



**Monitoring Report**  
Year 2; Report No. 3  
*for*  
**Lower Otay Lake Burrowing Owl Management Area**  
**(LOLBOMA)**

**Including Complex 2 (Mitigation for All Right Storage, San Diego County, California; WO # 427392;  
Building Permit # 122397)**

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## **BACKGROUND**

The burrowing owl (*Athene cunicularia*) population in much of the western United States has decreased substantially in the last few decades (Klute et al. 2003). The burrowing owl population(s) in California have shown a similar decrease with few exceptions (Barclay et al. 1997) and that in San Diego County has declined by approximately 90% since the late 1970s/early 1980s (Lincer and Bloom 2007).

Managing burrowing owls is a critical component of San Diego's Multiple Species Conservation Plan (MSCP); and the MSCP Biological Monitoring Plan (Ogden 1996) identified it as one of the grassland raptor species to be monitored. Although there is no shortage of literature on this owl (Clark, Lincer and Clark 1997, Lincer and Clark 2007), proper owl management is hampered by a lack of a comprehensive approach to management, including consistent and monitored translocation activities (Lincer, Pagel, and Bloom 2006, Lincer 2009). It is also limited by not having a good understanding of the owl's foraging range, which demonstrates substantial variation (Lincer 2007). In a pro-active mode to manage this owl, the City of San Diego applied for, and was awarded a California Department of Fish and Game NCCP Local Assistance Grant, which they then used to contract the Wildlife Research Institute, Inc. (WRI) to investigate and prioritize a number of sites for their ability to attract and support burrowing owls. These "Receiver Sites" were also seen as potentially available for owls that needed to be actively translocated out of harm's way when a more local passive translocation was not feasible or desirable.



