the Lakes serves several different roles such as invasive species control, nutrient recycling, thermal thinning, regeneration stimulation, and tall grass ecosystem maintenance. Prescribed burning has also contributed to improving visual characteristics adjacent to developed sites. Clearing of debris in culverts and drainage features reduced road damage and decreased soil erosion. Fire has been successful in maintaining and enhancing trail experiences, and improving access to historical sites.

We accomplished 2,034 acres in 2016, and 985 acres in 2017 of prescribed burning within critical areas of high educational value, priority restoration areas, and in the protection of high value infrastructure. We improved the visitor experience in the Elk & Bison Prairie through maintaining the stand structure and increasing forage with prescribed fire. Prescribed burning in the developed recreational sites contributed to improving visual characteristics, reducing soil erosion, and protecting infrastructure. We use prescribed fire within normal return intervals to sustain fire dependent communities in other forested areas throughout Land Between the Lakes.

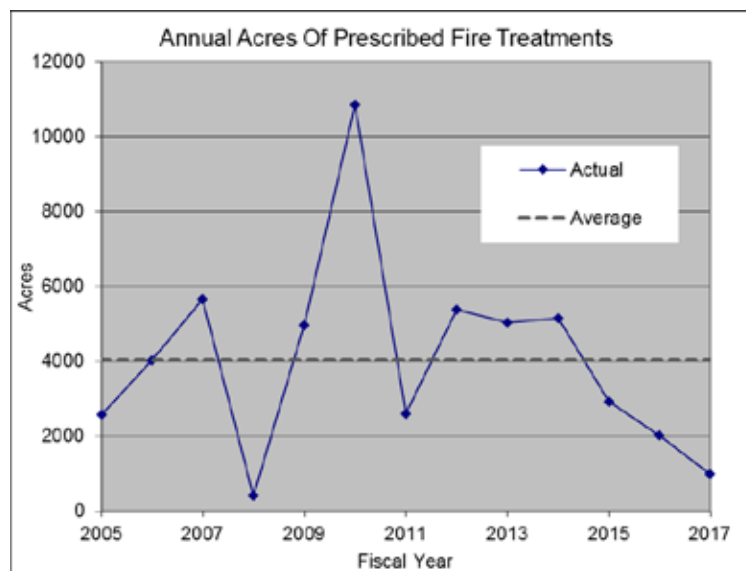


Figure 5.3: Prescribed Fire Treatments

A window for a desired growing season burn in a landscape research area (2,640 acres) has not developed due to an abnormal frequency and intensities of spring storms. Socio-political constraints are influential, and we have shifted into integrated efforts in open lands restoration and hazardous fuels reduction to burn quality acres. We expect to continue production in areas that current environmental decisions allow, inclusive of maintaining the integrity of our research sites.

Land Between the Lakes took advantage of favorable conditions to institute the first managed wildfire on the unit under the Wildfire Decision Support System. This resulted in just over 130 acres of initial fire re-introduction in a high value protection area. Due to existing constraints, risk, and high values this area had not been targeted for fuels treatments.

Fiscal Year 2017

Long term post-burn monitoring continues to be a valuable tool in validating parameters to ensure successful accomplishment of prescribed burning. We look to develop and initiate a robust monitoring program that will provide long term data. Land Between the Lakes looks to continue support and collaboration with partners and academia in monitoring fire return intervals and response of flora and fauna.

Outyear planning, combined with the current operating climate and collaboration efforts look to support an increase in average annual acreage with a mid-term goal close to our 5-year average. We will seek high quality production while maintaining focus on the right application.

Wildlife and Forest Management

Goal 5 of the Area Plan includes objectives for the forest structure on Land Between the Lakes. See the sections below for monitoring questions 5.7 through 5.29 for trends relative to wildlife diversity and habitat objectives in Goal 5. The current acreage in each forest structure type, and the 10 and 50 year goals as reported in the ten year monitoring evaluation report remain about the same. In general, the distribution of mature forest types remains predominantly closed forest. Timber harvesters created approximately 4,100 acres of mature woodland, or 3% of all mature structure types. No harvest activities occurred during Fiscal Years 2016 and 2017.

Fiscal Year 2017

Figure 5.4: Forest Structure in 2015
No changes occurred in 2016 and 2017.

<i>Forest Structure</i>	<i>Total acreage from 2004 FEIS</i>	<i>2010 Total Acreage</i>	<i>2015 Total Acreage</i>	<i>10 Year Goal Acres</i>	<i>50 Year Goal Acres</i>
Mature Closed Forest	90,316	89,278	84,628	79,000	53,000
Mature Open Forest	16,253	17,195	17,648	19,000	31,000
Mature Woodland	0	794	4,136	6,000	30,000
Canopy Gaps	120	474	822	1,600	9,000
Subtotal Mature Forest	106,689	107,741	107,317	105,600	123,000
Mid-Aged Forest	14,817	16,620	16,620	24,000	14,000
Young Forest	28,549	26,962	27,026	17,000	11,000
Regenerating Forest	2,536	1,268	1,559	5,400	5,400
Shortleaf Pine	130	130	283	1,000	1,600

The Forest Service revaluated the prescribed fire changes in the forest structure and no longer included fire acres in the forest structure changes over time. The table of forest structure acres now only contains changes from timber treatments. This is in part due to implementing less intense fires on the landscape hence reducing canopy gaps and limiting mortality in the mid-story. Therefore, the acres represented in this ten year Monitoring and Evaluation report for year 2010 are different than the acres that the 5 year M&E reported.

The acres moving from the different age classes and forest structure classes are based on assumptions. We made an assumption that approximately 20% of the regeneration forest structure type and young forest class moved to mid-aged forest class; and, approximately 15% of the mid-aged class moved to mature open canopy and mature closed canopy forest structure. While calculating these acres forest inventory data gaps at Land Between the Lakes became apparent.

Insignificant anomalies are attributed to differing database standards and collection protocols throughout the 10 year span of plan implementation.

Fiscal Year 2017

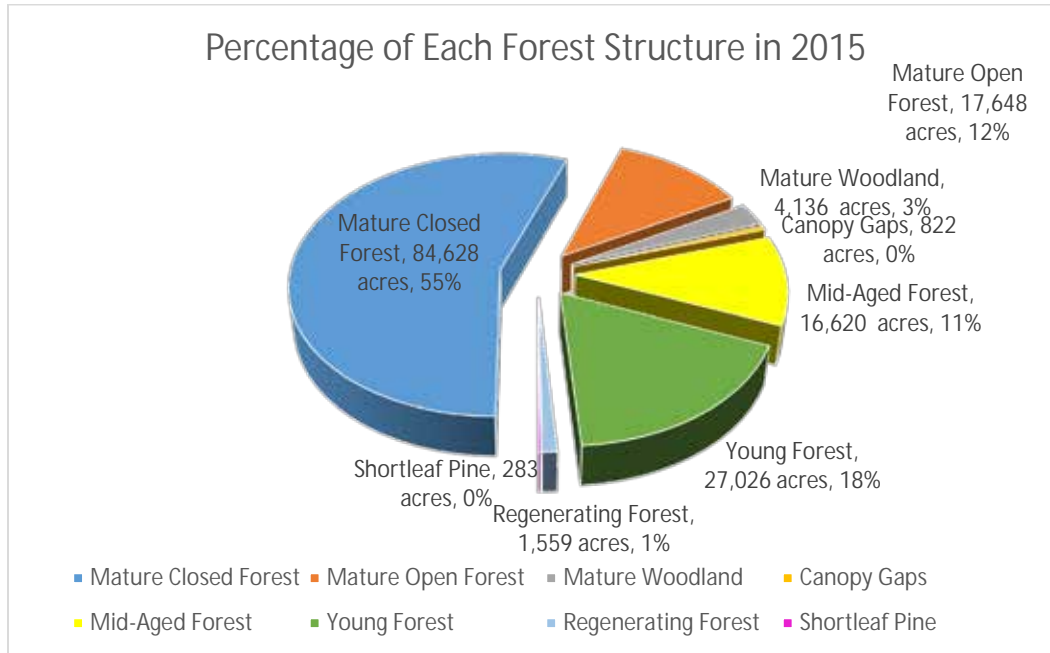


Figure 5.5: 2015 Percentage of Each Forest Structure
No changes occurred in 2016 and 2017.

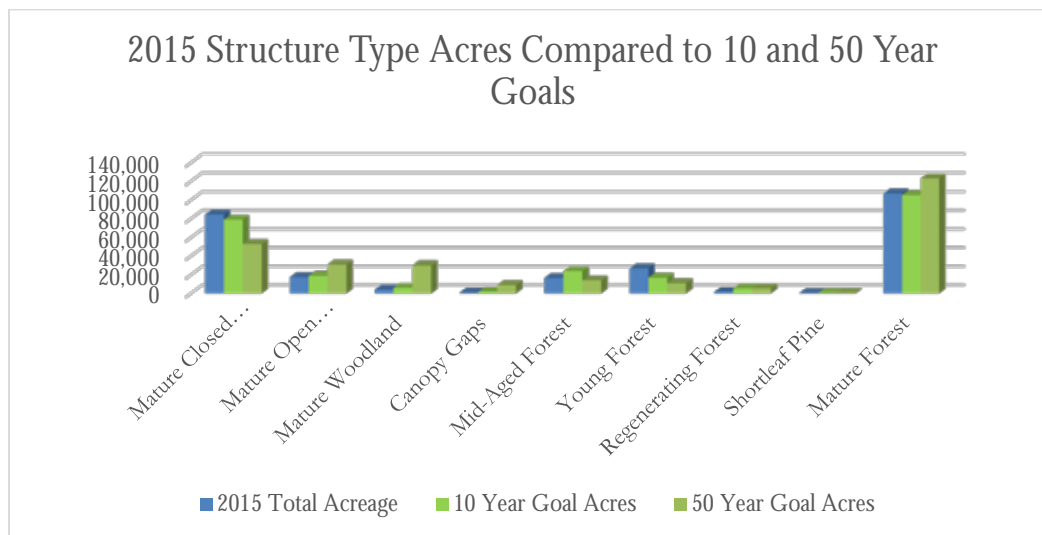


Figure 5.6: 2015 Structure Type Acres Compared to 10 and 50 Year Goals
No changes occurred in 2016 and 2017.

Fiscal Year 2017

Q5.7. How well are species of viability concern being maintained on Land Between the Lakes?

We report on species of viability concern annually, every 2 or 3 years, and every 5 years. Species' reports that follow are on the annual cycle.

MQ5.7 Trends in key habitats and/or populations of viability concern species.

We discuss the trends for populations and key habitats of Price's potato bean and bald eagles in Monitoring Question 5.9, and for bats in Monitoring Question 5.25.

In 2017, we confirmed a new plant species occurrence, white false indigo (*Baptisia alba*) observed on June 9, 2017 in about four patches along an open oak forest shoreline in Trigg County, Kentucky. This species occurrence is considered rare in Kentucky and it is associated with barrens and open oak woods.

Little active management of key habitats other than open lands occurred during the last two fiscal years. Therefore the trends for key habitats remained about the same as we reported in the ten year report in 2015.

We primarily assess populations for species of viability concern through field inventories. Austin Peay State University personnel conducted botany surveys in the Fox Hollow project area during March 2017 and did not find any Regional Forester's Sensitive plant species.



Figure 5.7: White false indigo on open oak forest shoreline

Q5.8. Are non-native invasives an increasing threat to Land Between the Lakes?

Yes, non-native invasive species continue to threaten the flora and fauna of Land Between the Lakes. The goal of the Forest Service is to reduce, minimize, or eliminate the potential for introduction, establishment, spread, and impact of invasive species across all landscapes and ownerships. In 2009, we outlined a strategy for prevention, control, or eradication of non-native invasive species on Land Between the Lakes. We identified areas based on priority for control or eradication with the highest priority being threatened, endangered, and sensitive species locations and habitats and the lowest priority being wetlands and inland lakes. We assessed what invasive species are known to occur on Land Between the Lakes and ranked them for control or eradication per state and Forest Service rankings. We documented the locations of non-native invasive plant species in our inventory, management, and monitoring of open lands and project level environmental assessments.

Pesticide applications are done in accordance with the National Environmental Policy Act. Pesticides is the general term used collectively for herbicides, insecticides, fungicides, etc. An environmental assessment is required for many of the priority areas identified in our Land Between the Lakes strategy. Currently we have pesticide applications covered in the following environmental

assessment decisions: Fire Ants (2017), Devils Backbone (2013), Demumbers Creek (2011), and Continued Maintenance of Open Lands (2007).

Since 2008, herbicide applications have occurred primarily in open land areas for non-native and undesirable plant species. We anticipate applying herbicides on priority invasive species and areas within the Devils Backbone and Demumbers Creek project areas within the next two years. See the discussion about treatment of imported fire ant mounds later in this section.

There are many more areas where we need to address non-native invasive species in Land Between the Lakes. It will take time, funding, and environmental assessments to complete this work. A prime example of this is the need to control kudzu, a top priority species. Kudzu is very aggressive in growth and is currently known to occur along the Woodlands Trace, in forested areas adjacent to open lands, and in and adjacent to at least one cemetery (Newby Cemetery). In 2016 and 2017, we treated the kudzu within the State Routes 68/80 road right-of-way. An environmental decision completed by the U.S. Department of Transportation addressed the treatment of non-native invasive species within this road right-of-way corridor.

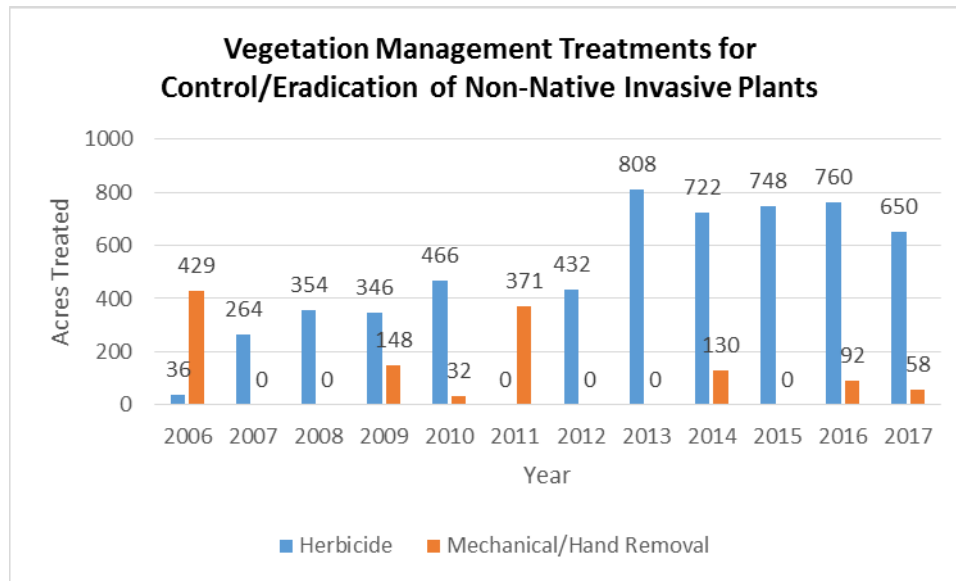
Since the development of our Land Between the Lakes non-native invasive species strategy we provided environmental education programs, literature, and messages to our public about prevention and control of non-native invasive species. We provided pamphlets to the public and cooperators about controlling fire ants. We put language in our cooperative farming special use permits, contracts, and partnership agreements about preventative measures to control the spread of the imported fire ants and invasive plant species. We requested partners and the public to immediately report the location of imported fire ant mounds and feral hogs to Forest Service staff.

MQ5.8. Trends in highest risk species.

Non-native Invasive Plants (NNIS)

Within open land areas across Land Between the Lakes we treated 856 acres in 2016 and 708 acres in 2017 to control non-native invasive species vegetation. We use a combination of fire, mowing, and approved herbicides. See Figure 5.8. The overall success rate for the control of NNIS in 2016 and 2017 ranged from 50% to 100%. Over half of the areas treated had an efficacy rate for targeted species of 90-100% success within the same season of application. Approximately 80% of the open lands that we treated with herbicides in 2016 and 2017 are those being restored and/or prepped for wheat and clover plantings. They primarily include warm season grass and wildlife food plot open lands. Additional areas treated include the South Bison Range, Elk & Bison Prairie, State Routes 68/80 right-of-way, and other open land types.

Fiscal Year 2017

**Figure 5.8: Non-native invasive species treatments 2006-2017**

The primary NNIS that we have targeted within the open land areas include:

- Autumn Olive (*Elaeagnus Umbellata*)
- Chinese Privet (*Ligustrum Sinense*)
- Japanese Privet (*Ligustrum Japonicum*)
- Loblolly Pine (*Pinus Taeda*)
- Sericea Lespedeza (*Lespedeza Cuneata*)
- Fescue (*Schedonorus Phoenix*)
- Johnson Grass (*Sorghum Halepense*)
- Pigweed (*Amaranthus Hybridus*)
- Cocklebur (*Xanthium Spinosum.*)
- Foxtail (*Setaria Sphacelata*)

Fire Ants

We began receiving reports of fire ants on Land Between the Lakes in mid-2013. We collected samples and positively identified these ants as imported fire ants, species *Solenopsis invicta* Buren, *S. richteri* Forel, or their hybrids. Imported fire ants are an invasive species that spread across the southeastern United States and can be damaging to people, pets, livestock, and native wildlife.

