Tree Swallow

Tachycineta bicolor

DESCRIPTION

The tree swallow is a medium-sized member of the Hirundinidae family with characteristic slender body form and long, pointed wings. This species has contrasting blue to brown plumage above and bright white below. Adult males and older female birds are metallic blue above, while second year female retain varying amounts of brown plumage typically associated with juvenile birds. Tree swallows are often observed hunting flying insects with long, gliding flight patterns, or perched on exposed branches or wires. This species is known to soar more than other members of the family.

BODY SIZE

Tree swallow body length averages 140 mm as measured from bill to tip of tail. Body weight varies seasonally, but typically averages 21 g during the breeding season, independent of sex (Robertson *et al.* 1992).

In The Primary Study Area: No body size data are available for tree swallows from the primary study area.

DISTRIBUTION

The tree swallow is distributed throughout northern and central North America and is one of the most widespread members its genus. Tree swallows breed on both coasts and northward to the limit of treeline. Currently, this species is expanding its range southward in the central US (Robertson *et al.* 1992). The densest breeding populations occur in the northeast and the Great Lakes Region. In Massachusetts, tree swallows are common throughout the state, with the greatest reported breeding densities occurring in the western portion of the state (Veit and Petersen 1993).

In winter months, the tree swallow's range includes the southeastern US and Gulf of Mexico coastline. Greatest winter densities occur in Florida and the Mississippi Delta. Occasionally, tree swallows winter as far north as southern New England due to their ability to subsist on fruit, especially bayberry (*Myrica* sp.) (Robertson *et al.* 1992).

Figure 1. Range of tree swallow in North America

MIGRATION

Fall migration of tree swallow populations in the eastern US begins soon after breeding season in July and August. Southward migration typically peaks in early to mid-Fall. East coast and eastern Great Lakes populations are likely to migrate along the eastern seaboard to Florida and the Caribbean (Butler 1988). The tree swallow is a diurnal migrant and birds often congregate in large flocks during the early evening to share nocturnal roosts usually located in dense woody and emergent vegetation (Forbush 1929). Flocking behavior along the outer coast of Massachusetts is a well-documented phenomenon with some flocks estimated in the hundreds of thousands as birds gather to exploit ripening bayberry and insect swarms (Veit and Petersen 1993). Tree swallows are able to return to their breeding grounds earlier than other swallow species due to their ability to subsist on fruit. In New England, tree swallows arrive on territories in early April (Forbush 1929).

HABITAT

Due to their aerial foraging technique and propensity to glide and soar, tree swallows require open spaces. However, tree swallows are cavity nesters and are dependent on excavated cavities in dead trees or artificial nest boxes. Preferred habitats include old fields and pond margins, wooded swamps, beaver flowages, and cranberry bog reservoirs (Veit and Petersen 1993).

In The Primary Study Area: Table 1 contains a summary of the literature review and observational data on the use by tree swallows of the natural community types found within the primary study area.

In a 1998 – 2000 study of tree swallows that focused on clutch size and nesting success within the primary study area and nearby reference areas, it was found that tree swallows' use of artificial nest boxes varied according to physical characteristics of the available habitat. The West Branch site had lower nest occupancy, likely due to the smaller stream order present and less food availability. Lower nest occupancy at the Canoe Meadows site is likely due to the density of standing trees that may have resulted in a greater population of house wrens (*Troglodytes aedon*) and black-capped chickadees (*Poecile atricapillus*) using the nest boxes (C. Custer, USGS, pers. com. to Woodlot Alternatives, Inc., March 2001).

HOME RANGE AND TERRITORIALITY

Tree swallow home range sizes vary with geographic area, habitat type and prey abundance. When defending a nest site, and especially when feeding nestlings, tree swallows show the greatest home range tenacity and typically remain within 320 – 650 feet of the nest site (McCarty and Winkler 1999). As colonial nesters, tree swallows are not aggressively territorial, but will typically defend an area of 30 – 50 feet surrounding the nest site. Large colonies can reach densities of 150 pairs per 0.7 acres (DeGraaf and Yamasaki 2001).

BREEDING

In Massachusetts, nesting activities typically take place between April 19 and June 15 (Veit and Petersen 1993). Pairs are generally monogamous during the breeding season and may develop year-to-year fidelity to an individual nest site. Selected nesting cavities are typically located from 3 – 25 feet above the ground (Baicich and Harrison 1997). Preferred natural nesting cavities are located in standing dead trees with average diameters of approximately 11 – 30 inches as measured at breast height (Robertson *et al.* 1992). Nests typically

