

8.0 RESEARCH RECOMMENDATIONS

Following is a summary of recommendations for future studies that would advance our knowledge and improve our ability to manage for the **covered** species and **their** habitats. Population and distribution studies, for example, could aid in the characterization and **prioritization** of areas for preservation or the refinement of preserve planning area boundaries in **subarea planning**, while other studies would help in managing preserve areas and individual target species once preserves are established. Some of these studies may be conducted as part of future subarea and project planning efforts, whereas others will be the focus of longer-term university or agency research projects. These research recommendations are not included **in** the monitoring plan budget.

The research recommendations provided below can be grouped into several generalized categories, including basic inventories, **taxonomic** studies, core and linkage studies, habitat and life history studies, population biology and genetic studies, habitat restoration **and/or** population **reestablishment** studies, and management studies. These recommendations are consistent with the research agenda recommended by the Scientific Review Panel for the State's Natural Communities Conservation Planning (NCCP) program. Additional recommendations may be generated based on results of the monitoring program **and/or** findings of the studies recommended below.

Inventories

- Conduct reconnaissance level surveys of large representative subplots (**ca.** 300 **acres** **in** size) within the easternmost area of the MSCP study area where biological resource information is considered insufficient to assess **biodiversity** and habitat value.
- Conduct surveys to better determine the distribution **and/or** extent of certain covered species (e.g., *Lotus nuttallianus*, *Cordylanthus orcuttianus*, *Ambrosia pumila*).

Taxonomic Studies

- Conduct taxonomic studies or otherwise resolve the taxonomic validity and **thus**, the legal status of certain covered plant species (e.g., *Caulanthus*

stenocarpus, *Erysimum ammophilum*, *Opuntia parryi* var. *serpentina*, *Solarium tenuilobatum*).

- Investigate the recent merging of *Corethrogyne filaginifolia* var. *linifolia* into the more common and widespread taxon, *Lessingia filaginifolia* var. *filaginifolia*. This will require further studies on the distribution and morphological differences between these taxa (Skinner et al. 1995).

Core and Linkage Studies

- Using vegetation and topography, identify potential alternative wildlife corridors and habitat linkages between proposed preserve areas. Assess the relative use of potential linkages by tracking focal ~~covered~~ animal species. Identify opportunities to enhance degraded linkages (e.g., retrofit existing roads with wildlife undercrossings, restore disturbed vegetation, use fencing, etc.).
- Conduct multi-year nestling banding programs of California gnatcatcher and coastal cactus wren within and adjacent to the following regional habitat linkages (listed in order of priority):
 - Lake Jennings/Lakeside/Crest/El Cajon
 - Los Penasquitos Canyon/Beeler Canyon/South Poway
 - Los Penasquitos Canyon/Black Mountain/Santa Fe Valley
 - Rancho del Rey/Poggi Canyon/Lower Salt Creek/San Miguel Mountains
 - Lower Salt Creek/Spring Canyon
 - Rancho Cielo/Santa Fe Valley/Lake Hodges
 - Lake Hodges/San Pasqual Valley/North Poway
 - South Poway/Central Poway/North Poway
 - South Poway/Santee/Miramar/Mission Trails
 - South Poway/Vicente Reservoir/Lake Jennings

Potentially suitable habitat for gnatcatchers and cactus wrens within 5 miles of the banding locations on the opposite end of the presumptive dispersal corridor should be surveyed between July and November to detect banded nestlings that have dispersed.

Habitat and Life History Studies

- **Determine** the ecological requirements and life histories of covered plant species. This information would complement the long-term status monitoring of key covered plant species, and would provide the practical information necessary to enhance or establish populations. Specific studies might focus on:
 - Specific habitat requirements;
 - Reproductive, pollination, and dispersal strategies;
 - Seed and pollen viability studies;
 - Germination requirements;
 - **Seedbank** ecology; and
 - Seedling mortality studies.

Population Biology and Genetic Studies

- On a species-specific basis, determine (1) the minimum size for viable self-sustaining plant populations, (2) the effective size (generally larger than the minimum size) for viable self-sustaining plant populations, (3) the **minimum** and optimum densities of stable plant populations, and (4) the optimum level of **relatedness** between **outcrossing** individuals (Messick 1986).
- Monitor representative populations of focal target animal species (California **gnatcatcher**, coastal cactus wren, willow flycatcher, burrowing owl, golden eagle, northern harrier) to estimate variance in demographic parameters and dispersal capability.
- Conduct genetic studies of populations of coastal cactus wren and willow flycatcher to assess relative levels of genetic variation within and between populations.
- Conduct inter- and **intrapopulation** genetic analyses of representative populations of covered plant species.

Habitat Restoration and/or Population Enhancement/Reintroduction Studies

- Using results of studies above, conduct and monitor small-scale habitat restoration studies within the preserve system. The restoration of native grasslands, wetlands, and vernal pools would be of particular value.
- Create coastal cactus wren breeding habitat (i.e., cactus patches) between existing occupied habitat to increase the viability of this species.
- Using results of the studies above and species' overall distribution and risk status, identify candidates for population enhancement or **reintroduction studies**. Conduct and monitor small-scale enhancement, translocation, or reintroduction studies.
- Establish and maintain **seedbanks** in conjunction with recognized institutions for certain covered plant species as a guarantee against extinction and as a possible source of research and **enhancement/reintroduction** material.

Management Studies

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- Develop and implement watershed management plans for coastal drainages and their estuaries.
- Conduct and monitor small-scale experimental burns to determine the effectiveness (and appropriate methodology) of fire as a management tool for specific covered species and priority habitats.
- Conduct and monitor small-scale experiments that use alternative methods (e.g., mechanical chopping) to simulate the effects of burns on species or habitats in areas where burning is not appropriate due to public safety concerns. These experiments would be most appropriate for species that germinate in response to increased light (or decreased canopy **cover**), rather than those species that germinate in response to heat or specific chemicals in the **charate**.