In 2016 and 2017, we monitored imported fire ant mound locations we identified in previous years to determine their current activity status. In 2016, eight mounds were active at the previously identified mound locations. The rest were inactive or had no mounds found. We found no new mound locations in 2016. In 2017, nine mounds were active at previously identified locations. We found 20 new, active mound locations.

Fiscal Year 2017

Under the Categorical Exclusion for the Treatment of Imported Fire Ants at designated recreation and developed areas, we treated nine active mounds in 2017. All were located within road right-of-ways. We monitored treatment at six of the mounds. Treatment was 100% effective and no activity was observed at any of the six mounds. We treated the other three mounds late in the season and will monitor the locations in spring of 2018.

We completed an Environmental Assessment for the Treatment of Imported Fire Ants area wide at Land Between the Lakes. The decision was signed on December 14, 2017. We will begin treating imported fire ant mounds area wide in the spring of 2018.

We will monitor the activity status of known mounds and the success of mound treatments. We continue to collaborate our monitoring efforts with Tennessee and Kentucky State Entomology Offices.

Feral Hogs

The Forest Service strategy is to eradicate feral hogs wherever found. This management directive reflects the hog policies of the state wildlife agencies in Tennessee and Kentucky. Feral hogs threaten desirable vegetation, native species habitat, and forages. Hogs pose a risk for spreading disease.

During 2003, we received our first report of feral hogs sighted on the northeastern end of Land Between the Lakes. The hog population on Land Between the Lakes has remained small since 2003. However, feral hogs appear to have expanded their range and density on the south end of Land Between the Lakes over the past 4 years. A dramatic increase in reported hog sightings and signs occurred during 2017 across the southern section of Land Between the Lakes with most seen west of Woodlands Trace National Scenic Byway (the Trace). Reports of sightings in the northern section of Land Between the Lakes have declined to minimal levels.

Situations exist throughout many states where hogs are transported illegally by private individuals to be released onto public lands for the purpose of establishing new huntable populations of feral hogs. It has become such a significant problem that at least 10 states, including Tennessee, have enacted legislation to limit or prevent hog hunting on public lands. Like other areas have discovered, once Tennessee enacted legislation to prevent hog hunting on state-managed public lands during 2011, Land Between the Lakes saw an expansion of hogs in Tennessee.

Hunters reported the harvest of two feral hogs from Hunt Area 16 in the Tennessee portion of Land Between the Lakes during 2015. No other hunters reported feral hog harvests on Land Between the Lakes during the last 15 years. Therefore, after allowing hog hunting for several years, Land Between the Lakes managers decided hunters did not control the growing hog population. Allowing hunting may have encouraged illegal relocation of hogs to Land Between the Lakes to increase. The Forest Service, in cooperation with state wildlife agencies, changed hunting regulations to stop public hog hunting on Land Between the Lakes in the fall of 2015.

Fiscal Year 2017

During 2013, the Forest Service partnered with USDA Animal and Plant Health Inspection Service, Wildlife Services (APHIS) to help control the feral hog population on Land Between the Lakes. During fiscal year 2016, APHIS employees captured and removed 21 feral hogs from the Tennessee portion of Land Between the Lakes. An additional 10 hogs were removed from Land Between the Lakes during fiscal year 2017.

The Forest Service plans to maintain an ongoing agreement with USDA Animal and Health Inspection Service for the management of feral hogs on Land Between the Lakes.

Q5.9. How is management of Land Between the Lakes affecting recovery of threatened and endangered species?

(Duplicate questions for Measures 9-10)

We continue to manage our natural resources to help provide habitats for native wildlife and for the recovery of threatened and endangered native species.

MQ5.9 Trends in Price's potato bean populations in relationship to Threatened & Endangered (T&E) Recovery.

Price's Potato Bean

The Price's potato bean (*Apios priceana*) is a federally threatened perennial vine that has been selected as a management indicator species for the recovery of this species, Figure 5.9. This species is known to occur on five sites, two in Lyon County, two in Trigg County, and one in Stewart County. The Price's potato bean is an inhabitant of open, mixed-oak forests, forest edges, clearings on river bottoms, and ravines. The plant is unable to tolerate deep shade. On Land Between the Lakes the Price's potato bean grows in mesic (moist) to dry site types and is associated with Mississippian and Warsaw limestone outcrops. This species is also associated with calcareous boulders and several populations within its range are known to extend onto road and utility right-of-ways.

Conservation measures for natural regeneration of existing populations and propagation of additional populations follow the 1993 U.S. Fish and Wildlife Service Price's Potato Bean Recovery Plan. All the populations on Land Between the Lakes are managed in coordination with the Kentucky and Tennessee U.S. Fish and Wildlife Service field offices. Assistance is also provided by the Kentucky State Nature Preserves Commission, Tennessee Department of Environment and Conservation, Austin Peay State University, Murray State University, and Land Between the Lakes Association.

In 2016, we partially mowed one of the Trigg County, Kentucky sites during the non-growing season to suppress woody vegetation growth and encourage the vines to grow horizontally. In 2017, at the same site as 2016, we removed hazard trees and mowed the area to continue to stimulate horizontal vine growth. In both years at this site, the vine, flower, and bean pod counts increased, almost doubling between 2016 and 2017.



Figure 5.9: Price's Potato Bean (*Apios priceana*), federally threatened; a perennial herbaceous vine in the pea family. Shown above in foreground are the seven leaflet divided leaves and vine twining around an aster species with its very noteworthy flower clusters that bloomed on a site in Land Between the Lakes.

In the latter part of July 2016, we experienced some major flooding in portions of Land Between the Lakes. As a result some lower portions of sites near water were flooded. At one site adjacent to a stream there was bent vegetation, and sites located along the lake shoreline had debris piles in them. This did not appear to effect the Price's potato bean, except that they flowered later than normal.

The vine, flower, and bean pod counts have continued to increase for Land Between the Lakes populations since management of them started in 2009. In 2016 we counted 178 vines, 1,176 flowers, and 505 bean pods for all five sites. In 2017 we counted 285 vines, 2457 flowers, and 483 bean pods. We did not monitor one of the sites in Kentucky in 2017.

In addition to monitoring our known sites, we survey proposed project areas for new populations of Price's potato bean and potential habitat for re-introduction in compliance with our Wildland Fire and Forest Management Program Biological Opinion requirements. In 2016, we surveyed 350 acres and in 2017 560 acres. Austin Peay State University graduate students and Forest Service staff completed the surveys. We observed no new Price's potato bean populations or their potential habitat in the proposed project areas in either year.

Monitoring of populations and habitat conditions will continue for all sites with implementation of the Price's Potato Bean Recovery Plan and in compliance with the requirements of our Wildland Fire and Forest Management Program Biological Opinion. The recovery plan for the Price's potato bean populations will be revised as needed in cooperation with our partners and based on results obtained through management, monitoring, and research.

MQ5.10. Trends in bald eagle populations in relationship to Threatened & Endangered (T&E) Recovery.

Bald Eagle

We continue to monitor winter occurrences, nesting sites, and nesting success for bald eagles at Land Between the Lakes. We monitor bald eagle occurrences in partnership and coordination with Kentucky Department of Fish and Wildlife Resources, Tennessee Wildlife Resources Agency, U.S. Fish and Wildlife Service and Friends of Land Between the Lakes.

Midwinter eagle surveys monitor the winter occurrences of bald eagles and golden eagles during the month of January. These surveys are coordinated at the national level by the US Army Corps of Engineers and at the state level by Kentucky Department of Fish and Wildlife Resources. The survey counts eagles along the shorelines of Kentucky Lake and Lake Barkley.

In 2016, the Kentucky Department of Fish and Wildlife Resources staff counted 74 bald eagles (60 adults and 14 immature) during the midwinter eagle survey along the shorelines of Land Between the Lakes National Recreation Area. The Kentucky Department of Fish and Wildlife Resources staff reported that mild winter weather and flooding throughout the Midwest region likely led to the low numbers of eagles recorded for the 2016 count.

The preliminary results of the 2017 midwinter survey completed by the Kentucky Department of Fish and Wildlife Resources staff counted 137 bald eagles. A total of 89 bald eagles were observed on Kentucky Lake, and 48 bald eagles were observed on Lake Barkley.

Bald eagle fledgling success in Land Between the Lakes has been monitored since 1984 when the first successful nesting of bald eagles occurred in Tennessee. The Kentucky Department of Fish and Wildlife Resources conducts aerial surveys of eagle nests in March annually. They count the number of active nests, and whether or not the nests observed have incubating adults, eggs, or hatched eagles in the nests. Land Between the Lakes staff and volunteers do follow-up ground observation surveys to count the number of successful fledglings.

Since 1984 fledgling success of bald eagles in Land Between the Lakes has increased. (Figure 5.10)

The 2016 nesting season was late, and no early nesting occurred. In Kentucky we observed 18 active nests from which 22 eaglets fledged. In Tennessee we observed 9 active nests from which 9 eaglets fledged. Thus, there was a total of 31 fledglings from 27 active nests on Land Between the Lakes in 2016. During this year we observed 7 new nests in the Land Between the Lakes, 3 in Kentucky and 4 in Tennessee.

During 2017, we observed a long fledgling season. We had 20 active nests in Kentucky from which 21 eaglets fledged. We had 8 active nests in Tennessee from which 10 eaglets fledged. Thus, there was a total 31 fledglings from 28 active nests on Land Between the Lakes. We observed 9 new nests locations in 2017, 8 in Kentucky and 1 in Tennessee.

Fiscal Year 2017

Eaglets Fledged from nests on Land Between the Lakes Monitoring began in Tennessee in 1984 and Kentucky in 1989					
Year	Totals	Year	Totals	Year	Totals
1984	1	1998	5	2012	19
1985	1	1999	14	2013	28
1986	0	2000	18	2014	26
1987	2	2001*	7	2015	32
1988	2	2002	15	2016	31
1989	4	2003	20	2017	31
1990	4	2004	14		
1991	4	2005	16		
1992	2	2006	12		
1993	4	2007	22		
		Species Delisted			
1994	6	2008	21		
1995	4	2009**	Unknown		
1996	6	2010**	8		
1997	4	2011***	16		
Total Eaglets Fledged:					399
* 2001: Transfer to Forest Service; insufficient staff to monitor nests					
** 2009 and 2010: weather related events diminished ability to monitor nest sites and assess fledging success					
*** 2011: LBL TN only one nest monitored for fledgling success					

Figure 5.10: Table of eaglets fledged since 1984

Q5.11. How is management of Land Between the Lakes affecting demand for wildlife-related recreation?

The 2004 Land and Resource Management Plan states current management of the forest, including open lands, is designed to meet wildlife habitat needs and provide dispersed recreation and environmental education opportunities. Popular wildlife-related recreation at Land Between the Lakes includes wildlife viewing, hunting, scenic driving, hiking, and camping. Land Between the Lakes remains a destination for wildlife-related recreation. Deer and turkey hunting participation is declining due to the loss of early successional forest and open lands habitat. (see section MQ7.34)

We described in the 2015 Monitoring and Evaluation Report how Land Between the Lakes did not achieve the 10-year objectives for forest management. Land Between the Lakes is more than 90 percent forested and forest conditions continue trending toward middle to late successional forest. The mature closed canopy oak forest remains the dominant structure type. There are fewer acres of young, regenerating forests across all forest communities, and more acres aging into middle age and mature structure types.

Today, open lands cover approximately 8,400 acres, compared to the objective of 10,600 acres in the Area Plan. Approximately 2,900 acres (1.7 percent) are cultivated in row crops and wildlife plantings. The remaining 5,500 acres (3.2 percent) are various grassland types including hayfields, road and utility right-of-ways, early successional wildlife openings, and native warm season grasses.

Wildlife-related recreation dependent on open forest structure or early successional habitat will continue to decrease unless Land Between the Lakes actively manages the vegetation. To address this monitoring question, we use Management Indicator Species as the measure and various sources such as breeding bird surveys, nest box surveys, spot light surveys, and deer and turkey hunt data.

(Duplicate questions for Measures 11-14)

MQ5.11. Trends in Eastern bluebird populations as a Non-game Demand species.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.12. Trends in white-tailed deer populations as a Demand Game species.

White-tailed deer are an important resource at Land Between the Lakes National Recreation Area. They are popular for wildlife viewing, photography, and hunting as the number one demand game species. White-tailed deer enhance other recreation and education opportunities at Land Between the Lakes, and help to support tourism and the regional economy. White-tailed deer are one of the management indicator species for implementation of the Land Between the Lakes Area Plan.



Figure 5.11: White-tailed deer at Land Between the Lakes

White-tailed deer use a variety of habitats ranging from forest to croplands. They are primarily browsers and eat a tremendous variety of plants throughout their range. Forage consumed is regionally specific and usually consists of leaves, twigs, and stems of woody plants, acorn mast, fruits, cultivated crops, grasses and forbs. When white-tailed deer can afford to be selective they tend to choose the most nutritious plants (Final Environmental Impact Statement for the Land and Resource Management Plan 2004).

Land Between the Lakes deer harvest trends declined from 2001-2015. To address the decline, the Forest Service changed the regulations in 2016. The 2016 changes no longer allowed bonus deer in Kentucky or Tennessee portions of Land Between the Lakes, and reduced the archery/crossbow limit from two deer to one in Kentucky. To better assess herd status, in 2016 and 2017 we conducted hunter surveys, herd health checks, road-based and aerial infrared surveys.

Fiscal Year 2017

Late winter nighttime infrared deer population surveys have been conducted on Land Between the Lakes since 2009 in Tennessee and since 2010 in the Kentucky portion of Land Between the Lakes using protocols developed by the Tennessee Wildlife Resources Agency. These road-based surveys were developed to help Land Between the Lakes wildlife staff monitor for significant increases and decreases in the deer population. During late January through March 2017, we conducted property-wide nighttime deer road-based surveys.

The road-based data is subject to greater variability and less accuracy than aerial surveys. In 2017, a more extensive and accurate aerial survey was conducted to validate road survey trend data. The surveys included compilation of data from digital photo captures. In addition, survey analysis was performed by a university professor that has significant experience performing statistical analysis on both aerial and ground deer population survey data.

The aerial infrared surveys indicated deer densities in both state portions were relatively low. The data shows deer populations within the Kentucky portion of Land Between the Lakes were at or slightly below carrying capacity for the type of habitat found on much of Land Between the Lakes (closed canopy forest with few openings). The Tennessee portion of Land Between the Lakes fared somewhat better with higher deer density numbers, still at or slightly above carrying capacity for the available habitat. Estimates were 10 deer per square mile in Kentucky and 19 deer per square mile in Tennessee. These estimates are comparable to other heavily forested areas. These estimates are well below historic levels for Land Between the Lakes, and well below current population levels in surrounding counties in western Kentucky and Tennessee. Herd health checks showed deer were in fair nutritional condition, and potentially near or in excess of the carrying capacity of the habitat.

State wildlife and university experts in the field suggested that, if affordable, Land Between the Lakes continue these aerial and ground surveys following the fall 2017 season to gain additional data to clarify the significance of the data collected the previous year. They also suggested that changes made to Land Between the Lakes' harvest limits and season lengths be left in place for additional seasons to allow biologists to correlate population survey data with these regulation changes, as multiple years of data are needed to determine the statistical significance of population fluctuations. These same wildlife experts also strongly suggested that Land Between the Lakes' mature closed canopy forested habitat is a significant limiting factor for white-tailed deer, similar to current Appalachian forested areas which are well known for only being able to maintain low deer populations when compared to other areas in Kentucky and Tennessee that have more early successional forest and open land habitat.

While deer populations will continue to fluctuate annually on Land Between the Lakes due to variable weather, mast crops, etc., unless habitat conditions change the long term downward trend will continue. Additionally, the surrounding lakes significantly limit ingress of new animals to repopulate Land Between the Lakes.

The deer population decline is primarily due to reduced habitat. The Land Between the Lakes forest continues to mature into older-aged closed canopy forest, and open lands decreased to 5 percent of

Land Between the Lakes. Unless habitat management increases the acreage of open forest structure and open lands, deer numbers will continue to decline. This will decrease associated recreation, education, and economic benefits.

Land Between the Lakes complete 2017 Deer Report can be found at https://landbetweenthelakes.us/wp-content/uploads/2014/02/Deer-Report-2017-Land-Between-the-Lakes-5_17_2017.pdf

MQ5.13. Trends in Eastern wild turkey populations as a Demand Game species

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.14. Trends in Northern bobwhite quail populations as a Demand Game species.

