

MONITORING BURROW USE OF WINTERING BURROWING OWLS

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Last spring's distribution and abundance study revealed that nesting pairs of burrowing owls experience attrition by the latter part of the nesting season. Nesting density in June and July was lower than it was during April and May. The spatial distribution of occupied burrows also began shifting in July. Therefore, to characterize a year-long collision hazard profile for burrowing owls in the Altamont Pass Wind Resource Area (APWRA), we continued the distribution and abundance study through the rest of the year. We visited 42 of the 46 sampling plots twice more during the fall months of 2011, mapping the locations of burrows used by burrowing owls. (The four plots we did not visit were inaccessible due to construction activities associated with the Vasco Winds repowering project.) We characterized most of the burrows during fall as refuge burrows, although a few showed evidence of nesting into late September and early October. We used the same survey methods as during spring. Our purpose is to include the additional burrowing owl burrow locations in predictive models to better inform wind turbine siting during repowering.

RESULTS

Within the 46 sampling plots, we had recorded 80 burrowing owl nest burrows during spring 2011. During the first two rounds of visits to 42 of these 46 plots, we recorded 452 burrowing owl burrows (Figure 1). Some of the new burrow locations undoubtedly overlapped with the nesting season burrows, but many obviously occur in new locations. Also, some of the 452 burrows mapped in late summer and fall were undoubtedly counted twice, but most were counted once. Many of the new locations are nearby the nesting season burrows, showing strong trajectories in areas of occupancy, but we also documented considerable expansion. Some of the plots lacking nesting season burrows were occupied by burrowing owls during fall (Figure 1). In plots lacking ground squirrels, burrowing owls took up residence in culverts under the roadways, and in rock crevices.

We did not see a significant change in burrowing owls observed per ha in the APWRA from spring through fall, 2011 (Table 1, Figure 2). The attrition of burrowing owl nesting pairs into May and June was offset by the emergence and dispersal of young in late summer and fall.

We observed additional patterns and trends, which we have yet to quantify, but which we briefly present here. During August, many young owls spread out from natal burrows. On 20 September we observed 3 burrowing owls flying 150-200 m above ground and heading west over plot 10, suggesting long-distance travel. On 20 September we observed a nest burrow with two adults and five young chicks, and we continued seeing chicks into early October. The last time we observed owls with juvenile plumage was on 7 October 2011. During the last week of September and in early October, we found decorations in front of multiple burrows again, but this pattern stopped a week or two later and we have not seen decorations since (we do not know the meaning of this pattern.)

During September, we found multiple burrowing owl fatalities at burrows far from wind turbines. Most burrowing owls occurred as singles from September through most of November. Since late October, burrowing owls mostly stopped alarm-calling upon our encounters with them. The owls usually wait until we are near their burrows before they flush, and sometimes they hide in their burrows instead of flushing. Since late October, we have rarely found fresh pellets at burrows, and we only occasionally find feathers. During the last week of November, we began detecting pairs of burrowing owls again.

DISCUSSION

We are continuing to visit the plots, and we are currently in the middle of our third round of visits since early August. We plan on continuing the surveys through February, but to continue after 31 December 2011, we will need a new contract agreement.

Table 1. Number of burrowing owls per ha found in plots within the Altamont Pass Wind Resource Area in 2011.

Plot	Burrowing owls per ha		
	12 APR to 20 JUN	4 AUG to 13 SEP	14 SEP to 8 NOV
9	0.000	0.000	0.000
9A	0.000	0.000	0.000
10	0.000	0.000	0.019
10A	0.171	0.051	0.085
10B	0.000	0.000	0.000
7	0.000	0.000	0.033
7A	0.000	0.000	0.000
7B	0.000	0.000	0.000
12	0.615	0.874	0.518
12A	0.000	0.000	0.000
12B	0.000	0.000	0.024
11	0.000	0.000	0.012
11A	0.391	0.130	0.037
11B	0.000	0.000	0.000
8	0.082	0.055	0.014
8A	0.105	0.087	0.070
16	0.000	0.000	0.019
14	0.136	0.117	0.117
14A	0.172	0.000	0.086
14B	0.244	0.132	0.169
17	0.173	0.121	0.069
17A	0.362	0.188	0.087
15	0.036	0.145	0.054
15A	0.144	0.082	0.082

2	0.163	0.183	0.102
2A	0.068	0.045	0.045
18	0.000	0.037	0.110
6	0.000	0.000	0.000
6A	0.143	0.111	0.111
6B	0.000	0.000	
3	0.000	0.022	0.022
3A	0.021	0.000	0.064
3B	0.000	0.000	0.064
4	0.000	0.000	0.073
4A	0.000	0.000	0.020
4B	0.019	0.058	0.000
13	0.000	0.000	0.013
13A	0.295	0.236	0.157
20	0.000	0.000	0.022
20A	0.000	0.000	0.000
20B	0.063	0.206	0.063
21	0.212	0.000	0.096
21A	0.000	0.000	0.020
22	0.143		
22A	0.000		
22B	0.000		

