

## PROJECT SOS: SAVE OUR SIALIA



Data compiled by volunteers Bob and Judy Peak during the 2008 nesting season  
for the Land Between the Lakes Association and the USDA-Forest Service

## Description of Locations

### Primary Location:

Land Between The Lakes, also known as LBL, is a 170,000-acre National Recreation Area that is located in western Kentucky and Tennessee. LBL is a 40-mile long isthmus that was formed when the Tennessee River and Cumberland River were impounded, creating Kentucky Lake and Lake Barkley (respectively). In 1963, President John F. Kennedy designated these federal lands as **Land Between The Lakes National Recreation Area**. The project was intended to demonstrate how an area with limited timber, agricultural, and industrial resources could be converted into a recreation asset that would stimulate economic growth in the region. Today, LBL is managed by the USDA-Forest Service, and, as the focal point of a \$600 million tourism industry, it remains one of the most visited attractions in Kentucky and Tennessee. With 300 miles of undeveloped shoreline, LBL hosts an average of two million visitors each year who come from all over the nation and more than 30 foreign countries. Land Between The Lakes offers a multitude of recreational opportunities and provides unique experiences in the areas of environmental education and historic interpretation. Bluebird nest boxes are located along bluebird trails in seventeen different areas of LBL, and birders and other visitors can view nearly all of the boxes. (Note: According to the North American Bluebird Society, "a bluebird *'trail'* is simply a series of bluebird boxes placed along a prescribed route.")

### Secondary Locations:

Consisting of 3,700 acres, **Lake Barkley State Resort Park** is the largest park in the Kentucky State Park system, and it is often called the system's flagship park. It is located on the shore of Lake Barkley in Trigg County, Kentucky, approximately ten miles east of the center of Land Between The Lakes. The park offers a wide variety of recreational opportunities for outdoor enthusiasts, including golf, fishing, boating, swimming, tennis, hiking, camping, trap shooting, and birding. Nearly all of the bluebird nest boxes located there can be observed from the roads in the park.

**John James Audubon State Park**, also a part of the Kentucky State Park system, is located in Henderson County, Kentucky and is composed of 692 acres, with 325 of those acres serving as a state nature preserve. The Audubon Museum in the park houses many of Audubon's original watercolors, oils, engravings, and personal memorabilia. The park's Nature Center features a wildlife observatory, which serves as a reminder of Audubon's own love for nature and the great outdoors. The park has five one-bedroom cottages and one ADA-accessible two-bedroom cottage, and there are facilities for camping, hiking, fishing, golf, tennis, and birding. Since bluebirds will tolerate humans in close proximity to their nests, the park's nest boxes are located in areas where park visitors can easily observe them. Most importantly, the nest boxes are close to the park's roads, so physically challenged people can view the birds from the comfort and convenience of a vehicle.

## Location of LBL Nest Boxes and Related Data

<u>Location</u>	<u>Number of Boxes</u>	<u>Number of Bluebirds Fledged</u>
North Information Center.....	5.....	35
Hillman Ferry Campground.....	7.....	57
Nature Station.....	35.....	167
Camp Energy.....	7.....	62
Elk-Bison Prairie.....	10.....	76
Golden Pond Visitor Center.....	15.....	61
Administration Office.....	5.....	34
Hunter's Check Station.....	3.....	27
Central Maintenance.....	10.....	14
Colson Overlook.....	1.....	7
Rushing Creek Campground.....	8.....	77
The Homeplace-1850.....	4.....	17
South Bison Range.....	24.....	119
South Maintenance Area.....	6.....	32
Brandon Spring Group Camp.....	9.....	84
South Information Center.....	6.....	52
Piney Campground.....	10.....	70
<b>Total.....</b>	<b>165*</b> .....	<b>991</b>

\*In March, 2008, the volunteers discovered two bluebird nest boxes mounted on posts in the Fenton Camping/Special Events Area. Judging by the condition and contents of the boxes, it appeared that no one had monitored them for many years. The volunteers subsequently made repairs to the boxes and monitored them during the nesting season. The boxes produced seven bluebird fledglings in 2008. Beginning in 2009, the boxes will be added to the LBL bluebird trails.

