San Diego Multiple Species Conservation Program Covered Species Prioritization

For Task B of Local Assistance Grant #P0450009

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Executive Summary

Introduction: This report describes the results of Task B1 from Local Assistance Grant P0450009, which aims to group and prioritize the San Diego Multiple Species Conservation Program (MSCP) covered species for monitoring. The risk-based approach that was used to prioritize the covered species is described in detail. The threat categories used in this prioritization scheme are defined, and a method is described that ranks habitat associations according to the risk factors that species using those habitats face. Finally, initial recommendations on species and habitat monitoring priorities are provided.

Description of prioritization scheme used: A step-down approach was applied to the list of MSCP covered species in order to prioritize them for monitoring consideration. The first categorization of the species was based on their at-risk classification from a variety of available sources (e.g., NatureServe global and state rankings, IUCN ranks, California Native Plant Society rankings). The species were classified as Risk Group 1 (most endangered), Risk Group 2 (moderately endangered), and Risk Group 3 (less endangered). Next, the threats/risk factors facing the species were identified and ranked as high, moderate, or low degree of threat to the species. The threats were also identified as covering a high, moderate, or low portion of the species range in San Diego County. The temporal response of species to the threats was identified as short-term or long-term. For example, habitat loss is an immediate (short-term) impact, whereas altered fire regime is a long-term threat. Finally, the habitat associations used by the species and their general spatial distribution in the County (e.g., widespread but sparse) were described.

Prioritization of habitat associations according to risk factors: We examined the habitats used by the covered species (both the number of covered species using each habitat type, and the number and magnitude of threats to each species). Habitat types were then ranked according to these threats to give an indication of the threats occurring to covered species in each habitat type.

Recommendations: We recommend that all plant and animal species in Risk Group 1 be considered for monitoring. These species are the most endangered and should be monitored directly. Species at the top of the lists are higher priority than those lower down the list. We also recommend an approach for ranking habitat associations for monitoring based on threats, and will examine this issue further in subsequent work.

I. Introduction

This report describes the results of Task B1 from Local Assistance Grant P0450009, to "strategically subdivide the system and prioritize for monitoring program development" by grouping and prioritizing the San Diego Multiple Species Conservation Program (MSCP) covered species for monitoring. For clarity, the description of that task is reproduced here, from the text of the Local Assistance Grant contract.

> *Group and prioritize covered species for monitoring. MSCP covered species were initially categorized according to Species Groups, Habitat monitoring and Community level monitoring. These groupings will be evaluated and revised if necessary, and a strategy will be implemented to identify those species requiring priority attention in monitoring protocol development. In addition to other tools, the grantees will use threatened species ranking protocols, specifically designed for prioritizing species at risk, to revise and/or assess these groupings (Andelman et al. 2004). The MSCP monitoring partners expect that some covered species that either require unique management considerations, are flag-ship species (e.g., California gnatcatcher), or are critically at risk (e.g., Thorne's hairstreak butterfly) will need to be evaluated as single species. In contrast, some species that can readily be placed into community groupings or guilds, such as other covered CSS birds, may need to be evaluated in the context of community monitoring. Historic ranges of other species may have overlapped with the planning area (e.g., California red-legged frog or Pacific pocket mouse), but, as there are no known populations within the current MSCP, such species will not need to be prioritized for monitoring. However, if discovered, these would be evaluated as single species for monitoring.*

This report describes in detail the prioritization scheme used to rank the covered species. The threat categories used in this risk-based scheme are defined, and the habitat associations are prioritized according to the risk factors that species using those habitats face. Finally, recommendations on species and habitat priorities are provided.

II. Description of Prioritization Scheme Used

The following step-down approach was applied to the list of covered species under the MSCP in order to prioritize them for monitoring consideration:

1. Apply an at-risk species classification based on the general principles of the protocols discussed in Hierl et al. (2005). Environmental risk factors relevant for the MSCP include habitat loss and fragmentation due to urban expansion, introduced species, adverse fire regime, and environmental contaminants (see section (b) for threat category definitions). Note that we have subsumed human induced risk factors into environmental factors because most risk factors have a human origin.

2. For each at-risk group, allocate species to categories based on the nature of the risk factor. Species at risk from habitat loss should be subdivided into major habitat categories

(e.g., based on vegetation associations). Wisdom et al. (2001) recommend that an initial prioritization of focal species be based on macrohabitat use (including vegetation type and structural stage combinations).

3. The spatial scale of risk factors and habitat associations should be given careful consideration to ensure representation across the MSCP region. Using information on home ranges (or a surrogate such as body size (Purvis et al. 2000)) further classify species in each group according to their spatial scale of response to environmental factors.

4. Using information on life span or plant functional group (as a surrogate), further classify species in each group according to their temporal scale of response to environmental risk factors.

5. Rank species in each group according to those that best satisfy the pragmatic issues of sampling and measurement outlined in Hierl et al. (2005).

6. Select one or more focal species from each group that best represent the rest of the group.

7. Apply a stopping rule. Examples of stopping rules are:

   a. Stop when each discrete vegetation community type is represented by at least one focal species

   b. Stop when all risk factors have been associated with at least one focal species

The scientific and practical rationale for this approach is described in detail in Hierl et al. (2005).

The current assessment of risk and the related threats are the most important factors in prioritizing species for monitoring with this step-down approach.[1] The implementation of Steps 1 to 7 above is the subject of this section of the current report. The pertinent pieces of information needed to prioritize the covered species are: at-risk category (based on applicable ranking systems), threats (or risk factors), habitat associations of species, degree and spatial extent of threats across a species' range within San Diego County, and temporal scale of the impact of threats. Information was compiled from all known available sources (from the scientific literature, available reports, electronic databases and opinion of acknowledged experts where warranted) on all of these items, and systematically collated in the following format:

i) At-Risk Category

ii) Threats/Risk Factors

iii) Habitat Associations and Spatial Distribution of Species

[1] Considerations of habitat connectivity were not included directly in this approach, though they were indirectly considered through other risk factors. Therefore, if a species was a good indicator of connectivity it did not change their priority ranking because this method is purely risk-based.

iv) Temporal Response to Risk Factors

The ultimate goal is to prioritize the covered species into two main groups:

- At-risk species will be those deemed to be at risk of decline or extinction under current conditions or in the face of short- or long-term threats.

- Focal species will form part of a broader group of ecological indicators. At-risk species may also serve as focal species, although this will not always be the case.

The first group is constructed by considering those species that fall into the highest risk category as determined by some at-risk categorization scheme (e.g., IUCN, NatureServe, Federal or State listings). Within the focal species group the aim is to represent all relevant combinations of habitat association and risk factor (denoted generally as HA/RF). Where multiple species occur for each HA/RF pair, further prioritization is achieved by considering the spatial and temporal scale of threats, with the aim of selecting a representative species that can serve as a focal species for that HA/RF pair. Below we provide an account of the process of prioritizing species using the step-wise approach described above.

i) At-Risk Category

The species' at-risk categories are based on Federal or State Listings or at-risk classification protocols from the California Native Plant Society (for plants), Partners in Flight Species Assessment (for birds), NatureServe or IUCN databases. The NatureServe database was relied on heavily as this provides the most comprehensive and consistent list of ranked plant and animal species for the USA. NatureServe ranks are based on a systematic approach using quantitative information, distribution maps and known threats to species. NatureServe ranks are widely used across the USA for conservation planning. The NatureServe Database has also been incorporated into the California Department of Fish and Game (DFG) Natural Heritage Program Rankings. Species were assigned to one of three broad at-risk groups (Risk Group 1, 2, or 3 in descending order of risk level). Species classified as Federally Endangered (FE), G1 (NatureServe Global Ranks), and S1 (State Rankings) received a ranking of 1. Species that were classified as endangered at the State level (S1) received a ranking of 1 if they were also highly ranked in another risk classification scheme. Sub-species presented a challenge for prioritization due to the inconsistency across at-risk classification protocols and because many of them are subject to ongoing taxonomic debate. Where discrepancies existed across ranking protocols, a judgment was made based on all available at-risk categories. However, this was only necessary for a small fraction of species as most classifications were in fairly good agreement. For the most part, where discrepancies exist, the State ranks were used to determine the at-risk category for the prioritization approach used here. These ranks are at a spatial scale most relevant (out of those available) to the MSCP.

Spatial scale is important when considering risk status. Global scales are too broad to be of relevance to the MSCP, whereas the incorporated preserve is too small a scale to capture true risk to taxa. Restricting attention to risk status solely within the MSCP conserved lands ignores the broader conservation context of taxa and ignores the degree to which risk might be spread due to spatial separation of subpopulations. For instance, all else being equal, a taxon with a

wide geographic distribution across California but rarely found within the MSCP preserve will not be as highly threatened as an endemic taxon well-represented within, but restricted exclusively to, the MSCP preserve because the former taxon has a higher degree of risk spreading. What this means is that there is a greater chance that correlated threats could eliminate all populations of the narrowly distributed endemic, resulting in extinction of the taxon., The widely distributed species, on the other hand, may have a spatial "buffer" because threats are more likely to be uncorrelated (e.g. a single fire, or consistent fire suppression, could eliminate the narrow endemic, however the more widely distributed taxon would less likely be eliminated from such an event). Only considering risks within the MSCP preserve would place the narrow endemic in a lower risk category than the more broadly distributed taxon described above even though the narrow endemic is more threatened as a taxon, all else being equal. Additionally, while monitoring and management will ultimately occur on MSCP preserve lands and will only address the threats that occur within the MSCP preserve, it is important to consider risk factors at a broader spatial scale, somewhat independently of the preserve, so that assigned risk status and the resulting prioritization is not purely an artifact of the way the MSCP preserve has been designated. This is especially pertinent when all proposed areas have not yet been incorporated into the preserve. On the other hand, assessing risks on a smaller spatial scale, restricted to San Diego County for instance, restricts attention to threats relevant to the MSCP region where monitoring and management is to occur. As a compromise to the need to consider risk at a broader spatial scale in order to faithfully capture risk, the need to consider risks in the smaller region where the MSCP is relevant, and the scales at which data is consistently available, we have chosen a two tiered approach to prioritizing species according to risk. This is explained in more detail below in the Section IV Initial Species Priority Lists.