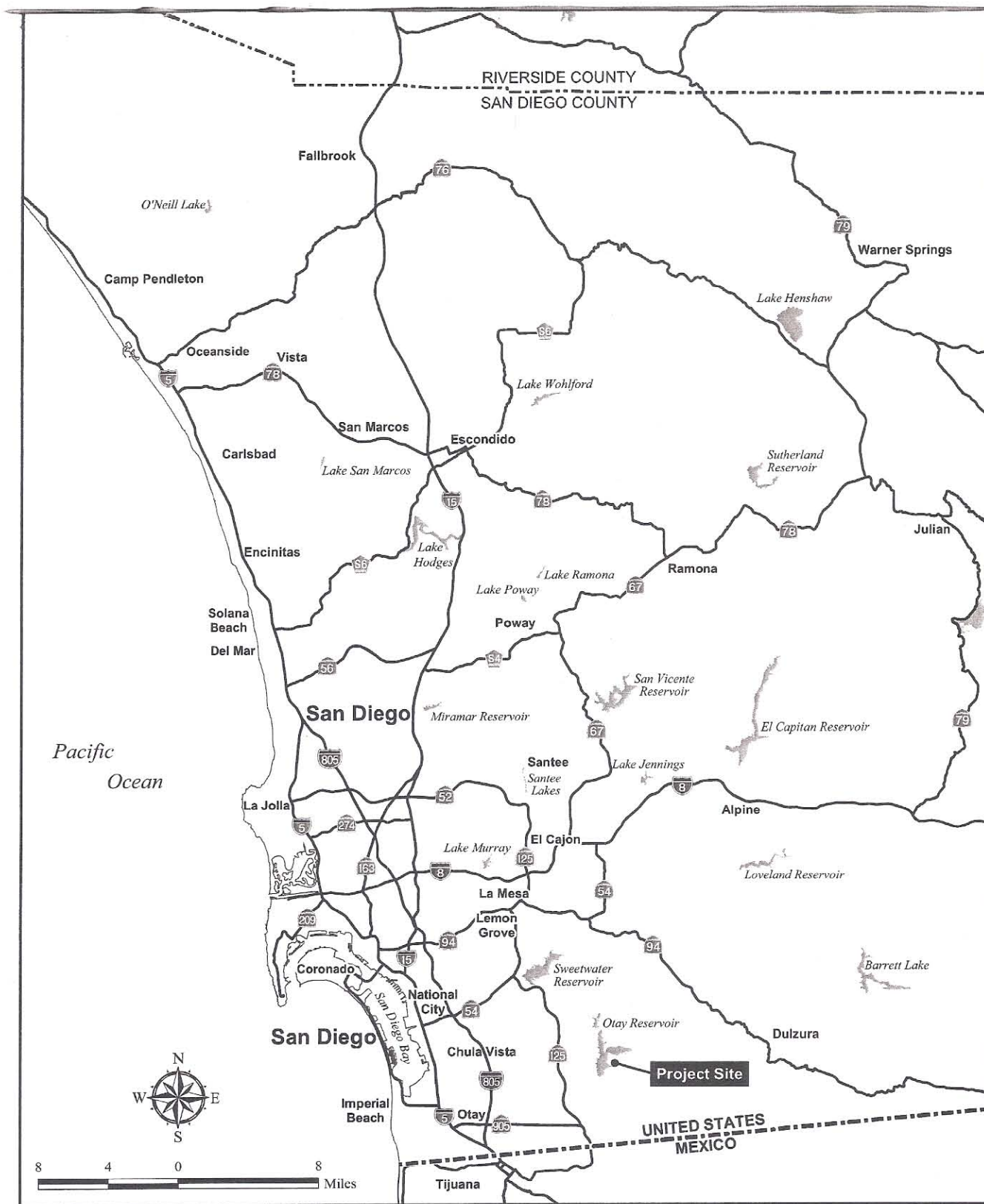


## Lower Otoy Lake Burrowing Owl Management Area



Figure 2.  
Location Map





## Lower Otay Lake Burrowing Owl Management Area

Figure 1.  
Regional Map





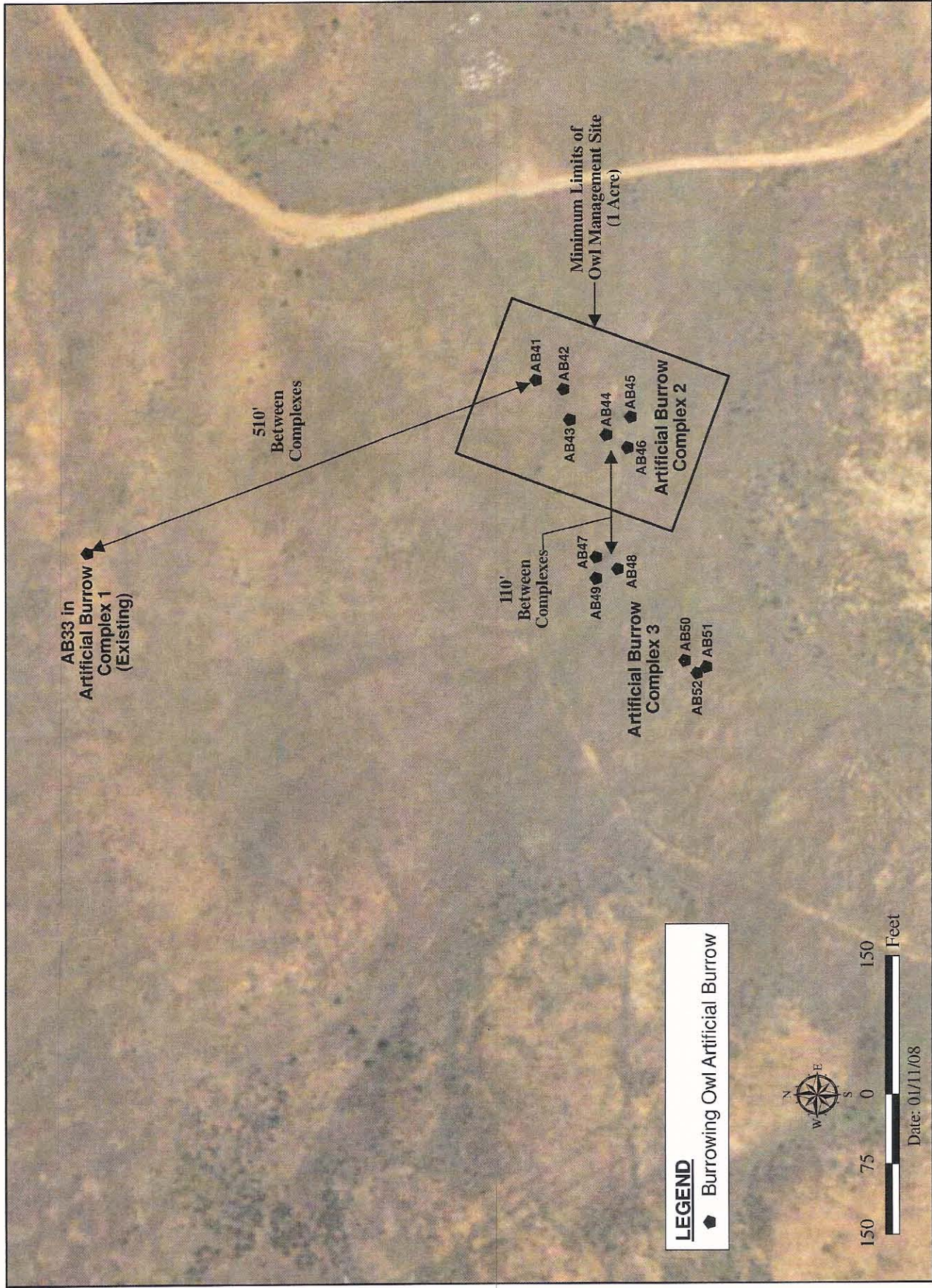


Figure 3.  
Burrowing Owl  
Complexes

# Lower Otay Lake Burrowing Owl Management Area





Based on site visits, an established set of site criteria, and input by the California Department of Fish and Game (CDFG) and the U. S. Fish and Wildlife Service (Service), the Lower Otay Lake site was identified as the best of the current potential Receiver Sites (Figures 1 and 2). To initiate the habitat management process, WRI installed 11 artificial burrows (ABs) on this site in 2005 and created rock piles to attract the owls and provide habitat for their prey. WRI created a Management and Monitoring Plan for the Lower Otay Lake Burrowing Owl Management Area (LOLBOMA) for the City of San Diego (WRI 2005), which provided recommendations and guidelines on how to manage and monitor the habitat at this site for burrowing owls. There are now three juxtaposed AB complexes at LOLBOMA (Figure 3). Complex 1 was installed on March 12, 2005 as described above. Complexes 2 and 3 were installed by WRI on December 15-17, 2007 as part of mitigation for the loss of 2 active burrowing owl burrows and several potential escape burrows on property, known as All Right Storage, which was being developed on Otay Mesa. This project site is a 2.5-acre parcel, south of the City of San Diego Brown Field and is bounded on the north by Otay Mesa Road, to the south by Camino Maquiladora, and partially to the west by Otay Heights Court. The entire site is located within the City of San Diego Multiple Species Conservation Program (MSCP) southern area but outside the Multi-Habitat Planning Area (MHPA). WRI installed 6 ABs on LOLBOMA for this development mitigation (Complex 2) and another 6 ABs to be used by the City Water Department for future mitigation (Complex 3) using a standard construction