

Genetic Isolation of Coastal Cactus Wren Follows Habitat Fragmentation Patterns in Southern California

Cactus wrens (*Campylorhynchus brunneicapillus*) are of conservation concern, due to their apparent sensitivity to habitat fragmentation as a result of their limited dispersal capabilities. These songbirds are one of the first species to become locally distinct when habitat patches become isolated.

Habitat fragmentation due to urban development and increased wildfire disturbance is pervasive in coastal southern California, and the effects of this extensive habitat loss has yet to be analyzed on a landscape genetic framework for the cactus wren. In a study published in *Molecular Ecology*, USGS ecologists and geneticists analyzed tissue samples from 371 individual wrens throughout their coastal southern California range to assess population structure and genetic patterns.

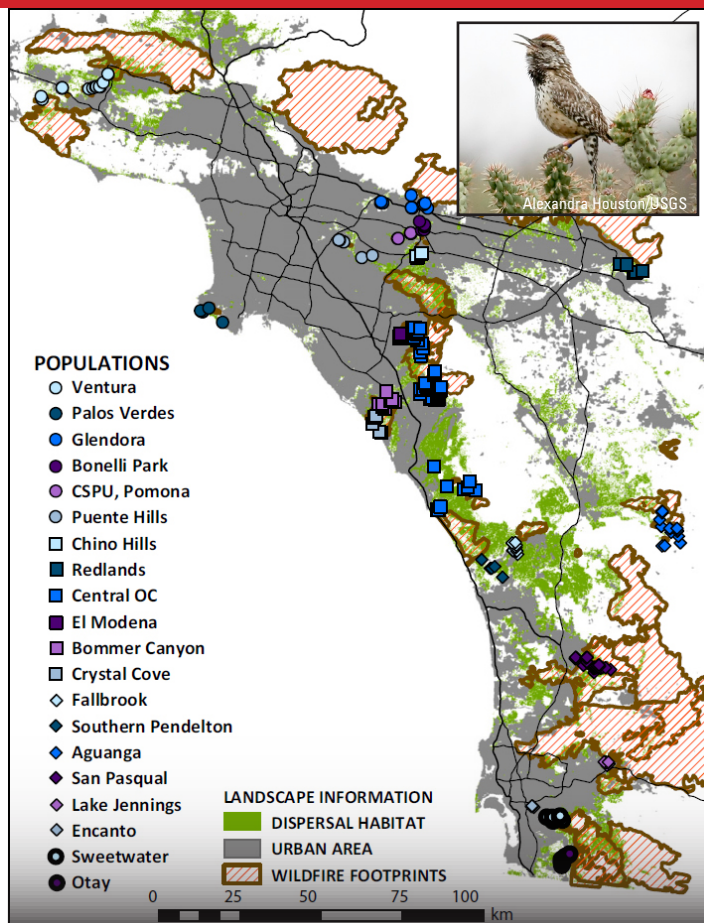
Researchers found that cactus wrens in the region comprised 20 different populations and 12 different genetic clusters. When compared to habitat maps, the genetic structure patterns seem to largely mirror the availability of preferred cactus wren nesting habitat—which in this region are prickly pear cactus (*Opuntia* sp.) and cholla cactus (*Cylindropuntia* sp.).

Intriguingly, the cluster and population boundaries identified through genetic analyses coincide with habitat fragmentation patterns caused primarily by urbanization. Researchers found that genetic differences in cactus wren were generally more strongly correlated to distances between optimal habitat, rather than simple geographic separation. Higher genetic bottleneck signals also were associated with areas of higher wildfire frequency.

The effects of urban fragmentation on cactus wren were most striking in areas where distinct clusters or populations were detected within very small spatial scales. The Otay and Sweetwater populations, for instance, exhibited significant genetic differences despite being relatively close in distance. But a habitat gap formed only in the past two decades—with urban development and a major fire—may have contributed to this pattern, lending weight to the importance of habitat in maintaining cactus wren population health.

This Brief Refers To:

Barr, KR, BE Kus, KL Preston, S Howell, E Perkins, AG Vandergast. 2015. **Habitat fragmentation in coastal southern California disrupts genetic connectivity in the cactus wren (*Campylorhynchus brunneicapillus*)**. *Molecular Ecology*. doi:10.1111/mec.13176
<http://www.werc.usgs.gov/ProductDetails.aspx?ID=5255>



Urban development has fragmented cactus habitat and isolated coastal cactus wren population, reducing genetic connectivity and diversity of populations in coastal southern California. Figure 2 in Barr et al. 2015

MANAGEMENT IMPLICATIONS

- Habitat fragmentation and alterations likely have reduced genetic connectivity and diversity of cactus wren populations in coastal southern California.
- Management efforts focused on improving connectivity or restoration of optimal nesting habitat may improve population resilience for coastal cactus wren.

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