

## CONSERVATION OF CLIFF SWALLOWS IN MASSACHUSETTS

by Mara Silver

This article presents results from 1993 and 1994 of my work in management strategies for Cliff Swallow (*Hirundo pyrrhonota*) conservation in Massachusetts. An earlier article, which appeared in *Bird Observer* (21[3]:150), presented results for 1991 and 1992, which are briefly summarized here.

Cliff Swallows have been declining in Massachusetts. Poor adhesion of nests to nest surfaces and competition from House Sparrows (*Passer domesticus*) for nesting sites appear to be the primary factors. The decline of agriculture and its associated decrease in open land may also be a factor. This trend may result in fewer local mud puddles from which the swallows obtain their nesting material. There may be other undocumented factors.

### Historical

The first recorded sighting of breeding Cliff Swallows in Massachusetts was in the Boston area, in Hingham and Attleboro in 1842 (Bent 1942). Henceforth, Cliff Swallow populations increased greatly as more buildings became available for nest sites, and fields were cleared for farming (Bent 1942). In the eastern United States Cliff Swallow populations probably reached their maximum numbers between 1840 and 1860 (Forbush 1908). In Massachusetts the Cliff Swallow was a "common summer resident" in 1870 (Griscom and Snyder 1955). A slow population decline commenced about 1880, when introduced House Sparrows spread throughout New England (Forbush 1929, Bull 1964). House Sparrows, as cavity nesters, compete directly with Cliff Swallows (Samuel 1969). The decline in this century has continued due to factors mentioned above, as well as to loss of open agricultural land and habitat loss due to development (unpublished Breeding Bird Atlas). There may be other undiscovered factors.

### Natural History and Ecology

Cliff Swallows are members of the family Hirundinidae, which includes swallows and martins. They are a migratory, highly colonial species. The birds travel between South America and large areas of North America.

In New England the breeding season lasts from early May until early August. The birds build bottle-shaped mud nests under the eaves of buildings and bridge superstructures. Once paired, both sexes participate in nest-building. Clutch size averages three to four eggs. Both parents incubate eggs and feed nestlings. The incubation period is approximately twelve to fourteen days, and the nestling period is approximately twenty-four days. Parents continue to feed fledglings before all leave for South America. Breeding activity within a colony

is closely synchronized.

### 1991 and 1992 Results

In 1991 I started a project under the sponsorship of the Natural Heritage and Endangered Species Program at the Massachusetts Audubon Society's (MAS) Graves' Farm Sanctuary in Hampshire County. Management activity was limited to House Sparrow control. The remainder of the time was spent observing the colony. Of the nesting attempts (including renesting), six were foiled by House Sparrows, seven nests fell, one nest was both usurped by House Sparrows and fell, and two nests produced young.

In 1992 the project was resumed under the auspices of the MAS. Management activity included House Sparrow control, the addition of thirty gallons of natural clay to the swallows' mud source, and the installation of three fired (i.e., will not disintegrate in water) stoneware clay "nest ledges." It was hoped that the addition of clay to the mud source would improve nesting material and decrease the incidence of nest falling. The nest ledges provided a nest base for the swallows to complete, again to decrease the incidence of nest falling. Of the thirty active nests, fifteen were usurped by House Sparrows, and eleven nests fell. Swallows used one of the three nest ledges. Thirteen to fifteen Cliff Swallow pairs were successful. (When nests fell with nestlings, they were returned to the eaves in substitute nests, and several pairs renested after the House Sparrow attack, contributing to the number of successful pairs.)

### Management Strategies — 1993-1994

The 1993 and 1994 results from the Graves' Farm site are as follows.

**House Sparrow Control.** By 1993 the House Sparrow population had been reduced to just a few pairs. In mid-May two males attempted to enter Cliff Swallow nests, and they harassed the swallows at the nest entrances. House Sparrows are wary and in past years appeared to learn they were being pursued. In 1993 sparrows were purposely ignored, became bold, were caught by surprise, and shot. No House Sparrows were seen at the colony for the rest of the season, and the sparrows did no damage to the colony.