approach (Barclay 2008). The approach was modified by covering each AB complex with chicken wire (before the final covering with 4-6 inches of dirt) to discourage coyotes and other predators from digging up the ABs. These ABs also had two entrances to provide owls with a safe retreat should a predator approach the central breeding chamber by way of the other burrow entrance.

## **MANAGEMENT AND MONITORING (2 YEARS)**

As part of the mitigation, WRI is monitoring LOLBOMA; specifically the ABs, burrowing owls, and the site's environs during each of two years following the December 2007 AB installation. These monitoring events also include burrow maintenance, minor site modification as necessary, and reporting. Surveys are conducted using a protocol acceptable to CDFG (CDFG 1995, CBOC 1997) and consist of 4 site visits conducted at the appropriate times of year, under acceptable weather conditions, and under the direction of a qualified Burrowing Owl Biologist. Timing is flexible, based on weather, biological conditions, and the ability to meet the below objectives. In fact, the number of actual visits will exceed the planned eight visits and we will conclude this portion of the monitoring and maintenance task in 2010 (vs. 2009).

In that the 3 AB complexes are juxtaposed to each other, and the owls can move freely between them, monitoring includes all three complexes. To address just a portion of the management area would likely give an incomplete, if not incorrect, picture of its biological status. For the convenience of the reader, a brief review of previous monitoring results is provided.

The overall objectives for this monitoring are to (1) document the success of these AB installations, (2) identify management needs, (3) maintain/improve the ABs and site, as necessary (limited to minor management without formal city approval because of existing environmental commitments; City of San Diego 1997), and (4) learn from this mitigation and make appropriate recommendations to the agencies involved.

