

ALABAMA BIRDLIFE

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EASTERN BLUEBIRD (*SIALIA SIALIS*) STUDIES DURING THE CONSTRUCTION OF A GOLFING COMMUNITY IN NORTH SHELBY COUNTY, ALABAMA

Dan C. Holliman

ABSTRACT

This eight year study traces the history of an Eastern Bluebird population on lands that were being developed for a golfing community in north Shelby County, Alabama. The results of a nest box and banding program are discussed. One thousand three hundred and sixty birds were fledged and 736 banded during the construction period from 1991-1996. The effects of human disturbance associated with PGA tournaments during five nesting seasons are analyzed. A strategy for the establishment of an Eastern Bluebird population in a newly created and planned urban development is given.

Little information is available concerning the establishment of an Eastern Bluebird population during the construction of a golfing community, particularly where PGA tournaments attract 100-130 thousand visitors during the nesting season. Usually, Eastern Bluebird trails are installed after a development has been completed, not while one is under construction. This research is only one topic of a 34-year study to determine the long term effects of a planned urban development upon a natural environment. The purpose of this research is to trace the history of an Eastern Bluebird population through the various construction phases of Greystone, a planned 2000 acre (809.4 hectare) urban development in north Shelby County, Alabama. Information concerning Eastern Bluebird habitat, banding and ecology is given. Precautions are listed that could mitigate golfing disturbance during the nesting season. A

strategy for the establishment of an Eastern Bluebird population in a newly created golfing community is described.

A BRIEF HISTORY OF THE STUDY AREA

The study area is located near the intersection of US 280 and AL 119 on Hugh Daniels Drive (T18S, R1W, Sections 32, 33, 34, 28, 27, 22 Cahaba Heights, Alabama; and T118SR1W, Sections 28, 26 Vandiver, Alabama, 7-1/2 minute topographic maps). Geologically, these lands are situated on Ordovician limestone and dolomite in the Cahaba Valley. Oak Ridge and Oak Mountain areas are underlain with beds of Mississippian and Pennsylvanian shale, sandstone and chert. The thin soil is a residuum of these rocks.

I began taking biology students on field trips in 1962 to the 60 acre (24.3 h) dairy farm located along the southwestern edge of what is now the 5th and 6th golf links of Greystone. Here they were involved in research projects on DDT, Mourning Doves (*Zenaida macroura*), and the restoration of Eastern Bluebird habitat. The Birmingham Audubon Society still includes this area in their Christmas Bird Counts (Imhof et al 1947 to 1995). Fifty years ago these pasture lands had consisted of woodlands, hay production and croplands. Turkey (*Meleagris gallopauo*), whitetailed deer (*Odocoileus virginianus*), and small game hunting and trapping was productive along Lee's Branch. Three families lived on the dairy farm. There was a small garden, orchard, barn, and a modernized milking facility. Dominant tree species were loblolly pine (*Pinus taeda*), post oak (*Quercus stellata*), southern red oak (*Quercus falcata*), mockernut hickory (*Carya tomentosa*) and sweetgum (*Liquidambar styraciflua*). With the exception of the dairy farm, these 2000 acres (809.4 h) that are now

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Greystone were heavily forested by a contiguous stand of timber. Fragments of the original mixed pine-hardwood remain in the 2 acre (0.81 h) Cove Hardwood Preserved on Pine Ridge, the 300 acre (12.4 h) Nature Preserve along the crest of Oak Mountain, and at the 2.7 acre (1.1 h) Greystone Educational Wetland on Hugh Daniel Drive. The remainder of the original 2000 acres (809.4 h) consists of single family residences, patio homes, streets, trails, pocket parks, green belts and 1.71 mile (2.75 k), 130 acre (52.6 h) golf course in a woodland setting.

THE NEST BOX PROGRAM

In the late fall of 1967 eight boxes were installed in likely places around the periphery of the dairy farm to compensate for the loss of natural cavities when the dairy farm was created. Since cows were present the boxes were placed outside the fence approximately 150 yards (137.2 m) apart facing the open pasture. In 1989, I learned of plans for the Greystone development and immediately began to saturate the old dairy farm area with nest boxes in hopes of building a "reservoir" population that could possibly "pioneer" new habitat once the golf course lands were opened. As expected, field surveys in 1990 showed a dramatic increase in Eastern Bluebird numbers around the dairy farm presumably due to the increase in nest boxes. With the event of opening up 130 acres (52.6 h) for the golf course the existing habitat at the dairy farm was increased more than 100%. Fifty boxes were installed in 1991 while site preparation was underway. In many cases this necessitated relocating some boxes the next year to make way for roads, utilities, heavy equipment and

