

## Western Riverside County MSHCP Burrowing Owl Monitoring Protocol, 2022

### INTRODUCTION

The Western Burrowing Owl (*Athene cunicularia hypugaea*; hereafter “owl”) is one of 45 bird species covered by the Western Riverside County MSHCP (Dudek & Associates 2003). Burrowing Owls are considered a Species of Special Concern in California (Gervais et al. 2008) and a National Bird of Conservation Concern by the U.S. Fish and Wildlife Service (2002). Burrowing Owls are found within California throughout the Central Valley, from Redding south to the Grapevine, east through the Mojave Desert, west to San Jose and San Francisco, within the outer coastal foothills area, and within the Sonoran Desert (Grinnell and Miller 1944). Owls inhabit the central portion of the Plan Area within the open lowlands (Garrett and Dunn 1981), and their overall distribution is scattered outside of the montane areas (Dudek & Associates 2003). The MSHCP identifies grasslands, agricultural fields, and playas and vernal pools as owl habitat within the Plan Area (Dudek & Associates 2003).

Owls in California tend to breed from February–August (Thomsen 1971; Poulin et al. 2011) and they typically nest in abandoned California ground squirrel (*Otospermophilus beechyi*) burrows, but may also use burrows previously occupied by small mammals, badgers (*Taxidea taxus*), or marmots (*Marmota* spp.). Owls will also use pipes, culverts, and nest boxes for nesting where natural burrows are scarce (Robertson 1929). Young are present as early as mid-April (Poulin et al. 2020) and will emerge from burrows about 14 days post-hatching (Zarn 1974). Young owls fledge (i.e., leave immediate vicinity of burrow) at about 44 days post-hatching (Landry 1979). Western Burrowing Owls may attempt a second brood if the first nesting attempt fails early in the season (Thomsen 1971; Butts 1973; Wedgwood 1976); otherwise, pairs produce a single brood each year. Pairs may use satellite burrows to protect themselves or their fledglings from predators or inclement weather (Gleason 1978; Rich and Trentlage 1983).

The Western Riverside County MSHCP identifies seven species objectives for owls, one of which requires documentation of  $\geq 120$  owls within the Plan Area, with no fewer than five breeding pairs in any one Core Area (Dudek & Associates 2003). The following protocol details how we determined whether Core Areas are supporting a minimum of five breeding pairs of owls. We generally conduct our first round of observations in mid-March and our final round of observations in July or August, depending upon the breeding phenology of local owls in 2022. This protocol also outlines how we perform our triannual inspections of artificial burrows on Conserved Land.

### Goals and Objectives

- A. Determine whether Burrowing Owl Core Areas are supporting a minimum of five breeding pairs of owls.
  - a. We will observe active burrows or burrow colonies for several hours throughout the breeding season to determine whether owls are breeding, and if so, how many pairs are using each Core Area.

- B. Determine whether artificial burrows on Conserved Land require maintenance to make them suitable for Burrowing Owls.
  - a. Conduct triannual inspections of artificial burrows and provide information to land managers.

## **METHODS**

### **Field Methods**

#### *Pair Count Surveys*

We will visit active burrows during the Burrowing Owl breeding season (1 Feb–31 Aug), with the frequency depending upon the level of activity at each burrow (e.g., we monitored burrows with nestlings more frequently than those in the incubation stage). We will not conduct visits if maximum wind speeds were >20 km/h, or during periods of precipitation or fog. The ideal conditions for conducting these surveys are during a temperature >20 °C, winds <12 km/h, and cloud cover <75%. We will deploy cameras for 24-hour increments, with cameras being set in the mid-morning and collected at about the same time the following day. These deployments will occur for one 24-hour period every two weeks.

Before deploying cameras, a biologist will visit the site to determine whether burrows are being used by owls. The biologist will briefly inspect the burrow entrances, looking for recent owl sign that could include fresh pellets, whitewash, feathers, or prey remains. The biologist will also make note of whether owls are seen or heard during the visit. These visits will be brief, to avoid disturbing breeding owls, and will occur on the day of camera deployment. If the biologist determines that burrows appear active, camera deployment will proceed.