Fig. 1

Fig. 2

Fig. 3



## Previous Monitoring and Maintenance

- Year 1, Report 1. The first post-installation maintenance monitoring for Complexes 2 and 3 took place on April 15, 2008. At that time, I checked ABs for structural damage. No damage was apparent. Tunnels were checked for openness but no repairs were necessary. At that time, minor site modification took place (e.g., movement of vegetation and/or rocks to keep the burrow entrances open). Neither owls nor any clear evidence of owls being active at burrows was observed at Complexes 2 or 3. Two adult owls were observed near AB-36 and AB-37 in Complex 1. These were assumed to be the pair (or possibly their replacement) that was actively translocated to these ABs in the spring of 2005 by CDFG and Service biologists.
- Year 1, Report 2. July 23, 2008. At least 5 burrowing owls were using the ABs; freely moving between the original Complex 1 and Complexes 2 and 3. Based on their behavior, I suspect these owls represented the adults that I documented on my last (April 15) visit and some proportion of the young that they produced this spring. There were new roads going through the recently installed AB Complexes (Complexes 2 and 3) and evidence that someone had also recently driven through Complex 1 on at least 2 occasions. I recommended fencing and signage to address these intrusions.
- Year 1, Report 3. October 7, 2008. Complex 3 did not reveal any owl activity at any of its ABs. Eight ABs showed substantial signs of activity at the other complexes: Complex 1 (ABs-31, 36, 37, 39, and 40) and Complex 2 (ABs-41, 42, 44). A total of, at least, 7 burrowing owls were documented. These were distributed as follows: Complex 1 (single individuals at ABs-31, 37, and 40); Complex 2 (single individuals initially observed at ABs 41 and 42; later, a total of 4 individuals were observed at AB-44); Complex 3 (no owls initially documented but one owl later flushed from Complex 2 to this complex). The City of San Diego had installed interpretive “keep out” signage and a post and cable barrier along the service road to the south of LOLBOMA, which appeared to be discouraging vehicular access.
- Year 1, Report 4. December 31, 2008. Many ABs showed signs of varying activity levels. Complex 1 revealed activity at ABs-30, 31, 33, 34, 36, 37, 38, 39, and 40; Complex 2 at ABs-41, 42, 43, 44; Complex 3, similar to my observations during my 3<sup>rd</sup> Quarterly Monitoring event (October 7, 2008; above), did not reveal any owl activity at any of its ABs. The timing of owl use (i.e., recent vs. old) was difficult to ascertain since rains within the previous weeks made dating owl sign somewhat challenging. This also meant that the owl use of the ABs, as indicated during this on-site, was conservative, with some older evidence being obliterated by rain. A total of, at least, 4 burrowing owls were documented above ground: Complex 1: single individual at AB-30; Complex 2: three individuals observed at AB-42; Complex 3: no owls were observed at this complex. The City of San Diego-installed interpretive “keep out” signage and a post and cable barrier along the service road to the south of LOLBOMA appear to continue to discourage vehicular access.

- Year 2, Report 1. March 18 2009. Assisted by Mr. Dave Bittner. This on-site event also included a meeting with City of San Diego staff to review our activities and update them on the status of the owls on this site. City staff present were Niki McGinnis, April McCusker, Kim Wehinger, Dave Marten, and Tim Cass. ABs showing signs of varying activity levels included: Complex 1 (ABs-30, 31, 33, 34, 35, 37, 38, 39, and 40); Complex 2 (ABs-41, 42, 43, 44); Complex 3 (ABs-48 and 49 showed heavy use). A total of, at least, 3 burrowing owls were documented above ground (Complex 2: one individual observed at AB-42. At Complex 3: one individual observed at AB-48 and another at AB-49). The City of San Diego-installed interpretive “keep out” signage and a post and cable barrier along the service road to the south of LOLBOMA appear to continue to discourage vehicular access.
- Year 2, Report 2. June 19 and 24 and August 9, 2009. On June 19, 2009, two WRI Biologists and I arrived at 0810 and left at 1210. We monitored artificial burrows and owls for status, endoscoped all active burrows, and banded (green metal Acraft band “54” over “W” and USGS Band # 614-14706) one of two fledgling owls (approximately 6 weeks old). Two adult owls were also present. AB-48 appeared to be the natal burrow this spring but the owls were not restricting their use to that AB or even that Complex. Complex 1 (i.e., the original complex at the top of the hill to the north of Complex 2 and 3) was examined closely but no BUOWs were observed.