In summary, species were assigned to broad risk categories using State Ranks for California (and supplemented with Federal and IUCN listings) to capture risk status at the broad scale of the state. This is the smallest scale for which risk ranks are systematically available for all covered species. Species were further prioritized within each risk category according to the number, degree and spatial extent of risk factors affecting the species within San Diego County. This balances considerations of risk at a spatial scale that is relevant for the taxa and a scale that is relevant for prioritizing species within the MSCP region given the information available.

The degree to which current management activities (including in the MSCP region) mitigate risks to species has not been incorporated into this prioritization due to the uncertainty associated with the benefits of management for many species. It is the goal of monitoring to gauge the effects of management. Currently the information available on the degree to which management has reduced risks to species is unreliable for many of the covered species. Furthermore, uncertainty exists about ongoing funding to support management, making such activities unreliable for risk classification. Hence, in the aim of consistency, which is necessary to systematically prioritize all covered species, management has not been included as a risk reduction factor. Ongoing management activities will be important factors when constructing conceptual models for the purpose of monitoring design. Risk categories for all MSCP covered species appear in Tables 1 (plants) and 2 (animals).

ii) Threats/Risk Factors

Risk factors are the activities or processes that threaten the viability of populations and cause negative trends in population size. In San Diego County natural populations are faced with myriad threats that operate at different levels of intensity and spatial scales. The level of fragmentation most covered species in San Diego County have been subjected to exacerbates the effects of many threats. As highlighted in the scientific literature and summarized in the previous report (Hierl et al. 2005) any monitoring plan designed for the purpose of informing future management activities must explicitly consider threats. The important components of risk factors to consider are the type and cause of the threat, the degree to which a risk factor contributes to the overall risk a species faces, and the spatial and temporal scale of the risk factor. Here we do not distinguish between human-induced risk factors and environmental factors because most risk factors have a human origin. It is also important to note that the risk factors considered here are both realized threats that are currently affecting the status and trend of populations (e.g., altered fire regime, recreation activities) and currently unrealized threats that are expected to affect the status and trend of populations in the future (e.g., proposed development). Risk factors are considered across the entirety of San Diego County and not just within the MSCP region. If species are highly threatened outside the MSCP region to an extent that they may disappear from these areas, then it will be necessary to monitor those populations within the MSCP conserved lands to ensure that the MSCP preserve is providing adequate protection. This is because maintenance and management of the MSCP preserve is more crucial to the persistence of the taxon when that taxon is experiencing more threats to a higher degree outside of the preserve. While we realize threats outside the MSCP preserve lands can not be monitored, they should nevertheless be considered in an initial prioritization of species because such threats are an indicator of the importance of the MSCP preserve to the persistence of the taxon.

One of the most difficult risk factors to assess for the covered species is military activities. This is due to several confounding factors. Military lands have active management strategies in place for species occurring there. While military activities can present substantial risks to species occurring on military lands, current and ongoing management may mitigate those risks, effectively reducing (or negating) their effects. Moreover, the availability of information on the nature of military activities, where they occur within a species range, and their effects on species is such that these assessments must be made under greater uncertainty than for other risk factors considered here. Furthermore, the management of species on military lands lies outside the purview of the MSCP and hence the relevance of this risk factor to the MSCP is unclear. However, we recognize that this particular risk factor may be under-represented in the prioritization scheme.

Threats were identified for each of the covered species by scouring available reports and the scientific literature. All sources of information used are documented in Appendices A and B of this report. Twenty different threat categories were identified and these are defined below. Where discrepancies occurred between sources of information, peer reviewed scientific publications outranked information available from reports if the scientific publication was published after the dissenting report. This occurred in two cases (risk level for Tri-colored blackbird and the risk factor of cattle endangering vernal pool plant populations (Cook and Toft 2005, Marty 2005)). For the most part, reports and expert opinion were heavily relied upon as they were they only sources of information available. Due to the subjectivity of assigning risk

levels, a consensus had to be reached among four assessors. Those items that remained uncertain were highlighted and brought to experts for verification. The opinions of four experts were used to verify the threats identified for all the covered species (Dr. Jon Rebman for plants; Phil Unitt for birds; Clark Winchell for birds; Mark Mendelsohn for birds).

The degree to which the risk factor contributes to the overall risk faced by the species within San Diego County was split into three categories: high (H); moderate (M); and low (L). The spatial scale of the risk factor across the County was also broadly categorized: high (H - widespread across the species distribution within San Diego County); moderate (M - moderately spread across the species distribution); low (L - low spread across the species distribution). These crude distinctions are sufficient to capture general properties of the risk factors and their effect on populations. For the purpose of prioritization, distinctions any finer than this are not necessary to capture the pertinent threats and their spatial scale.

iii) Habitat Associations and Spatial Distribution of Species

In order to achieve a representation of habitat types in a monitoring plan it is necessary to consider the habitat associations of each of the covered species in addition to risk factors. Again, information was compiled from available data sources, usually reports or electronic databases (e.g., CNPS online database). Habitat associations for all MSCP covered species appear in Tables 1 (plants) and 2 (animals). All sources of information used are documented in Appendices A and B.

The spatial scale of the species within San Diego County was also considered. The following categories were assigned for range and spatial density:

Range:
- Widely distributed
- Moderately distributed
- Narrowly distributed
- Extremely restricted

Spatial density:
- Dense
- Moderately dense
- Sparse
- Extremely sparse

It is important to note that the term density does not refer to population abundance. It refers to the degree of contiguity of grid cells in which the species is known or predicted to occur in San Diego County. Distribution maps provided by the County of San Diego Multiple Species Conservation Program were used to assess the range and spatial density for covered plants. The San Diego Bird Atlas was used to assess the spatial distribution of bird species. All known habitat associations were recorded, as reported in the available literature. For instance, if bluffs/coastal dunes were reported but occurred within Southern maritime chaparral then both habitat types were recorded. This provides slightly more information, which may be important to consider for monitoring purposes rather than simply recording Southern maritime chaparral.

iv) Temporal Response to Risk Factors

One of the steps in the prioritization scheme outlined above is to use information on life span or age at first reproduction to further classify species in each group according to their temporal scale of response to environmental risk factors (Step 4). While this is straightforward for animals, it is problematic for many plant species in southern California. Many plants rely on fire for germination, which is usually unpredictable. Hence, for these species the effective life span is the time interval between fires. Life history type, or functional group, was assigned to plants as a more appropriate indicator of temporal response to threats.

For each covered species, the information described in sections i-iv was compiled into an information sheet, such as the examples shown for *Sterna antillarum browni* and *Pogogyne nudiuscula* below. The information sheets for all of the covered species are provided in Appendices A (plants) and B (animals).

As can be seen in these examples, each species information sheet describes at-risk category, risk factors (threats, risk, spatial scale, and temporal scale), habitat associations and spatial pattern of habitat, functional classification, and lists all sources used. Both of these examples are for high-risk species with narrowly restricted ranges, but with contrasting habitat associations and different suites of risk factors.

Sterna antillarum browni - California least tern

1. At-Risk Category:

Risk Group 1 (FE/CE G4T2T3Q S2S3)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	loss of suitable nesting sites
Altered hydrology	High	High	Long-term	silting
Predation	High	High	Short-term	
Recreation/Human disturbance	High	High	Short-term	trampling despite fencing around some nest sites
Invasives	Low	Moderate	Short-term	increased vegetative cover reduces nest site suitability

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging - bays, lagoons, estuaries, inland lakes; breeding - dunes, some nest in urbanized areas like Lindbergh field

(b) extremely restricted; sparse

4. Functional Group (plants); Generation time or life span (animals)

Breeding migrant (come to breed Apr-Sept), life span ~5 years

Notes: One problem for the tern is that breeding sites are now fixed and additional sites are not available, so predator discovery of a site (or other threats to breeding sites) are all the more serious.

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html#shorebirds>, < http://www.sdnhm.org/research/birdatlas/wrenderings/99fall-reports.html>, and <http://www.sdnhm.org/exhibits/cats/hunters.html>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Pogogyne nudiuscula

1. At-Risk Category:

Risk Group 1 (FE/CE G1 S1.1 List 1B) (close to extinction)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	urban development
Invasives	High	High	Short-term	
ORVs	High	High	Short-term	
Altered hydrology	High	High	Long-term	
Grazing	High	Moderate	Short-term	wallowing
Recreation/Human disturbance	Low	Moderate	Short-term	trampling
Pollution	Low	Low	Short-term	illegal dumping

3. (a) Habitat associations and (b) Spatial scale of species

(a) vernal pools (in chamise chaparral and open grasslands)

(b) extremely restricted range; sparse

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: This species is only known to occur in Otay Mesa vernal pool complexes.

Sources:

Bauder, E. T., and S. McMillan. 1996. Current Distribution and Historical Extent of Vernal Pools in Southern California and Northern Baja California, Mexico. *in* C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren Jr., and R. Ornduff, editor. Ecology, Conservation, and Management of Vernal Pool Ecosystems Conference Proceedings. California Native Plant Society, Sacramento, CA.

Center for Plant Conservation: National Collection of Endangered Plant Profiles. Accessed 10/2005. <http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=3554>.

Coulter, L., J. Williams, and D. Stow. 2004. Final Report: Image-Based Detection of Changes between 2001-2003 at the Otay Mesa Vernal Pool Restoration Site. San Diego State University, Department of Geography, Prepared for City of San Diego.