## Summary of Data

During the 2008 nesting season, a total of 1,205 eastern bluebird (*Sialia sialis*) eggs were laid in the 165 bluebird nest boxes at Land Between The Lakes (LBL), with 991 bluebirds fledging, for an 82.2% fledging success rate. (Note: A young bird has "fledged" if it leaves the nest on its own.) Adult bluebirds made 292 nesting attempts in the boxes. (Note: An "attempt" is defined as a bird building a nest and laying at least one egg.) There were 190 unhatched bluebird eggs and 24 dead bluebird nestlings discovered in the boxes. On March 26<sup>th</sup>, the volunteers found a dead adult female bluebird in a nest box at Piney Campground. Judging by the condition of the body, the bird had expired during the winter months.

From nest construction to the fledging of the young birds, the eastern bluebird's reproductive cycle covers approximately one month. Therefore, the volunteers must monitor the nest boxes on a monthly basis to accurately determine the outcome of each nesting attempt. The volunteers monitored the boxes on the following dates: March 26-27, April 16-17, May 14-15, June 9-11, July 7-9, August 7-9 and September 12-14.

[Note: A female bluebird usually builds a nest in less than a week and lays one egg per day until the clutch is complete. Eastern bluebird clutches typically consist of three to six eggs. When the last egg has been laid, the female begins incubation of the eggs, which takes 12-14 days. After the eggs hatch, both bluebird parents feed the nestlings for about 16-18 days. When the juveniles fledge, the bluebird parents may feed them for an additional two weeks, or until the young birds can secure food on their own.

Approximately two-thirds of an eastern bluebird's diet consists of insects and other invertebrates. The remainder of the bird's diet is made up of wild fruits. In Kentucky, a female bluebird will usually produce two broods during the nesting season, and a third brood is possible. Bluebirds do not reuse a nest, so the nest material may be removed as soon as the juvenile birds have fledged. Throughout the winter months, if weather conditions become intolerable, wintering bluebirds may use the nest boxes as roost sites.

During the monthly monitoring process, each nest box is inspected, and the contents are recorded on field sheets and cumulative data sheets. At the conclusion of the nesting season, these sheets are used to compile statistical information and determine anecdotal accounts for each area. When monitoring, the volunteers use the following criteria as indicators of fledging success for bluebirds and most cavity-nesters:

- (1) nestlings have vacated the nest box and/or there are no eggs in the nest box,
- (2) nest material is compressed or flattened (due to maturation of the nestlings),
- (3) there is no indication or evidence of predation by small mammals, snakes, or other birds,
- (4) there is an abundance of pin feather scales in the nest, which are disintegrated remains of the keratinous sheaths that encapsulate the nestling's flight feathers---this whitish material resembles human dandruff,
- (5) there is a collection of fecal material (white) attached to the inside walls of the nest box---it is deposited as the mature nestlings exercise and prepare for flight.]

Maintenance work on the nest boxes was completed on additional days in October. Including preparatory work, travel time to LBL, nest box monitoring work

in the field, maintenance work in the field, bluebird presentations for groups, and participation in the annual meeting of the North American Bluebird Society, the two volunteers spent over 200 hours working on Project SOS and drove approximately 1,200 miles to monitor, repair, or relocate bluebird nest boxes at LBL.

(Note: The volunteers would like to thank the USDA-Forest Service for providing a vehicle for the field work at LBL. The Peaks would also like to thank Phil Hazle, the Jailer for Calloway County, Kentucky, who provided replacement nest boxes through a special training program he has developed for the jail inmates.)

