Artificial nest burrows for Burrowing Owls

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The Burrowing Owl, *Athene (=Speotyto) cunicularia*, is one of the more familiar and more distinctive of the New World owls. Occurring widely throughout the western United States and southern Canada, it is also found throughout much of Central and South America (Peters, 1940). It is found in a variety of habitats ranging from deserts, grasslands, prairies and other natural areas to agricultural lands and also to other man-altered environments (Bent, 1938; Zarn, 1974). They have often utilized the mowed verges of airports (Thomsen, 1971; pers.obs.). Our understanding of these owls has been greatly enhanced by the recent studies of Butts (1973), Coulombe (1971), Marti (1974), Martin (1973) and Thomsen (1971) and the valuable summary of Zarn (1974). These studies indicate that the three essential conditions for suitable Burrowing Owl habitat seem to be openness, short vegetation, and burrow availability (Zarn, 1974:14).

Although once common, the Burrowing Owl is now thought to be declining throughout much of its past range. Unfortunately, accurate estimates of the size of Burrowing Owl populations remain largely unavailable (Zarn, 1974). Even so, it is clear that they are disappearing from many areas of former abundance.

The several people who have studied Burrowing Owls consider this decline to be due to two principal factors: "loss of burrow sites as a result of widespread burrowing mammal control activities, and direct loss of habitat to urban, industrial and agricultural development" (Zarn, 1974). Although listed as "status-undetermined" by the U.S. Department of Interior (1973), it has for several years been included on the National Audubon Society's Blue List (Arbib, 1977). This "early warning" list is reserved for species which "have recently or are currently giving indications of non-cyclical population declines or range contractions" (Arbib, 1971).

There is no simple remedy to the problem of decreases in suitable habitat for Burrowing Owls. Several suggestions have been made concerning the formation of refuges for both burrowing mammals and Burrowing Owls (Zarn, 1974). A technique we have developed in the course of a continuing study of a Burrowing Owl population in Orange County, California, may prove a valuable environmental enhancement procedure in alleviating the other major problem: the shortage of suitable nesting burrows.

Burrowing Owls are capable of digging their own burrows, but more commonly utilize existing burrows or burrow "starts" excavated by other animals, particularly mammals. Medium to large-sized ground squirrels, *Spermophilus*, and prairie dogs, *Cynomys*, seem to be the most important in this respect. A summary of burrow excavators is presented by Zarn (1974). In our study area the Beechey Ground Squirrel, *Spermophilus beecheyi*, was the principal excavator of burrows utilized by the owls. Our technique was to provide a completely artificial burrow in the form of a tunnel and nest chamber constructed of wood. These structures supplemented the naturally existing burrows and were quickly utilized by the owls.

The idea for an artificial burrow first occurred during a banding study of Burrowing Owls nesting along the shoulder of roads on the Seal Beach Naval Weapons Station, Seal Beach, California. Since most of the open land on the station is regularly disked for fire control, the road edges constituted much of the only undisturbed areas available for owl burrows. The nature of the substrate kept the burrows rather shallow and tunnels were often inadvertently collapsed through human activities. We found these tunnels could be repaired by shoring up the sides and top with bits of scrap wood without causing desertion. Subsequently we utilized this technique to open a section of the tunnel portion of burrows and reach the

Figure 1. Installation and operation of artificial nest burrows: the unassembled burrow components (top left); installation (top right); the in-place burrow ready to be buried (middle left); insertion of a cloth-wrapped stick "plunger" to confine birds to back portion of tunnel and nest chamber when banding (middle right); removal of nestling for study (bottom left); the objects of our attention (bottom right).