In 1994 no House Sparrows were present at the colony. A male was seen approximately 200 yards away calling on a bird nesting box for several days in May, but then left.

**Nest Ledges.** On April 29 and 30, 1993, seventy-five nest ledges were installed under the eaves of the barn, thirty-eight on the north side and thirty-seven on the south. These are modeled to replicate half-finished Cliff Swallow nests for the swallows to complete. They are made of the same material as the nest ledges used in the 1992 study. They were installed on the north side first. As they were being installed, Cliff Swallows were investigating and landing on them. Swallows built on the north side first, possibly because the nest ledges

were there first. Of a total of sixty-three pairs that nested, fifty-eight used the nest ledges. Of these fifty-eight nests, one crumbled from its ledge. Of the five nests that were not built onto nest ledges, two fell. There were forty-five to fifty-five successful pairs.

In 1994 seventy-five additional nest ledges were installed on April 24 and 25 for a total of 150, seventy-five on each side of the barn. No swallows visited them while they were being installed. Of the thirty-five pairs that arrived to nest, thirty-three used the nest ledges. Two pairs used two nests that were built in 1992. Four pairs nested on the north side of the barn, and thirty-one on the south side. The fewer pairs on the north side may have resulted from the removal of mud from the nest ledges after the 1993 breeding season. Nests were left intact on the south side. Swallows readily occupied complete nests and seemed to prefer them. Of the thirty-five nesting pairs, over twenty-five were successful. Two pairs of Barn Swallows (*Hirundo rustica*) attempted to nest on nest ledges, one pair on each side of the barn, on the western end. The pair on the north side began nest building, and both pairs were seen chasing Cliff Swallows from the vicinity. Within a few days however, both pairs had abandoned the sites, although the Cliff Swallows had not appeared to put up a fight.

**Mud Supply.** In 1993 the mud puddle from which the swallows got their nesting material was located on the north side of the barn. It was kept wet through the breeding season. Ten gallons of natural clay were added in mid-June. At various times in early spring swallows were sighted gathering mud of a different composition from wet areas in the field north of the barn. It appears the composition of nesting material might not be as crucial when being added to nest ledges, as so few nests crumbled from them. In 1991 and 1992 almost all nests built directly onto eaves fell entirely off the surface, indicating the area of attachment as the most vulnerable part of the nest.

In 1994 the mud puddle was again kept wet through the breeding season. No clay was added. All farming activity ceased at the farm after February. Henceforth it became necessary to both dig up the puddle, as no farm vehicles were traversing it, and to cut the tall grass around the puddle, which the farmer had done. Without these activities the puddle quickly fills in with vegetation. One swallow was found dead at the puddle before the grass around it was sufficiently short, probably killed by a domestic cat. The swallows appear to be more tentative about mud collecting when there is tall vegetation around the puddle.

#### Management Strategies at Other Locations — 1994

At two locations (Williamsburg, Hampshire County, and Princeton, Worcester County), management strategies were implemented to try to lure Cliff Swallows to sites where they formerly bred but are now vacant.

At the Williamsburg site, located about two miles west of the Graves' Farm

site, Cliff Swallows had last nested in 1987. Numbers of breeding Cliff Swallows at this site had declined rapidly after 1982. Five nest ledges were installed in late April under the eaves of the barn, the traditional nesting site. Two of these nest ledges were installed in 1993. Swallows did not prospect or nest at the farm either year. House Sparrows are controlled at the farm by removing their nests. Mud supply is provided by two small springs on the property.

At the Princeton site (MAS Wachusett Meadow Wildlife Sanctuary), Cliff Swallows had last nested in 1986, at which point there were four pairs. Twenty-eight of thirty-five nest ledges were installed on April 9 on a large barn, a traditional nesting site. The remaining six were installed at a later date inside another barn, again a traditional nesting site. On June 20 one pair nested on the same side of the barn as the nest ledges but did not use the ledges. The nest, built north of the ledges, fell on July 16, after which the swallows left. House Sparrows are controlled at the sanctuary with traps. It may be that there was not a sufficient mud supply at this site. Active farms, but not necessarily sanctuaries, often contain muddy areas. There was a small puddle immediately next to the barn, but it was surrounded by tall vegetation. I believe that to attract Cliff Swallows to presently vacant sites, ample mud in open areas must be visible to birds prospecting for nest sites.