There were 26 white bluebird eggs (2.15% of the total) found in the following areas: Rushing Creek Campground, South Bison Range, and the South Information Area. Twenty-five of the white eggs produced birds that eventually fledged. Statistically, slightly more than 4% of all bluebird eggs are white, with the other eggs being the more typical light blue color produced by some members of the thrush family, including the American robin (*Turdus migratorius*). Interestingly, there is no absolute certainty that bluebirds fledged from a clutch of white eggs will also produce white eggs when they become sexually mature, and bluebird hatchlings from white eggs always have blue feathers, except in the case of an albino. (It should be noted that there is no apparent link between white egg color and albinism in bluebirds, and any such occurrence would be extremely rare and purely coincidental.) Furthermore, there is usually no mixture of white and blue eggs in a bluebird clutch. On the rare occasion that a white egg is found among a clutch of blue eggs, or vice versa, a second female bluebird probably "dumped" the anomalous egg at an opportune moment. In 19 nesting seasons and inspections of several thousand bluebird clutches, the authors of this report have never observed a mixture of egg colors in a bluebird nest. A few cases of suspected egg dumping have been noted and recorded, but no direct observation of the birds' nesting behavior could be used to confirm the authors' suspicions.

The LBL nest boxes also yielded 35 Carolina chickadee (*Parus carolinensis*) fledglings, 17 prothonotary warbler (*Protonotaria citrea*) fledglings, and 5 tree swallow (*Iridoprocne bicolor*) fledglings. The prothonotary warbler, a Neotropical migrant, is the only cavity-nesting warbler in the eastern United States.

[Note: In several parts of its range, the prothonotary warbler has been declining since 1966. On average, decreasing numbers of these warblers have been recorded on both Christmas Bird Counts and Breeding Bird Surveys, the latter indicating significant declines in Alabama, Arkansas, and Georgia between 1966 and 1996. From the late 1980s to 1996, Canada's sole breeding population dropped by at least 75% and the bird is now listed as Endangered in Canada. The group Partners in Flight has designated the prothonotary warbler as "Threatened and Declining." (data provided by the National Audubon Society)]

The number of bluebirds fledged in 2008 was the fifth-highest total in the nineteen years that the volunteers have managed the LBL bluebird trails. The totals for other years were: 1990: 544 bluebirds fledged from 108 boxes; 1991: 720 bluebirds fledged from 153 boxes; 1992: 727 bluebirds fledged from 159 boxes; 1993: 820 bluebirds fledged from 155 boxes; 1994: 898 bluebirds fledged from 159 boxes; 1995: 872 bluebirds fledged from 157 boxes;

1996: 754 bluebirds fledged from 156 boxes; 1997: 599 bluebirds fledged from 162 boxes; 1998: 774 bluebirds fledged from 149 boxes; 1999: 719 bluebirds fledged from 152 boxes; 2000: 871 bluebirds fledged from 153 boxes; 2001: 964 bluebirds fledged from 154 boxes, 2002: 1,086 bluebirds fledged from 158 boxes; 2003: 978 bluebirds fledged from 161 boxes; 2004: 1,129 bluebirds fledged from 164 boxes; 2005: 976 bluebirds fledged from 164 boxes; 2006: 1092 bluebirds fledged from 165 boxes; and, 2007: 1050 fledged from 165 boxes. If one uses a ratio of bluebirds fledged per nest box, the 2008 nesting season ranked as the seventh-best year, with a ratio of 6.00 bluebirds fledged per box. During the volunteers' tenure, 1,151 additional juvenile birds, representing six species [Carolina chickadee, tufted titmouse (*Parus bicolor*), prothonotary warbler, Carolina wren (*Thryothorus ludovicianus*), tree swallow, and white-breasted nuthatch (*Sitta carolinensis*)], have fledged from the LBL bluebird nest boxes.