We will use trail cameras in 2022 to monitor the number of nestlings and fledglings at each active burrow. Photos and videos recorded by trail cameras will also provide information on individual owls that are fitted with numbered leg bands (Appendix A). Cameras will be set outside burrow entrances overnight and will be attached to existing owl perches where possible, or to temporary stakes where perches are not already present. Temporary stakes will not exceed the height of the trail cameras (approximately 15 cm) because we do not want to create perches that could be used by avian predators. Additionally, temporary stakes will be placed approximately 3 m directly outside the burrow entrance.

### **Equipment**

- Aerial photo of site
- Binoculars (minimum 8x magnification)
- Two-way radios
- Datasheet(s)
- Anemometer/thermometer
- Trail cameras (Bushnell®, various models)
- SD cards
- Temporary stakes (if necessary)

### *Artificial Burrow Monitoring*

We will monitor artificial burrows in April, August, and December 2022, which coincide with the early and late breeding season, and overwintering season, respectively. During each check we will collect data on the overall site, specifically within 50 m of the cluster of burrows, including classifying the vegetation type and height (estimated; in April only); identifying potential threats, including predator presence and some human activities; proposing management needs such as mowing and herbicide treatment; indicating the presence of features that could be used as burrows by Burrowing Owls, including ground squirrel burrows and rock or wood piles; and providing a count of perches that could be used by owls or potential predators. At each artificial burrow we will identify the presence of Burrowing Owl sign such as pellets or feathers. We also determined whether the burrow is in use by owls, and if so, what it is being used for (e.g., roosting or nesting). If owls are present, we will provide a count of adults, nestlings, etc. We will then assess the condition of the burrow and the surrounding site so land managers can conduct necessary work to make the site suitable for owls. Finally, we will collect information on any predator activity within 10 m of the burrow (Appendix B).

### **TRAINING**

Biologists collecting these data are familiar with the ecology of Burrowing Owls within western Riverside County. Additionally, they have experience conducting habitat assessments and non-breeding or breeding season surveys. Breeding surveys conducted for the Biological Monitoring Program qualify as experience, as does the collection of habitat data during our triannual surveys at active burrow sites. Biologists are also familiar with the appropriate state and federal statutes pertaining to Burrowing Owls, scientific research, and conservation.

### **LITERATURE CITED**

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**Appendix A.** Datasheet for 2022 Burrowing Owl pair count surveys.

<b>MSHCP Burrowing Owl Pair Count Survey Data Sheet, 2022</b>			
Observer: _____	Date: _____	Site ID: _____	X, Y coordinates: _____
Start temp. (°C): _____	Avg. sky code: _____	Max wind (km/h): _____	End temp. (°C): _____
Survey notes (specific to this survey): 			

Burrow ID					
	Likely nesting stage, if applicable (circle one):		Construction - Incubation - Early nestling - Late nestling - Fledgling - N/A		Explain:
	n adult owls	Paired? (Y/N)	n juvenile owls	Notes	
Consensus:					

Burrow ID					
	Likely nesting stage, if applicable (circle one):		Construction - Incubation - Early nestling - Late nestling - Fledgling - N/A		Explain:
	n adult owls	Paired? (Y/N)	n juvenile owls	Notes	
Consensus:					

Burrow ID					
	Likely nesting stage, if applicable (circle one):		Construction - Incubation - Early nestling - Late nestling - Fledgling - N/A		Explain:
	n adult owls	Paired? (Y/N)	n juvenile owls	Notes	
Consensus:					

Burrow ID					
	Likely nesting stage, if applicable (circle one):		Construction - Incubation - Early nestling - Late nestling - Fledgling - N/A		Explain:
	n adult owls	Paired? (Y/N)	n juvenile owls	Notes	
Consensus:					

Sky Condition Codes: 0 = clear or few clouds; 1 = partly cloudy; 2 = mostly cloudy; 3 = fog or smoke; 4 = light drizzle; 5 = constant snow; 6 = constant rain.

