

Western Burrowing Owl Ecology and Survey Methods

Tribal Coordination Meeting
May 13, 2025

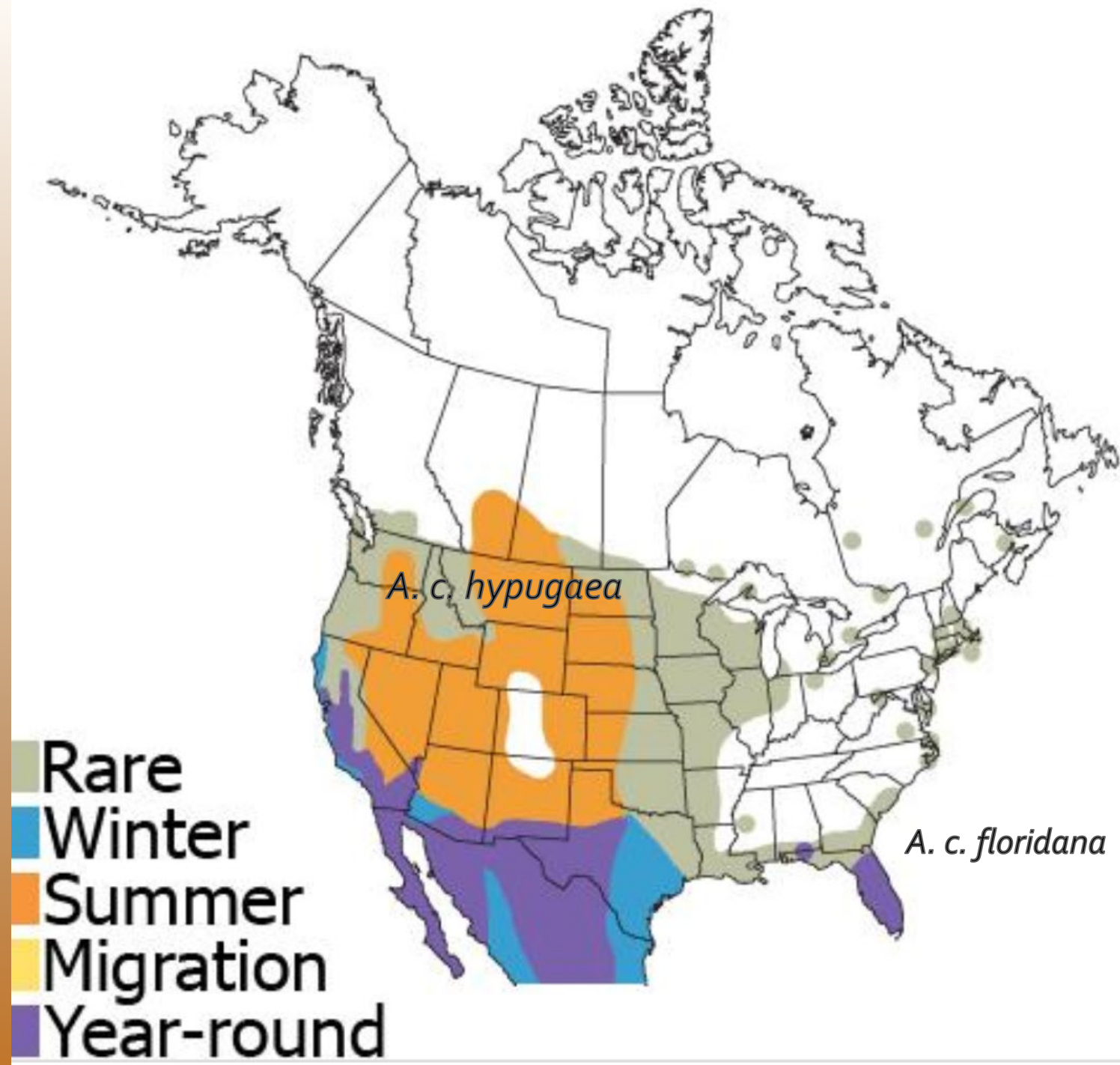


RANGE

Western Burrowing Owl (*Athene cunicularia hypugaea*)

- Migratory and Resident populations
- California
 - Resident/Migratory boundary is variable
 - Migrants winter with Residents
- Limited gene flow among resident breeding sites
- Genetic panmixia among migratory breeding sites
 - uniform random mating