The two remaining study sites, in Rutland and Lunenburg, Worcester County, host active Cliff Swallow colonies. The owners of these properties have an interest in their colonies and their conservation, and agreed to participate in the project.

At the Rutland site, Alta Vista Farm, ten nest ledges were installed on April 16 on one side of a barn where Cliff Swallows had not nested. In past years the swallows nested above the doorway of a barn where their excrement had become a nuisance. It was hoped they would use the nest ledges and nest away from the doorway. Of the five nesting pairs, two used the nest ledges. The remaining three nested in another location on the opposite side of the barn. At this site House Sparrows are not controlled, but no damage from sparrows occurred. Mud is plentiful at this site.

At the Lunenburg site, Woodruff Farm, ten nest ledges were installed on April 16 on the side of a building where many of the resident Cliff Swallows nest. None of the more than twenty-five nesting pairs used these nest ledges. However, a small amount of mud was added to eight of them, and two to three inches of mud were added to two. Many of the nests at this farm are complete nests that have remained up for years and are composed of both mud and cow manure. The question of whether or not cow manure strengthens Cliff Swallow nests is worthy of inquiry. As at Graves' Farm, swallows quickly took up residence in previously constructed nests. House Sparrows are trapped in bird boxes and sparrow traps at this farm. Mud is plentiful.

## Conclusions

The increase in numbers of breeding Cliff Swallows at Graves' Farm during the 1991-1994 period suggests that management activities benefited the colony. With the implementation of House Sparrow control, installation of nest ledges, and a sufficient mud supply the colony began to recover. The cause of the decrease in pairs of breeding swallows from sixty-three in 1993 to thirty-five in 1994 is not known. The spring of 1994 was cold. Cliff Swallows are vulnerable to both cold and wet weather (Krapu 1986). Colonies move locally. Cliff Swallows that otherwise might have nested at the farm may have nested at another site nearby, although none were detected at surrounding farms.

One pair of Cliff Swallows was successfully attracted to a site where they formerly bred. If just a few birds nest, others are likely to follow, as the species is extremely colonial. The importance of mud at these sites to attract the swallows' interest cannot be overemphasized.

It remains to be seen whether the Cliff Swallow colonies in Rutland and Lunenburg will benefit from management. It is necessary to evaluate each site individually and to choose management activities accordingly. For instance, at the Rutland site nests fall with some frequency, but at the Lunenburg site they do not. Each site is unique.

To answer questions raised in this study and to come to conclusions, further years of experimentation and observation are necessary. Preliminary results, however, indicate that it may be possible through human intervention to conserve the Cliff Swallow in Massachusetts.

**Update.** In 1995 approximately twenty-two of twenty-six Cliff Swallow pairs that nested at Graves' Farm were successful. Nest-building began on May 3, and birds continued to arrive through the end of May. On June 5 there were forty-five to fifty pairs of Cliff Swallows at the Farm, but by June 12 some later-arriving birds abandoned the site approximately halfway through nest-building. All but one nest, which was attached to an old Eastern Phoebe nest, were built onto nest ledges. A mud puddle was created and maintained. Mud was also supplied in a four-foot-square mud pan. Two male House Sparrows were eliminated on May 31. A pair of House Sparrows remained, and the male destroyed at least one nest on June 13. The female was eliminated on June 15, and the male on June 20. No House Sparrow damage was observed after this point.

At Wachusett Meadow Sanctuary, on the large barn, which is the traditional nesting site, eleven of the twenty-eight nest ledges that were installed in 1994 showed signs of Cliff Swallow activity in 1995, with a small amount of mud added to each of them by June 6. None of these pairs stayed to nest. Mud was supplied in a mud pan. At Alta Vista Farm in Rutland three of the eleven active nests were built onto nest ledges. No House Sparrow damage or fallen nests

were observed. At Woodruff Farm in Lunenburg, of the approximately thirty active nests, none were built onto nest ledges, although mud was added to all of them.

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