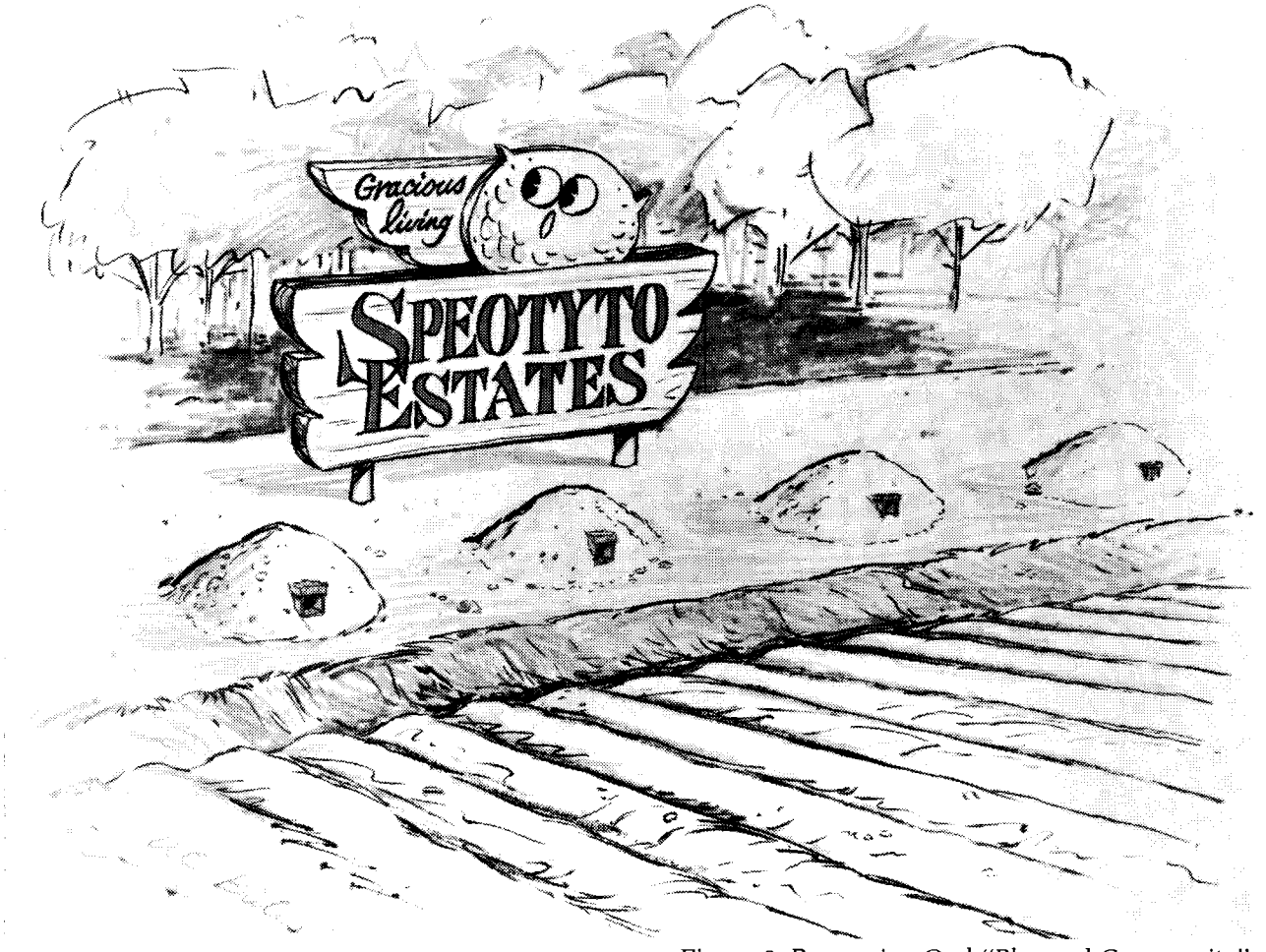

Figure 2. Burrowing Owl "Planned Community"

young in the nest chamber. After banding, the young were replaced and the tunnel similarly repaired with boards. Again, there was no observed desertion by the adult owls. The natural progression from this was to construct a completely artificial tunnel and nest chamber which could be opened for detailed observation of the development of the young.

Artificial burrows (Fig. 1.) were installed and observed during the 1974-76 breeding seasons. The nest chamber was made of warp-resistant plywood and measured 12" x 12" x 8" deep. The tunnel connecting the chamber to the burrow entrance was 4" x 4" and approximately 6' long with one right-angle turn about 4' from the entrance. The sides and top of the nest chamber and tunnel were of wood with a natural dirt floor. The actual dimensions were not felt to be critical. but at least one turn in the tunnel seemed necessary to maintain the nest chamber in darkness. The whole artificial burrow was buried to a depth of 6 inches to provide thermal stability in the nest chamber. This depth also made it possible to easily open the nest chamber daily, and to record the growth of the young owls (Landry, in prep). This activity was accepted with equanimity by both young and adults.

Some flooding and silting in of unoccupied burrows was caused by winter rains; thus most burrows had to be renovated prior to each breeding season. Our study population of owls is at least partially migratory, and most burrows are left unattended for several months in winter. It is not known how much continual occupancy by the owls, as is the case in other areas, would contribute to keeping the burrows free of silting and in good condition. Where burrows are installed on banks or mounds the tunnel could be slanted down at an angle of about 15°, which would probably alleviate this problem.

Artificial burrows were at first installed in portions of the road shoulder having an existing rodent or owl burrow or where such a burrow, now collapsed, had occurred. In almost all cases the artificial burrow was accepted almost immediate-

ly; newly laid eggs were found in one artificial burrow 2 days after it was installed. A total of 30 such burrows were installed during this study of which 20 were actively being used in 1975. The potential use of this technique as an enhancement, as well as management, tool was indicated by Burrowing Owls accepting and utilizing artificial burrows installed in adjacent areas where no pre-existing natural burrow had occurred. Thus the owls were attracted to a site by the provision of a suitable nest burrow, albeit an artificial one.

Considering the importance of burrow availability as a factor controlling Burrowing Owl numbers (Zarn, 1974), the construction and installation of artificial burrows could well prove to be an important maintenance or enhancement technique. Although we have not as yet tried it, the construction of a low earth berm or a series of dirt mounds (Fig. 2) would facilitate the installation of artificial burrows in flat terrain. These would not be excessively expensive to construct and could have the additional advantage of attracting the owls to peripheral portions of agricultural and/or pasture areas. This would tend to decrease their interference with other activities of the landowner. If this technique works, the owls could well be encouraged in their tendency to co-exist in close proximity with man and his activities and provide the benefits of their dietary preference for rodents and insects.

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