Range map from *The Sibley Guide to Birds*



LIFE HISTORY

- Small, semi-colonial, ground nesting owl
- Nest underground in burrows
- **Can't dig their own burrows**
- Depend on fossorial animals
- Prefer open grassland and desert habitats



LIFE HISTORY

- No sexual dimorphism
 - Males and females are same size and color
 - *but* male plumage color fades during breeding season



LIFE HISTORY

- Clutch size: 6–12 eggs
- Nest success highly variable (fledge 0–10 young)
- Site fidelity (philopatry)



LIFE HISTORY

- Activity Pattern
 - Crepuscular
 - **Nighttime = foraging**
 - Daytime = roosting/resting
- Diet - opportunistic generalist
 - Primarily insects and small mammals
 - Varies by local abundance of prey species





HABITAT

What is Burrowing Owl Habitat?

Habitat Communities

- Varies by geographic region
- Grassland
- Desert
- Shrub steppe, sage scrub
(open % cover)

Core Features

- Burrows/shelter (≥ 4 in. diameter)
- Flat, expansive topography
- Low, open vegetation
- Low percent shrub cover
- Few perches
(e.g., trees, power poles)



Photo: Morongo Band of Mission Indians



HABITAT

Ecosystem Engineer Connection

- Dependent on fossorial (digging) animals to create burrows
- **Can't dig their own burrows**
(limited burrow modification only)
- Ground Squirrels especially important
- Semi-colonial
- Predator warning "system"
 - Ground squirrels
 - Conspecifics

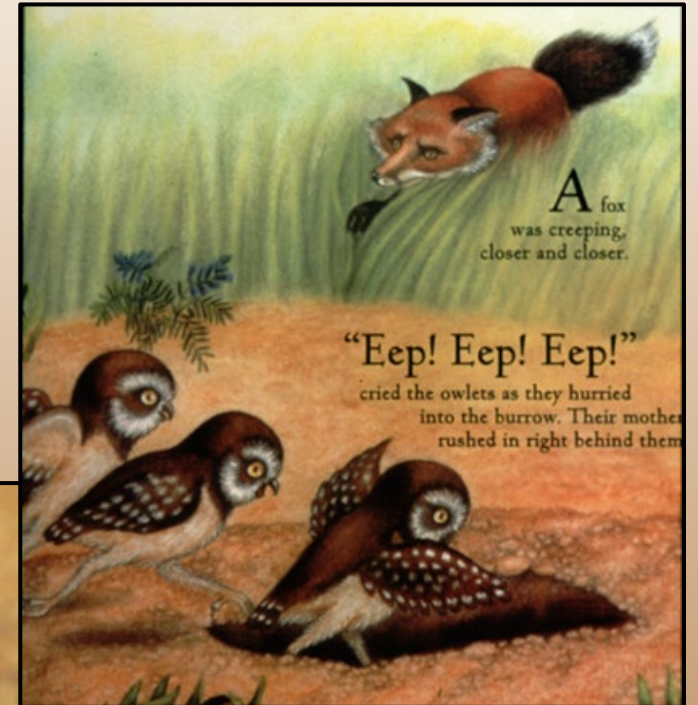




HABITAT

Satellite Burrows

- Satellite burrows are important
- Integral part of the nest “complex”
- Influences nesting
 - Nest selection
 - Site occupancy
 - Nest success
 - Productivity



HABITAT



HABITAT



HABITAT

Unusual Situations

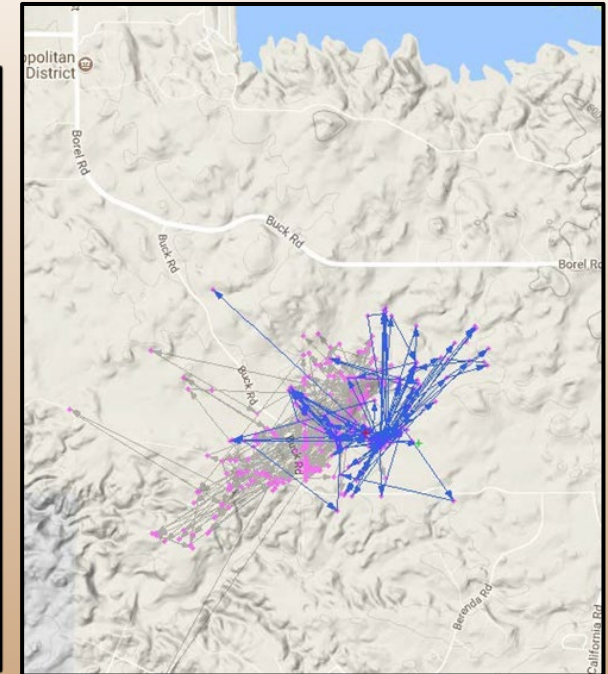
- Graded construction sites
- Rock piles
- Manmade structures
- Culverts
- Tires
- Wood pallets
- Near and under tall perches and fences
- Near and under trees

