

NEST BOX TRAIL HISTORY 1985-2016

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INTRODUCTION

In August of 1984, members of the Wasatch Audubon Society (Ogden, Utah) held a workshop to construct “bluebird” nesting boxes. In September of 1984, volunteers installed 168 boxes along UT-39 from Limestone Springs, over Monte Cristo pass, ending 3.5 miles into Rich County. We thank Don Paul, then Non-game Biologist for Utah Division of Wildlife Resources) and Jack Rensel (charter member of Wasatch Audubon Society) for taking the initiative to plan and lead this effort; and, we thank the countless volunteers who spent many hours maintaining these nest boxes and gathering use data for over 30 years. Over the years, box construction style and materials varied due to the number of individuals and scouting groups contributing to the effort. However, most boxes had an outside measurement of approximately 7x7x12 inches (width, depth, height) with a 1.5-inch entrance hole.

In 1992, the route was modified, with fewer boxes along UT-39 and additional boxes added to fence posts in the Ant Flat area and along a fence heading south from UT-39 in Rich County (near the junction of Rich, Cache, and Weber Counties). Five factors were considered in the decision to change the routes: (1) the danger to the volunteers surveying and maintaining a route along a busy highway with increasing traffic each year; (2) limited parking space along the shoulder of UT-39 to avoid traffic; (3) increasing vandalism of the boxes; (4) a concern for the safety of adult birds flying back and forth across the highway when feeding young; and (5) heavy snow had knocked down many boxes located in aspen stands. In addition, high use by House Wrens indicated the boxes were not in ideal Mountain Bluebird habitat. Most boxes had been originally placed in aspen stands. The “new” route location placed most boxes on fence posts in non-forested habitats. These boxes were located from approximately 7000 to 8900 feet in elevation. Twice a year for 31 years, volunteers from Wasatch Audubon Society collected data, built, place/replaced, repaired, and otherwise maintained 99-175 boxes. The majority of the boxes were used by Mountain Bluebirds, House Wrens, and Tree Swallows; and data analyzed are for these three species. However, occasionally Mountain Chickadee, Cassin’s Finch, Flying Squirrel, and mice utilized the boxes.

BIOLOGY AND BEHAVIOR

Mountain Bluebird – Mountain Bluebirds are relatively unique among the members of the thrush family. Mountain Bluebirds nest in cavities, use open (non-forested) habitats, and demonstrate feeding behaviors more like a scaled-down American Kestrel. They feed mostly on insects and use a variety of behavioral actions to capture these insects. From an observation perch, they will locate and pursue prey either by dropping to the ground or “fly-catching”, feeding on the ground, hovering above low growing vegetation to locate insects, and gleaning insects from plants. Most other thrushes are cup-nesting forest dwellers that search for food on the ground. Some thrushes, like the Townsend’s Solitaire, are forest canopy dwellers.

Mountain Bluebirds are the most migratory of all the bluebirds. In late summer, family groups will join other small groups to form large flocks. These flocks usually migrate along the ridges of north-south oriented mountain ranges. In early spring, most males arrive at the nesting site before the females. However, pairs of birds sometime arrive together.

Once a suitable cavity is selected, the female does the nest building, mostly with dried grasses. Only the female incubates the eggs; incubation length is about 13 days. During egg laying and incubation, the male will bring food to the female. Both sexes gather food for the nestlings. If the female is present, the male generally gives her the food to either eat or present to the young. If the female is not present, the male feeds the young directly. If the female starts a second nest, the male does all the feeding for the first brood. Range-wide, approximately 50% of the pairs attempt a second nest; it is not known how many second-nesting attempts are made at this high elevation. A clutch can be from 4-8 eggs, but is usually from 5-6. The eggs are pale blue and average 21.9 x 16.6 mm (0.86 x 0.66 inches) in size.

As nest sites are often a population limiting factor for secondary cavity nesters, they readily accept nest boxes. Secondary cavity nesters are species that do not excavate their own cavities (as woodpeckers do), but nest in natural, excavated, or provided cavities/boxes. Mountain Bluebirds usually “win” the competition for nest boxes that are also attractive to either House Wrens or Tree Swallows. Their ability to out-compete among these species is partially due to their earlier arrival on the high mountain breeding areas. In the 1970s, Mountain Bluebirds were identified as a species of concern by the U.S. Fish and Wildlife Service (the Blue List). Recent data show the population to be stable to slightly increasing.