Greer, K., L. Coulter, and A. Hope. 2002. Utility of high spatial resolution multispectral for mapping and monitoring vernal pool habitat in transitional urban environments. Prepared for Earth Science Applications Directorate, National Aeronautics and Space Administration.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/200.html>.

US Fish and Wildlife Service. 1998. Vernal Pools of Southern California Recovery Plan. US Department of the Interior, Fish and Wildlife Service, Portland, OR.

III. Threat Category Definitions

The following threat categories were identified for the purpose of prioritization. Definitions of threats and sources were modified from The Nature Conservancy Definitions of Sources of Stress (TNC 2004).

Habitat loss

Presence of current or proposed urban, suburban, or rural development (including residential, commercial, and industrial), and the resulting habitat destruction and disturbance. Also refers to agricultural conversion (the elimination of native vegetation for agricultural crops or pasture), and road development or expansion.

Source of Stress Descriptors	Development Residential Commercial Industrial Interstate or State Highway (including road expansion) Agricultural conversion Crops Orchards Pasture

Recreation/Human disturbance
Includes all recreational activities and development of recreational sites (trails, facilities, etc.) that directly impact species through trampling/crushing (resulting in damage or death), habitat destruction and disturbance, or indirectly through soil impaction, erosion, etc. Also includes disturbance to animal species due to human presence near their habitat. Off-road vehicle impacts are considered separately because their impacts are significant and distinct from the effects of many other recreational activities.

Source of Stress Descriptors	Hiking Biking Boating Jet Skis Golfing Dogs (with hikers) Fishing (recreational and commercial) Development of recreational sites

Off-road vehicles
Includes the direct and indirect impacts from off-road vehicles (ORVs) such as trampling/crushing, habitat destruction, soil compaction, and erosion.

Source of Stress Descriptors	ORVs Recreational Border Patrol activities

Invasive species
Presence or potential spread of invasive species that alter ecological processes or directly threaten a target species. This threat is defined as competition between the native and invasive plants or animals, or habitat alteration by the invasive species. Predation on covered species by non-native species is included in the 'predation' category.

Source of Stress Descriptors	Horticultural Plants Agricultural Plants Accidentally/Historically Introduced Plants Accidentally/Historically Introduced Animals

Altered fire regime
Includes fire suppression, artificially increased fire frequency, fire management activities (prescribed burns or response to wildfire), incompatible fire policies, or a range of other influences on fire regime.

Source of Stress Descriptors	Wildfire Fire Management Activities Fire Suppression Prescribed burns (inappropriate frequency, intensity, seasonality, size) Response to Wildfire/Arson Human ignitions Arson Unintentional (e.g., illegal alien campfires, cigarettes, ORVs)

Altered hydrology
Any alteration of a site's hydrology (in riparian, vernal pool, other freshwater, or coastal habitats) resulting from activities such as water withdrawal, channel modification, catchment construction, and other intentional/unintentional modifications to natural stream/river/basin morphology and hydrologic regimes. Also includes any alteration of shorelines that disrupts natural coastal processes (e.g., tidal flux in estuaries and lagoons), and potential increases in storm damage to already degraded systems. Note that many causes of altered hydrology are the indirect result of other threats (for example, habitat loss, agriculture, ORVs). However, altered hydrology directly threatens some species and hence is listed as a separate threat.

Source of Stress Descriptors	Water withdrawal Surface Water (agricultural, industrial, water supply) Ground Water (agricultural, industrial, water supply) Channel modification Channelization Ditching Dredging Levee and Dikes Damming Sea walls Sediment build-up and siltation of estuaries Modification of vernal pool basins

Intentional removal by humans
Includes removal of species for animal control (e.g., predator removal, trapping), hunting, fire management (e.g., creation of fire breaks or fuel reduction), and collection for firewood, pet trade, horticulture, or aesthetics, with potential negative impacts to populations.

Source of Stress Descriptors	Collection of Plants Horticulture Firewood Aesthetics Fire management Fire breaks Fuel reduction Removal of Animals Animal control Hunting Pet trade collection

Predation/Herbivory
Includes predation or herbivory by native and non-native species. While predation by native species is a natural process, trophic alterations such as anthropogenically-enhanced native predator populations (e.g., skunks, raccoons, corvids) that lead to increased predation of the covered species are considered a threat. Predation by non-native or domestic species (e.g. red foxes, bullfrogs, dogs, cats) is also considered a threat. For avian species, predation of birds and/or eggs is considered, but nest parasitism is included in a separate threat category. For plant species, unnaturally high rates of herbivory by native species or herbivory by non-native species are included.

Source of Stress Descriptors	Artificially-enhanced native predator or herbivore populations Introduction of non-native/domestic predators or herbivores

Pollution
Includes urban runoff, water/soil contamination (e.g., heavy metals, nitrogen deposition), air pollution, and light or noise pollution. Also includes illegal dumping of trash or toxins.

Source of Stress Descriptors	Air pollution Acid Rain Ozone Nitrogen deposition Urban runoff Nutrient overload Heavy metal contamination Light/Noise pollution Dumping (trash or toxins) Other contaminants

Fragmentation

Includes consequences of habitat fragmentation such as: edge effects, genetic isolation, loss of connectivity/corridors, and decreased habitat quality/utility.

Source of Stress Descriptors	Edge effects Genetic isolation Loss of connectivity Dispersal barriers

Mining
Includes any mining activities that directly impact species through habitat destruction and disturbance, or result in secondary impacts (e.g., downstream sedimentation, toxins). This includes ongoing and historic extraction that still impacts species and requires restoration.

Source of Stress Descriptors	Instream Mining (gravel, sand, etc.) Other mining/resource extraction

Grazing
Any cattle/sheep/goat grazing activities that directly impact species (e.g., consumption, wallowing, trampling, and in-stream watering) or indirectly impact species through overall habitat degradation (e.g., soil compaction). Includes both historic grazing where impacts are still present and current grazing.

Source of Stress Descriptors	Plant consumption
	Wallowing
	Trampling
	In-stream watering
	Indirect Impacts
	  Soil compaction
	  Increased nutrient loads
	  Erosion/Sedimentation

Pesticides or poisons
Inadvertent poisoning of covered species, such as through the consumption of poisoned pests/rodents, or through agricultural practices involving pesticides/herbicides.

Source of Stress Descriptors	Pesticides Herbicides Poisons

Farming operations
Includes farming activities such as plowing and discing that disturb habitat (e.g., destroy burrows). Other general agricultural impacts, such as nutrient release, sedimentation, pesticide/toxin introduction, and habitat conversion are covered in other threat categories.

Erosion
Any significant movement of sediment resulting from frequent/intense fires or other disturbance that denudes vegetated areas. Includes impacts of erosion and subsequent deposition (e.g., disruption of seed bank, scouring of streambeds).

Loss of prey base or host plant
Any loss, displacement, or reduction in the prey base or host plant of a covered species. This loss may be due to any of the other threats listed here that negatively impact the prey or host plant on which a covered species relies (e.g. displacement of native ants by non-native Argentine ants negatively impacts San Diego Horned Lizard, elimination of Tecate cypress by frequent fires negatively impacts Thorne's Hairstreak Butterfly).

Parasitism or Disease
Nest or other parasitism impacting species, such as cowbird nest parasitism. Also includes the introduction of disease (e.g., from a non-native species) to a population.

Power lines
Create an obstruction to movement (relevant for bird flight) and injury or death through electrocution.

Roads
Collisions between vehicles and wildlife that result in injury or death. Road development and expansion is covered under habitat loss category.

Military activities
Military activities on government land (e.g., the Silver Strand) that cause one or more stresses to species.

Notes: Climate change is likely to affect all covered species, but currently these effects are difficult to distinguish from the other threats listed above. Also note that border-related activities are impacting many of the covered species, but these threats have been addressed under other threat categories that better describe the risk posed by these activities (e.g., ORVs, altered fire regime caused by illegal immigrant campfires).

IV. Initial Species Priority Lists

Note that this process is iterative and feedback on groupings/lists/information used may change this prioritization, and that the species will be grouped into species monitoring, community monitoring, and habitat monitoring groups once conceptual models are developed in the next task.

The application of Steps 1 to 7 identified most covered species as candidates for monitoring. That is, due to the numerous risk factors and habitat associations of covered species, many Habitat Association/Risk Factor groups were comprised of only one species. Furthermore, for HA/RF groups with multiple species, no species stood out as obvious focal species. This is not surprising and was, in fact, anticipated in the first report (Hierl et al. 2005). We reiterate here the caveats provided in applying the focal species concept to the covered species list:

> "We provide a few caveats that need to be considered in applying the focal species concept to further prioritization of the covered species list. First, since the covered species list is already the result of species prioritization, the methods reviewed here may

not reduce this list much further. It may be the case that, depending on the strategy used to produce the covered species list, this is the minimal set of species with which to gauge the status and trend of biodiversity within the MSCP. Second, we assume that the methods used to compile the list of covered species are scientifically sound. That is, the set of covered species is assumed to be appropriate for monitoring purposes (all the covered species satisfy some criterion for candidature as focal species and there are no species left out of the list that obviously qualify for inclusion in the covered species list). An exception is the Quino checkerspot butterfly, which has been petitioned for inclusion as an MSCP covered species. We assume a similar petition process will be pursued if additional species are identified for inclusion in the MSCP program. In the absence of documentation on how the covered species list was compiled, we take it as a matter of faith that this is the case. Third, all focal species prioritization protocols reviewed here assume that the pool of species from which focal species are selected is large, perhaps much larger than the size of the covered species list. These issues must be taken into consideration when applying focal species prioritization protocols designed for different contexts." (Page 36, Hierl et al. 2005)

"In the case of the covered species list, a ranking of focal species will be important because all of the covered species may be prioritized as focal species under this step-down approach. Hence, we further recommend that species that are exposed to a higher degree of risk and species that satisfy the pragmatic criteria for sampling and measurement to a higher degree be given priority as focal species." (Page 48, Hierl et al. 2005)

Below we outline the strategy used for ranking the covered species within each Risk Group according to degree of risk. In the absence of clear focal species, species with a higher degree of risk should receive higher priority for monitoring consideration.