Just because it's available and used, doesn't mean it's "good"



BREEDING SEASON

- February 1 – August 31
.....**but these dates vary!**
- Phases
 - Courtship – early season
 - Incubation – 28 to 30 days
 - Chicks emerge – ~ 14 days old
 - “Fledge” – 44 to 53 days old
(capable of flight but **not** independent)
- Satellite burrows
- Strong site fidelity
- Nest Territory – 100 meters (328 ft)
- Home Range – 600 meters (1,968 ft)





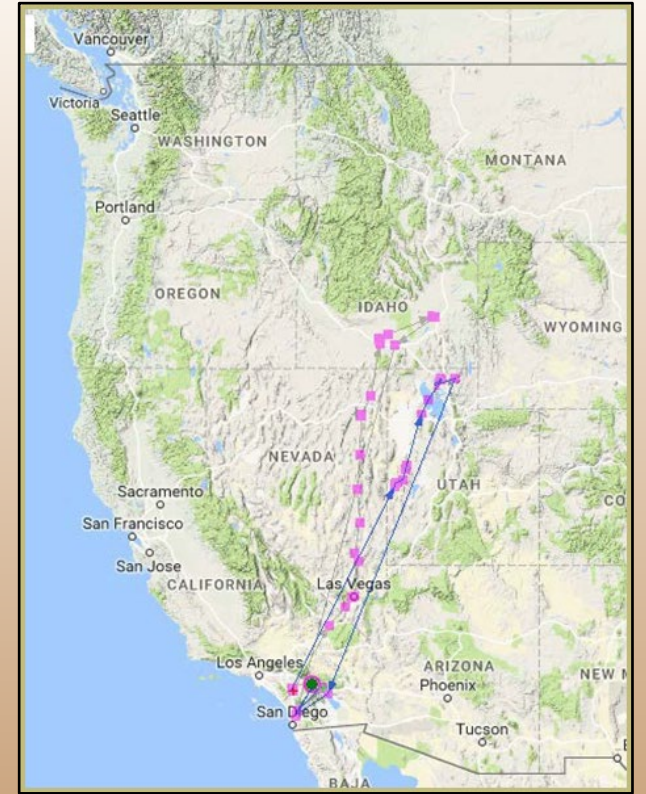
BREEDING SEASON

Sign and Nest Decoration



NON-BREEDING SEASON

- September 1 – January 31 (**variable**)
- Different Shelter Types
Burrow, Erosion rill, Culvert, Shrub, Pipe
- Variable Habitats
Less open and flat
- More movements
- Less faithful to nest sites
...but may return to breed
- Less conspicuous
- Singles or multiple owls
- Partially migratory



SURVEY METHODS

Survey Types

- Pedestrian (walking) transect surveys
- Driving road surveys
- Point counts with call playbacks

Considerations

- Objective(s)
- Habitat type
- Time of year/season
- Size of survey area
- Sample or 100% Coverage





SURVEY PROTOCOL

Staff Report on Burrowing Owl Mitigation

State of California
Natural Resources Agency
Department of Fish and Game
March 7, 2012¹

¹ This document replaces the Department of Fish and Game 1995 Staff Report On Burrowing Owl Mitigation.