Table 1. Habitat use by tree swallow in the primary study area

Habitat Codes and Natural Community Classifications																						
Wetland Habitats													Terrestrial Habitats									
ROW	ROW & PAB	SHO		PFO				PSS	PEM		WM	VP	SW	MW	HW			OF	AGR	RES		
Medium-gradient stream	Low-gradient stream	Riverine pointbar and beach	Mud flat	Red maple swamp	Black ash-red maple-tamarack calcareous seepage swamp	Transitional floodplain forest	High-terrace floodplain forest	Shrub swamp	Deep emergent marsh	Shallow emergent marsh	Wet meadow	Woodland vernal pool	Spruce-fir-northern hardwood forest	Northern hardwoods-hemlock-white pine forest	Successional northern hardwood forest	Red oak-sugar maple transitional forest	Rich mesic forest	Cultural grassland	Agricultural cropland	Residential development		
B	B							B			B							B	B	B		

ROW = Riverine Open Water
SHO = Shorelines
PFO = Palustrine Forested
PSS = Palustrine Scrub-Shrub
PEM = Palustrine Emergent
WM = Wet Meadow
PAB = Palustrine Aquatic Bed
VP = Vernal Pool
SW = Softwood Forests
MW = Mixed Forests
HW = Hardwood Forests
OF = Open Fields
AGR = Agricultural Croplands
RES = Residential

Season of Use
B = Breeding
M = Migration
W = Wintering
Y = Year-round
Shading = observed in study area

consist of a woven grass cup with varying amounts of feathers, with quills interwoven into the cup, forming overhanging walls. A study conducted in the Hudson River Valley suggests that nest mass and numbers of feathers used decline with increasing PCB concentration in foraging areas (McCarty and Secord 1999).

Clutch sizes vary with age of nesting individuals and date at which egg laying begins. Typical clutch size ranges from 2 – 8 eggs with an average of 4 – 7 eggs being the most common (DeGraaf and Yamasaki 2001). In Massachusetts, the average clutch was found to be 5.2 eggs with a 79.5% hatch rate over an 11-year period from 1938 to 1953 (Veit and Petersen 1993). The incubation period usually lasts 13 – 16 days, and nestlings are fed at the nest 15 – 25 days prior to fledging (DeGraaf and Yamasaki 2001). It is rare for tree swallows to produce two broods in a season, but the birds commonly re-nest if the first clutch is destroyed early in the season.

In the Study Area: Clutch size in the Housatonic River study area averaged 5.4 eggs/clutch during the 1998 and 1999 sampling seasons (C. Custer, USGS, pers. com. to Woodlot Alternatives, Inc., March 2001). Hatching success during this same period was lowest (85.7%) at the Roaring Brook sample population, and highest (96.9%) at the New Lenox Road site.

GROWTH AND DEVELOPMENT

On average, nestlings weigh between 1.5 and 1.7 g at hatch (Robertson *et al*. 1992). Nestling body mass increases on a sigmoidal growth curve (i.e., begins at a slow rate and gradually increases and then rapidly increases), with maximum weights attained at 12 – 14 days of age, followed by a gradual loss of weight prior to fledging (Robertson *et al*. 1992). Maximum weight for tree swallow nestlings is 22 – 24g, and average recorded weight at fledging is 20 – 21g. Asynchronous hatching may result in the largest nestling averaging 94% greater body mass than the last nestling to hatch (Zach 1982, as cited in Robertson *et al*. 1992). This accumulation rate was also found to decline with tissue dilution as nestling body size growth rates increased after 12 days of age.

MOLT

Initial juvenile feather growth begins at 6 – 7 days of age as contour feathers begin to emerge. Primary feather growth starts between 7 and 8 days (Marsh 1980, as cited in Robertson *et al*. 1992). Juvenile plumage is noticeably different from adult plumage of either sex. Juveniles appear grayish brown above with no iridescent blue coloration. Similar to the adult plumage, juveniles are mostly white below with a faint broken collar of grayish brown similar to bank swallows (*Riparia riparia*).

Male swallows go through a definitive prebasic molt during their first fall, at which time they obtain adult, iridescent plumage. Female tree swallows initially undergo a complete prebasic molt during their first fall. After this molt, their appearance varies from drab brown with green iridescence above to extensive iridescent greenish blue feathers interspersed through otherwise drab plumage. Increases in exposure to PCB contamination has been linked to earlier development of adult type plumage in second year females (McCarty and Secord 1999). During the Fall of their second year, females complete a definitive prebasic molt at which time their plumage becomes similar to that of the adult male, but slightly duller and greener (Cohen 1984a, as cited in Robertson *et al*. 1992).