While monitoring the bluebird nest boxes in 2008, the volunteers found that some of the boxes were used at various times by ants, wasps, and a variety of other insects. While working on the project, the volunteers also spotted numerous species of birds (including many wild turkeys-*Meleagris gallopavo* and ospreys-*Pandion haliaetus*), as well as many fallow deer (*Cervus dama*) and white-tailed deer (*Odocoileus virginianus*). In an unrelated anecdotal incident, on August 8, 2008 (about 7:10 A.M.), the volunteers were traveling south on The Trace (Highway 453), and they spotted a dead armadillo in the other lane, between the 26 and 27 mile-markers. Although the head was mutilated, the remainder of the body was completely intact. Judging by its appearance, and information in a mammal field guide, it was a nine-banded armadillo (*Dasypus novemcinctus*). This location is very close to the spot where the volunteers observed a road-killed armadillo in July, 2005. An LBLNRA biologist confirmed that other armadillos have been sighted at LBL in recent years.

As an additional part of Project SOS, the volunteers used their own vehicle to check and maintain a bluebird trail (53 nest boxes) they have established at nearby Lake Barkley State Resort Park (LBSRP). In 2008, there were 469 bluebird eggs laid in the LBSRP boxes, with 405 birds fledging, for an 86.3% fledging success rate. There were 104 nesting attempts by bluebirds at the state park, and the ratio of state park bluebirds fledged per nest box was 7.64. The volunteers also found 19 dead bluebird nestlings in the boxes. Ten of the LBSRP bluebird eggs were white (2.13% of the total), and all of those hatchlings fledged successfully.

In previous years, the total bluebird fledglings at LBSRP were: 1990: 23 bluebirds fledged from 10 boxes; 1991: 27 bluebirds fledged from 11 boxes; 1992: 91 bluebirds fledged from 27 boxes; 1993: 97 bluebirds fledged from 30 boxes; 1994: 85 bluebirds fledged from 31 boxes; 1995: 87 bluebirds fledged from 29 boxes; 1996: 67 bluebirds fledged from 29 boxes; 1997: 99 bluebirds fledged from 28 boxes; 1998: 93 bluebirds fledged from 28 boxes; 1999: 118 bluebirds fledged from 29 boxes; 2000: 128 bluebirds fledged from 29 boxes; 2001: 116 bluebirds fledged from 36 boxes; 2002: 148 bluebirds fledged from 37 boxes; 2003: 302 bluebirds fledged from 37 boxes; 2004: 296 bluebirds fledged from

41 boxes; 2005: 316 from 41 boxes; 2006: 350 bluebirds fledged from 41 boxes; and, 2007: 405 bluebirds fledged from 50 boxes. In 2008, no additional species nested in the LBSRP nest boxes. Since 1990, in addition to bluebirds, the LBSRP bluebird trail has yielded 230 fledglings, produced by five species (Carolina chickadee, tufted titmouse, prothonotary warbler, Carolina wren, and tree swallow).

In May, 2007, the volunteers assisted the LBSRP naturalist (Jenny Howard) in setting up a bluebird nest box that contains a camera (donated by the Kentucky Bluebird Society). The camera is connected to an indoor monitor, and lodge guests can view the live activities of nesting birds.

[The nest cam box had two clutches of bluebird eggs in 2008. The first clutch consisted of five eggs in April, and four of those babies fledged. One of the nestlings was attacked and removed from the box by a house sparrow (*Passer domesticus*). The second clutch of eggs was completed in June and had four eggs. Two of the bluebird babies from the June brood fledged. (One nestling disappeared---probably due to a predatory bird---and one egg did not hatch.)]

As a further extension of Project SOS, the volunteers monitored a 15-box bluebird trail that they established at John James Audubon State Park (JJASP) in 2005. During the 2008 nesting season, the JJASP nest boxes produced 55 bluebird fledglings, 18 Carolina chickadees, 17 tree swallows, and four Carolina wrens. As a result of 16 nesting attempts by bluebirds, 61 bluebird eggs were discovered in the JJASP nest boxes. There were three unhatched bluebird eggs and three dead bluebird babies found in the boxes, and the bluebird fledging success rate was 90.1%. If bluebirds exhibit nest site fidelity, it is hopeful that surviving adult bluebirds will return to JJASP next spring and continue boosting the park's population.