Trends will be addressed in the next biennial monitoring and evaluation report.

Q5.15. How is management of Land Between the Lakes affecting special habitats and major biological communities?

Treatments to manage habitats were discussed at the beginning of the goal 5 section. Some of the measures below were addressed and the others will be addressed in the next biennial monitoring and evaluation report.

(Duplicate questions for Measures 15-25)

MQ5.15. Trends in pileated woodpecker populations in relationship to Snags in Forested Situations.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.16. Trends in Eastern bluebird populations in relationship to snags in Open Forested Situations.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.17. Trends in Acadian flycatcher populations in relationship to Mature Riparian Forests.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.18. Trends in Northern bobwhite quail populations in relationship to Grasslands.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.19. Trends in prairie warbler populations in relationship to Oak Woodlands.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.20. Trends in Great-crested Flycatcher populations in relationship to Mature Open Oak Forest.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.21. Trends in wood thrush populations in relationship to Mesophytic and Riparian Forests with Canopy Gaps and Mature Forest Interior.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.22. Trends in Eastern meadowlark populations in relationship to Grassland.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.23. Trends in Yellow-breasted chat populations in relationship to All Forest Type Regeneration.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.24. Trends in composition of aquatic communities dependent on clear water and stable channels.

Trends will be addressed in the next biennial monitoring and evaluation report.

MQ5.25. Trends in bat population levels.

Murray State University biologists conducted a bat survey for long term-monitoring in 2015 at Land Between the Lakes National Recreation Area. The preliminary results from the 2015 Summer Bat Survey were reported in the 2015 Monitoring and Evaluation report. More details are provided in this year's report.

The bat species diversity and distribution in 2015 were similar to the values from previous surveys. However, the capture rates in 2015 were lower for some bat species, when compared to previous surveys. Specifically, the capture rate for White Nose Syndrome susceptible species was lower than in 2005. The decline of these species is consistent with the decline across Kentucky since the emergence of White Nose Syndrome in Kentucky in 2011. A total of eleven species have been captured in mist net surveys on Land Between the Lakes.

Murray State University's final report included the completed analysis of acoustic data. Results showed that the "Acoustic surveys generally supported the results of the mist net surveys". Southeastern myotis (*Myotis austroriparius*) and northern long eared bat (*Myotis septentrionalis*) had probable presence detected at a similar percent of sites to mist net capture rates. Indiana bat was not captured in mist netting surveys, but 11-30 percent of the acoustic survey sites recorded probable presence. Murray State University biologists also conducted acoustic monitoring in the fall of 2015 to compare the probable presence of bat species between summer and fall. Bat species that were widespread during summer, based on acoustic analysis, continued to be widespread during fall. The occurrence of two species, the silver-haired bat and Southeastern myotis, increased during the fall.

The northern long eared bat was listed as threatened under the Endangered Species Act on April 2, 2015. This species has been captured at Land Between the Lakes in mist-net surveys and acoustic surveys. The capture rate was lower in the 2015 survey than in previous surveys.

Fiscal Year 2017

One Indiana bat (*Myotis sodalis*) was confirmed roosting in Land Between the Lakes in April 2017. This is the first confirmed report of an Indiana bat occurring on Land Between the Lakes. As part of a Tennessee state project, biologists tracked the bat from its capture location in Tabaccoport Cave, Tennessee, to a tree on the Tennessee portion of Land Between the Lakes, where it roosted for several days. It was then tracked to a location outside Land Between the Lakes. This indicates that the bat was using Land Between the Lakes for temporary roosting and foraging during migration, and that it likely moved elsewhere for the summer breeding season.

During the summer of 2017, Murray State University biologists monitored the tree that the bat roosted in for further bat activity. They conducted six emergence surveys at the site. They observed bats emerging from the tree during one of the surveys. Acoustic recordings identified the bats as tri-colored bats.

We anticipate that the next long term monitoring survey will occur in 2020. Until then, there will be no widespread monitoring for bat populations. We will continue to perform project specific bat surveys as needed, though there are none scheduled at the time of this report.

Q5.26. Is the forest less likely to be affected by insects, disease, and wildfire?

(Duplicate questions for Measures 26-28)

Land Between the Lakes and our partners actively manage and monitor the forest. The treatments described here in Goal 5 lead to a resilient forest to better withstand impacts from insects, disease, and wildfire. Refer to the table and pie chart earlier in Figure 5.4 through 5.6 earlier in Goal 5 for treated acres and percentages about the management over the last ten years. Monitoring will continue to occur across the forest.

MQ5.26 Trends in early, mid, and late-successional forests by prescription group.

Land Between the Lakes forest conditions continue to trend toward an increasing amount of middle to late successional forest within the general forest and core area prescriptions groups. In Fiscal Years 2016 and 2017, no new timber activities occurred on the forest to alter any of the prescription groups.

MQ5.27. Trends in species diversity, structural diversity, age class, and stocking levels.

Trends will be addressed in the next biennial monitoring and evaluation report.

Overall, the trend of an increase in the amount of middle to late successional forest conditions continues in the general forest and core areas. This means the predominantly oak forest will continue moving closer to maturity and will be predisposed to stresses, such as insects and disease related to forest health issues. In Fiscal Years 2016 and 2017, no new timber activities occurred on the forest to alter species diversity, structural diversity, age class, and stocking levels.

Fiscal Year 2017

Transition Monitoring Question 49. Will regeneration treatments on the landscape impair soil quality to inhibit natural or artificial regeneration to occur on the treated landscape? Indicators include stocking surveys completed within 5 years after the final treatment.

Regeneration treatments occurred on the Willow timber sale in 2015. We will conduct the final stocking survey in 2020.

MQ5.28. Trends in native insect and disease effects.

Insects and Disease

No insect infestations in hardwood or pine stands have been detected on the forest. Diseases associated with old age, coupled with abiotic stressors such as tornadoes and ice damage, are still a concern. In 2016, a wind event occurred in the Cravens Bay and Birmingham Ferry areas. This event created blowdown on approximately 300 acres. A decision was signed for salvage treatment in these areas and now the areas are being used for firewood cutting. Monitoring for insect and diseases of these areas will continue.

Another contributing factor to consider in assessing the potential of oak decline is root and canker pathogens, such as armillaria root disease and Hypoxylon canker. Hypoxylon canker can be seen on many mature red oaks, particularly scarlet and blackjack oak, throughout the recreation area.

Other potential pests and pathogens that may affect the forest include the two-lined chestnut borer, red oak borer, various leaf defoliators, oak wilt, and sudden oak death. Sudden oak death is new to the forests of the eastern United States. Various locations throughout Land Between the Lakes have dying white oak, red oaks and chestnut oaks. These will be monitored to determine the cause of the mortality. It is a threat given the large number of oaks and other plant species that are host to the fungus (*Phytophthora ramorum*). A national sudden oak death risk/hazard map developed by the USDA Forest Service, National Forest Health Monitoring Research Unit, has Land Between the Lakes split between the high and moderate relative risk categories.

Forest Service uses stand level inventory data and random aerial reconnaissance to monitor and collect data on insects and disease at Land Between the Lakes. Stand level data collected on 38,273 acres include tree mortality, signs of pests and pathogens, and abiotic damage such as wind or ice damage. Although data relating to pockets of damage and individual tree mortality or damage has been captured, large-scale insect and disease outbreaks have not been detected in areas inventoried.

Non-native insects cause concern at Land Between the Lakes. The most well-known and previously monitored insect is the gypsy moth. Currently we put out 27 Gypsy moth traps annually as a monitoring and early detection system to the occurrence of the moth. A new exotic insect of concern is the emerald ash borer. These insects, especially emerald ash borer, are of concern to the Forest Service because they are sometimes transported by human activities such as bringing firewood from quarantine areas on camping trips. To date no gypsy moths or emerald ash borers have been detected at Land Between the Lakes. The forest management staff plans to continue participating in USDA monitoring programs. It will also be important to continue to work closely

Fiscal Year 2017

with the recreation staff to promote visitor awareness and participation in reducing habits that have a real potential to spread these insect populations through camping activities.

Q5.29. Has the Forest Service made progress towards identifying old growth stands on the ground?

In Fiscal Years 2016 and 2017, we inventoried approximately 4,000 acres, bringing the total inventoried on the forest to 38,273 acres. No old growth stands were identified. This does not mean there is no old growth at Land Between the Lakes because many acres still need to be inventoried.

MQ5.29. Completed inventory of old growth stands.

The current inventory being collected at Land Between the Lakes uses the Common Stand Exams method. This data can be used to identify any potential old growth stands that may be present in inventoried areas.

In Fiscal Years 2016 and 2017, we collected forest inventory data in the Fox Hollow and Gordon Hollow areas. These areas were chosen for data collection as possible future project areas. No old growth was found in these areas

Prescription Area	Years 2004-2010	Years 2010-2015	Years 2015-2017	Total Acres
General Forest	9,700	15,041	4,000	28,741
Core	2,900	1,132	0	4,032
Oak Grassland Restoration Demonstration Area	5,500	0	0	5,500
All Acres	18,100	16,173	0	38,273

Fiscal Year 2017

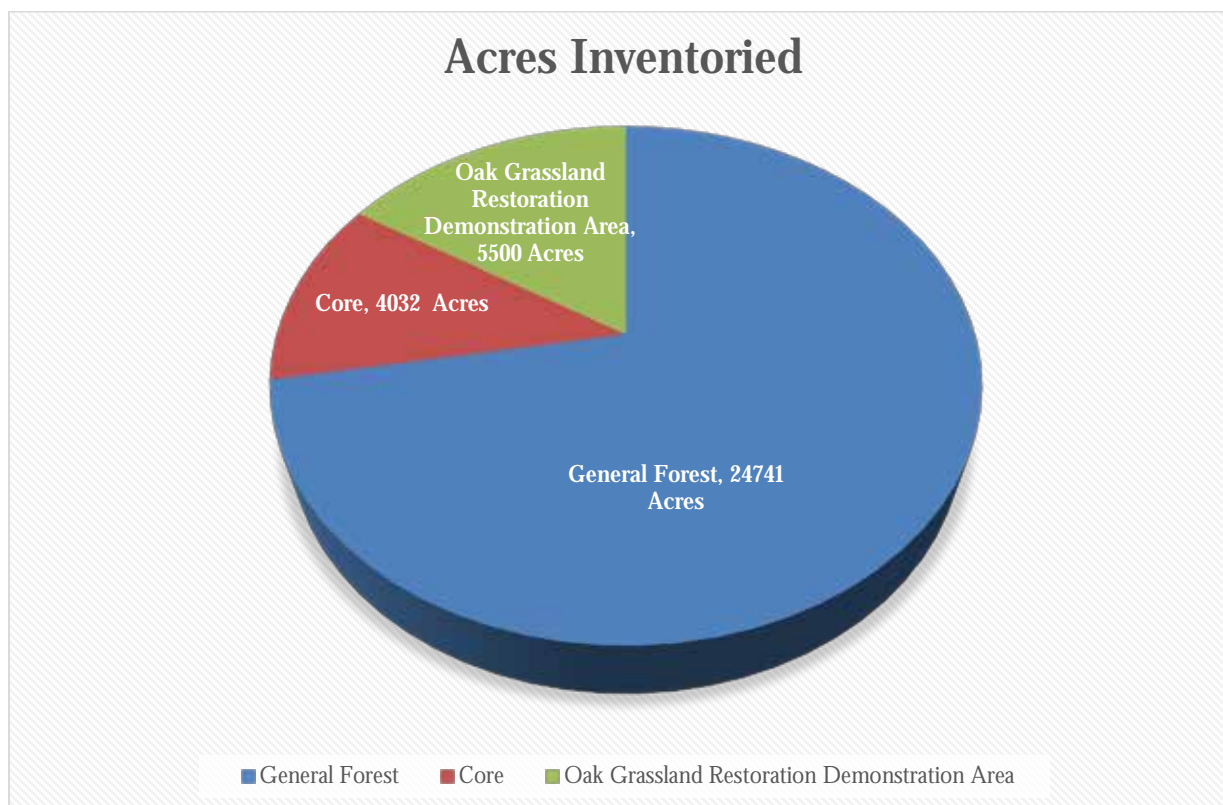


Figure 5.12: Acres of Inventoried Prescription Acres

Climate Change

Transition monitoring questions 45, 46, and 47 for climate change 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. To see the indicators and procedures that will be used at the broader-scale for these monitoring questions, see the Region 8's Broader-Scale Monitoring Strategy at <https://www.fs.usda.gov/main/r8/landmanagement/planning>.

Transition Monitoring Question 45. How has climate variability changes and how is it projected to change across the region? Indicators include climate extremes, precipitation, temperature, water balance, trends in land cover changes.

Information will be reported in the next biennial report.

Transition Monitoring Question 46. How is climate variability and change influencing the ecological, social, and economic conditions and contributions provided by plan areas in the region? Indicators include jobs and income, recreation use and satisfaction, non-native invasive plant species, phenology, wildfire and prescribed fire, and forest health status.

Fiscal Year 2017

Information will be reported in the next biennial report.

Transition Monitoring Question 47. What effects do national forests in the region have on a changing climate? Indicators include carbon stocks and trends and greenhouse gas emissions.

Information will be reported in the next biennial report.

Fiscal Year 2017

Goal 6:	Demonstrate and widely export innovative, efficient, and effective management techniques that can benefit others.
Sub-element NFS Generic Desired Condition	“Through the Demonstration Project role, the FS will continually seek to sharpen its management policies and techniques with an eye toward exporting these innovative and beneficial approaches to others locally, regionally, and nationally.” [Area Plan, Vision]
Example Area Plan Desired Condition Statement	“In its demonstration role, LBL will develop and test the programs, methods, and systems by which recreation, EE, and vegetation are managed, with the intention of promoting those elements that would provide benefits to other public and private land managers and units.” [Area Plan, Vision]
Desired Trend Statement	“Each year, export three to five demonstration products.” [Objective 6a]
Monitoring Questions	30. Has LBL produced measurable results from demonstration projects that have led to positive changes on other units? 31. How many demonstration products have been exported?
Area Plan Performance Measures	30. Trends and annual summary of accomplishments and results 31. Trends and annual summary of accomplishments and results
Data Sources Utilized	--Annual summary of units supported, accomplishment reports, feedback, policies changed, results; tracking, by documenting the assistance provided, support to specific organizations and agencies --Track annual accomplishments with standard tracking system
Importance	This goal contains one of the key emphases of the LBL Protection Act and reinforces the key purposes described for LBL when created in 1963. Effective delivery of conservation education messages is also a primary objective of both LBL and the agency.
What It Tells Us	The results related to this goal will provide key information about whether LBL is meeting its legislated objectives.

Fiscal Year 2017

Goal 6: Demonstrate and widely export innovative, efficient, and effective management techniques that can benefit others.

Q6.30 Has Land Between the Lakes produced measurable results from demonstration projects that have led to positive changes on other units?

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.

M Q6.30. Trends and annual summary of accomplishments and results

Land Between the Lakes completed the following demonstration projects during Fiscal Years 2016 and 2017.

Land Between the Lakes Association Partnership

Two highlights occurred within the partnership with Land Between the Lakes Association, also known as the "Friends group," over the past two fiscal years. In Fiscal Year 2017 the Friends group established and hired a new position, Director of Outreach and Sustainability. This position is similar to a Development Director at other non-profit organizations. The primary tasks of this new position are improving and developing relationships in the surrounding communities and increasing sponsorship and grant incomes for the organization. The intent is the position will make the Friends group more self-sustaining and less dependent upon funding from the Forest Service as a partner.

In August of 2017, two employees of the Friends group travelled with three Forest Service employees to San Bernardino, California to meet with the Southern California Mountains Foundation for one week. The Southern California Mountains Foundation is the "Friends" organization for the San Bernardino National Forest and the largest friends group within the USDA Forest Service. We spent the week sharing ideas and learning about all of their operations to bring back for use at Land Between the Lakes. Many of the ideas taken from this trip are already in the early implementation phase here on the unit.

Fiscal Year 2017



Figure 6.1: Land Between the Lakes Forest Service and Friends Group staff with Southern California Mountains Foundation Staff

Website

Our Demonstration Authority allows Land Between the Lakes to establish and maintain its own website: www.landbetweenthelakes.us. This is a huge asset to telling our recreation area's story. The website does not appear "governmental" and is incredibly user friendly. Due to the ability to update the site ourselves, we can make changes to the site at any time to better serve our constituents. Currently an intern student maintains the website through an agreement with Murray State University's Computer Science Department.

Tourism Marketing & Promotion

Over the past several years, communicating with our visitors, stakeholders and elected officials changed dramatically. Travelers went from finding out about vacation destination sites through state travel guides and site brochures to the internet, and now to their smart phones and tablets. Within a few short years, technology advanced exponentially. Examples of information on our website include an alerts page, online reservation system, blogs, and links to our social media sites. Land Between the Lakes Association continues to operate our social media sites.