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Biological Monitoring Program  
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Data entered (initials and date): \_\_\_\_\_

Data checked (initials and date): \_\_\_\_\_

**Appendix B.** Datasheet for 2022 artificial burrow monitoring.

**Burrowing Owl Management - Monitoring Form**

Observer: \_\_\_\_\_ Date: \_\_\_\_\_ Location: \_\_\_\_\_ Site ID: \_\_\_\_\_  
 Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_ (start/end times for entire survey)

**Site Assessment** (w/in 50 m of burrow or colony)

<b>WEATHER</b> Temp (celsius): _____ Wind Speed (circle one) 0 - calm 1 - smoke drifts 2 - felt on face 3 - leaves/twigs in motion 4 - dust rises 5 - small trees sway 6 - large branches sway 7 - walking difficult		<b>VEGETATION (Complete this section in April only)</b> % cover dominant veg cover: _____ Avg. veg height (cm): _____ Dominant Veg Type (circle) 1 - native grassland 2 - non-native grassland 3 - native forbland 4 - non-native forbland 5 - grass/herb 6 - shrubland (>5% shrub) 7 - Other (describe in notes)	
Weather Condition (circle one) 0 - clear, few clouds 1 - <50% clouds 2 - >50% clouds 3 - fog 4 - light precip 5 - mod/heavy precip		Tall (>15 cm) veg patches?: Y N % Cover Tall (>15 cm) Veg: _____ Vegetation Notes:	
<b>PREDATOR THREATS</b> Perched Raptor: Present Raptor Nest: Present Predator Digging: Present Predator Burrows: Present		<b>PREDATORS (SP. &amp; SIGN)</b>	
<b>OTHER THREATS</b> (High, Medium, or Low, if None, leave blank) OHV use: _____ Construction: _____ Vandalism: _____ Dumping/litter: _____ Firearms: _____ Equestrian: _____ Livestock: _____		<b>MANAGEMENT NEEDS</b> (rank need as High, Medium, or Low, if None, leave blank) Fencing: _____ Trash Removal: _____ Signing: _____ Law Enforcement: _____ Mowing: _____ Barrier Construction: _____ Burn Prep: _____ Predator Management: _____ Graze Assessment: _____ Herbicide Treatment: _____ Management Notes:	
<b>AVAILABLE BURROWS &amp; PERCHES - Indicate presence ("P") or provide a count</b> Ground Squirrel: _____ Rock/wood pile: _____ Tall perches (>2 m): _____ Kangaroo Rat: _____ Eroded Embankment: _____ Short perches (<2 m): _____ Artificial: _____ Other: _____ Culvert: _____ # of available burrows: _____ Pipe: _____			Available Burrow Notes:

Appendix B. Continued.

**Burrowing Owl Management - Monitoring Form**

**Burrow Assessment** (w/in 10 m of burrow)

Burrow ID: \_\_\_\_\_ Time Start: \_\_\_\_\_ Time End: \_\_\_\_\_

<b>OCCUPANCY</b>			<b>BIRDS @ BURROW</b>	
<b>BUOW Sign at Burrow</b>	<b>Burrow Use</b> (circle one)	<b>Peeper Used?:</b> N Y	# Adults, by sex: _____	
Pellets: Present	1 - nest	3 - not in use	# Juv: _____	
Whitewash: Present	2 - roost	4 - n/a	# Fledgl.: _____	
Feathers: Present			# Nestl.: _____	
Digging: Present			# Eggs: _____	
	<b>If Nesting, Stage</b> (circle one)	<b>Nest Box Opened?:</b> N Y n/a		
	1 - pair bonding			
	2 - construction			
	3 - laying			
	4 - incubating			
	5 - nestling			
	6 - fledgling			
	7 - n/a			
<b>CONDITION</b>				
<b>Burrow Condition</b>	<b>The following present/intact?</b>		<b>Predator Sign at Burrow?:</b> N Y	
Veg <10 cm?: N Y n/a or unk.	Rope: N Y n/a	<b>Type of Predator Sign:</b> _____		
Entrance clear?: N Y n/a or unk.	Perch: N Y n/a			
Pipe/tunnel clear?: N Y n/a or unk.	Info Sign: N Y n/a			
Pipe intact?: N Y n/a or unk.	ID Sign: N Y n/a			
Nest box intact?: N Y n/a or unk.				
Rodent occupancy?: N Y n/a or unk.				
Water in burrow?: N Y n/a or unk.				
Cobwebs?: N Y n/a or unk.				
<b>PREDATORS (LIST SPECIES &amp; TYPE OF SIGN)</b>				
<b>Burrow Notes:</b>				