On June 24, 2009 (1900-2200), we returned to the site for approximately 3 hours in an attempt to band additional owls but without success. At that time, 2 adults and two young (one banded as described above) were observed. No owls were observed at Complex 1 from our observation areas at Complex 2 and 3.

On August 9, 2009 (1900-2200), I returned to the site again to attempt to trap and band additional owls but without success. One owl, likely an adult, was observed guarding AB-44 (Complex 2) and the remains of a recently predated young owl was found at AB-47 (Complex 3). No leg bands were found at the kill site. From the appearance of the plucked feathers, it was likely a Cooper’s Hawk or a falcon that made the kill. However, molted feathers from both an immature Red-tailed Hawk and Great-horned Owl were also found on Complex 3. No owls were observed at Complex 1 from my observation areas at Complex 2 and 3.

## **Current Monitoring Results (Year 2, 3rd Monitoring Event)**

This monitoring event occurred on February 5, 2010.

I conducted this monitoring and maintenance activity with WRI Biologist, Brittany Schlotfeldt. We arrived at 1140 and left at 1510. Conditions were: 68-58 degrees F; 1-3 MPH; 15-80% overcast, and 3+ miles visibility. We monitored artificial burrows and owls for apparent occupancy, and conducted maintenance, including a limited application of Round Up © around selective AB entrances to keep the vegetation short. Our experience, and that of other BUOW Biologists, is that if vegetation is allowed to grow to a height above 5 or 6 inches, any BUOWs present will leave the area. This is, presumably, because taller vegetation affects their ability to see both prey and predators in a timely manner. We also trimmed larger vegetation and removed dirt from several burrow tunnels and breeding chambers.

Evidence of BUOW use (pellets, prey remains, etc. in conjunction with copious white wash) was noted at Complex 1 (ABs 37 and 38) and Complex 3 (AB-49). No sign of BUOW use was noted at Complex 2. A total of 3 BUOWs were observed in the original Complex 1 and these appeared to be associated with ABs 33, 35/36, and 38. No owls were observed at the other two complexes.

Evidence of small mammal activity continues to increase with scat of various species observed at many AB entrances, especially at Complex 1. Two cottontail rabbits had taken over ABs; one at AB-37 and the second at AB-38. Some sign of small mammal activity around, and use of, burrows was noted in Complex 3 but little evidence was seen at Complex 2. We frequently collect the regurgitated owl pellets in the hopes that we can, ultimately, analyze the contents for prey, which could be useful information for owl and habitat management. Also, by removing the pellets, it becomes easier to interpret the recentness of owl activity at the burrow.

With respect to maintenance, some AB tunnels were partially filled in with dirt (presumably, by small mammals). Standing water was noted in some breeding chambers in Complex 1. An unusual kind of damage was noted at AB-37 (also in Complex 1). A 2-foot section of perforated pipe (one of the two access burrows) had been crushed and moved 20 feet away from the AB. We recovered the remaining burrow entrance and replaced the armoring (rocks) around the shortened section and partially buried the loose 2-foot section so that it provided an additional escape burrow. Interestingly enough, evidence of human presence (a burned hat) was also noted nearby. No new evidence of vehicles crossing through the owl management area was observed. The City of San Diego-installed interpretive “keep out” signage and a post and cable barrier along the service road to the south of LOLBOMA, and any worker education they are conducting, appear to be discouraging vehicular access.

Other birds observed included: Lark Sparrow, Tree Swallow, Red-tailed Hawk, American Kestrel, Ferruginous Hawk, Northern Harrier (adult male and female), Common Raven, Killdeer, Western Meadowlark, Cassin’s Kingbird, Lesser Goldfinch, House Finch, and California Quail. On the way to and from the study site, we also noted several bird species in and around the eastern arm of Lower Otay Lake: Common Egret, California Towhee, and Yellow-rumped Warbler. Mammals on the study site included: Coyote (scat), Botta’s pocket Gopher (mounds), Black-tailed Jackrabbit (sighting and widespread scat), and Kangaroo Rat (scat and tail drags). There appeared to be an increased amount of fossorial mammal activity on and around the AB sites, with prevalent evidence of Botta’s Pocket Gopher and lesser amounts of mouse- and K-rat-size burrows. California Ground Squirrels were not observed on the site but were observed at the east end of the access road to the study site, near the gated entrance at Otay Lakes Road, and were also seen just west of LOLBOMA.