Fiscal Year 2017

The demonstration authority also allows Land Between the Lakes to market and produce brochures differently than many other government units. For example, in Fiscal Year 2017 Land Between the Lakes began a local marketing campaign to highlight individual facilities and programs as opposed to the unit as a whole. The goal of the marketing campaign is to refocus efforts to inform the public in surrounding counties about activities at Land Between the Lakes, thus increasing visitation across the unit. We extended this marketing campaign to Parenting Magazines in Western Kentucky, Clarksville/Fort Campbell, and Nashville.

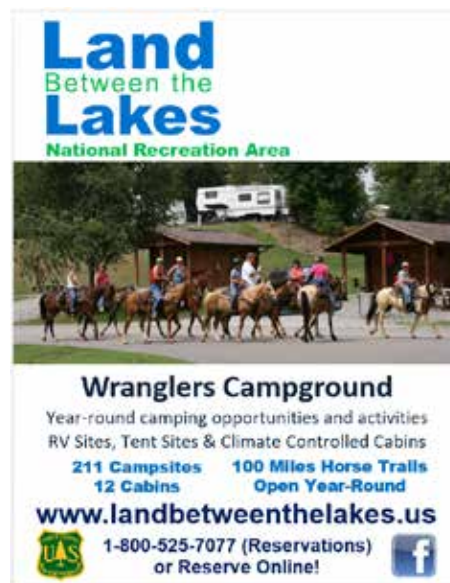


Figure 6.2: Example of ad placed in December 2017 issue of Purchase Parenting Magazine

Q6.31. How many demonstration products have been exported?

Most projects completed did not yield specific exportable products. The projects from 2016 and 2017 are described under the next monitoring question.

M Q6.31. Trends and annual summary of accomplishments and results

All Demonstration Projects

Below you will see a list by fiscal year of the individual projects completed as part of this demonstration goal.

Fiscal Year 2017

1. Partnership with Murray State University's Computer Science Department to provide an intern with the responsibility of updating and maintaining Land Between the Lakes' website
2. Travelled to San Bernardino, CA to meet with the Southern California Mountains Foundation to strengthen partnership between the Forest Service and the Land Between the Lakes Association
3. Developed small marketing campaign to better reach local communities with opportunities at Land Between the Lakes

Fiscal Year 2016

1. Implementation of Quick Books System for electronic uploads of documents to Land Between the Lakes Association

Fiscal Year 2017

2. Partnership with Austin Peay State University to digitally archive historic photographs, slides, videos and newspaper articles. Original documents will appropriately be kept in the archiving department at the university.
3. Worked with local companies to improve products and services at the campground outposts

Fiscal Year 2015

4. San Dimas Research and Technology Development Center – assisted with new trail monitoring publication
5. Lois Lane Project -- transitioned press releases as if written by a local news reporter; increased full coverage in traditional and digital media

Fiscal Year 2014

1. Demonstrated using wood pellets for biomass fuel at Trigg County Hospital and Lyon County High School
2. Introduced responsive website www.landbetweenthe lakes.us
3. Trail resurfacing – demonstrated a porous pavement system to hold aggregate in place during storm run-offs that also allows for water drainage

Fiscal Year 2013

1. Spring Mountains National Recreation Area – consulting and sharing of business practices
2. Valles Caldera National Preserve -- consulting and sharing of business practices; included a site visit by the Executive Director of the Friends of Land Between the Lakes to meet with management and stakeholders
3. Improved listings on third party online sites like TripAdvisor – sharing best practices in community and other forests

Fiscal Year 2012

1. Biomass boiler demonstration project at the Trigg County Hospital; provide wood chips for five years
2. Central Hardwoods Joint Venture -- advisor in support of helping bird populations survive and developed four general habitat types: grasslands, grass-shrublands, forest-woodlands, and wetlands
3. Differential camping fees beta test – did not adopt
4. Year round camping at Energy Lake Campground beta test – did not adopt
5. Staff electric cars in Wranglers Campground beta test – adopted
6. Golf carts usage in developed campgrounds beta test – user request -- adopted

Fiscal Year 2011

1. Biomass boiler demonstration project at the Lyon County High School; provide wood chips for five years
2. New Point-of-Sale system
3. Transfer of Station recommendation to Washington Office

Fiscal Year 2010

1. Biomass mid-story removal contract

Fiscal Year 2017

2. Biomass wood harvest sale
3. Outfitter/guide capacity study

Fiscal Year 2009

1. Digital Radio System Test
2. Region 9: Stewardship Program Consultation
3. Washington Office: Local Unit Reservation using Point of Sale Methodology
4. Green Mountain Interpretive Association Consultation and Mentoring

Fiscal Year 2008

1. San Dimas All-Terrain Vehicle Study
2. North Carolina Consultation/Mentoring Visit

Fiscal Year 2007

1. Washington Office: Office of Regulatory and Management Services Test
2. Region 8: Fire Learning Network Expansion
3. Washington Office: Forest Plan Monitoring & Evaluation Prototypes
4. Dakota Prairie Grassland Marketing Plan
5. Ozark Blanchard Caves Interpretation Association and Marketing Plan
6. Off-Highway Vehicle Dust Study
7. Joint Venture Agreements; Advance Payments to Partners
8. Friends of Cherokee Consultation

Fiscal Year 2006

1. Florida Recreation Plan
2. ATV Disk/seed spreaders for food plots
3. Regional Office: ATV EcoTourism Guidebook Client/Project

Fiscal Year 2005

1. Washington Office Recreation/Heritage Resources: Policy Improvement Project – Commercial Recreation Special Permit Use – Advertising/Partnership Recognition Dave Holland
2. Washington Office: Minerals & Geology Management Internal Marketing Strategic Plan

Fiscal Year 2004

1. Finger Lakes National Forest Recreation/Interpretation Improvements Feasibility Study
2. Mt. Hood National Forest, Forest Management Strategic Plan
3. Washington Office: Recreation Short Course Instructor Services Utah State and Clemson
4. Region 8: 18 Month Forest Plan Revision Demonstration
5. Region 10: Accountability through Accountability consultation
6. Chugach National Forest Logan District Conservation Education Center consultation
7. Tulsa Region Corps of Engineers – Business Techniques Training
8. Brasstown Bald Consultation/Mentoring

Goal 7:	Enhance dispersed recreational and EE opportunities throughout LBL.
Sub-element NFS Generic Desired Condition	<p>“...management will also promote and increase support for dispersed day-use and extended-stay activities in anticipation of increased demand in dispersed recreational and educational activities and experiences.</p> <p>“Hunting and fishing will continue to be important dispersed recreation opportunities at LBL.” [Area Plan, Vision]</p>
Example Area Plan Desired Condition Statement	<p>“Dispersed activities and opportunities will become an extension of the developed Rec/EE facilities and sites that currently exist.”</p> <p>“Program and project efforts will be directed toward improving and developing self-guided trail systems for nature viewing, hiking, biking, and horseback riding. Scenic lake vistas will be opened up, and the road system will support scenic driving, access to cemeteries, and access to dispersed recreational opportunities.” [Area Plan, Vision]</p>
Desired Trend Statement	<p>“Rehabilitate one to two areas contributing to dispersed recreation opportunities (e.g. backcountry, lake access, etc.) annually as determined by the realignment process, based on meeting present and anticipated user needs, providing resource protection, reducing maintenance costs, and reducing infrastructure.” [Objective 7a]</p> <p>“An average of one to two miles of trail will be constructed annually.” [Objective 7b]</p> <p>“Complete an average of one interpretive project annually within the Nature Watch Demonstration Areas and Oak-Grassland Demonstration Areas.” [Objective 7c]</p>
Monitoring Questions	32. Have dispersed recreational and EE opportunities at LBL been enhanced? (Duplicate question for Measures 32-35)
Area Plan Performance Measures	<p>32. Trends and annual summary of accomplishments and results</p> <p>33. Backlog of facility and trail maintenance needs and trends</p> <p>34. Results and trends in user satisfaction ratings</p> <p>35. Trends in financial resources needed and available to provide recreation opportunities</p>
Data Sources Utilized	<p>--Objective accomplishments, percentage of visitation utilizing dispersed Rec/EE opportunities</p> <p>--Analysis of Infra Deferred Maintenance Report and reporting of percent change in backlog</p> <p>--Summary of visitor satisfaction surveys or personal letters and notes received; objective accomplishments, integrated projects completed</p> <p>--Analysis of incoming funds-traditional budgets and fee collections-and costs of operations, in view of needs; reports using standard tracking systems</p>

Fiscal Year 2017

Importance	This goal contains one of the key program changes displayed in the LBL Area Plan and responds to concerns voiced by the visiting public during the planning process that LBL was not meeting changing customer demands through existing services.
What It Tells Us	The results related to this goal will provide key information about whether LBL is meeting its stated objectives in the Plan and is responding to the feedback of the public.

Goal 7: Enhance dispersed recreational and environmental Education opportunities throughout Land Between the Lakes.

Q7.32 Have dispersed recreational and environmental education opportunities at Land Between the Lakes been enhanced?

(Duplicate question for Measures 32-35)

Over the past two years we enhanced recreational and environmental educations opportunities at Land Between the Lakes.

Water Trails

Land Between the Lakes Regional Water Trails are being developed to provide a series of water trails for paddlers on Lake Barkley and Kentucky Lake shorelines in Kentucky and Tennessee. On Lake Barkley this will include water trails from Barkley Dam upstream to, and including, Cross Creeks National Wildlife Refuge. On Kentucky Lake this will include water trails from Kentucky Dam upstream to, and including, the Duck River unit of the Tennessee National Wildlife Refuge. The vision of the program is to connect these trails with existing trails along the Tennessee and Cumberland Rivers to provide a complete paddling experience. See the trail map on the website at <https://www.landbetweenthelakes.us/regional-water-trails/>.

The Land Between the Lakes Regional Water Trail will be a nationally designated water trail system that draws people of all ages for recreation opportunities, connects natural and historical resources, contributes to increased tourism and economic benefits, commits stewardship from the paddling community and enhances the quality of life of the Land Between the Lakes region. Planning began in 2016. The Land Between the Lakes Regional Water Trail initiative is made up of partners from five federal agencies, three Kentucky State Parks, three Tennessee State Parks and Chambers of Commerce and Visitors Bureaus in five Kentucky and ten Tennessee counties.

Fiscal Year 2017



Figure 7.1: Water Trail Symbol



Figure 7.2: Energy Lake

2017 Total Solar Eclipse

There was a total eclipse of the sun on August 21, 2017. Land Between the Lakes was in the area of extended totality of the eclipse. We expected and had a period of high visitation. Planning began in 2016 as reservations were opened to the public over a year in advance of the event. Forest Service staff, contractors, Friends of Land Between the Lakes, regional cooperators, state and local leaders, as well as Forest Service, state, and local law enforcement, met regularly for a year prior to August 2017. The planning included developing a list of viewing areas across Land Between the Lakes so the visitor centers and website provided locations for new-comers to the area to enjoy the eclipse. We reviewed all of these viewing sites and provided the necessary temporary sanitation equipment prior to the event. Plans were made for emergency evacuation of medical emergencies due to crowded roads. The visitation for the event encompassed three days and estimated in excess of 75,000 visitors. No accidents or other medical emergencies occurred during the event and no special cleanup was required after it. The event introduced Land Between the Lakes to a national audience who visited the area for the first time during the solar eclipse.



Figure 7.3: Eclipse at the Homeplace



Figure 7.4: Eclipse at the Fenton Day Use Area

Weather Events in Fiscal Years 2016 and 2017

The weather created several challenges in maintaining the recreation opportunities during the last two years. Two high lake level events occurred in January of 2016 and May of 2017 at Land Between the Lakes. We committed funding and teamwork to reopen lakeside facilities for visitors. In July of 2016, a tornado, strong straight line winds, and heavy rainfall closed Cravens Bay Campground for three months. Damage to other developed facilities, roads, and trails in the area caused short closures as well. The coordinated effort by Forest Service staff, contractors, and volunteers resulted in all facilities and trails being open by Labor Day weekend. Some damaged trail bridges required temporary trail reroutes.

Recreation Improvements

Golden Pond Shooting Range

We made improvements to the Golden Pond Shooting Range in Fiscal Year 2017. We installed two additional shooting benches along with an extended shelter over the benches. Also, we installed targets for use by shooters using funds donated by the Land Between the Lakes Sportsman Club. This installation improved the shooting experience at the range and reduced maintenance costs associated with cleaning up user-made targets left behind by shooters.



Fiscal Year 2017

Figure 7.5: Targets at Golden Pond Range

Basic and Dispersed Camping

There has been confusion with the nomenclature of the backcountry permit at Land Between the Lakes when it is compared to terminology used by other national forests across the United States. The backcountry permit was changed to basic and dispersed camping permits to reduce the confusion. The basic camping permit is required for use of the designated basic campgrounds and camping areas across Land Between the Lakes. The dispersed camping permit is required for camping in the non-designated areas across Land Between the Lakes. We replaced all the signage at the entrances to Land Between the Lakes and the campgrounds and camping areas to inform the users about the changes. We sell both permits at the Visitor Center, welcome stations, campground gatehouses, and on the website.



Figure 7.6: Basic Campground Entrance Sign



Figure 7.7: Land Between the Lakes Entrance Sign

New Informational Maps

In 2017, the Forest Service, in partnership with the Friends of Land Between the Lakes and the Coca-Cola Bottling Company, installed informational maps at four campgrounds. These maps provide campers with information on what is available across Land Between the Lakes while they stay at the campgrounds. The four facilities were Hillman Ferry, Energy Lake, Wranglers, and Piney Campgrounds. These informational maps are similar to the maps installed a few years ago at two pull-offs along 68/80 Highway.

Fiscal Year 2017



Figure 7.8: Informational Map

Piney Campground

In 2016, a new playground was added near the Piney Campground Outpost to add another recreational option for the children of campers during their stay.



Figure 7.9: Piney Outpost Playground

Energy Lake Campground

A Dump station was added in 2017 at Energy Lake Campground. This allows campers to extend their length of stay at the campground.

M Q7.32 Trends and annual summary of accomplishments and results

Summaries in each program area are described throughout this section of the report.

Transition Monitoring Question 41. What progress has been made toward becoming sustainable in Land Between the Lakes' recreation and environmental education operations? Indicators include Deferred Maintenance, Cost Recovery (including cost of operations), and Mile of Trails Maintained or Improved to Standard.

M Q7.33 Backlog of facility and trail maintenance needs and trends

Deferred Maintenance

We significantly lowered the amount of backlog maintenance needs at Land Between the Lakes in 2016 and 2017. We improved access at facilities through several projects. Maintenance and repairs at dispersed facilities eliminated erosion and poor drainage areas.

Cravens Bay Campground

In 2017, Land Between the Lakes replaced six portable toilets in Cravens Bay Campground with two accessible vault toilet buildings meeting the American Disability Act criteria. This is an example of maintenance cost reduction. The Forest Service also rehabilitated the Cravens Bay Bathhouse to better meet American Disability Act criteria.



Figure 7.10: Renovations at Cravens Bay bathhouse



Figure 7.11: Replacement vault toilet at Cravens Bay

Nickell Branch Campground and Boat Ramp

Erosion continued to damage the facilities, roads and the parking lot at the Nickell Branch Campground and Boat Ramp. We reworked the drainage to allow water to flow into the ditches and culverts. This eliminated the recurring erosion issues.

Fiscal Year 2017



Figure 7.12: Renovations at Nickell Branch



Figure 7.13: Renovations at Nickell Branch

Sugar Bay Campground and Boat Ramp

We completed repairs to a user-created road where storm runoff made a “ditch” through the middle of Sugar Bay Campground. This eliminated road erosion “ruts” and erosion to two campsites.



Figure 7.14: Erosion at Sugar Bay



Figure 7.15: Renovations at Sugar Bay

Fiscal Year 2017

Gatlin Point Campground

Storm run-off caused erosion on the roads and camping areas within Gatlin Point Campground. Most of the erosion issues were due to ditch failure. We re-established the proper drainage ditches and culverts, or replaced them with similar structures.



Figure 7.16: Erosion at Gatlin Point



Figure 7.17: Rehabilitation at Gatlin Point

Wranglers Campground

In 2017 we stabilized approximately 150 feet of stream bank in Wranglers Campground B loop. This project was necessary to improve water quality and minimize erosion. Multiple phases of the project included:

- Phase one cleaned debris from the ditch and removed blockages to allow drainage and prevent backwater damming.
- The stream banks were shaped or feathered back to reduce soil damage.
- Four culverts were installed and 100 tons of rip rap rock was placed.
- An additional project repaired erosion on a 300 foot section and diverted water back into original drainage in the Overflow area behind D loop.
- Restoration work was completed along Forest Service Road 368 and Equestrian Trail 1. Trail work repaired erosion and damage caused by equestrian use. Water was diverted back into the original drainage. The area was then reseeded. A temporary fence/barrier was erected to protect the area from riders until the vegetation is established.