house construction. An increase in nest box use in 1992 suggested that birds were quickly exploiting newly found nest sites on the fairways as soon as boxes were in place. Dump nests were common as new breeding pairs moved into the new habitat looking for nest sites. The snow blizzard on 12 March 1993 resulted in the death of 10 birds found in 4 different nest boxes. This weather event probably accounted for the late start-up date for nesting that year. By 1994, numbers began to climb in spite of an increase in raccoon (*Procyon lotor*) numbers. These mammals were so common they could often be seen during the day. Massive construction in outlying areas probably pushed these animals into Greystone. Aluminum, cone-predator guards were installed on the post of each box in late 1995, thus significantly reducing egg and clutch loss in 1996. Other predators recorded throughout the study included: flying squirrels (*Glaucomys volans*), house cats (*Felis silvestris*), and rat snakes (*Elaphe obsoleta*). Competition with Carolina Chickadees (*Parus carolinensis*), Tufted Titmouse (*Parus bicolor*), House Finches (*Carpodacus mexicanus*), and Great-crested Flycatchers (*Myiarchus crinitus*) was noticed. By 1996, 51 boxes were finally in place around the fairways. Where possible, boxes were erected outside of the tree line to reduce occupancy by titmice and chickadees. The boxes were spaced approximately 54.9 feet (150 m) apart. I later learned that some golfers fortuitously used them in calculating the distance of their drives. No boxes were erected in spots that could possibly divert the golfers' attention, such as placement on horizons and close to putting greens. The predator guards were painted brown to blend into the surrounding

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woodland and to prevent glare that would distract golfers. Care was taken not to locate the openings of nest boxes within range of automated sprinklers. Table 1 shows the relation of construction activities to nest box productivity.

THE BANDING PROGRAM

The objective of the banding program was to determine the dispersal of Eastern Bluebirds as a result of the nest box program. The numbers in parentheses indicate birds that were banded out of the total successfully fledged for that year. The nesting dates indicate date of first egg and date of last fledgling out of nest for that particular year. The 1967-68 data was selected because of completeness and comparability with 1991-96 information (Table 1).

Table 1

RELATION OF CONSTRUCTION ACTIVITY TO NEST BOX PRODUCTIVITY

YEAR	TOTAL FLEDGED (BANDED)	NUMBER BOXES	% OCCUPANCY	NESTING DATES
Pre-construction Years - Note 1.				
1967	86 (49)	8	100	* Mar30-Aug20
1968	79 (6)	7	100	* Mar15-Aug24
Site Prep Years - Note 2.				
1991	261 (177)	50	90	Mar30-Jul30
1992	293 (191)	50	90	Mar23-Aug20
1993	148 (60)	50	70	Apr2-Aug15
1994	179 (100)	50	90	Mar20-Aug18
Early Post-construction Years - Note 3.				
1995	206 (118)	50	90	Mar26-Aug20
1996	273 (90)	51	92	Mar25-Aug20
TOTALS 1525 (791)				

NOTES:

- 1 Pre-construction = no land disturbance in the heavily wooded 2000 acres surrounding the dairy farm
- 2 Site preparation = timber removal, road construction, utility installation, house construction, golf course in various stages of completion, significant disturbance to the bluebirds.
- 3 Early Post-construction = Most roads complete, most housing construction complete, no major changes in golf course design other than landscaping, minimal disturbance to bluebirds.

* After Creel (1970)

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Fledglings were banded between 7-12 days of age and only when flight feathers were fully sheathed in the periderm. There was always a chance that younger birds could be injured in handling. Older fully feathered birds were not banded because of the likelihood that they might leave the nest prematurely because of bander disturbance. No nests were deserted due to banding procedures. There was always an attempt to reduce disturbance by spending a minimum amount of time at nest boxes. No parasites, diseases or health problems were noticed during this study.

Band recoveries indicate that most birds either remain in the Greystone area or radiate out into surrounding communities no more than 3 miles (1.9 k) from their home nest box.

It is interesting to note that of the 10 birds killed by the blizzard of 1993, two were banded by Mr. John Findlay, III, under the permit of Dr. T.A. Imhof. Findlay banded one bird at Dr. Lee's Tree Nursery on AL 199, 1/4 mile (0.16 k) from Greystone, and the other near the Meadowbrook Post Office, also on AL 119, 2 miles (1.24 k) from Greystone. Several bands were collected from birds that were window casualties of Greystone residents.