In 2005, 18 bluebirds fledged from ten nest boxes at JJASP; in 2006, 12 nest boxes produced 37 bluebird fledglings; and, in 2007, 12 nest boxes produced 34 bluebird fledglings. Since 2005, in addition to bluebirds, the JJASP bluebird trail has yielded 72 fledglings, representing three species (Carolina chickadee, tree swallow, Carolina wren).

In August, 2007, the volunteers assisted the JJASP naturalist (Julie McDonald) in setting up a nest cam box (donated by the Kentucky Bluebird Society) in the wildlife observation area behind the park's nature center.

[In April, 2008, the box produced four Carolina wren fledglings from a clutch of five eggs. (One egg did not hatch.)]

## **Conclusion**

In summary, during the 2008 nesting season, the total number of eastern bluebird fledglings for Project SOS (LBL, LBSRP, and JJASP combined) was 1,451. There were also 53 Carolina chickadees, 22 tree swallows, four Carolina wrens, and 17 prothonotary warblers that fledged from the combined nest boxes. Since the project was started in 1990, there have been 19,961 bluebird fledglings and 1,453 fledglings produced by six other cavity-nesting bird species.

[Note: Due to the following factors, the fledgling totals listed in this report are conservative figures and probably do not reflect the *actual* number: (1) if any evidence exists that fledging may not have occurred, the volunteers count the entire clutch as a nesting failure; (2) occasionally, female bluebirds may lay additional eggs immediately after nest box inspections have been recorded for a given month, and the “extra” juvenile birds may fledge before the volunteers complete the next monthly inspection. Consequently, the exact number of fledglings is likely to be greater than the totals in this report.]

As always, the goal of Project SOS is to maintain a core population of bluebirds to counterbalance severe seasonal conditions, particularly winter conditions comparable to the winters of 1977 and 1978, which proved to be devastating for bluebirds and many other songbirds. Furthermore, since birding is one of the most prevalent recreational activities in the United States, and eco-tourism has become a driving force in the recreational pursuits of millions of Americans, the economic benefits of Project SOS are immeasurable. For that reason, in future years, the project should continue to be a valuable enhancement for Land Between The Lakes National Recreation Area, Lake Barkley State Resort Park, and John James Audubon State Park.

As an added endorsement of the project, the eastern bluebird has been selected by the USDA-Forest Service as a management indicator species for LBL. Management indicator species are animal (or plant) species selected for use as a planning tool in accordance with the regulations of the National Forest Management Act (1982). These indicator species are used to help set management objectives, analyze effects of alternatives, and monitor plan implementation. The eastern bluebird has been chosen because its population changes are believed to indicate the effects of management on selected biological components (i.e. snags in open forest situations and non-game species of interest).

The bluebird trails at Land Between The Lakes and Lake Barkley State Resort Park are registered as a part of the Transcontinental Bluebird Trail (TBT). The TBT, developed by the North American Bluebird Society, is a network of bluebird trails stretching across the United States and Canada that will eventually provide thousands of nest boxes for bluebirds and other cavity-nesting species. The bluebird trails monitored by the volunteers at LBL and the state parks cover a four-county area (Trigg County, KY, Lyon County, KY, Henderson County, KY, and Stewart County, TN). The nesting data in this report will be shared with the USDA-Forest Service, Lake Barkley State Resort Park, John James Audubon State Park, the Land Between The Lakes Association, the North American Bluebird Society, and other governmental or ornithological organizations.

(Questions or comments may be directed to Bob and Judy Peak at [blubrds@bellsouth.net](mailto:blubrds@bellsouth.net).)

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