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Figure 7.18: Rehabilitation at Wranglers



Figure 7.19: Rehabilitation at Trail One

Hillman Ferry Campground

We completed several projects in Hillman Ferry Campground to reduce the backlog of deferred maintenance in 2016 and 2017:

- Repaired a drainage issue on the road to Areas A and B. The road was washing out and causing the pavement to collapse. The repairs armored the drainage ditches and contoured them for better flow.
- Replaced the shelters covering the beach and outpost pavilion.
- Replaced the trail bridge to the amphitheater.
- Replaced the playground by the outpost.



Figure 7.20: Rehabilitation at Hillman Ferry B Loop

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Figure 7.21: Rehabilitation at Hillman Ferry Beach



Figure 7.22: Rehabilitation at Hillman Ferry Trail Bridge

Sustaining Recreation

Over the last ten years, we looked at ways to make the recreation programs more efficient and sustainable for the future. In 2012 we implemented a 32-point plan for the management of the backcountry, lake access, and day use areas. We decommissioned the following infrastructure as part of this process in Fiscal Years 2016 and 2017. These reduced our deferred maintenance backlog from \$6,899,707 to \$4,260,183, or more than \$2.6 million.

- Decommissioning began of closed facilities
 - Rushing Creek Campground
 - Jones Creek Campground
 - Bacon Creek Boat Ramp
- Decommissioning of closed buildings
 - Removal of well house and capping well at Birmingham Ferry

Land Between the Lakes addressed budget reductions in facilities and maintenance and anticipated future reductions through an innovative partnership with the public in 2012. We identified more than \$1 million in viable ideas from the public through a combination of potential cost savings and revenue increasing opportunities. The feedback process used to finalize the immediate actions included a web based comment process. Implementation of the process began in 2013. Items we implemented in Fiscal Years 2016 and 2017 include:

- Added 50 amp electric service at Piney Campground
- Installed 12 camping cabins at Energy Lake



Figure 7.23: Camping cabin at Energy Lake

Cost Recovery

With decreasing budgets across the Forest Service, Land Between the Lakes experienced significant decreases in appropriations designated for facilities and recreation. This downward trend began in 2011 and appears to continue in the foreseeable future. Land Between the Lakes continues to analyze and change operations to decrease costs while maintaining current services. Over the past several years, Land Between the Lakes reduced deferred maintenance to lower costs and focused on increasing revenue through increasing visitation and recreational opportunities. With the ever changing population and evolving recreation demand, Land Between the Lakes will have to focus on bringing in more revenues to offset the decrease in appropriations to meet recreation demand. In 2011, Land Between the Lakes had a total area-wide cost recovery of 31%. The area-wide cost recovery increased to 39% in Fiscal Year 2017 by decreasing costs and increasing revenues. In 2015, Hillman Ferry and Piney Campgrounds became fiscally self-sustaining and continued to be over 100% in cost recovery for the past two years. In Fiscal Year 2017, Wranglers Campground had its first year of being self-sustaining.

Besides focusing on revenue, Land Between the Lakes must stay aware of changes in recreation trends and the ever changing demographics. With population changes nationally and locally, public

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land use will shift over the next five to 10 years. Land Between the Lakes will make appropriate changes to ensure we continue to be an economic driver for the region.

Trails

Land Between the Lakes continues to make great strides in developing, maintaining, and promoting positive trail experiences for all trail users. With its unique history, varied trail opportunities, and high visitor demand, successful trail management at Land Between the Lakes has proven to be a challenging and rewarding process. Countless volunteers, organizations, businesses, and friends assisted by dedicating time, money, materials, and sweat to ensure each trail niche operates efficiently. Ultimately, by managing current use and planning for the future, a multiple-use trail system at Land Between the Lakes can succeed.

Maintenance and Monitoring

During Fiscal Years 2016 and 2017, contractor, staff, and volunteers collectively maintained 139 miles of trail routes each year. Of those, we reported about 90 miles maintenance each year that meet Forest Service trail standards.

Fiscal Year 2016 – Trails Maintained to Standard (reported through INFRA) – 83.7754 mi.

Fiscal Year 2017 – Trails Maintained to Standard (reported though INFRA) – 91.6481 mi.

Miles	Trails
16	Nature Station Trails - 8 miles twice Hematite, Center Furnace, Woodland Walk, and Honker Trails
57	North/South Trail and associated connector trails
27	Fort Henry Trails Pickett Loop, Telegraph, Piney, Artillery, Devil's Backbone, Tennessee Ridge, and Peytona Trails
11	Central Hardwoods Scenic Trail
14	Canal Loop and Connectors (Volunteers)
5	Hillman Heritage Trail
9	Brandon Spring Trails Yellow, Blue, Red, White, Orange, and Paw Trails
139	Total Trail miles

Figure 7.24: Trail miles maintained in Fiscal Years 2016 and 2017

Miles	Trails
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2	Central Hardwoods Scenic Trail (post-March 2017 managed wildfire trail maintenance)
2	Total

Figure 7.25: Trails Improved to Standard (INFRA)-2.02 miles

Trail maintenance requires different techniques, tools, or specializations depending on the type of trail being addressed. Land Between the Lakes offers a variety of trail options across the recreation opportunity spectrum. That variety provides the Forest Service the opportunity to demonstrate new maintenance techniques, and monitoring approaches to improve upon existing methods, often simultaneously. We used “green” materials and experimented with different composite drainage and stream stabilization products with considerable success. Listed below are some of the trails projects we completed during Fiscal Years 2016 and 2017.



Figure 7.26: Repairs to poorly drained sections of the Central Hardwoods Scenic Trail (October-November, 2016)



Figure 7.27: (Left) North/South Trail bridge decking repairs (May-June, 2017); (Right) Honker Trail steps replacement (June-July, 2017)

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While it's imperative we perform these maintenance measures regularly to preserve trail integrity, we also recognizes the need for scientific data to help quantify on-the-ground actions. The efforts listed below include environmental studies conducted during Fiscal Years 2016 and 2017 to monitor how certain recreational uses affect soil, water, and vegetation.

The following addresses some monitoring measures:

1. Hancock Biological Center – Monitors water quality in Turkey Bay and throughout Kentucky Lake. <http://www.murraystate.edu/qacd/cos/hbs/hbs.htm>
2. Partnership with National Technology Development Program-Missoula - A second soil moisture monitoring station was installed to give a comparative analysis of similar measurements taken simultaneously at another station located within Turkey Bay OHV Area. <http://ohv.fleetanalytics.net/>, <http://kentuckyohv.metridyne.com/>



Figure 7.28: New soil moisture monitoring station at Turkey Bay Off-Highway Vehicle Area (June 2017)

3. LBL 200 event monitoring – Trail profile surveys and photos taken at predetermined trail points along a motorcycle route for event utilizing the North/South Trail and other roads.

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Figure 7.29: LBL 200 pre- and post-event trail monitoring point (September, 2017)

Volunteers continue to serve as integral contributors to the success of Land Between the Lakes. Nationally recognized organizations, local clubs, church groups, college and university assemblies, and numerous families and individuals all contribute to various programs throughout Land Between the Lakes. During Fiscal Years 2016 and 2017, the trails and OHV niche continued to thrive because volunteers served in many capacities. Volunteers performed trail maintenance and inventory tasks, monitored trail conditions, and reported successes, failures, and recommendations back to the Forest Service.



Figure 7.30: Volunteers during National Trails Day (June, 2017) and Turkey Bay OHV Area cleanup (September, 2017)

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Figure 7.31: Clearing Canal Loop Trail with help of volunteer from cycling group (July, 2016)

Hematite Trail

Efforts to address deteriorating infrastructure associated with Hematite Trail continue to show progress. Located in the Northern Nature Watch Area, Hematite is the #1 hiked trail at Land Between the Lakes and is a popular destination for visitors to Woodlands Nature Station. Several features of the trail reached their life expectancy and compromised public safety. Other features incur increased costs for repeated repairs. Various weather events spanning the past 5-7 years adversely affected trail infrastructure resulting in the existing boardwalk to shift/float away and caused retaining structures and trail edges to erode. The priority infrastructure improvements include replacing three complex bridges, replacing approximately 1,000 feet of existing boardwalk, decommissioning a short boardwalk spur, and enhancing wildlife viewing opportunities for persons with disabilities. Listed below are some of the planning measures and action items associated with Hematite Trail completed during Fiscal Years 2016 and 2017.

November 14, 2015 – Public open house hosted at Nature Station

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April 12-13, 2016 – Site visit with Trails Unlimited staff for soil type/density testing and preliminary structure assessment

November 3, 2016 – Detailed report submitted by Trails Unlimited staff for soil test findings, structure recommendations, and preliminary cost estimates

May 16, 2017 – Concurrences and Categorical Exclusion checklist completed

June 8, 2017 – Decision Memo and PACE! It Assessment documents authorized

September 19-21, 2017 – Comprehensive site survey performed by Forest Service crew (surveyor, engineer, and hydrologist). They gathered data pertaining to natural and constructed feature elevations, subsurface conditions, existing and projected trail alignment, and hydrological history. The data will be used to produce structure design drawings, a hydrological analysis, and a refined cost estimate for the replacement structures.



Figure 7.32: Hematite Trail site visit with Trails Unlimited (April, 2016)



Figure 7.33: Hematite Trail site visit with Forest Service Crew (September, 2017)

Wranglers Trail 11 Construction

We constructed a 2.8 mile designated pack and saddle stock trail in Trigg County, Kentucky, named Wranglers Trail 11. This project was mitigation to replace three miles of trail decommissioned for the highway 68/80 construction. The Forest Service collaborated with the Land Between the Lakes Back Country Horsemen of America to identify and mark the proposed route. Features of the new trail include:

- Construction along the side slope of the contour with a 2-4 % grade with the intent to drain and reduce soil compaction and displacement.

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- Three hardened stream crossings using eco-block to reduce erosion to stream banks, protect aquatic species and preserve water quality.
- Regulatory signs erected adjacent to open land agriculture fields instructing trail riders to stay on the trail in an effort to protect the resources.
- A trail side rest area consisting of two picnic tables, two hitching rails, and a trash receptacle near the “Old Golden Pond” rest area.
- A vault toilet at another trail side rest area where Trail 11 intersects with Trails 9 and 10.

We installed an additional vault toilet at the “Blue Hole”, a popular destination on Wranglers Trails 6, 7, and 8.



Figure 7.34: Trail 11 Construction



Figure 7.35: Trail 11 Construction

Kentucky Lake Bridge Trail

In December of 2016, the State of Kentucky opened the trail that crosses over Kentucky Lake on the recently constructed bridge. The Forest Service then connected this trail through Fenton Day Use Area to the Central Hardwoods Bike/Hike Trail. The Central Hardwoods Trail will eventually connect to the trail across the Lake Barkley Bridge when it is completed in 2018. The Forest Service installed a vault toilet at Fenton in 2016. This new facility serves both the Central Hardwoods/Bridge Trailhead and the Fenton Boat Ramp.



Figure 7.36: Kentucky Lake Bridge



Figure 7.37: Fenton Sweet Smelling Vault Toilet

July 2016 Storm Damage

During the week of July 2-8, 2016, Land Between the Lakes experienced several rounds of severe weather resulting in over 13 inches of rainfall. Numerous roads, trails, bridges, drainage features, and other recreation facility infrastructure sustained significant damage from flash flooding. One pedestrian bridge on Honker Trail was severely undermined. Approaches to a bridge at Brandon Spring Group Center were detached and displaced. Two bridges on the North/South Trail were completely washed away. These structures along with many others across Land Between the Lakes were captured by individual damage survey reports (DSR) and submitted for Emergency Relief for Federally Owned Roads (ERFO) funding. Each trail bridge was selected to begin the process for replacement.

The roads, trails, and infrastructure at Turkey Bay OHV Area also sustained major damage. Turkey Bay was closed for over a month to make the necessary repairs.



Figure 7.38: Trail bridge damage (left) and trail and road damage at Turkey Bay OHV Area (right) after July 2016 storms

Canal Loop Bridge Replacement

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In Fiscal Years 2016 and 2017, we improved visitor safety and reduced deferred maintenance for two bridges associated with the Canal Loop Trail. We decommissioned the bridges after considering past inspections, ages, locations, site conditions, repairs, and visitor use. We removed the bridges from service in June 2016. Planning for replacement bridges began in 2017.



Figure 7.39: Canal Loop trail bridge site (June, 2016)

Turkey Bay OHV Area Upgrades

Listed below are a few of the infrastructure upgrades we completed at Turkey Bay Off-Highway Vehicle Area during Fiscal Years 2016 and 2017.

- January 2016 – Five new porta-john chemical toilets installed to replace aging/deteriorating structures in camping areas.
- March 2016 – New directional and regulatory signage installed at entrance, Forest Service Road 167, camping areas, and trailheads.
- July-August 2016 – Initial road, trail, and camping area storm repairs and flood cleanup completed to re-open facility.
- August 2016 - New vault toilet installed. This amenity upgrade provides a safer, cleaner, and more comfortable service for Turkey Bay visitors and reduces long-term maintenance costs to the Forest Service.

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Figure 7.40: New vault toilet at Turkey Bay (August, 2016)

- May-November 2016 – Performed trail tread/corridor and drainage feature maintenance on 15 miles of the main trails.
- April 2017 – Initiated work to repair 2 hardened creek crossings damaged during July 2016 storms.
- August 2017 – New roof, bladder pressure tanks, vehicle bollards, vents, and hydrant installed at well house. Hazard trees removed behind building.

Trail Maintenance and Watershed Improvements

Every year Land Between the Lakes maintains numerous infrastructure features such as campsites, roads, fire rings, trailhead boards, and water systems. The level of use drives the level of maintenance performed on these items. No level of maintenance may be as difficult to define, measure, or witness immediate results as “watershed maintenance”. Over the past 10 years, Land Between the Lakes was a focal point, garnering national attention at times, for the techniques, methods, and partnerships applied to not only improve watershed quality but also to minimize the impacts of unmanaged recreation. The following table highlights a few of those applications completed during Fiscal Years 2016 and 2017:

Figure 7.41: Watershed improvements through trail maintenance and repairs

Fiscal Year	Miles	Acres	Primary Funding	Watershed	Activity
2016	11.9		Forest Service Legacy	Dry Creek/ Cumberland River	Drainage feature and trail tread maintenance, culvert decommission (1)
2016	15		Forest Service Watershed	Turner Hollow/Turkey Creek/Kentucky Lake	Drainage feature and trail tread maintenance

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2017		0.5	Forest Service Watershed	North Fork Turkey Creek/ KY Lake	Initiate creek crossing repairs(2)
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Figure 7.42: Watershed improvement projects (June 2016 - July 2017)

M Q7.34 Results and trends in user satisfaction ratings

User satisfaction can be found in [Goal 2](#) under Measurement Question 2.3, *Trends in visitation, levels of community participation*.

Promotions/Special Events

Dispersed recreational opportunities, which include all trail-related activities, are an extension of Land Between the Lakes' mission to "protect and manage the resources of the Recreation Area for optimum yield of outdoor recreation and environmental education through multiple use management." Maintaining, developing, and promoting these activities not only enhances visitors'

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trail experiences but also ensures these opportunities remain available for years to come. Numerous clubs, organizations, and businesses coordinated trail events and activities at Land Between the Lakes. These events, some over 25 years old, resulted in positive exposure, advocacy for that trail use, and financial stimulus for the surrounding region. The following list includes some events and groups utilizing Land Between the Lakes during Fiscal Years 2016 and 2017.

- White Lightning mountain bike race – Wood N’ Wave, Grand Rivers, KY
- Race to the Canal mountain bike race – Wood N’ Wave, Grand Rivers, KY
- Canal Loop Trail Runs (23K, marathon, 60K, and 50 mile races) - Durbin Race Management, Knoxville, TN
- Run!LBL (23K and marathon races) – Durbin Race Management – Knoxville, TN
- LBL Challenge adventure race (12 and 24 hr events) – 361 Adventures, Cincinnati, OH
- Unbridled Series adventure race (8 hr event) – 361 Adventures, Cincinnati, OH
- Land Between the Lakes Jeep Jamboree – Jeep Jamboree USA, Georgetown, CA
- LBL 200 Dual Sport Ride – KT Riders, Cadiz, KY (since 1986)
- Espinazo del Diablo bicycle race (36, 48, and 84 mi events) – Gear Up Cycles, Murray, KY
- Bicycle product demonstrations – Gear-Up Cycles, Murray, KY
- Various U.S. military training – Ft. Campbell, KY
- Various religious and military reenactments
- Various Boy/Girl Scouts of America events and camps

Hunting

The Forest Service manages hunting on Land Between the Lakes National Recreation Area in cooperation with the Kentucky Department of Fish and Wildlife Resources, Tennessee Wildlife Resources Agency, U.S. Fish and Wildlife Service, and other partners. Hunting continues to be a popular activity on Land Between the Lakes, especially during fall, winter, and spring. The Forest Service continues to offer more than 230 days per year of hunting opportunities on Land Between the Lakes for big game, small game and waterfowl. In partnership with the National Wild Turkey Federation, we continue to provide turkey and deer hunting opportunities for hunters who are permanently confined to a wheelchair.