Appendix C: Habitat Assessment

- Literature search; Minimum 1 survey pass; site + 500-foot buffer
- Suitable habitat = rolling to flat topography; suitable burrows
- Burrows and surrogates: **≥11cm in diameter**
- Map all suitable burrows

Appendix D: Breeding & Non-Breeding Surveys

1) **Breeding Season** (1 Feb – 31 Aug); peak between (15 April – 15 July)

- 4 surveys:
 - 1 between 15 Feb – 15 April;
 - 3 between 15 April – 15 July with min 3-week interval AND 1 survey after 15 June
- **Pedestrian transects spaced 7m – 20m**
- Scan at start and every 100m
- Conditions: >20 C (68 F); <12km/hr. winds, cloud cover <75%
- Timing: morning civil twilight to 10 AM or 2 hrs. before evening civil twilight

2) **Nonbreeding Season** (1 Sept – 31 Jan)

- occupancy data but still need breeding survey
- 4 evenly spaced surveys; same methods as breeding surveys

3) **Preconstruction Surveys**

- Minimum 2 surveys >14 days prior to ground disturbance AND within 24 hrs. of ground disturbance



Survey Considerations

Detectability Varies

- Not always obvious
- Nest/occupied burrow evidence varies
- Other evidence - alarm calls, flushing & low flight, molted feathers



Survey Considerations

Detectability Varies

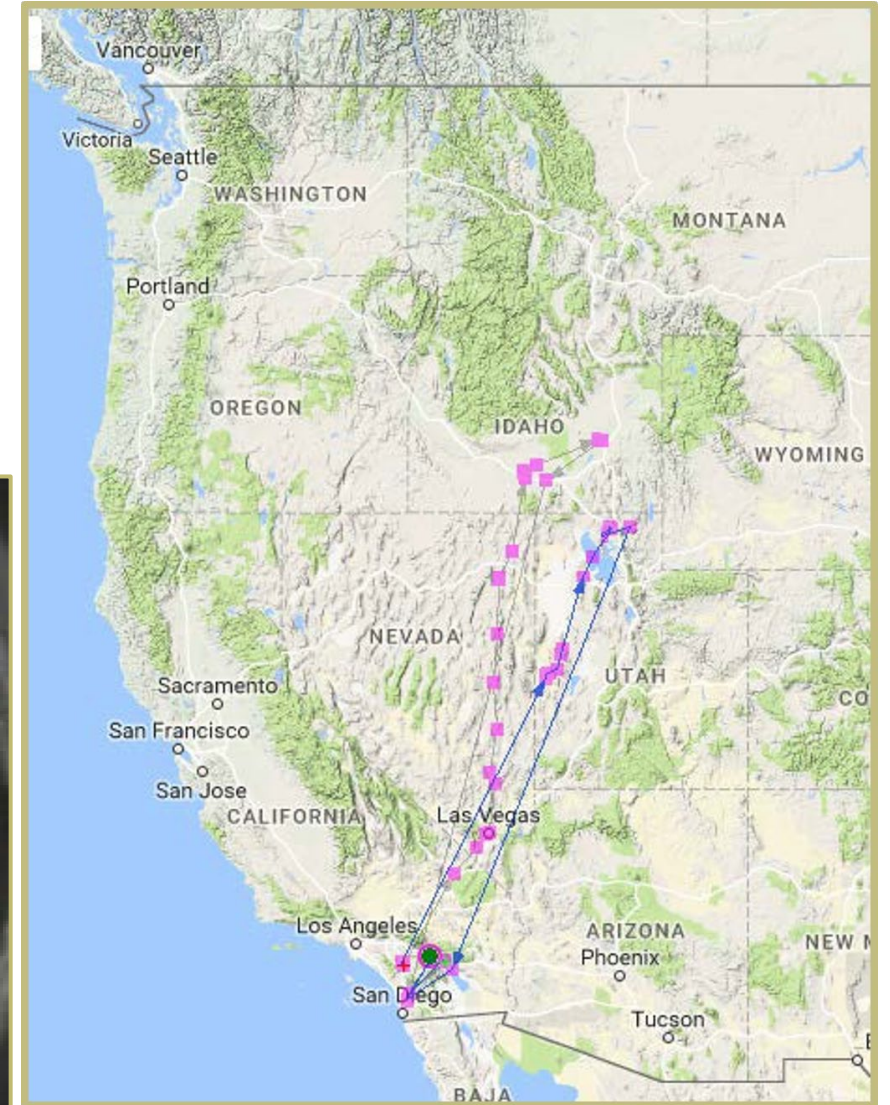
- Multiple surveys and optimal observation times are important



Survey Considerations

Nonbreeding Season

- More movements
- Not centered around a nest
- More time spent underground
- More inconspicuous





Daniel Hawkins

THANK YOU

Noelle Ronan
Wildlife Biologist
U.S. Fish and Wildlife Service
noelle_ronan@fws.gov