

*Burrowing Owl in the Altamont Pass Wind Resource Area
Problem Statement and a Hypothesis Testing Framework*

Problem Statement – Estimates of the number of burrowing owls killed by turbines are larger than what seems plausible.

1. Estimates are biased high
 - a. Adjustment factors are wrong
 - i. Burrowing Owl detection probability is higher than it is for other birds, resulting in estimates that are over-adjusted and thus biased high.
 1. H1. BUOW carcasses are removed less often than other birds because they are too large to be carried off but not too large to be consumed in one sitting and consequently feather spots are commonly created.
 2. H2. BUOW are killed by nocturnal predators more often than other birds and nocturnal predators are more likely to leave a feather pile than other predators because they consume the prey on the spot rather than carrying the carcass away.
 3. H3. BUOW are killed more often by predators than other birds because they are ground nesters.
 4. H4. Burrowing Owl feather piles are more visible to searchers than other carcasses or feather piles of other birds
 - ii. Burrowing Owl carcasses are removed at a slower rate than other birds.
 1. H5. BUOW feather piles persist and are detectable longer than other carcasses or feather piles of other birds
2. Estimates are correct
 - a. BUOW deaths are directly turbine related (turbine strikes)
 - i. BUOW engage in behavior that brings them into the rotor swept area during turbine operations
 1. H6. Lights attract them to the top of turbines
 2. H7. Prey items (Insects) are attracted to turbines and BUOW are attracted to prey
 3. H8. Prey items (bats) are attracted to turbines and BUOW are attracted to prey
 4. H9. BUOW fly to top of turbines for mating or territorial defense
 5. H10. BUOW use turbines for perching during seasonal shutdown and become acclimated, then get killed after turbine operations resume.
 6. H11. Recently fledged BUOW fly into the rotor swept area.

- ii. Non-resident and/or otherwise inexperienced BUOW are killed disproportionately
 - 1. H12. Majority of carcasses are from migrants or floaters.
 - 2. H13. Majority of carcasses are from first-year birds or fledglings
- b. BUOW deaths are indirectly turbine related
 - i. Predators use turbines to hunt for burrowing owls
 - 1. H14. Predators flush BUOW into the rotor swept area
 - 2. H15. Perch hunting predators hunt from turbines and kill BUOW at their burrows
 - ii. BUOW mortality is associated with specific positions of active turbines relative to occupied burrows (i.e. distance, directions, and/or slope).
- c. BUOW deaths are not turbine related
 - i. BUOW mortality in the APWRA is within the normal range for populations not located in or near wind farms.