To limit harvest and provide a safer and better quality experience, we hold quota hunts on Land Between the Lakes for deer and turkeys. Forest Service staff respond to hunters’ questions during the application process, and throughout the year.

Thousands of hunters continue to apply for deer and turkey quota hunts each year. The numbers of hunters that applied for quota hunts from 2008 through 2017 are provided in the table below, along with number of permits issued. Factors affecting the number of permits available each year include number of hunts available, attempts to reduce crowding and harvest, and declining number of youth applicants. Applications for all quota hunts, except youth hunts, exceed the available number of permits.

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Figure 7.43: Quota Hunt Numbers		
Species And Year	Quota Hunt Applications	Quota Hunt Permits
Deer		
2008	11,965	5,691
2009	10,166	4,133
2010	9,307	4,187
2011	9,032	4,144
2012	8,779	4,105
2013	8,575	3,977
2014	8,209	3,885
2015	8,389	3,836
2016	6,716	3,747
2017	5,697	3,680
Turkey		
2008	2,629	2,076
2009	2,292	1,897
2010	2,407	1,917
2011	2,232	1,854
2012	2,261	1,892
2013	2,322	1,854
2014	2,425	1,839
2015	2,539	1,457
2016	2,426	1,404
2017	2,504	1,401

The numbers of deer and turkeys harvested during quota hunts are affected by a number of factors, including number of permits issued, number of hunters receiving permits who actually show up for the hunt (not measured as no check-in is required), weather, fluctuations in game populations, and individual hunter preferences.

Wildlife staff evaluates data from deer surveys and harvests to help determine the health of the deer population and determine how much hunting pressure the herd is receiving. Wildlife staff also evaluate information provided by hunters, staff, and other related forest users regarding deer sightings and activities.

A gradual decrease in the Land Between the Lakes deer population became increasingly noticeable by the 2015 fall deer season. After reviewing the harvest and survey data following that season, Land Between the Lakes wildlife managers took an in-depth look at data with the Kentucky Department of Fish and Wildlife Resources and Tennessee Wildlife Resources Agency. The review indicated a need to limit deer harvest numbers on Land Between the Lakes by changing the hunting regulations for the 2016 fall season.

Wildlife specialists and law enforcement staff determined many hunters hunted on Land Between the Lakes because the hunters were able to harvest extra deer above the existing state limits (bonus). After review of the data, staff found some of the harvests reported as Land Between the Lakes harvests were actually harvested off-site. Some hunters were using Land Between the Lakes as a method to illegally harvest extra deer. This created unreliable information for wildlife management staff to determine population impacts due to hunting versus other potential factors.

We decided to decrease the Land Between the Lakes deer harvest for the fall 2016 season through changes in hunting regulations. The 'bonus' deer opportunity was removed from both the Tennessee and Kentucky portions of Land Between the Lakes, except during youth quota hunts. The number of deer allowed for harvest was reduced from two to one on the Kentucky portion of Land Between the Lakes only. In addition, the archery season was shortened a few weeks from the state seasons so that it started during late September and ended during early January. These changes and the reasoning behind them were relayed to the public using various communication formats.

These changes resulted in a significant decrease in the number of archery deer harvests reported for the Kentucky portion of Land Between the Lakes during the 2016 fall season. Prior to the changes, the popularity of Land Between the Lakes as an archery deer hunting destination was steadily increasing over the past several years, and the number of reported archery harvests on the Kentucky portion of Land Between the Lakes exceeded quota hunt firearm harvests.

Another impact of these regulation changes was 20%, then 30%, fewer hunters applied for deer quota hunts on Land Between the Lakes for the 2016 and 2017 seasons when compared to the 2015 season. Many hunters were unaware of the regulation changes and related herd reduction information when they applied for the 2016 season. As additional hunters became aware of the changes, there was an additional 10% decrease in applications from the previous year.

Environmental Education Program

More detailed information about the environmental education program is located under Goal 3 of this report.

Dispersed environmental education opportunities have increased and been enhanced. On a regular basis we offer guided canoe trips, guided yacht and van eagle tours, night hikes, Fort Henry hikes, wildflower hikes, pond prowls, stream strolls, Iron Furnace tours, the Discovery Agents game, and self-guided nature watch tours. Interpretive panels are dispersed throughout Land Between the Lakes.

Nature enthusiasts now enjoy exploration of the demonstration area called The Woodlands Nature Watch Area. The hub is located at the Nature Station, but developments away from the facility opened Bobcat and Empire Points to the public which provided non-motorized beach access and a canoe/kayak looping route. Informational panels were installed at each point and some guided tours take place. Other projects include the Hematite Trail renovations. Plans include replacing the viewing blind in a more safe and sustainable location and developing an accessible path to a renovated viewing point. The Discovery Agent mobile game is played primarily outside of the Nature Station.

Regionally, we provide field trip grants to public school classes within 100 miles of Land Between the Lakes. We partnered with Stewart County Independent School District for field trips to Devils Backbone, Earth Camp, and educator workshops. Locals are invited to come out, spread out and join in the Christmas Bird Count.

Heritage Program

We described stewardship and educational projects promoted by the Heritage Program in Goals 1, 2 and 3 earlier in this report. Many people enjoy visiting over 270 cemeteries on Land Between the Lakes National Recreation Area. Former residents and their descendants visit and maintain most of the cemeteries. The Heritage Program also provides cemetery maintenance and access to cemeteries with road maintenance, often on roads that were never designed to be driven by today's cars. We completed maintenance related to access to 46 cemeteries during Fiscal Years 2016 and 2017.

The Land Between the Lakes Protection Act legally obligates the Forest Service to maintain an inventory of and ensure access to cemeteries for burial, visitation, and maintenance. Furthermore, a design criteria in the 2004 Area Plan went beyond the original Tennessee Valley Authority standard for cemetery access. The Tennessee Valley Authority standard stated that they would provide access to cemeteries to the same level as existed at the time Tennessee Valley Authority created the Recreation Area. The Area Plan design criteria stated that the Forest Service would provide access to cemeteries that meets or exceeds the type that existed when it became federal property. No one documented the quality of the access roads at time of creation of Land Between the Lakes National Recreation Area so disagreement can occur as to what a properly maintained cemetery access might look like. It is important Land between the Lakes work together with former residents, their families, and their descendants to provide access when and where it is needed.

M Q7.35 Trends in financial resources needed and available to provide recreation opportunities

Management of financial resources has always been an important piece of the recreation program at Land Between the Lakes National Recreation Area. We are very proactive with the users of Land Between the Lakes dialoguing about the best use of the financial resources.

In 2016, Land Between the Lakes conducted a fee review of the prices charged for camp sites in the Seasonal Camping Program. The prices that were charged at the time were compared to the long term sites in similar campgrounds at federal, state, and private facilities within a 300 miles radius. Based upon this analysis, we raised prices for the seasonal camping program for the 2017 and 2018 seasonal camping program. This increase in pricing will assist Land Between the Lakes in maintaining and making needed improvements in all developed recreation sites across the unit.

Transition Monitoring Question 42. Does Land Between the Lakes have the ability to meet present and future user demands for recreation and environmental education activities, programs, and facilities? Indicators include Satisfaction from NVUM, Financial Resource Trends, Cost of Operations Trends, and Facility Improvements.

Land Between the Lakes is part of a Region 8 proposal to develop a sustainable recreation strategy for all national forests within the region. The Forest Service regionally has more recreation sites than it can afford to maintain to standard. Over the past several years, the Forest Service developed criteria to be used to compare all the similar recreation facilities across the region. With that complete, in 2017 Land Between the Lakes began to plan for a collaborative public involvement process to involve interested parties to help us develop a plan to have the right mix of recreation opportunities that are socially, economically, and ecologically sustainable. We plan to begin this public involvement process in 2018.

As part of the sustainable recreation strategy, Land Between the Lakes conducted a review of the environmental education facilities and programs. The facilities and programs were reviewed for how they can best meet the needs of the customers and educators that use the programs and facilities as recreational experiences or as part of an educational visit. The review included input from regional and local educators, environmental education professionals and Forest Service staff. Information gathered from this review will be used as part of the planning process to develop a sustainable recreation strategy for Land Between the Lakes.

We summarized deferred maintenance, cost recovery, and facility improvements earlier under Goal 7. We present the annual budget for operation of Land Between the Lakes under Goal 8 of this report.

Goal 8:	The LBL Area Plan will remain effective and usable and lead to accomplishments that support National Strategic Goals.
Sub-element NFS Generic Desired Condition	“...as a unit of the FS, LBL will actively fulfill its role in support of the FS’s National Strategic Goals.” [Area Plan, Mission]
Example Area Plan Desired Condition Statement	“The programs and methods used at LBL will be in a constant state of evaluation for improvement and refinement, assuring that LBL will maintain a cutting-edge management focus in all disciplines.” [Area Plan, Vision]
Desired Trend Statement	“A user-friendly and informative Area Plan monitoring and evaluation report will be produced annually and include comparison of LBL accomplishments and National Strategic Goals.” [Objective 8a]
Monitoring Questions	36. Are the goals of the LBL Plan leading to accomplishments that support national objectives? (Duplicate question for Measures 36-39)
Area Plan Performance Measures	36. Trends and annual summary of accomplishments and results. 37. Determine whether standards, guidelines, and management requirements are being met and are effective in achieving expected results. 38. Determine if planning information or physical conditions have changed and provisions remain scientifically valid. 39. Comparison of estimated and actual costs of plan implementation.
Data Sources Utilized	--Comparison of projects and recent accomplishments to the National Strategic Plan goals and objectives; public comments; standard tracking systems --Interdisciplinary review; sample projects to observe effectiveness of implemented standards --Interdisciplinary review of Area Plan for needed changes as new information becomes available and/or significant changes in conditions are observed --Compare trends in operating budgets to the estimated costs of implementing the Area Plan
Importance	Ensures that the Plan stays usable and is working to support not only LBL goals, but those of the agency. Aids in communication with stakeholders.
What It Tells Us	By reviewing the accomplishments, we are able to find trends that indicate if the Plan is moving towards desired conditions, and should emerging issues begin to occupy more time and resources than the objectives in the Plan, indications for a “need for change” can be identified.

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Goal 8: The Land Between the Lakes Area Plan will remain effective and usable and lead to accomplishments that support National Strategic Goals

Q8.36 Are the goals of the Land Between the Lakes Plan leading to accomplishments that support national objectives?

(Duplicate question for Measures 36-39)

The 2004 Area Plan remains aligned with the goals of the USDA Forest Service and Region 8. The planning information, assumptions, and provisions of the Area Plan remain scientifically valid.

M Q8.36 Trends and annual summary of accomplishments and results.

We continue to contribute to the achievement of the National Forest Service strategic goals by completing the assigned Performance Attainment Reporting targets. The table below displays key accomplishments for the last five full fiscal years of the 2004 Area Plan implementation. Prior fiscal year accomplishments were reported in earlier Monitoring and Evaluation Reports.

The narratives written for the first seven goals earlier in this report provide the best explanation of the trends and summary of accomplishments.

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Figure 8.1: Fiscal Year Accomplishments

Specific National Objective (Target)	Unit of Measure	FY13 Accomp.	FY14 Accomp.	FY15 Accomp.	FY16 Accomp.	FY17 Accomp.
Miles of high clearance system roads receiving maintenance	Mile	25	13	21	27	7
Miles of passenger car system roads receiving maintenance	Mile	234	241	104	106	114
Miles of road decommissioned	Mile	0	0	0	na	na
Total trail system miles meeting standard	Mile	92	132	268	29	340
Miles of system trail improved to standard	Mile	3	8	38	na	2
Miles of system trail receiving maintenance to standard	Mile	89	124	130	84	92
Number of interpretive and conservation education plans implemented	Plan	1	1	1	1	1
Priority Heritage assets managed to standard	Asset	N/A	N/A	41	52	69

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Specific National Objective (Target)	Unit of Measure	FY13 Accomp.	FY14 Accomp.	FY15 Accomp.	FY16 Accomp.	FY17 Accomp.
Heritage program managed to standard	Program	N/A	1	0	1	1
Recreation site capacity (number of People At One Time) operated to standard	PAOT (Core) (Integrated)	1,300,449	1,240,613	1,232,991	1,224,292	1,224,292
		3,075,212	5,863,009	5,863,009	5,914,474	5,914,474
Number of wildlife interpretation and education products	Product	---	---	---	---	---
Acres of inland lake habitat enhanced	Acre	2,371	1,385	1,111	1,126	927
Acres of inventory data collected or acquired meeting corporate standards	Acre	6,000	15,260	6,750	13,524	35,362
Acres of non-threatened/endangered terrestrial habitat enhanced	Acre	14,688	13,742	11,061	7,285	9,287
Soil and water resource acres improved	Acre	6,593	802	581	635	574
Volume of Regular Timber Sold	ccf	2,949 plus 3,829*	9,853*	37	14	19
Number of forest special products permits issued	Permit	33	na	na	na	na
Annual monitoring requirements completed	Number	10	10	10	9	8
Landscape scale Ecosystem assessments completed	0	0	1	1	0	0

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Specific National Objective (Target)	Unit of Measu	FY13 Accomp.	FY14 Accomp.	FY15 Accomp.	FY16 Accomp.	FY17 Accomp.
Highest priority acres treated annually for noxious weeds and invasive plants on NF lands	Acre	808	851	748	957	708
Land use authorizations administered to standard	Authorization	38	27	24	30	34
Total Acres Treated For Haz. And Secondary Fuels	Acre	5,793	11,083	5,536	3,771	985
Haz. Fuels Acres Treated with Prescribed Fire	Acre	5,698	5,154	2,917	2,079	985
Secondary Fuels (FN Other Acres Treated)	Acre	---	5,929	2,619	1,692	na
Number of land use proposals and applications processed	Application	9	8	14	16	15
Recreation Special use Authorizations Administered to Standard	Authorization	200	208	250	281	288
Threatened & Endangered (T&E) and non-T&E Habitat Enhanced	Acre	14,688	13,741	11,061	10,940	9,287
Stewardship	Acre	5,010	5,380	4,713	4,691	5,644

*Due to accounting system, 3,829 ccf sold in FY13 was accounted in FY14.

The large increases between FY11 and FY12/13 in the number of acres of natural resource improvements came from a change in reporting to use of integrated accomplishments. These habitats include inland lake habitat enhanced, soil and water resource acres improved, threat and endangered (T&E) and non-T&E habitat enhanced. The actual acres treated are approximately the same numbers as FY11 and earlier. The value for timber volume sold in the table has approximately 3,800 ccf from FY13 accounted for in FY14 in addition to the FY14 volume target.

M Q8.37 Determine whether standards, guidelines, and management requirements are being met and are effective in achieving expected results.

Design criteria, including standards, are applied during project implementation. We monitor individual projects upon implementation to meet the plan direction.

We continue to contribute to the achievement of the National Forest Service strategic goals by completing the assigned Performance Attainment Reporting targets. The table above displays key accomplishments for the last five full fiscal years of the 2004 Area Plan implementation.

The large increase in the number of acres inventoried in Fiscal Year 2017 resulted from the aerial survey of white-tailed deer we conducted. The discussion about this survey can be read under Goal 5 of this report. The decrease in acres of fuels treatments accomplished was mostly due to weather influences as described in Goal 5.

M Q8.38 Determine if planning information or physical conditions have changed and provisions remain scientifically valid.

The leadership and interdisciplinary team who developed this report determined no changes are needed in the Area Plan at this time. The Area Plan is based on best available science and this is reviewed periodically during analysis of projects.

The team recommends an area-wide landscape scale assessment of Land Between the Lakes be conducted to identify data gaps and management opportunities for outyear planning. We will collaborate with the public to review our natural resources, heritage, recreation, environmental education, and social and economic program areas. The assessment will lay groundwork for data collection needs for potential plan revision under the 2012 Planning Rule.