## **DISCUSSION**

The presence of 3 BUOWs is encouraging. In to how many functional pairs this will translate later in the spring remains to be determined.

The presence of an, apparently, increasing and more diverse fossorial mammal population, especially close to the ABs, is also encouraging. However, we have neither quantifiable data on this covariate nor on which mammal species the owls might be preying. Many of these mammals provide potential burrows and prey for the owls and their current increase (perhaps, in response to the initial ground disturbance and presence of the ABs) suggests that further management to augment the fossorial mammal population could be successful. If



the local prey levels were encouraged to increase, that could result in: additional pairs of owls, increased egg production, and increased fledging and survival rates. If the prey could be augmented especially closer to the ABs, that would also decrease the distance the owls need to travel from the nest to forage, which in turn would make them less available/vulnerable to predators.

Some AB tunnels were filled in with dirt, presumably, by small mammals, but the extent often seems limited to a short section; in some cases, to a plug of dirt for predator protection.

The standing water in some of the breeding chambers in Complex 1 (on the ridge) is a potential problem, especially, if it did not drain adequately before the owls needed them for nesting. It is also possible that the presence of water could discourage the owls from using a particular burrow if it was observed when the owls first inspected the burrow for potential use. The water is, apparently, seeping into the area between the top of the bucket and the sides of the hole in which the bucket sits, during the rainy season. This could, likely, be rectified by sealing the space between the buckets and the surrounding soil with soil-cement and creating a small lip to keep the surrounding water from flowing into the AB chamber. Standing water was only noted in some of the ABs in Complex 1, which seems to drain well and this may mitigate the problem somewhat. These ABs will be subsequently examined for water and appropriate action recommended and/or taken.

## RECOMMENDATIONS

1. Continue educational efforts with others using the area to discourage vehicular and/or pedestrian use on the owl management area. If that does not work adequately, consider fencing the area around both Complexes 2 and 3 (together) and Complex 1 (separately).
2. In an attempt to increase owl productivity and, perhaps the number of active pairs, augment the prey population through the distribution of brush and rock piles. It may also be possible to plant native plant species to further support the appropriate wildlife. A substantial number of these piles and/or plantings should be placed near the AB complexes in order to decrease the exposure of owls to predators.
3. Establish a long-term monitoring program for owl prey (especially, insects, herps, and small mammals). This should include herp arrays and associated pitfall traps and the periodic collection and analysis of owl pellets for prey content throughout the year.
4. The BUOW is a semi-colonial species and it has evolved to benefit from the presence and awareness of its neighbors (for both prey and predators). To expect the one pair of owls at LOLBOMA to attract enough additional individuals/pairs to build a colony is, probably, unrealistic. We have repeatedly noted where once a colony gets below a certain minimal number of pairs, it usually results in that colony ultimately failing. This is a species that is clearly on the edge of survival for a number of reasons, not all of which we necessarily know. However, immigration and natality are hard-pressed to keep up with emigration and mortality at this and other sites throughout Southern California. One logical adaptive management action would be to move captive-bred owls, development-displaced owls, or owls that need to be released from captivity, to LOLBOMA on a regular and continuing basis. This would not only help replace losses but it would also add to the genetic diversity of the colony, which, in turn, would improve chances of survival. The existing complexes would, likely, support more than the one pair that has been there, especially if the prey base is augmented. However, any plans to add a substantial number of additional owls will require

the installation of additional and, somewhat nearby, ABs. We have learned a lot about the adequacy of the currently located ABs. A preliminary examination of the area around LOLBOMA indicates that there are areas that would be good candidates for additional ABs.

5. From a long-term management standpoint, it is desirable to wean these owls off ABs and on to a more natural and self-sustaining alternative, such as fossorial mammal burrows. Therefore, steps should be made to explore the feasibility of introducing a population of California Ground Squirrels or, perhaps, other fossorial wildlife to LOLBOMA. It is, perhaps, both relevant and encouraging that California Ground Squirrels appear to be moving closer to LOLBOMA.

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