Steps for ranking species within priority lists:

1. Species are grouped according to their at-risk ranking into Risk Groups 1, 2 and 3 in descending order of risk level (step i from approach described above). Species that are not currently known to occur in the MSCP region or had taxonomic changes that placed them in a more common taxon since the covered species list was compiled were separated from the prioritization lists. These species (labeled "Excluded") are highlighted in grey at the end of the plant and animal prioritization lists and their reason for exclusion are described (Tables 1 and 2 and Figure 1). "Excluded" species are not recommended for monitoring.

2. Species in each of the Risk Groups are ordered by the number of high-level threats ('high' from step ii above) facing each species, then sorted further by the number of total threats. For instance, a species experiencing three high-level threats and five total threats was ranked higher than a species experiencing two high-level threats and six total threats. Short-term response or long-term response was used as a tie breaker where relevant, with species having short-term responses ranked higher than those having long-term responses to a threat.

The prioritization of species according to degree of risk appears in Tables 1 and 2. Plants and animals are treated separately. Species in Risk Group 1 receive higher priority than species in

Risk Group 2, which receive higher priority than species in Risk Group 3. Within each risk group, species experiencing more high-level threats receive higher priority for monitoring than those with less high-level threats (indicated by the order the species are listed, with highest priority from top to bottom).

V. Prioritization of Habitat Associations According to Risk Factors

In addition to the species prioritization obtained in Tables 1 and 2, there are a number of useful outcomes stemming from the application of the step-down approach that can assist in monitoring decisions. The information compiled in Tables 1 to 2 can assist in answering the following questions:

- How many covered species are associated with each habitat type?
- How many highly threatened species occur in each habitat type?
- Which habitat types are associated with the most threats to covered species?

The answers to these questions can assist in prioritizing habitat types for monitoring. It should be noted, however, that "habitat" is a species-based concept (Franklin et al. 2002). Any habitat monitoring needs to be done in the context of the species using that habitat. Hence, for the purpose of MSCP monitoring it is only relevant to prioritize habitats in terms of the covered species occurring there and the threats those species face within their habitat (as opposed to the threats to the habitat itself). While threats to the habitat itself are significant risk factors to covered species, they are a subset of the many threats covered species face. Careful consideration needs to be given to what constitutes habitat quality and quantity in terms of the covered species using that habitat and the risks they face within that habitat. That is, species life history traits and their response to all major risk factors need to be considered in designing habitat monitoring, and such monitoring should be performed in conjunction with other species-specific monitoring. It will be insufficient to monitor habitat cover through aerial photographs, for instance, when predation is a major risk factor for a given species.

Figure 1 displays the number of covered species and their at-risk group in each habitat type. For animals, salt marsh habitats are associated with the most Risk Group 1 species. This is followed by riparian/riparian woodland, which has the highest number of covered species, then grassland, coastal sage scrub, beaches/salt flats/mud flats, urban areas, and vernal pools. For plants, chaparral contains the most covered species and the most Risk Group 1 species, and coastal sage scrub the next highest number of covered species and Risk Group 1 species, followed by grassland and vernal pools. Habitat monitoring, performed in an appropriate way for the associated covered species, could have the greatest value if performed in areas where the most covered species occur. However, these graphs do not consider the threats that species face in these habitats, only the general at-risk group species are in.

Figures 2 (animals) and 3 (plants) display the number of covered species in each habitat type and the number of threats these species face in each habitat type. When considering habitat types in

conjunction with the number of major threats species using those habitats face, riparian/riparian woodland areas rank the highest for animals, followed by grassland and salt marsh, then coastal sage scrub. For plants, chaparral and coastal sage scrub rank the highest, followed by closed cone forest and vernal pools. Next highest ranked are grassland, riparian/riparian woodland and maritime scrub.

VI. Recommendations

We recommend that all species in Risk Group 1 for both plants and animals be considered for monitoring. These species have the greatest risk of extinction and need monitoring attention. Due to the uncertainty and scientific debate surrounding the focal species concept, high at-risk species should be monitored directly and not via surrogates. Risk Group 1 species were further prioritized to assist in decision making in the face of limited resources—species at the top of the list should be given higher priority over lower-ranked species. If resources allow, as many covered species as possible should be monitored. Again, species in Risk Groups 2 and 3 have been prioritized according to risk factors to assist in decision making.

In addition we recommend that prioritization of habitat associations for monitoring consider the threats to covered species occurring within the habitat types. A prioritization of habitat types has been provided in terms of the number of covered species occurring in each type and the number of threats faced by the species that use each habitat. Habitats with the highest number of major threats to the highest number of covered species that use them should be given priority for monitoring.

Figure 1. Number of MSCP covered animal and plant species by habitat type and risk group.

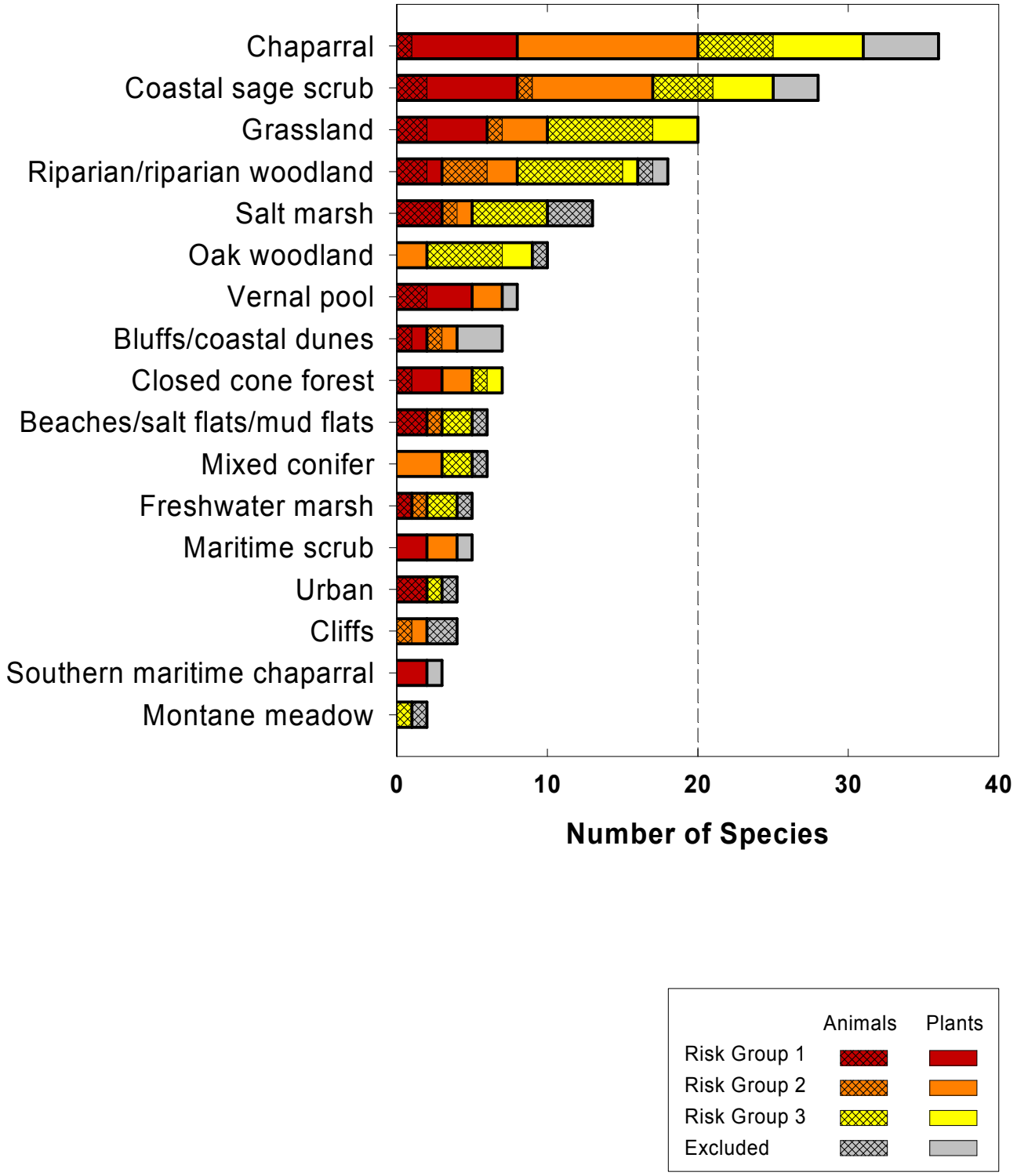

Figure 2. Number of MSCP covered animal species and number of threats (Major = High-degree, Other = Moderate and Low-degree threats) by habitat type. Note that the Number of Threats refers to the number of distinct threats to species occurring in the habitat type. Hence, in each bar a distinct threat only appears once.