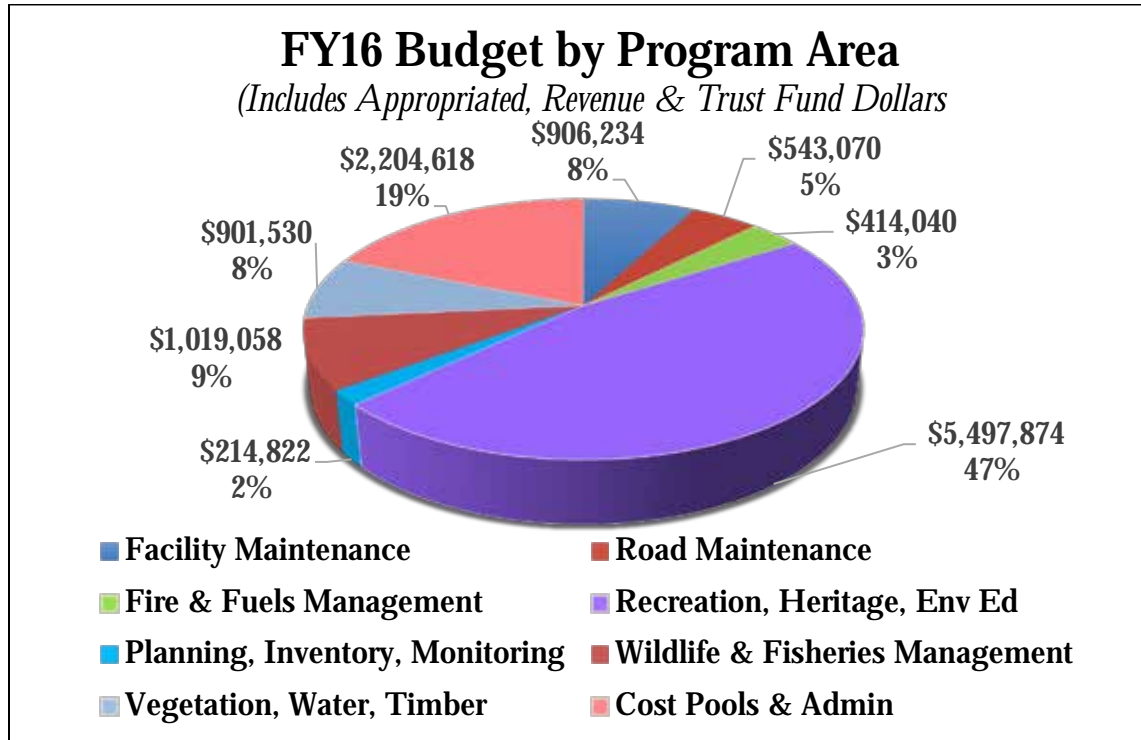
Land Between the Lakes issued one plan amendment in September 2013 to increase the acres by 1,150 of shortleaf pine-oak forest in Goal 5 and to change the boundary of the Devil's Backbone State Natural Area. The plan amendment is included in Appendix 4 of this report. Land Between the Lakes approved changes on May 11, 2016 to the plan monitoring program to meet the 2012 Planning Rule requirements. The monitoring changes are included in Appendix 4 of this report. We reported monitoring results for these changes in this year's report.

M Q8.39 Comparison of estimated and actual costs of plan implementation.

Funding – Budget

Our annual operating budget in fiscal year 2016 was approximately \$11.7 million. This consisted of \$7.3 million received in federal appropriations and \$4.4 million received in revenue. The Fiscal Year 2017 total budget was approximately \$11.7 million represented by \$7.2 million in federal appropriations and \$4.5 million in revenue receipts. The percentages applied to each program area are illustrated in the pie charts and tables.

Fiscal Year 2017

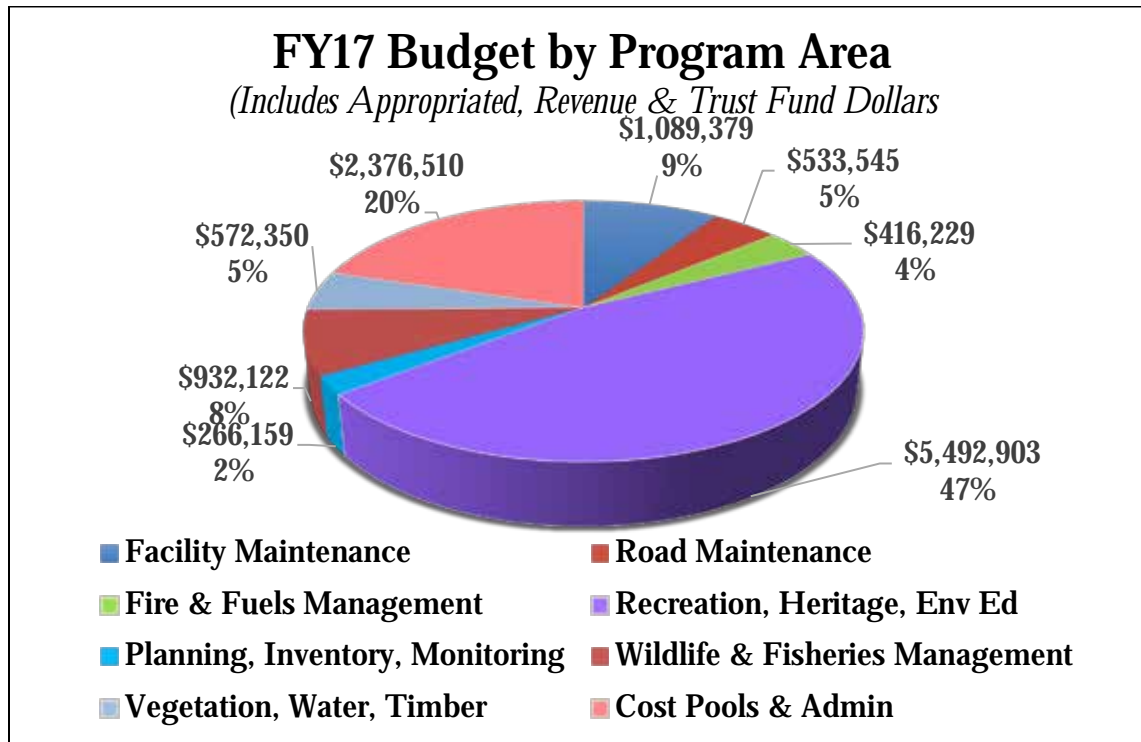


Program Area	Amount	%
Facility Maintenance*	\$906,234	8%
Road Maintenance	\$543,070	5%
Fire & Fuels Management	\$414,040	4%
Recreation, Heritage, Env Education	\$5,497,874	47%
Planning, Inventory, Monitoring	\$214,822	2%
Wildlife & Fisheries Management	\$1,019,058	9%
Vegetation, Water, Timber	\$901,530	8%
Cost Pools & Admin	\$2,204,618	19%
TOTAL	11,701,246	100%

*Includes recreation and environmental education maintenance dollars

Figure 8.2: Budget for Fiscal Year 16 with pie chart

Fiscal Year 2017



Program Area	Amount	%
Facility Maintenance*	\$ 1,089,379	9%
Road Maintenance	\$533,545	5%
Fire & Fuels Management	\$416,229	4%
Recreation, Heritage, Env Education	\$5,492,903	47%
Planning, Inventory, Monitoring	\$266,159	2%
Wildlife & Fisheries Management	\$932,122	8%
Vegetation, Water, Timber	\$572,350	5%
Cost Pools & Admin	\$2,376,510	20%
TOTAL	11,679,197	100%

*Includes recreation and environmental education maintenance dollars

Figure 8.3: Budget for FY17 with pie chart

Transition Monitoring Question 48. What changes are occurring in the social, cultural, and economic conditions in the areas influenced by national forests in the region? Indicators include jobs and income, employment and specialization, forest expenditures and employment, personal income; population change, growth and density; poverty, racial and ethnic composition; economic trends.

Question 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.

Volunteer Support

Volunteers provided 89,548 hours of service in Fiscal Year 2017 while the Public Land Corps Program for our apprentice and intern program provided 28,960 hours of additional service. The total of 118,508 hours, or 65.84 people-years, provided an estimated \$2,860,796 value to Land Between the Lakes.



Figure 8.4: Volunteers clean up shore at Fenton Lake access area.

Partnership with the Friends of Land Between the Lakes provided an additional, in-kind assistance valued at around \$1,014,550 in addition to direct cash contributions of \$350,000.

When we combine volunteer hours with all other in-kind assistance and cash contributions from partners, the value of total savings to the taxpayer in Fiscal Year 2017 reached over \$4 million.

E. Action Plan

We need to conduct an area wide assessment to prioritize management activities on Land Between the Lakes National Recreation Area. We will collaborate with the public to review our natural resources, heritage, recreation, environmental education, and social and economic program areas. The assessment will lay groundwork for data collection needs for potential plan revision under the 2012 Planning Rule. The USDA Forest Service and the public will then need to prioritize filling of data gaps in preparation for the assessment phase of the 2012 Planning Rule.

F. Appendices

Appendix 1: Monitoring and Evaluation

The following section is a direct excerpt from Section 2 of the Area Plan. It clearly articulates both the reasons to develop this report and the methodologies being employed.

Monitoring and Evaluation

Monitoring constitutes an important link between the goals of the Area Plan and annual program accomplishments. The planning process has identified key monitoring questions that address each of the priority goals and objectives; they are listed in Part 1 of the document (*2004 Area Plan*) under Area Wide Goals. The monitoring program will focus on some risks mentioned previously while addressing suitable uses, use strategies, and design criteria. Much of what we monitor includes species' trends. For trends, we usually address every five years.

Our monitoring will track the wide variety of components of the Area Plan. Roles and contributions identified include our interdisciplinary program specialist who will complete data gathering and evaluation of the Area Plan's implementation. Additionally, both the general public and stakeholders will be involved to capture the perceptions of how successfully we achieve our area wide goals and objectives. Monitoring will track how well implementation of the Area Plan's goals and objectives is bringing the conditions of Land Between the Lakes to the desired conditions specified by the Area Plan.

Because this Area Plan also supports the Forest Service National Strategic Goals, the monitoring program will also weigh the Area Plan's progress and achievements in supporting these national goals. However, as these national goals are likely to change over time as national issues and special initiatives dictate, they were not included as formal goals of the Area Plan. This monitoring program, therefore, will include a comparison of this Area Plan's goals, annual program accomplishments, and current or future national goals as part of the monitoring process.

By applying the evaluation questions and measures for each area goal, results and trends will provide a clearer picture of progress toward the vision. The evaluation of monitoring information will measure how close Land Between the Lakes is to reaching desired conditions identified in the Area Plan, including goals, objectives, and susceptibility to emerging issues.

An important concept incorporated in this Area Plan is the continuing use of some evaluation factors used in the analyses of the Environmental Impact Statement (EIS) alternatives. This approach allows for those EIS evaluation factors to serve as benchmarks from which original assumptions can be tested, and progress toward desired conditions can be measured.

Evaluations will serve as the springboard from which the resource specialist can identify changes needed in the Area Plan or its implementation, or research needed to clarify and address management issues. Results will also be used to help set shorter-term (three-to-five-year) strategic direction, as well as annual work plans. Existing strategies will be updated as needed, based on these evaluations. Results will be in the Area Plan M&E annual report. The Monitoring Summary Table in the Appendix (*of the Area Plan*) includes a complete list of questions, measures, method of collection, frequency, and responsible staff."

Appendix 2: Friends Group Partners

Partners of Friends of Land Between the Lakes

Support our environmental education mission

State Parks:

- Kentucky Dam Village State Resort Park
- Lake Barkley State Resort Park
- Paris Landing State Park
- Kenlake State Resort Park

Conservation Organizations:

- Ducks Unlimited
- National Wild Turkey Federation
- Monarch Watch
- North American Butterfly Association
- North American Bluebird Society
- Purple Martin Conservation Association
- National Audubon Society
- National Wildlife Federation
- Frogwatch AZA
- Operation Rubythroat
- Red Wolf Coalition
- Living Lands & Waters
- Kentucky Waterwatch
- Cumberland River Compact
- Kentucky Bowfishermen

Universities & Colleges

- Murray State University
- University of Kentucky Extension
- Purdue University
- Austin Peay State University
- Southern Illinois University
- University of Tennessee, Martin

Children's Organizations:

- West Kentucky 4-H
- Boy Scouts of America
- Trigg County High School Environmental Science Club
- Girl Scouts of America
- Joshua Tree Home Educators Association
- Highland Rim (middle TN) Headstart
- Futskilz Soccer Training

Professional Organizations:

- National Association for Interpretation
- Region 3 of National Association for Interpretation
- Kentucky Association of Environmental Education
- Tennessee Environmental Education Association
- North American Association for Environmental Education

Fiscal Year 2017

Federal Agencies:

- Natural Resource & Conservation Service
- Tennessee National Wildlife Refuge
- Clarks River National Wildlife Refuge
- US Fish & Wildlife Service
- Monitoring Avian Productivity and Survivorship (MAPS)
- Partners in Flight
- National Park Service

State Agencies & Local Organizations:

- Kentucky Department of Fish & Wildlife Resources
- Tennessee Wildlife Resources Agency
- Tennessee Aquarium
- Louisville Zoo
- Nashville Zoo
- Chattanooga Nature Center
- Caldwell County Conservation District
- Marshall County Public Library
- Logan County Public Library
- Western Kentucky Amateur Astronomers

Appendix 3a: Annual Heritage Report

Available on the Internet at: www.landbetweenthelakes.us/stewardship/heritage/



Model Tennessee Post Office, 1964

Fiscal Year 2017

Appendix 3b: Current List of Priority Heritage Assets (Updated February 2017)

	Priority Heritage Asset Name	Management Category	PHA Year	Last Condition Assessment	Next Condition Assessment
1	Center Furnace	Interp/Science	2004	2015	2020
2	Great Western Furnace	Interp/Science	2004	2013	2018
3	Fort Henry	Interp/Science	2004	2013	2018
4	Will Flora Cabin	Interp/Adaptive	2008	2013	2018
5	St. Stephen Church & Cem	Traditional/Sacred	2009	2014	2019
6	Chinese Cemetery	Traditional/Sacred	2011	2016	2021
7	Paradise Church and Cem	Traditional/Sacred	2013	2013	2018
8	Jacob Lady Cemetery	Traditional/Sacred	2013	2013	2018
9	Henry Lady Cemetery	Traditional/Sacred	2013	2013	2018
10	Pegrim 1 Cemetery	Traditional/Sacred	2013	2013	2018
11	Pegrim 2 Cemetery	Traditional/Sacred	2013	2013	2018
12	Hildreth 2 Cemetery	Traditional/Sacred	2013	2013	2018
13	Serpent Bluff	Traditional/Sacred	2014	2014	2019
14	Watkins Infant Home & Cem	Traditional/Sacred	2014	2014	2019
15	Pisgah Stone Box Graves	Traditional/Sacred	2014	2014	2019
16	Jenny Ridge Cemetery	Traditional/Sacred	2014	2014	2019
17	Luton Cemetery	Traditional/Sacred	2014	2014	2019
18	Sills Farm Cemetery	Traditional/Sacred	2014	2014	2019
19	Williams 1 Cemetery	Traditional/Sacred	2014	2014	2019
20	St. Mary's 1 Cemetery	Traditional/Sacred	2014	2014	2019
21	Hick's 2 Cemetery	Traditional/Sacred	2014	2014	2019
22	Shaw 1 Cemetery	Traditional/Sacred	2014	2014	2019
23	Nevils Creek Cemetery	Traditional/Sacred	2014	2014	2019
24	Cherry Cemetery	Traditional/Sacred	2015	2015	2020
25	Jones Cemetery 9L10	Traditional/Sacred	2015	2015	2020
26	Spiceland Cemetery	Traditional/Sacred	2015	2015	2020
27	Nunn Cemetery	Traditional/Sacred	2015	2015	2020
28	Outland Cemetery	Traditional/Sacred	2015	2015	2020
29	Champion 2 Cemetery	Traditional/Sacred	2015	2015	2020
30	Hamilton 1 Cemetery 9K4	Traditional/Sacred	2015	2015	2020
31	Hamilton 2 Cemetery 9L1	Traditional/Sacred	2015	2015	2020
32	Jessie Vinson Cemetery	Traditional/Sacred	2016	2016	2021