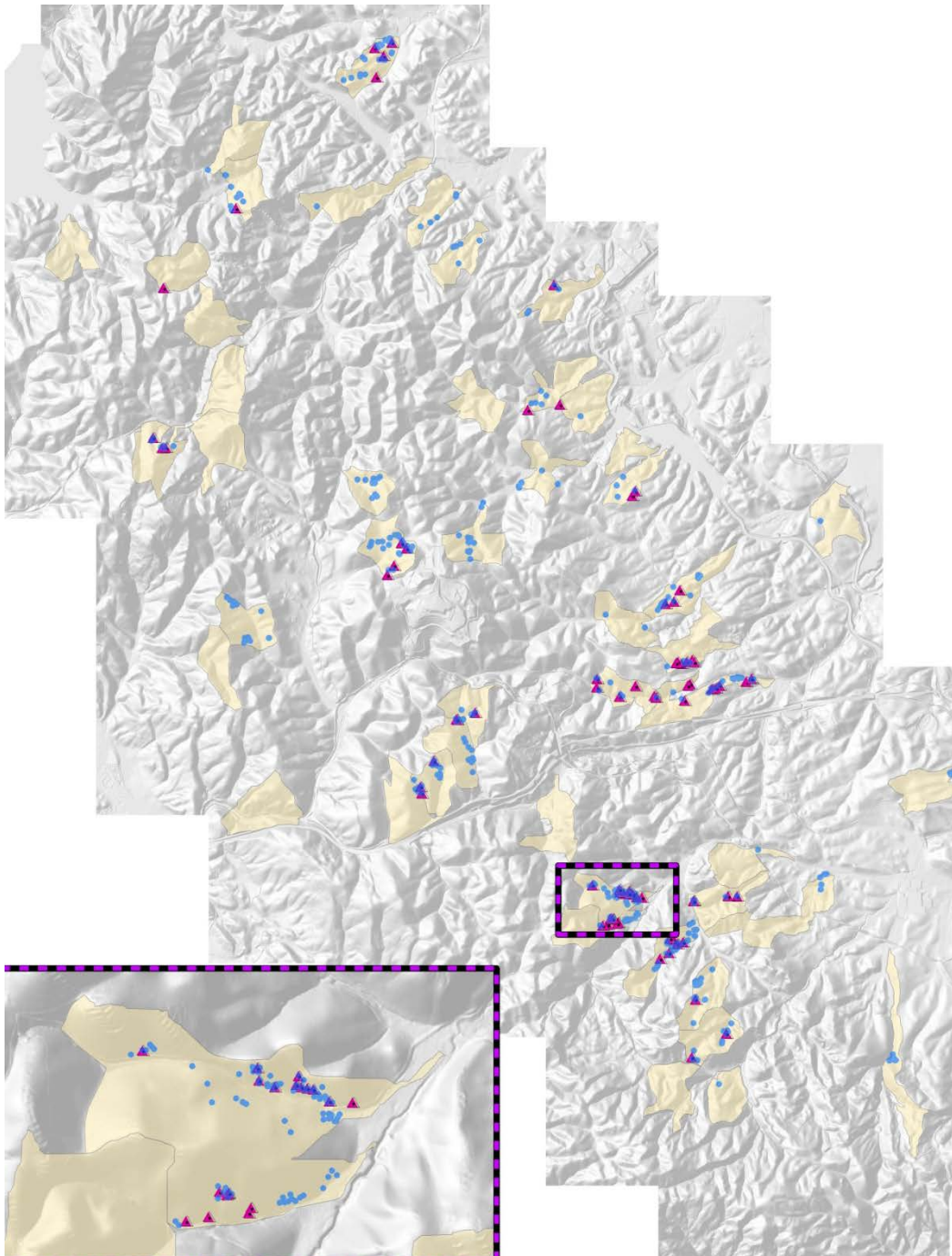


Figure 1. Comparison of fall refuge burrow use (blue circles) compared to spring nesting burrow use (purple triangles) among 46 sampling plots (yellow polygons) during 2011 in the Altamont Pass Wind Resource Area. The expanded box at the lower left provides a zoomed-in view of Plot 12 within the Midway portion of the APWRA.

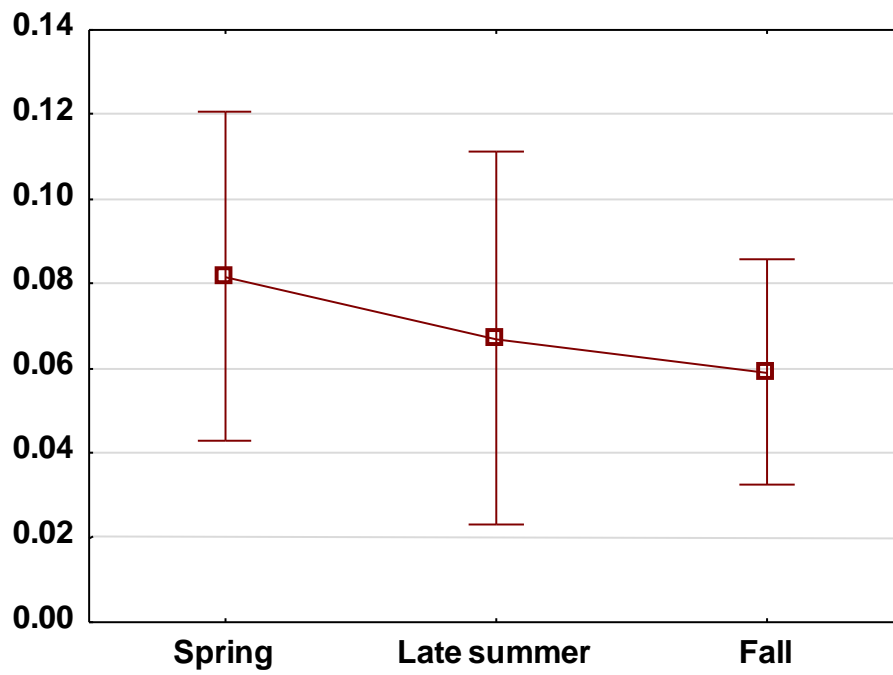
Burrowing owls detected per ha

Figure 2. Mean and 95% confidence interval of burrowing owls per ha observed among sampling plots in the Altamont Pass Wind Resource Area in 2011.