PGA TOURNAMENTS

Early in the project problems were anticipated with spectator disturbance associated with major golf tournaments. Starting in 1992, five tournaments drew crowds of 100-130 thousand people annually who were at one time or another on the golf course during the nesting seasons. An attempt was made to place nest boxes out of the way of planned parking areas,

bleachers, tents, and the PGA Village. Patterns of foot traffic within the spectator area were difficult to determine for the first three tournament years because of slight structural adjustment being made to roads, parking areas, fairways, and putting greens. In 1995, after studying spectator movement along the fairways, some nest boxes were repositioned. Volunteers from the Greystone community were recruited to study crowd behavior and possible effects on feeding and incubating birds. These high risk areas were closely monitored in an attempt to reduce human disturbance. Signs were placed on active nest boxes asking spectators not to disturb them. There were only two cases of crowd vandalism in the last five tournaments. Both instances caused nest desertion because of litter placed in the boxes of incubating birds in spite of the fact that ample trash bins had been placed throughout the spectator area. In 1992, a vendor in the PGA Village voluntarily roped off a nesting box so that it would not be disturbed. This "adopted" box produced 5 fledglings during the tournament. During the 1996 tournament a pair of bluebirds successfully fledged 5 young at the 18th hole in spite of a bleacher full of noisy spectators and imposing TV cameras.

Table 2 relates the tournament dates to the dates of nesting for each year. Mortality of eggs and nestlings in high risk boxes are indicated. It should be made clear that the mortality could be due to causes other than crowd disturbance, although not likely. Observations of crowd behavior suggests that spectator disturbance could be implicated in the desertion of several nests in 1992 and 1993.

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Eight years of nesting data for Greystone bluebirds indicates that the first clutch occurred between March 15-May 30, the second May 21-July 18, and the third July 10-Aug 24. This varied according to weather conditions and the availability of food.

Table 2

GOLF TOURNAMENT AND BLUEBIRD NESTING DATES AND MORTALITY

1ST CLUTCH (MARCH 15-MAY 30)	
YEAR AND DATE OF TOURNAMENT	MORTALITY EGGS-NESTLINGS
1996 May 28 - June 2	0 - 0
1995 May 31 - June 5	0 - 0
3RD CLUTCH (JULY 10-AUG 24)	
YEAR AND DATE OF TOURNAMENT	MORTALITY EGGS-NESTLINGS
1994 July 29 - Aug 7	2 - 0
1993 July 30 - Aug 8	4 - 1
1992 July 31 - Aug 9	5 - 3
Note: The nesting population was not impacted during 1995 and 1996 since the tournament occurred toward the end of the first clutch, and before the second clutch got under way. The 1992-94 tournaments fell within the dates of the 3rd clutch, thus possibly producing some mortality as the nesting season wound down.	

The results of this study indicate that an Eastern Bluebird trail and major PGA tournaments are compatible with proper planning. Ideally, it would be best for Greystone bluebirds if this tournament were either scheduled before the beginning of the first clutch or toward the end of the third. Advanced

planning could possibly reduce mortality by following these recommendations:

1. Determine the location of planned parking areas, bleachers, tents, PGA Village, and pattern of spectator foot traffic before erecting nest boxes.
2. Relocated all nesting boxes out of the spectator areas and foot traffic routes along the golf course.
3. Place warning signs on active boxes that are at risk so that visitors can be alerted and disturbance kept at a minimum.
4. Alert tournament marshals at each fairway about the location of active boxes.
5. Place adequate litter containers close to active boxes so that some will not be tempted to deposit litter in nest boxes.
6. Residents with homes on the fairway should be asked to help monitor the boxes closest to their yard.
7. During the early stages of tournament planning make available Eastern Bluebird trail information to the press and members of other media. This would go a long way in helping the public to understand the plight of nesting bluebirds.

A STRATEGY FOR THE ESTABLISHMENT OF AN EASTERN BLUEBIRD POPULATION IN A NEWLY CREATED GOLFING COMMUNITY

Site preparation for a new development can drastically alter the ecological integrity of any mixed pine-hardwood forest. Some changes are

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obvious while others are subtle but long-lasting. The practice of fragmentation reduces the size of forest patches, changes the types and quality of food and cover, alters temperature and moisture regimens and potentially exposes animals to increased predation, competition, parasitism, and exploitation by humans (Morrison et al. 1992). Because of these changes, small and isolated patches of forest generally support fewer animal species than do large forest tracts (Whitcomb et al. 1981). Habitat for many bird species is either lost or altered while new habitat is created for others. Some are benefitted by the creation of open areas. This is particularly true for birds that prefer "edge" habitat and golf courses.

Cooperative planning by the biologist and land architect is absolutely essential. A detailed biological study that has already located ecologically sensitive areas in the proposed development is helpful in creating a master plan. With this information in hand wildlife management objectives can be set that could aid in restitutive measures to partially compensate for most forest destruction and/or alterations.