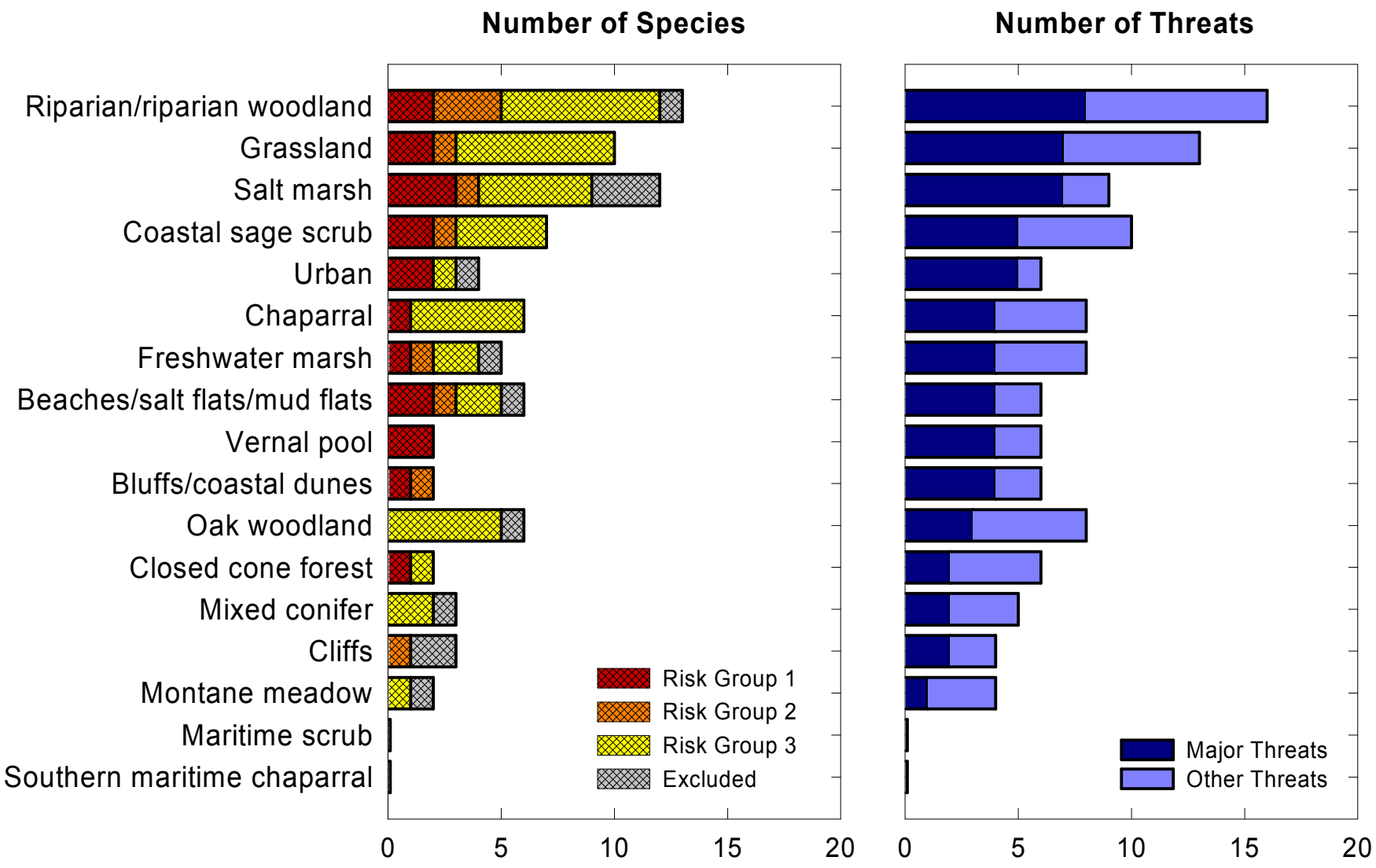

Figure 3. Number of MSCP covered plant species and number of threats (Major = High-degree, Other = Moderate and Low-degree threats) by habitat type. Note that the Number of Threats refers to the number of distinct threats to species occurring in the habitat type. Hence, in each bar a distinct threat only appears once.

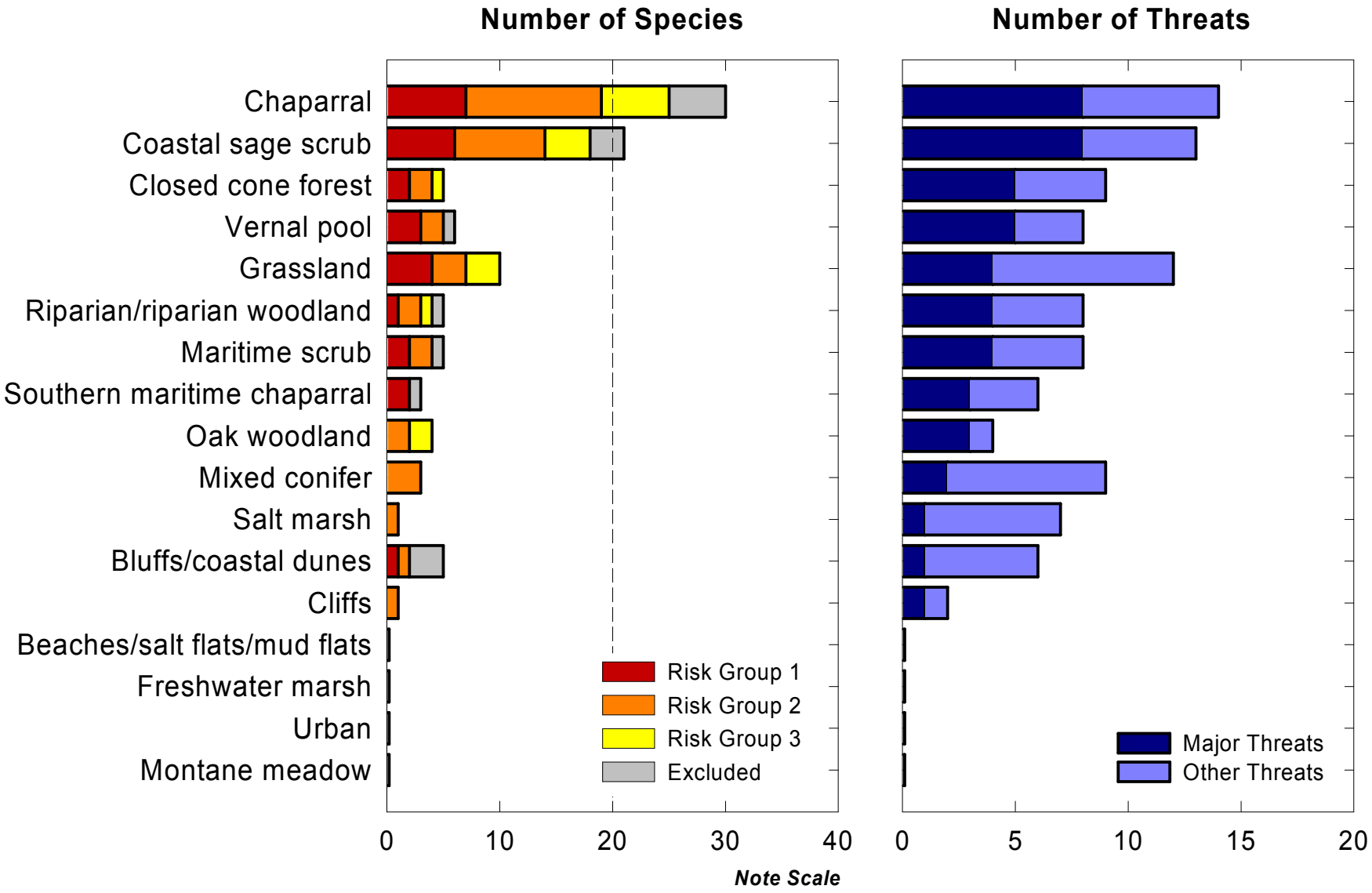

Table 1. Threats to MSCP covered plant species, with degree of risk (R) and spatial scale (S) ranked as H (High), M (Moderate), and L (Low), and temporal scale of response (T) to the threat ranked as L (long-term) or S (short-term), followed by habitat types the species use and plant functional groups.

RISK GROUP 1	Threats												
Species	Habitat loss	Invasives	Off-road vehicles	Recreation/human disturbance	Altered fire regime	Altered hydrology	Fragmentation	Grazing	Pollution	Intentional removal by humans	Herbivory	Military activities	Mining
Pogogyne nudiuscula Otay Mesa mint	H H S	H H S	H H S	L M S		H H L		H M S	L L S				
Orcuttia californica California Orcutt grass	L L S	M H S	H H S	L H S		H H L		H M S					
Deinandra conjugens Otay tarplant	H H S	M H S	H M S				H H L	L L S					
Navarretia fossalis Prostrate navarretia	H M S	H H S	M M S			H H L		L L S					
Cordylanthus orcuttianus Orcutt's bird's-beak	M M S	M M S	H H S	H H S		L H S							
Ambrosia pumila San Diego ambrosia	H M S	H H S	L L S	M H S									M L L
Baccharis vanessae Encinitas baccharis	H H S	M M S		L L S	H H L					L L S			
Acanthomintha ilicifolia San Diego thorn-mint	H H S	H H S	L L S					L L S	L L S				
Arctostaphylos glandulosa var. *crassifolia* Del Mar manzanita	H H S	M M S		L L S			H L L			L L S			
Pinus torreyana ssp. *torreyana* Torrey pine					H H L				L H L		H H L		
Lotus nuttallianus Nuttall's lotus	L H S	H H S	L L S	M H S								M M S	
Dudleya blochmaniae ssp. *brevifolia* Short-leaved dudleya			M L S	H H S									
Rosa minutifolia Small-leaved rose			L H S				H H L						
Cupressus forbesii Tecate cypress					H H L					L L S			
Nolina interrata Dehesa beargrass	L L S	M H S			M H L					L L S			

R[1]	S[2]	T[3]
H	M	S
High	Moderate	Short-Term

[1] R = degree of risk (H=high; M=moderate; L=low degree of threat to the species)

[2] S = spatial scale of the risk factor (extent of the species' range impacted by the threat, H=high; M=moderate; L=low)

[3] T = temporal scale of impact of the risk factor (S=short-term response; L=long-term response)

Note: Threats not shown in this table were not considered a risk to any of the species listed above (in this case: erosion).