Land Between the Lakes National Recreation Area Monitoring and Evaluation Report

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33	Mitchell Cemetery	Traditional/Sacred	2015	2015	2020
34	Rhoads Cemetery	Traditional/Sacred	2015	2015	2020
35	Savels Cemetery	Traditional/Sacred	2015	2015	2020
36	Turkey Creek Cemetery	Traditional/Sacred	2015	2015	2020
37	Reynolds Cemetery	Traditional/Sacred	2015	2015	2020
38	Catholic 1 Cemetery 7H2	Traditional/Sacred	2015	2015	2020
39	Catholic 2 Cemetery 7J7	Traditional/Sacred	2015	2015	2020
40	Pleasant Valley Cemetery	Traditional/Sacred	2016	2016	2021
41	Kuhn Cemetery	Traditional/Sacred	2016	2016	2021
42	Ross Cemetery	Traditional/Sacred	2016	2016	2021
43	George Higgins	Traditional/Sacred	2015	2016	2021
44	Higgins 1 Cemetery	Traditional/Sacred	2015	2015	2020
45	Campbell Cemetery	Traditional/Sacred	2016	2016	2021
46	Bosswell 3 Cemetery	Traditional/Sacred	2016	2016	2021
47	Barnett Cemetery	Traditional/Sacred	2017	2016	2021
48	Stone 2 Cemetery	Traditional/Sacred	2016	2016	2021
49	Ruban Collie Cemetery	Traditional/Sacred	2016	2016	2021
50	Hilltop Cemetery	Traditional/Sacred	2016	2016	2021
51	Bass Cemetery	Traditional/Sacred	2016	2016	2021
52	Lone Pine Cem & TL Home	Traditional/Sacred	2017	2017	2022
53	Isaac Gray Cemetery	Traditional/Sacred	2017	2017	2022
54	Turner Cemetery	Traditional/Sacred	2017	2017	2022
55	Acree Cemetery	Traditional/Sacred	2017	2017	2022
56	Long Creek Cemetery	Traditional/Sacred	2017	2017	2022
57	Mays Cemetery	Traditional/Sacred	2017	2017	2022
58	Pinnager Cemetery	Traditional/Sacred	2017	2017	2022
59	Downs 2 Cemetery	Traditional/Sacred	2017	2017	2022
60	Cumberland-Matheny Cem	Traditional/Sacred	2017	2017	2022
61	Matheny Cemetery	Traditional/Sacred	2017	2017	2022
62	Ferguson Springs Cemetery	Traditional/Sacred	2017	2017	2022
63	Dennis Cemetery	Traditional/Sacred	2017	2017	2022
64	Higgins 4 Cemetery	Traditional/Sacred	2017	2017	2022
65	Newby Cemetery	Traditional/Sacred	2017	2017	2022
66	Colson Cemetery	Traditional/Sacred	2017	2017	2022
67	Woodson Chapel Cemetery	Traditional/Sacred	2017	2017	2022
68	Malone Cemetery	Traditional/Sacred	2017	2017	2022
69	Garrett Gray Cemetery	Traditional/Sacred	2017	2017	2022

Appendix 4: Plan Amendment

Land Between the Lakes National Recreation Area Land and Resource Management Plan

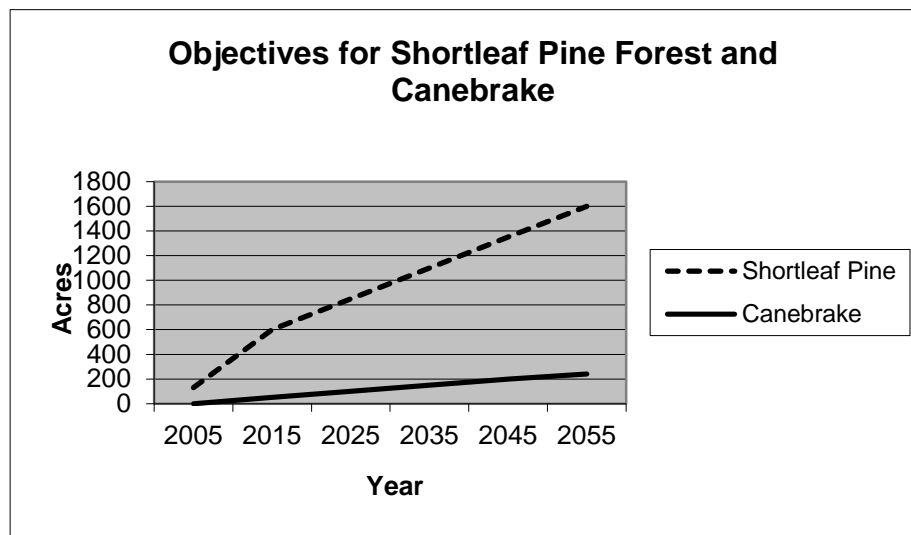
Amendment # 1

September 2013

Part 1 of this amendment increases the acres by 1,150 acres of shortleaf pine and shortleaf pine-oak forest in Goal 5, Objective 5f of the Area Plan. The benchmark for these forest types would improve to an optimum rating as analyzed in the Area Plan FEIS.

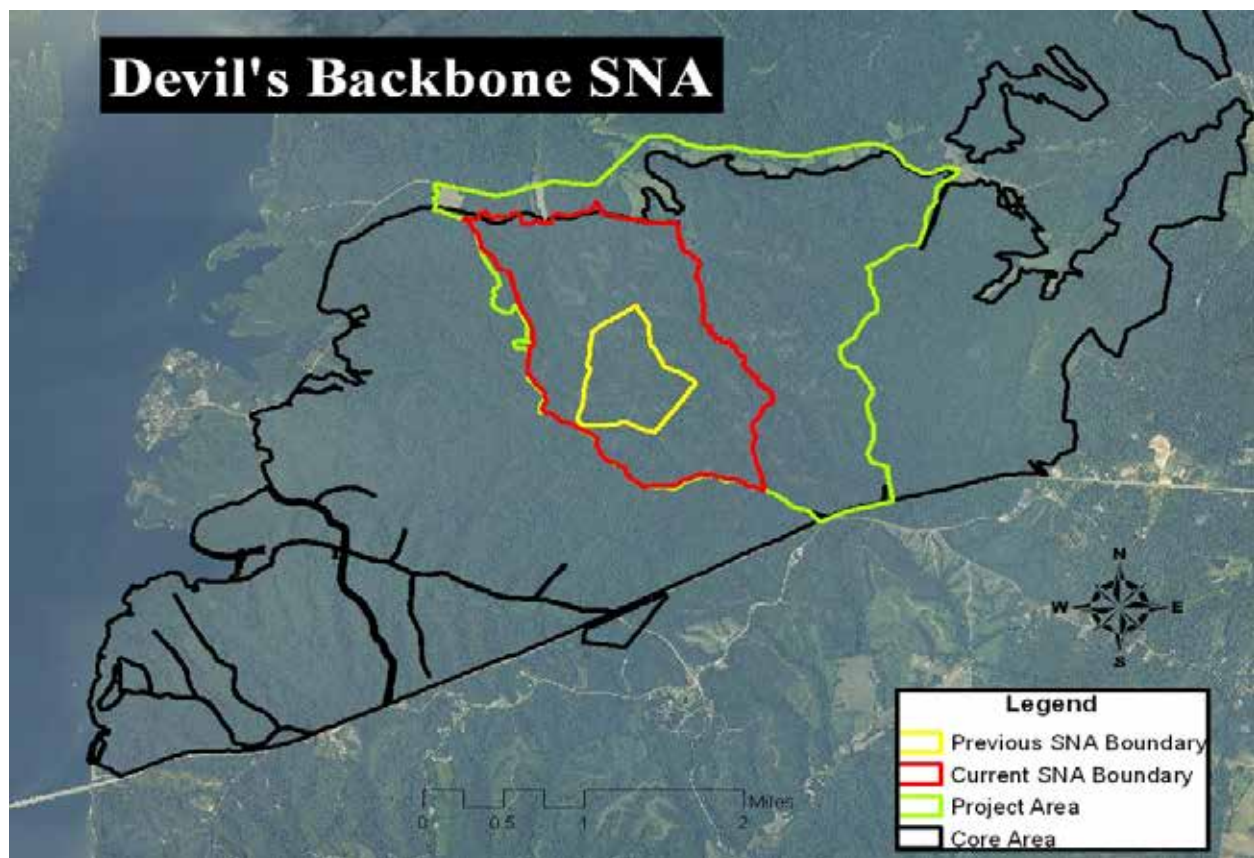
The following changes will be made to the Land and Resource Management Plan, Land Between the Lakes National Recreation Area:

- Ø **Page 53.** Change OBJ5f to “Create and maintain a sustained supply of at least 600 acres of combined shortleaf pine and shortleaf pine-oak forest in the vicinity of the Devil’s Backbone Area of LBL over the first decade. In addition, provide up to 1,000 acres of combined shortleaf pine or shortleaf pine-oak regenerating forest conditions throughout LBL over the first decade, with a long-term objective (over 50 years) of 1,600 acres of mature shortleaf pine and shortleaf pine-oak forest throughout LBL.
- Ø **Page 53.** Change the graph to:



Part 2 of this amendment changes the boundary of the Devils Backbone State Natural Area (SNA) from 160 acres to 1,386 acres. The map for Prescription Areas South in Appendix 7 of the Area Plan will be changed to incorporate this decision. See the map at the end of this Attachment for the change in the boundary.

This amendment is not a significant change in the Land Between the Lakes Area Plan. The determination that this is a non-significant amendment is made in accordance with the regulations in 16 USC 1604(f)(4), 36 CFR 219.10(f) of the 1982 planning regulations (as authorized by 36 CFR 219.17(b) of the current planning regulations, dated April 9, 2012), and Forest Service Manual 1926.5, Land Management Planning, Amendments. This plan amendment meets the criteria for a non-significant amendment because these changes will not “significantly alter the long-term relationship between levels of multiple-use goals and objectives originally projected . . . [or] have an important effect on the entire forest plan or affect resources throughout a large portion of the planning area during the planning period” (FSM 1926.52). The NEPA analysis for this change is documented in a Decision Notice and Environmental Assessment.



Fiscal Year 2017

Appendix 4: Monitoring Changes

Land Between The Lakes National Recreation Area
Land and Resource Management Plan
Administrative Change
2012 Planning Rule Monitoring Program Transition
May 2016

This Administrative Change – the 2012 Planning Rule Monitoring Program Transition – to the 2004 Land and Resource Management Plan (Area Plan) for the Land Between The Lakes National Recreation Area, brings the plan monitoring program into conformance with the requirements of the 2012 Planning Rule. The 2012 Planning Rule allows for corrections or adjustments to the Forest Plan using a process called “Administrative Changes.” “Administrative changes” as defined by 36 CFR 219.13(c) in the 2012 Planning Rule is “... any change to a plan that is not a plan amendment or revision. Administrative changes include corrections of clerical errors to any part of the plan, conformance of the plan to new statutory or regulatory requirements, or other content in the plan (219.7(f)).”

Administrative Change

The administrative changes to the plan monitoring program are as follows:

Evaluation Reports

Monitoring Evaluation Reports changes will be produced on a biennial schedule. It is anticipated that the next Monitoring Evaluation Report containing these changes will be available by September 30, 2018.

Monitoring Questions and Indicators for Requirements in 2012 Planning Rule

The monitoring questions and indicators for the eight requirements in the 2012 Planning Rule are listed in the table below. Monitoring questions in the 2004 Area Plan address requirements 1 through 4 of the 2012 Planning Rule. Requirements 5 through 8 are met with a combination of existing and new questions. The technical background documents in the project record describe the scientific rationale.

Broad Scale Monitoring

Questions 45, 46, 47, and 48 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 Forest Evaluation Reports. To see the indicators and procedures that will be used at the broader-scale for these monitoring questions, see the Region 8’s Broader Scale Monitoring Strategy at www.fs.usda.gov/main/r8/landmanagement/planning.

Approval and Effective Date

This Administrative Change becomes effective upon signature below, and being posted online at the Forest’s website. Administrative changes are not subject to the objection process (36 CFR 219.50). This Administrative Change and the monitoring Tasks (or Questions) in Appendix 5 of the 2004 Area Plan will continue to be addressed in the Monitoring and Evaluation Reports until they are reviewed during plan revision.

/s/ Tina R. Tilley
Tina R. Tilley
Area Supervisor

May 11, 2016
Date

Land Between the Lakes National Recreation Area Monitoring and Evaluation Report

Fiscal Year 2017

Transition Monitoring for Land Between The Lakes Area Plan <i>Tasks (or questions) in 2004 Area Plan Monitoring Table in Appendix 5 of the plan document will not change.</i>		
Requirement (36 CFR 219.12(a)(5))	Question	Indicator
(i) Status of select watershed conditions.	5. Has the Forest Service made progress in reducing erosion and improving watershed conditions in 6 th level watersheds and how was this accomplished? <i>(Same as Task 5, Goal 4 in 2004 Area Plan)</i>	Number of acres reported as being treated for watershed improvements.
	4. Has the Forest Service established baseline data for channel classification of its major intermittent and perennial streams? <i>(Same as Task 4, Goal 4 in 2004 Area Plan)</i>	Completion of two stream classifications and determinations of channel function process every five years.
(ii) Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems	15. How is management of LBL affecting special habitats and major biological communities? <i>(Same as Task 15, Goal 5 in 2004 Area Plan)</i>	Trends in bald eagle populations dependent upon tall trees in all forest types and associated with aquatic ecosystems.
		Trends in Prairie warbler populations in relationship to Oak Woodland Restoration.
		Inventory of snags and den trees within the General Forest of LBL.

Land Between the Lakes National Recreation Area Monitoring and Evaluation Report

Fiscal Year 2017

(iii) The status of focal species to assess the ecological conditions.	15. How is management of LBL affecting special habitats and major biological communities? <i>(Same as Task 15, Goal 5 in 2004 Area Plan)</i>	Trends in Yellow-breasted chat populations in relationship to All Forest Type Regeneration
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Transition Monitoring for Land Between The Lakes Area Plan <i>Tasks (or questions) in 2004 Area Plan Monitoring Table in Appendix 5 of the plan document will not change.)</i>		
Requirement (36 CFR 219.12(a)(5))	Question	Indicator
(iv) The 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.	9. How is management of LBL affecting recovery of threatened and endangered species? <i>(Same as Task 9, Goal 5 in 2004 Area Plan)</i>	Trends in Price's potato bean populations in relationship to T&E Recovery.
(v) The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.	40. What does visitation look like at Land Between The Lakes and its facilities? <i>(Similar to Task 3, Goal 2 and Task 32, Goal 7 in 2004 Area Plan)</i>	Annual visitation trends collected by campground registrations, back country and backpacking permits, traffic counters, and admissions to Environmental Education facilities.

Land Between the Lakes National Recreation Area Monitoring and Evaluation Report

Fiscal Year 2017

	41. What progress has been made toward becoming sustainable in LBL's Recreation and Environmental Education operations? (Similar to Task 33, Goal 7 in 2004 Area Plan)	Deferred Maintenance, Cost Recovery (including cost of operations trends), and Miles of trails maintained or improved to standard
	42. Does LBL have the ability to meet present and future user demands for recreation and environmental education activities, programs, and facilities? (Similar to Task 35, Goal 7 in 2004 Area Plan)	Satisfaction from NVUM, Financial Resource Trends, Cost of operations Trends, Facility improvements

Transition Monitoring for Land Between The Lakes Area Plan <i>Tasks (or questions) in 2004 Area Plan Monitoring Table in Appendix 5 of the plan document will not change.)</i>		
Requirement (36 CFR 219.12(a)(5))	Question	Indicator
	43. How has Environmental Education (EE) become an integrated program targeted at helping individuals become aware of their relationship with natural and cultural resources while supporting stewardship of these resources through individual visitor action? (Similar to Task 37, Goal 7 in 2004 Area Plan)	The amount of interpretation and environmental education opportunities provided through Schools, Special Events, Outreach, Volunteer Activities, Facilities

Land Between the Lakes National Recreation Area Monitoring and Evaluation Report

Fiscal Year 2017

	44. How is LBL making progress towards creating and implementing a Heritage Program? (New question for heritage monitoring already being reported)	LBL Heritage Annual Report containing Programmatic Agreement Implementation and Heritage Program Update
(vi) Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.	45. How has climate variability changed and how is it projected to change across the region? (New question)	Climate extremes, precipitation, temperature, water balance, trends in land cover changes
	46. How is climate variability and change influencing the ecological, social, and economic conditions and contributions provided by plan areas in the region? (New question)	Jobs and income, recreation use and satisfaction, non-native invasive plant species, phenology, wildfire and prescribed fire, and forest health status
	47. What effects do national forests in the region have on a changing climate? (New question)	Carbon stocks and trends and greenhouse gas emissions
Transition Monitoring for Land Between The Lakes Area Plan <i>Tasks (or questions) in 2004 Area Plan Monitoring Table in Appendix 5 of the plan document will not change.</i>		
Requirement (36 CFR 219.12(a)(5))	Question	Indicator
	28. Is LBL less likely to be affected by insects, disease, and wildfire? (Same as Task 28, Goal 5 in 2004 Area Plan)	Acres of insect infestations and disease and number of acres treated through wildland fire use, prescribed fire, and mechanical treatments

Land Between the Lakes National Recreation Area Monitoring and Evaluation Report

Fiscal Year 2017

(vii) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.	48. What changes are occurring in the social, cultural, and economic conditions in the areas influenced by national forests in the region? (New question)	Jobs and income, employment and specialization, forest expenditures and employment, personal income; population change, growth and density; poverty, racial and ethnic composition
		Local Economic Trends (inflation, unemployment, current economic conditions)
	See questions under requirement (v)	See indicators under requirement (v)
(viii) The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land.	49. Will regeneration treatments on the landscape impair soil quality to inhibit natural or artificial regeneration to occur on the treated landscape? (New question)	Stocking surveys completed within 5 years after the final treatment.
	5. Has the Forest Service made progress in reducing erosion and improving watershed conditions and how was this accomplished? (<i>Same as Task 5, Goal 4 in 2004 Area Plan</i>)	Annual field observations of BMP effectiveness