FOOD HABITS AND DIET

Tree swallows actively pursue flying insects, and occasionally glean insects from the water surface or vegetation. Frugivory is well documented during spring migration and especially fall migration, but constitutes a relatively minor portion of their diet during nesting. Tree swallows feed primarily on emergent aquatic insects that can potentially assimilate sediment-associated contaminants. Prey sizes typically range from 0.04 to 1.7 inches. The 0.1- to 0.2-inch prey class is the best represented in average diet samples collected (McCarty and Winkler 1999). An analysis of food items delivered to nestlings consisted of Diptera (46%), Homoptera (26%), Ephemeroptera (11%), Odonata (5%), Coleoptera (4%), Molluska (4%), Aranae (2%), Psocoptera (1%), Hymenoptera (1%), plus trace amounts of Hemiptera, Neuroptera,

Trichoptera, and Lepidoptera (Blancher *et al.* 1987, as cited in Robertson *et al.* 1992). Parents begin feeding young as soon as they hatch, making 10 – 20 feeding trips per hour. The average size of meal delivered to the nest is 28 mg (Quinney and Ankney 1985). Foraging typically takes place between 0 and 40 feet above the ground. When feeding nestlings, adult swallows typically stay within 330 – 660 feet of the nest.

In The Primary Study Area: Well-used foraging areas within the study area include open portions of the river, Woods Pond, and other backwater marshes and ponded areas (C. Custer, USGS, pers. com. to Woodlot Alternatives, Inc., March 2001)

POPULATIONS AND DEMOGRAPHY

Survivorship: Estimates from band recovery data indicate that tree swallow survivorship during the first year is 21% (Butler 1988). Survivorship after the first year ranges from 40 – 60% annually (Houston and Houston 1987 as cited in Robertson *et al.* 1992).

Age at Maturity and Life Span: Tree swallows are able to breed during their second year. The average lifespan is 2.7 years and the maximum life span is 8 years (Butler 1988).

Enemies: House sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), and house wrens are known to destroy nests and eggs and compete for nesting cavities. Tree swallows tend to avoid nesting in close proximity of forest cover to minimize potential for house wren intrusions (Rendell and Robertson 1990, as cited in Robertson *et al.* 1992). Known mammalian nest predators include raccoons (*Procyon lotor*), chipmunks (*Tamias striatus*), deer mice (*Peromyscus maniculatus*), and feral house cats. American kestrels (*Falco sparverius*), northern flickers (*Colaptes auratus*), common grackles (*Quiscalus quiscula*), and American crows (*Corvus brachyrhynchos*) will raid nests for eggs and nestlings. Adult tree swallows are taken by a variety of avian predators including American kestrels, sharp-shinned hawks (*Accipiter striatus*) merlins (*Falco columbarius*), and peregrine falcons (*Falco peregrinus*).

STATUS

General: The tree swallow is a common bird throughout its range with the greatest abundance occurring in central New England and the Adirondack Mountains (Robertson *et al.* 1986, as cited in Robertson *et al.* 1992). The population of tree swallows has been increasing over the past 25 years. In the eastern United States an average of 6 tree swallows are reported per Breeding Bird Survey route completed.

In The Primary Study Area: Tree swallows were frequently observed in the primary study area during the breeding season in suitable habitats in the course of 1998 – 2000 field surveys (Figure 2).

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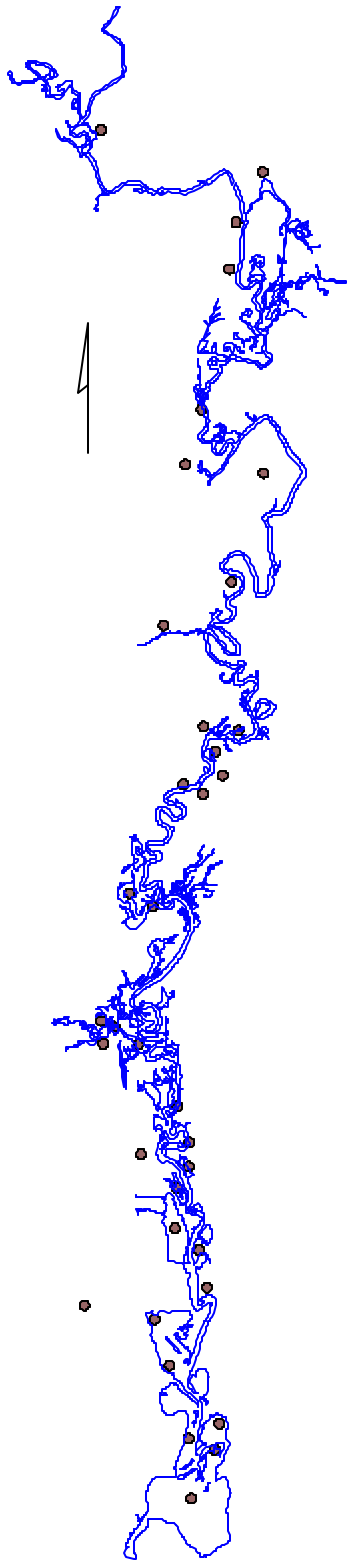

Figure 2. Tree Swallow sightings in the primary study area