RISK GROUP 1

Habitat Type

Species	Chamise chaparral	Mixed chaparral	Coastal sage scrub	Vernal pool	Salt marsh	Maritime scrub	Grassland	Bluffs/coastal dunes	Riparian	Southern maritime chaparral	Closed cone forest	Oak woodland	Cliffs	Riparian woodland	Mixed conifer	Functional group
Pogogyne nudiuscula Otay Mesa mint				Y												annual herb
Orcuttia californica California Orcutt grass				Y												annual grass
Deinandra conjugens Otay tarplant			Y			Y	Y									annual herb
Navarretia fossalis Prostrate navarretia				Y												annual herb
Cordylanthus orcuttianus Orcutt's bird's-beak			Y													annual herb
Ambrosia pumila San Diego ambrosia			Y				Y		Y							herbaceous perennial
Baccharis vanessae Encinitas baccharis	Y	Y	Y							Y						shrub (regenerates after fire/disturbance)
Acanthomintha ilicifolia San Diego thorn-mint	Y		Y				Y									annual herb
Arctostaphylos glandulosa var. *crassifolia* Del Mar manzanita	Y									Y						shrub (facultative seeder)
Pinus torreyana ssp. *torreyana* Torrey pine											Y					tree (pine)
Lotus nuttallianus Nuttall's lotus								Y								annual herb
Dudleya blochmaniae ssp. *brevifolia* Short-leaved dudleya	Y															herbaceous perennial (succulent)
Rosa minutifolia Small-leaved rose	Y		Y			Y										shrub
Cupressus forbesii Tecate cypress		Y									Y					tree (cypress)
Nolina interrata Dehesa beargrass	Y	Y					Y									shrub

RISK GROUP 2

Threats

Species	Habitat loss	Altered fire regime	Invasives	Altered hydrology	Recreation/human disturbance	Off-road vehicles	Erosion	Pollution	Military activities	Fragmentation	Herbivory	Grazing	Intentional removal by humans	Mining
Eryngium aristulatum var. *parishii* San Diego button-celery	H H S		H H S	H H L	L M S	M M S					L M S	L L S		
Pogogyne abramsii San Diego Mesa mint	H H S		H H S	H H L				L L S	M H S					
Ericameria palmeri ssp. *palmeri* Palmer's ericameria	H H S	H H L	L M S				H M S			L M L				
Arctostaphylos otayensis Otay manzanita	H L S	H H L	M M S											
Ceanothus cyaneus Lakeside ceanothus	H M S	H H L												
Cordylanthus maritimus ssp. *maritimus* Salt marsh bird's-beak	M M S		M H S	H H L	M M S	L L S		L H L					L L S	
Cylindropuntia californica var. *californica* Snake cholla		H H L	M H S		M L S	M L S		M L S		M H L				
Monardella viminea Willowy monardella	M M S		H H S		M H S	L L S	M H L							L L S
Muilla clevelandii San Diego goldenstar	L L S		H H S		M M S	M M S		L L S	M L S					
Lepechinia cardiophylla Heart-leaved pitcher sage	L L S	H H L	M M S		L M S									
Dudleya viscida Sticky dudleya	H M S				L L S									
Dudleya variegata Variegated dudleya	M M S		M H S		M H S	M M S						L L S		
Calochortus dunnii Dunn's mariposa lily	M L S		M H S								L L S		L L S	
Lepechinia ganderi Gander's pitcher sage	M M S	L H L	M M S		L L S									
Senecio ganderi Gander's butterweed		M H L	M M S			L L S								
Agave shawii ssp. *shawii* Shaw's agave		L H L												

R[1]	S[2]	T[3]
H	M	S
High	Moderate	Short-Term

[1] R = degree of risk (H=high; M=moderate; L=low degree of threat to the species)

[2] S = spatial scale of the risk factor (extent of the species' range impacted by the threat, H=high; M=moderate; L=low)

[3] T = temporal scale of impact of the risk factor (S=short-term response; L=long-term response)

RISK GROUP 2

Species	Chamise chaparral	Mixed chaparral	Coastal sage scrub	Vernal pool	Salt marsh	Maritime scrub	Grassland	Bluffs/coastal dunes	Riparian	Southern maritime chaparral	Closed cone forest	Oak woodland	Cliffs	Riparian woodland	Mixed conifer	Functional group
	Habitat Type															
Eryngium aristulatum var. parishii San Diego button-celery				Y												perennial herb
Pogogyne abramsii San Diego Mesa mint				Y												annual herb
Ericameria palmeri ssp. *palmeri* Palmer's ericameria	Y	Y	Y						Y							shrub (likely obligate seeder)
Arctostaphylos otayensis Otay manzanita		Y									Y	Y				shrub (obligate seeder)
Ceanothus cyaneus Lakeside ceanothus		Y									Y					shrub (likely obligate seeder)
Cordylanthus maritimus ssp. maritimus Salt marsh bird's-beak					Y											annual herb
Cylindropuntia californica var. *californica* Snake cholla	Y		Y			Y										shrub (succulent)
Monardella viminea Willowy monardella		Y	Y						Y						Y	perennial herb
Muilla clevelandii San Diego goldenstar	Y		Y				Y									geophyte
Lepechinia cardiophylla Heart-leaved pitcher sage		Y										Y			Y	shrub
Dudleya viscida Sticky dudleya	Y	Y	Y										Y			perennial (succulent)
Dudleya variegata Variegated dudleya	Y	Y	Y				Y									perennial (succulent)
Calochortus dunnii Dunn's mariposa lily	Y	Y													Y	geophyte
Lepechinia ganderi Gander's pitcher sage		Y	Y				Y									shrub
Senecio ganderi Gander's butterweed		Y														perennial herb
Agave shawii ssp. shawii Shaw's agave			Y			Y		Y								perennial (monocarpic succulent)

RISK GROUP 3

Threats

Species	Habitat loss	Altered fire regime	Invasives	Off-road vehicles	Altered hydrology	Fragmentation	Pollution	Grazing	Intentional removal	Recreation/human disturbance
Brodiaea orcuttii Orcutt's brodiaea	H M S		H H S	M M S	H M L		L L S	L L S		
Tetracoccus dioicus Parry's tetracoccus	H M S	H H L		L M S						
Satureja chandleri San Diego barrel cactus	H H S	L L L	M H S	M L S		L L L			L L S	
Ceanothus verrucosus Wart-stemmed ceanothus	M M S	H H L				M H L				
Monardella hypoleuca ssp. *lanata* Felt-leaved monardella		M H L	H H S							
Satureja chandleri San Miguel savory	L L S	M H L								L L S
Astragalus tener var. *titi* Coastal dunes milk-vetch	No known populations in MSCP									
Lessingia filaginifolia var. filaginifolia Del Mar Mesa sand aster	Taxonomic debate/uncertainty -- currently included in more common taxon									
Erysimum ammophilum Coast wallflower	No known populations in MSCP									
Aphanisma blitoides Aphanisma	No known populations in MSCP									
Berberis nevinii Nevin's barberry	No known natural populations in MSCP									
Brodiaea filifolia Thread-leaved brodiaea	No known populations in MSCP									
Solanum tenuilobatum Narrow-leaved nightshade	Taxonomic debate/uncertainty -- currently included in more common taxon									
Calamagrostis densa Dense reed grass	Taxonomic debate/uncertainty -- currently included in more common taxon									
Caulanthus stenocarpus Slender-pod jewelflower	Taxonomic debate/uncertainty -- currently included in more common taxon									

R[1]	S[2]	T[3]
H	M	S
High	Moderate	Short-Term

[1] R = degree of risk (H=high; M=moderate; L=low degree of threat to the species)

[2] S = spatial scale of the risk factor (extent of the species' range impacted by the threat, H=high; M=moderate; L=low)

[3] T = temporal scale of impact of the risk factor (S=short-term response; L=long-term response)

Note: Threats not shown in this table were not considered a risk to any of the species listed above (in this case: herbivory, mining, military activities, and erosion).

RISK GROUP 3

Habitat Type

Species	Chamise chaparral	Mixed chaparral	Coastal sage scrub	Vernal pool	Salt marsh	Maritime scrub	Grassland	Bluffs/coastal dunes	Riparian	Southern maritime chaparral	Closed cone forest	Oak woodland	Cliffs	Riparian woodland	Mixed conifer	Functional group
Brodiaea orcuttii Orcutt's brodiaea		Y	Y				Y				Y					geophyte
Tetracoccus dioicus Parry's tetracoccus	Y		Y													shrub
Satureja chandleri San Diego barrel cactus	Y		Y				Y									shrub (succulent)
Ceanothus verrucosus Wart-stemmed ceanothus	Y															shrub (likely obligate seeder)
Monardella hypoleuca ssp. *lanata* Felt-leaved monardella	Y	Y										Y				suffrutescent perennial
Satureja chandleri San Miguel savory	Y		Y				Y					Y		Y		shrub
Astragalus tener var. *titi* Coastal dunes milk-vetch								Y								annual herb
Lessingia filaginifolia var. filaginifolia Del Mar Mesa sand aster		Y	Y													perennial subshrub or herb
Erysimum ammophilum Coast wallflower						Y		Y		Y						short-lived perennial
Aphanisma blitoides Aphanisma								Y								annual (succulent)
Berberis nevinii Nevin's barberry	Y	Y							Y							shrub (obligate resprouter)
Brodiaea filifolia Thread-leaved brodiaea				Y												geophyte
Solanum tenuilobatum Narrow-leaved nightshade	Y	Y	Y													perennial to subshrub
Calamagrostis densa Dense reed grass	Y															perennial grass
Caulanthus stenocarpus Slender-pod jewelflower	Y	Y	Y													annual herb

Table 2. Threats to MSCP covered animal species, with degree of risk (R) and spatial scale (S) ranked as H (High), M (Moderate), and L (Low), and temporal scale of response (T) to the threat ranked as L (long-term) or S (short-term), followed by habitat types used by the species, animal groups, and avian status in San Diego County.

