

USGS NSF GRIP Opportunity

USGS Center:	Western Ecological Research Center
Project Title:	Synthesizing genetic and movement data to quantify wildlife connectivity in altered landscapes
Project Hypothesis or Objectives:	<p>Worldwide, natural landscapes are increasingly fragmented by urban development, road networks, energy development, agriculture and other human-induced landscape changes, leading to greater conflict between natural resources, wildlife and infrastructure with consequences for genetic integrity and long term persistence of wildlife populations. Habitat fragmentation decreases habitat area while increasing isolation, and can drastically alter genetic structure and metapopulation function, increase inbreeding and local extinction risks within local populations, and decrease adaptive potential. Quantifying functional connectivity at individual and landscape scales is, thus, a major goal of the field of conservation biology and overlaps with USGS Ecosystems Science Mission Area strategic goals of understanding drivers of ecosystem change, sustaining and restoring ecosystem and landscape function, and supporting recovery and management of threatened and endangered species.</p> <p>Connectivity in fragmented reserve systems can be investigated using a variety of methods at different spatial and temporal scales. Methods such as mark-recapture, radio and satellite tracking, and camera stations can yield direct estimates of the number of individuals in a particular location, population densities and abundance. However, these methods are well-adapted to only a limited number of species, can be time and cost intensive, and fail to link movement/dispersal to successful breeding (the second component of effective connectivity). Genetic fingerprinting and population genetic analyses can quantify individual movement and gene flow (movement and reproduction) across broader spatial and temporal scales. Finally, linking observed movement and gene flow patterns to measurable habitat characteristics is necessary in identifying the landscape drivers that facilitate or impede connectivity, and in assessing habitat management strategies. Rarely are these methods applied in concert across multiple species, but it is in the nexus of these three types of data</p>

(movement, gene flow and habitat) that a full understanding of regional connectivity across spatial scales and ecological communities can emerge. The major goal of this project is to analyze genetic and direct movement data for target species and landscape characteristics in a spatially explicit framework to assess habitat linkages in southern California.

- Duration:** 9-12 months
- Internship Location:** San Diego, CA
- Area of Discipline:** Landscape Genetics, Ecology, Conservation
- Expected Outcome:** These analyses will be an opportunity to synthesize traditionally underutilized empirical data on wildlife occurrences and movement. Results will directly inform land management and acquisition in southern California preserve systems aimed at mitigating the effects of fragmentation on wildlife. A successful project will also provide a framework and analytical tools for quantitatively assessing complementary data types and ranking linkages for functional connectivity with a comprehensive approach that can be applied in ongoing adaptive management strategies both locally and in other systems.
- Special skills/training Required:** Background in ecology, genetics, spatial statistics, or landscape ecology. Completion of a bachelors or masters degree in biology or related discipline or field (ecology, environmental sciences, genetics, conservation biology, wildlife, geography). Applicant should be familiar with laboratory and/or field data collection techniques, GIS, statistics, and demonstrate oral and written communication skills to deliver scientific findings.
- Duties/Responsibilities:** Collect and/or compile and analyze genetic and direct mark/recapture, telemetry or camera trap data to estimate connectivity for one or more species in a fragmented southern California landscape. Development of integrated analyses and ranking system for prioritizing land acquisitions and management actions aimed at improving connectivity in southern California preserve systems.
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