Tree Swallow – Tree Swallows commonly nest in the high elevation habitats represented by the placement of the nesting boxes discussed in this article. Their diet is composed of flying insects and does not overlap significantly with the diet of Mountain Bluebirds. Both species tend to seek nesting cavities at the edge of aspen stands and readily use nesting boxes. As with Mountain Bluebirds in this area, the population limiting factor appears to be the availability of suitable nesting sites. Also, late spring snow storms can cause heavy mortality, but the effect of weather on long-term population size is unknown.

Tree Swallows are considered monogamous, however recent genetic studies have shown that up to 50% of the young in a nest are not descendents of the resident male. The female does most of the nest construction and the incubation. Unlike Mountain Bluebirds, there is no record of the male feeding the female during incubation. Nests of Tree Swallows usually include a large number of feathers from other species. We have observed feathers from ducks, hawks, owls, grouse, flickers, and many other birds in the nesting boxes. The male brings in most of these feathers and presents them to the female for placement in the nest. Feathers are often added to the nest after egg laying begins. They will build a new nest on top of an old nest and sometimes on top of a Mountain Bluebird nest after the bluebird young have fledged.

Tree Swallows can have a clutch of 2-8 eggs, but usually 4-7. The eggs are white and average 18.7 x 13.2 mm (0.74 x 0.52 inches) in size. Incubation is for 11-19 days. Both parents feed the young with 10-20 trips to the nest per hour.

House Wren – House Wrens tend to select nest boxes closer to or within aspen stands. They tend to avoid boxes more than 100 feet (30 m) from trees. Range-wide, House Wrens have adapted well to small town and suburban backyards. They readily accept, and may prefer, human-made nest boxes to natural cavities. Breeding Bird Survey (BBS) data indicate the population is on an increasing trend range-wide, not just in Utah. They are an “edge” species so have adapted well to forest fragmentation in many parts of their range. The patchiness of the aspen habitat in this area seems to be ideal. Due to their wide range (North, Central, and South America), their loud song, and their tolerance of human habitats, House Wrens are one of the best known and most thoroughly studied of the North American songbirds. There are approximately 30 subspecies of House Wrens, divided into 5 taxonomic groups. The subspecies occurring in Utah, *Troglodytes aedon parkmanii*, was once referred to as a full species called the Western House Wren. They are grayer in color and paler than the eastern House Wren subspecies.

House Wrens are secondary cavity nesters. Males begin placing small twigs in all available nesting cavities within their territory immediately after arriving on the breeding grounds. The female completes the nest of choice by forming a cup and lining it with inner bark strips and grass. Their eggs are white to pinkish white and profusely marked with reddish-brown to lavender spots and blotches. Egg size seems to be more variable than many other bird species and ranges from 14.8-19.0 mm long (.58-.75 in.) and 11.3-13.8 mm broad (.45-.54 in.), averaging 16.5 x 13.2 mm (0.65 x 0.52 in.). Clutch size is from 4-9 eggs with an average of 6. Incubation is by the female for 12-13 days. Males remain close during incubation and a few records of males feeding incubating females have been reported. Both sexes feed the young for 17-18 days before they fledge. The breeding cycle, from first egg laid to independence of young, is 45-51 days. Second broods have been reported in many areas. And, reports of the young of the first brood feeding young of a later brood have occurred. However, it is unknown if second broods are possible at the high elevation of the boxes reported here.

RESULTS AND DISCUSSION

Use data were collected on 99-175 human-made nest boxes placed in the Monte Cristo and Ant Flat areas, which are in the northeast edge of Weber County, southeast edge of Cache County, and west edge of Rich County, Utah. The data spans the 1985-2016 timeframe with no summer data for 1993 and 2016. The use rate varied from a low of 47.0% (1991) to a high of 93.2% (2005), with a 30-yr. average of 75.2% (Table 1). As stated above, the boxes were primarily used by Tree Swallows, Mountain Bluebirds, and House Wrens. In 1989, 1990 and 2010 one box was used by a Mountain Chickadee pair and one box was used by a pair of Cassin’s Finch in 1994 (these boxes were not included in data analysis). Tree Swallow use varied from a low of 5 boxes (1985) to a high of 55 boxes (2000), with an average of 25.2 boxes used per year. Mountain Bluebird use varied from a low of 7 boxes (1985) to a high of 33 boxes (2013), with an average of 19.7 boxes used per year. Use by House Wrens varied from a low of 10 boxes (1999 and 2000) to a

high of 80 boxes (1992), with an average of 41.9 boxes used per year. Some of the variation, especially for House Wrens, was due to changing the box locations in 1992, as mentioned in the introduction. However, we did notice a significant reduction in the number of House Wrens in the period from 1996 through 2000, when only an average of 15.6 boxes were used each year. In recent years (2002-2015), the House Wren use rate averaged 40.9 boxes used each year, which approaches the 30-year average.