RISK GROUP 1	Threats												
Species	Habitat loss	Invasives	Altered hydrology	Predation	Recreation	Altered fire regime	Pollution	Off-road vehicles	Loss of prey base or host plant	Fragmentation	Parasitism and Disease	Roads	Erosion
Streptocephalus wootoni Riverside fairy shrimp	H H S	H H L	H H L	H H S			L L L	M H S					
Branchinecta sandiegonensis San Diego fairy shrimp	H H S	H H L	H H L	H H S			L L L	M H S					
Sterna antillarum browni California least tern	H H S	L M S	H H L	H H S	H H S								
Campylorhynchus brunneicapillus sandiegensis Coastal cactus wren	H H S	H H L				H H L				H H L			
Empidonax traillii extimus Southwestern willow flycatcher	H H S	H H S	L L L		L L S	L H L					L H S		L L L
Rallus longirostris levipes Light-footed clapper rail	H H S		H H L	M H S	L H S		L H L						
Speotyto cunicularia Burrowing owl	H H S	H H L		L L S								L L S	
Panoquina errans Salt marsh skipper butterfly	L L S	L L L	H H L				H H L						
Charadrius alexandrinus nivosus Western snowy plover	L H S			H H S	H H S								
Agelaius tricolor Tricolored blackbird	H H S		H H L	L L S									
Mitoura thomei Thorne's hairstreak butterfly	L L S					H H L			H H S				

R[1]	S[2]	T[3]
H	M	S
High	Moderate	Short-Term

[1] R = degree of risk (H=high; M=moderate; L=low degree of threat to the species)

[2] S = spatial scale of the risk factor (extent of the species' range impacted by the threat, H=high; M=moderate; L=low)

[3] T = temporal scale of impact of the risk factor (S=short-term response; L=long-term response)

Note: Threats not shown in this table were not considered a risk to any of the species listed above (in this case: intentional removal by humans, mining, military activities, grazing, pesticides or poisons, power lines, and farming).

RISK GROUP 1

Habitat Type

Species	Chaparral	Coastal sage scrub	Vernal pool	Beaches/salt flats/mud flats	Salt marsh	Freshwater marsh	Maritime scrub	Grassland	Bluffs/coastal dunes	Riparian	Southern maritime chaparral	Closed cone forest	Oak woodland	Cliffs	Riparian woodland	Montane meadow	Mixed conifer	Urban	Animal Group	Avian Status in SD County
Streptocephalus woottoni Riverside fairy shrimp			Y																invertebrate	
Branchinecta sandiegonensis San Diego fairy shrimp			Y																invertebrate	
Sterna antillarum browni California least tern				Y	Y				Y	Y								Y	bird	breeding/migrant
Campylorhynchus brunneicapillus sandiegensis Coastal cactus wren		Y																	bird	breeding/resident
Empidonax traillii extimus Southwestern willow flycatcher															Y				bird	breeding/migrant
Rallus longirostris levipes Light-footed clapper rail					Y														bird	breeding/resident
Speotyto cunicularia Burrowing owl		Y						Y										Y	bird	breeding/resident
Panoquina errans Salt marsh skipper butterfly					Y														invertebrate	
Charadrius alexandrinus nivosus Western snowy plover				Y															bird	breeding/resident
Agelaius tricolor Tricolored blackbird						Y		Y											bird	breeding/resident
Mitoura thornei Thorne's hairstreak butterfly	Y											Y							invertebrate	

RISK GROUP 2

Species	Habitat loss	Recreation	Predation	Altered hydrology	Altered fire regime	Parasitism and Disease	Invasives	Power lines	Off-road vehicles	Loss of prey or host plant	Erosion	Fragmentation	Mining	Pesticides or poisons
	Threats													
Bufo microscaphus californicus Arroyo southwestern toad	H H S		H H S	H H L	L H L		L M S		M M S		L H L		L L S	
Vireo bellii pusillus Least Bell's vireo	H H S	L M S	H H S	M H L		H H S	M H S					L M L		
Polioptila californica californica California gnatcatcher	H H S		M M S		H H L	L L S	L L S							
Aquila chrysaetos Golden eagle	H H S	H H S						M L S						L L L
Haliaeetus leucocephalus Bald eagle		M M S				L L S		L L S						
Pelecanus occidentalis California brown pelican		L L S								L H L				

R[1]	S[2]	T[3]
H	M	S
High	Moderate	Short-Term

[1] R = degree of risk (H=high; M=moderate; L=low degree of threat to the species)

[2] S = spatial scale of the risk factor (extent of the species' range impacted by the threat, H=high; M=moderate; L=low)

[3] T = temporal scale of impact of the risk factor (S=short-term response; L=long-term response)

Note: Threats not shown in this table were not considered a risk to any of the species listed above (in this case: intentional removal by humans, pollution, military activities, grazing, roads, and farming).

RISK GROUP 2

Habitat Types

Species	Chaparral	Coastal sage scrub	Vernal pool	Beaches/salt flats/mud flats	Salt marsh	Freshwater marsh	Maritime scrub	Grassland	Bluffs/coastal dunes	Riparian	Southern maritime chaparral	Closed cone forest	Oak woodland	Cliffs	Riparian woodland	Montane meadow	Mixed conifer	Urban	Animal Group	Avian Status in SD County
Bufo microscaphus californicus Arroyo southwestern toad										Y									amphibian	
Vireo bellii pusillus Least Bell's vireo															Y				bird	breeding/migrant
Polioptila californica californica California gnatcatcher		Y																	bird	breeding/resident
Aquila chrysaetos Golden eagle								Y						Y					bird	breeding/resident
Haliaeetus leucocephalus Bald eagle						Y				Y									bird	non-breeding/migrant
Pelecanus occidentalis California brown pelican				Y	Y				Y										bird	non-breeding/migrant

RISK GROUP 3

Species	Habitat loss	Fragmentation	Altered hydrology	Loss of prey base or host plant	Recreation	Predation	Off-road vehicles	Intentional removal by humans	Invasives	Roads	Altered fire regime	Pollution	Farming	Pesticides or poisons
Clemmys marmorata pallida (Southwestern pond turtle)	M M S	L M L	H H L			H H S	L L S	L L S	H H S			L M L		
Circus cyaneus (Northern harrier)	H H S	M M L			H H S		H H S							
Felis concolor (Mountain lion)	H H S	H H L		L H S				M H S		L L S				
Passerculus sandwichensis beldingi (Belding's Savannah sparrow)	L L L	H H L	H H L		L H S	L H S								
Cnemidophorus hyperythrus beldingi (Orange-throated whiptail)	H H S			H H S		L L S	L L S				L H L			
Aimophila ruficeps canescens (California rufous-crowned sparrow)	H M S	H M L				L H S								
Odocoileus hemionus fuliginata (Southern mule deer)	H L S	H L L						L L S		M L S				
Phrynosoma coronatum blainville (San Diego horned lizard)	M M S	M M L		H H S			L L S	L L S						
Taxidea taxus (American badger)	H H S							M L S		L L S			L L S	
Plegadis chihi (White-faced ibis)	H H S		H H L											
Buteo regalis (Ferruginous hawk)	H H S				M M S									L L L
Sterna elegans (Elegant tern)					M H S	M H S								
Numenius americanus (Long-billed curlew)	L L S													
Accipiter cooperii (Cooper's hawk)										L L S				
Rana aurora draytonii (California red-legged frog)	No currently known occurrences in MSCP													
Egretta rufescens (Reddish egret)	Rarely visits MSCP region													
Branta canadensis (Canada goose)	No known threats in MSCP													
Buteo swainsoni (Swainson's hawk)	No currently known occurrences in MSCP													
Passerculus sandwichensis rostratus (Large-billed Savannah sparrow)	No known threats in MSCP													
Sialia mexicana (Western bluebird)	No known threats in MSCP													
Falco peregrinus (American peregrine falcon)	No known threats in MSCP													
Charadrius montanus (Mountain plover)	No currently known occurrences in MSCP													

Notes: *Plegadis chihi* was ranked below *Phrynosoma coronatum blainville* and *Taxidea taxus* because it is a non-breeding occasional visitor to the MSCP.
Accipiter cooperii was ranked below *Numenius americanus* because it is an urban adapter.

R[1]	S[2]	T[3]
H	M	S
High	Moderate	Short-Term

[1] R = degree of risk (H=high; M=moderate; L=low degree of threat to the species)

[2] S = spatial scale of the risk factor (extent of the species' range impacted by the threat, H=high; M=moderate; L=low)

[3] T = temporal scale of impact of the risk factor (S=short-term response; L=long-term response)

Note: Threats not shown in this table were not considered a risk to any of the species listed above (in this case: mining, military activities, grazing, erosion, power lines, and parasitism and disease).