Taylor (1986) identifies four approaches that would allow people and wildlife to coexist in an urban situation:

1. *Permanent Habitat Allocation.* This method involves setting aside certain land and water areas to be "forever wild". Land that may not be suitable for development because of topography and/or geology are ideal candidates for permanent habitat allocation. The Cove Hardwood Preserve, the Nature Preserve, and the Greystone Educational Wetland provide such areas. It was

possible to leave many small pieces of wildlife habitat between asymmetrical lots and around the edges of sedimentation ponds. The productivity of vegetated plots depends upon undisturbed over-story, mid-story, and natural ground cover. The periphery of these woodlands should be "feathered". This involves leaving shrubs and small trees of graduated heights along the edge of the cut thus increasing biological diversity. Premium Eastern Bluebird habitat can be established along these feather edges.

2. *Common Conservation* The method of common conservation is the sharing of resources while they are being used by both humans and wildlife. Planting 30 foot (27.3 m) buffer zones of natural vegetation along the banks of small streams and sedimentary ponds provides a water and food source for bluebirds. Natural ground cover should be left where possible to provide habitat for insects.

3. *Environmental Integration.* This is the deliberate attempt to fit human construction into natural surroundings in a way that attempts to preserve the ecological integrity of a community as a whole. Green belts, or corridors, should either be left or created to interconnect food patches and larger blocks of forest. Clearing project lands for the golf course increased the amount of "edge" and consequently increased optimum Eastern Bluebird habitat. During site preparation most candidate nest cavity trees (stumps, snags, etc.) were removed either for cosmetic purposes or for safety reasons. Reparation for lost habitat can occur in the following two ways: "In-Kind" replacement in replacing native berry-producing shrubs with like kind; "Out-of-Kind"

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replacement is replacing a natural nest cavity with a nest box, or a native, berry-producing shrub with a different species of native berry-producing species. Earlier surveys (Holliman 1990, 1994) provide a list of "In-Kind" and "Out-of-Kind" berry producing shrubs for Greystone.

4. *Rotation*. This perhaps is the most difficult approach in "fitting" an Eastern Bluebird population into a development. This is the method of rotation or "taking turns". It might be thought of as a "time allocation" for a given place in contrast to "permanent habitat allocation". There were appropriate places during the construction phases of Greystone where nest boxes could be erected so that birds could nest if only for one nesting season. As construction occurred these nest boxes were relocated. The master development plan predicted construction schedules and where pieces of habitat would lie fallow for several nesting seasons. This advance notice made it possible to anticipate likely places for short term nest box installation. Even after construction was completed, service roads and construction material storage areas were re-seeded and were returned to productive bluebird habitat.

Taylor's prescription (1986) bodes well not only for Eastern Bluebird but for other wildlife and plants in Greystone that can adapt to an urban habitat.

ACKNOWLEDGMENTS

Future years will bring difficult challenges to the urban biologist. A sensible balance between our natural world and development must be found. This calls for the cooperation of people from all walks of life. As in the case of

all common environmental endeavors there are many to thank for this team effort. Special appreciation is given to the Daniel Corporation and particularly Mr. Charlie Tickle, CEO, of Daniel Corporation; and Mr. Hap Gwaltney, Vice President of Daniel/Greystone and his staff. Under their leadership they relied on the advice of an Environmental Committee composed of professionals and residents to make decisions about the environment. Daniel Corporation had the foresight to have a biological study accomplished before construction began not only to determine the presence of any sensitive species, but also to gather information so that maximum use could be made of natural features in a planned urban development. Ms. Donna Bonds and Ms. Michel Gwin, administrative assistants, worked closely with the residents of Greystone giving them information concerning the mission of the program. The Greystone Golf Club under the management of Mr. Gary Kamenicky and the Grounds Department under the supervision of Mr. Scott Urbantke cooperated fully, making available golf carts for the countless surveys. Special recognition should be given to Scott Urbantke and his staff who have maintained a golf course that is ecologically sensitive. Ms. Bonita Crowe, a former Greystone resident, helped check nesting boxes and provided assistance in leading a community volunteer bluebird program.

Lastly, I give heartfelt thanks to the cadre of Birmingham-Southern College students who faithfully assisted me in many ways in all types of weather throughout the field work. **Dan C. Holliman**, Professor of Biology, Birmingham-Southern College, Aradelphia Road, Birmingham, AL 35254

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FEMALE HOODED MERGANSER (*LOPHODYTES CUCULLATUS*)

SUCCESSFULLY HATCHES TWO WOOD DUCK (*AIX SPONSA*) EGGS

Chad A. Manlove

The Hooded Merganser is unique among North American mergansers in that it breeds exclusively on this continent (Dugger et al. 1994). Throughout much of the eastern United States, populations of breeding Hooded Mergansers are widely dispersed in forested habitats consisting primarily of second growth