The boxes were visited by volunteers from Wasatch Audubon Society twice a year (except 1993 and 2016) to collect data and maintain the boxes. The June visit recorded nest status, which included information on species, partial or completed nest, number of eggs, number of young and if adult birds were observed. The September visit recorded nest status, including evidence of success, number of eggs remaining, and number of dead young in the nest. The September visit also included cleaning out the used nest materials, repairing any damage to the boxes, and replacing any destroyed boxes. From these two visits, a rough estimate of the number of young presumed to fledge was made from 2000 through 2015 (Table 2). For this period, the nesting boxes maintained by Wasatch Audubon Society produced an average of 85.1 young Tree Swallows, 65.7 young Mountain Bluebirds, and 149.6 young House Wrens per year. Assuming these data are reasonably accurate, over 4800 young of these three species fledged over the 16 years of data collection, which is impressive. Extrapolated, the number would exceed 8,000 young fledged over the history of the nest box project. We believe this has been, and will continue to be, a worthwhile effort.

SUMMARY

For 31 years, volunteers from Wasatch Audubon Society have collected data, built, placed/replaced, and otherwise maintained from 99-175 bird nesting boxes in the Monte Cristo and Ant Flat areas (near the junction of Rich, Cache, and Weber Counties, Utah). Five species of birds: Tree Swallow, Mountain Bluebird, House Wren, Mountain Chickadee, and Cassin's Finch have nested in these boxes. There also have been flying squirrels and mice using the boxes. This report analyzed information for the three most common birds using the boxes: Tree Swallows, Mountain Bluebirds, and House Wrens. Over the years, the box year-by-year use rate has varied from a low of 47.0% to a high of 93.2%, with an average of 75.2%. It is believed that over 8,000 young birds have fledged from the boxes during the course of the project.

Table 1. Wasatch Audubon Society Nesting Box use, 1985-2016.

Year	# Boxes Available	# Used	% Used	Tree Swallow*	Mountain Bluebird*	House Wren*
1985	153	89	58.2%	5	7	77
1986	154	92	59.7%	9	11	72
1987	134	104	77.6%	19	14	71
1988	116	86	74.1%	8	18	60
1989	149	88	59.1%	15	10	63
1990	155	90	58.1%	12	13	65
1991	166	78	47.0%	12	10	56
1992	175	117	66.9%	20	17	80
1993	No Data					
1994	99	81	81.8%	33	19	29
1995	103	73	70.9%	30	25	18
1996	109	80	73.4%	38	29	13
1997	106	90	84.9%	53	23	14
1998	116	92	79.3%	39	22	31
1999	105	85	81.0%	55	20	10
2000	107	90	84.1%	58	22	10
2001	110	82	74.5%	45	22	15
2002	118	70	59.3%	35	17	18
2003	121	90	74.4%	30	27	33
2004	109	97	89.0%	28	26	43
2005	103	96	93.2%	18	19	59
2006	103	82	79.6%	20	20	42
2007	102	78	76.4%	20	22	36
2008	103	72	69.9%	17	19	36
2009	108	91	84.3%	20	17	54
2010	103	92	89.3%	22	20	50
2011	94	76	80.9%	21	17	38
2012	103	79	76.7%	23	22	34
2013	109	82	75.2%	22	33	27
2014	99	89	89.9%	18	30	41
2015	106	93	87.7%	11	20	62
2016	99	74	74.7%	No data	No data	No data
Average	117.3	86.4	75.2%	25.2	19.7	41.9

*Number of boxes used each year.

Table 2. Estimated Productivity (estimated number of young fledged).

Year	Tree Swallow	Mountain Bluebird	House Wren
2000	221	91	40
2001	127	39	38
2002	155	72	106
2003	96	93	62
2004	110	88	156
2005	77	62	288
2006	84	59	218
2007	58	61	159
2008	56	64	133
2009	36	64	247
2010	63	50	167
2011	64	51	191
2012	82	55	83
2013	62	85	95
2014	29	46	154
2015	42	72	257
AVERAGE	85.1	65.7	149.6