RISK GROUP 3

Habitat Type

Species	Chaparral	Coastal sage scrub	Vernal pool	Beahes/salt flats/mud flats	Salt marsh	Freshwater marsh	Maritime scrub	Grassland	Bluffs/coastal dunes	Riparian	Southern maritime chaparral	Closed cone forest	Oak woodland	Cliffs	Riparian woodland	Montane meadow	Mixed conifer	Urban	Animal Group	Avian Status in SD County
Clemmys marmorata pallida Southwestern pond turtle										Y									reptile	
Circus cyaneus Northern harrier					Y	Y		Y											bird	breeding/resident
Felis concolor Mountain lion	Y									Y			Y				Y		mammal	
Passerculus sandwichensis beldingi Belding's Savannah sparrow					Y														bird	breeding/resident
Cnemidophorus hyperythrus beldingi Orange-throated whiptail	Y	Y								Y			Y						reptile	
Aimophila ruficeps canescens California rufous-crowned sparrow	Y	Y						Y											bird	breeding/resident
Odocoileus hemionus fuliginata Southern mule deer	Y	Y						Y					Y		Y		Y		mammal	
Phrynosoma coronatum blainvillei San Diego horned lizard	Y	Y						Y				Y	Y		Y				reptile	
Taxidea taxus American badger								Y								Y			mammal	
Plegadis chihi White-faced ibis					Y	Y				Y									bird	non-breeding/migrant
Buteo regalis Ferruginous hawk								Y											bird	non-breeding/migrant
Sterna elegans Elegant tern				Y	Y														bird	breeding/resident
Numenius americanus Long-billed curlew				Y	Y			Y											bird	non-breeding/migrant
Accipiter cooperii Cooper's hawk													Y		Y			Y	bird	breeding/resident
Rana aurora draytonii California red-legged frog										Y									amphibian	
Egretta rufescens Reddish egret					Y														bird	non-breeding/migrant
Branta canadensis Canada goose					Y	Y													bird	breeding/migrant
Buteo swainsoni Swainson's hawk																			bird	non-breeding/migrant
Passerculus sandwichensis rostratus Large-billed Savannah sparrow				Y	Y														bird	non-breeding/migrant
Sialia mexicana Western bluebird													Y			Y	Y		bird	breeding/resident
Falco peregrinus American peregrine falcon														Y				Y	bird	breeding/resident
Charadrius montanus Mountain plover														Y					bird	non-breeding/migrant

VII. Literature Cited

Andelman, S. J., C. Groves, and H. M. Regan. 2004. A review of protocols for selecting species at risk in the context of US Forest Service viability assessments. Acta Oecologica **26**:75-83.

Cook, L., and C. A. Toft. 2005. Dynamics of extinction: population decline in the colonially nesting Tricolored Blackbird (Agelaius tricolor). Bird Conservation International **15**:73-88.

Franklin, A. B., B. R. Noon, and T. L. George. 2002. What is habitat fragmentation? Pages 20-29 in T. L. George and D.S. Dobkin, editors. Studies in Avian Biology No. 25, The effects of habitat fragmentation on birds in western landscapes: contrasts with paradigms from the eastern United States. Cooper Ornithological Society, Seattle, Washington.

Hierl, L. A., H. M. Regan, J. Franklin, and D. H. Deutschman. 2005. Draft Assessment of the Biological Monitoring Plan for San Diego's Multiple Species Conservation Program. Prepared for California Department of Fish and Game.

Marty, J. T. 2005. Effects of cattle grazing on diversity in ephemeral wetlands. Conservation Biology **19**:1626-1632.

Mendelsohn, M. 2005. Personal interview concerning MSCP covered bird species.

Purvis, A., J. L. Gittleman, G. Cowlinshaw, and G. M. Mace. 2000. Predicting extinction risk in declining species. Proceedings of the Royal Society **267**:1947-1952.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

The Nature Conservancy. 2004. Definitions of Sources of Stress (Threats). Developed during the Sequencing Conservation Actions Project, Southern U.S. Region, The Nature Conservancy.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, California.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

Winchell, C. 2005. Personal interview concerning MSCP covered bird species.

Wisdom, M. J., G. Hayward, S. Shelly, C. D. Hargis, R. S. Holthausen, J. Epifanio, L. Parker, and J. Kershner. 2001. Using species groups and focal species for assessment of species at risk in forest planning. Unpublished manuscript, US Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Appendix A: Information Sheets for Covered Plant Species

Acanthomintha ilicifolia - San Diego thorn-mint

1. At-Risk Category:

Risk Group 1 (FT/CE G1 S1.1)*

*Note: The ranking system code definitions are provided in Appendix C

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasive species	High	High	Short-term	
Habitat loss	High	High	Short-term	urban development
ORVs	Low	Low	Short-term	
Grazing	Low	Low	Short-term	
Pollution	Low	Low	Short-term	illegal dumping

3. (a) Habitat Associations and (b) Spatial scale of species

(a) grasslands, openings in coastal sage scrub and chamise chaparral, edges of vernal pools

(b) widely distributed, moderately dense (total estimated 150,000-170,000 individuals in 32 populations; 4 known populations in MSCP – Sabre Springs, Sycamore/Slaughterhouse Canyons, Asphalt, Inc.)

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: This species occupies a distinctive microhabitat: grassy openings in chaparral or coastal sage scrub with friable or broken clay soils. Many of the known populations are on private land. The federal register notes mining as a threat, but no specifics on what type, where, or the degree of the threat are given.

Sources:

California Department of Fish and Game. Accessed 10/2005. Habitat Conservation Planning Branch: California's Plants and Animals. <http://www.dfg.ca.gov/hcpb/cgi-bin/more_info.asp?idKey=ssc_tespp&specy=plants&query=Acanthomintha%20ilicifolia>.

Center for Plant Conservation: National Collection of Endangered Plant Profiles. Accessed 10/2005. <http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=19>.

City of San Diego. 2000. Summary of Monitoring Results for *Acanthomintha ilicifolia*.

City of San Diego. 2001. Summary of Monitoring Results for *Acanthomintha ilicifolia*.

City of San Diego. 2003. Summary of Monitoring Results for *Acanthomintha ilicifolia*.

City of San Diego. 2004. Summary of Monitoring Results for *Acanthomintha ilicifolia*.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Griffin, D. J. 2003. DRAFT 2003 Report of MSCP Covered Species at San Diego National Wildlife Refuge. Prepared for US Fish and Wildlife Service.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/003.html>.

US Fish and Wildlife Service. 1998. Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Four Plants From Southwestern California and Baja California, Mexico. Federal Register 63(197): 54938-54956.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Agave shawii ssp. *shawii* - Shaw's agave

1. At-Risk Category:

Risk Group 2 (G2G3 S1.2)

2. Risk Factors

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Adverse fire regime	Low	High	Long-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal sage scrub, coastal bluffs, maritime succulent scrub

(b) narrowly distributed; extremely sparse (San Diego County represents northern end of its range, widespread in Mexico; MSCP populations at Cabrillo National Monument, Torrey Pines, and SDNWR [Imperial Beach] are all introduced)

4. Functional Group (plants); Generation time or life span (animals)

Perennial (monocarpic clonal succulent – flowers once after about 15 years then dies)

Notes: Mature plants of this species **s**urvive fire and resprout. A few natural populations might possibly remain on Pt. Loma. Collecting has historically been a problem; however populations in the county seem to have stabilized in recent years. Seedling establishment may be a good variable to monitor. Was included as a MSCP covered species because it was considered a good indicator of coastal bluff scrub

Sources:

CalFlora: Wildflowers and Other Plants of Southern California. Accessed 10/2005. <http://www.calflora.net/bloomingplants/index.html>.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/003.html>.

Ambrosia pumila - San Diego ambrosia

1. At-Risk Category:

Risk Group 1 (FE G1 S1.1 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasives	High	High	Short-term	rarely thrives in areas invaded by exotic grasses
Habitat loss	High	Moderate	Short-term	some population on protected lands
Recreation/Human disturbance	Moderate	High	Short-term	trampling, major problem in Mission Trails
Mining	Moderate	Low	Long-term	sand mining (Sweetwater)
ORVs	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) native grasslands within floodplains (creek beds, drainages), riparian, coastal sage scrub

(b) widely distributed; sparse (21 populations, Riverside County and San Diego County; was more widespread in the past, now much more limited)

4. Functional Group (plants); Generation time or life span (animals)

Herbaceous perennial

Notes: Although this species is clonal in habit (e.g., rhizomatous), a recent study by M. Hawk found that single populations previously believed to contain one genetic individual may actually contain multiple, independent individuals. This species has been successfully transplanted and does well in disturbed areas. A one-time study indicated plants in some populations were not producing viable seed.

Sources:

California Native Plant Society. Accessed 10/2005. Inventory of Rare and Endangered Plants. <http://www.cnpssd.org/ambrosia99.html>.

City of San Diego. 2000. Summary of Monitoring Results for *Ambrosia pumila*.

City of San Diego. 2001. Summary of Monitoring Results for *Ambrosia pumila*.

City of San Diego. 2003. Summary of Monitoring Results for *Ambrosia pumila*.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Dudek & Associates. 2000. City of San Diego Mission Trails Regional Park San Diego *Ambrosia* Management Plan. Prepared for City of San Diego.

Griffin, D. J. 2003. DRAFT 2003 Report of MSCP Covered Species at San Diego National Wildlife Refuge. Prepared for US Fish and Wildlife Service.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/008.html>.

Soil Ecology Restoration Group (Johnson, J., D. Bainbridge, J. Janssen, and D. Truesdale). 1999. *Ambrosia pumila*: monitoring, outplanting and salvage. <http://www.serg.sdsu.edu/SERG/restorationproj/chaparraland/ambrosia.html>.

US Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants; Reopening of Comment Period on Proposed Endangered Status for *Ambrosia pumila* (San Diego Ambrosia). Federal Register 65(62): 16869-16870.

Aphanisma blitoides - Aphanisma

1. At-Risk Category:

Excluded – No known populations in MSCP (G2 S2.1)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal bluffs

(b) extremely restricted distribution; sparse

4. Functional Group (plants); Generation time or life span (animals)

Succulent annual

Notes: May be extirpated from San Diego County; recent sighting at Point Loma extirpated by Navy construction. Potential populations could be found at Tijuana Valley and Torrey Pines.

Sources:

Junak, S., W. L. Halvorson, C. Schwemm, and T. W. Keeney. 1996. Sensitive Plants of San Nicolas Island, California (Phase 2). U.S. Geological Survey, Technical Report No. 57.

NatureServe Explorer: An Online Encyclopedia of Life. Accessed 10/2005. <http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Aphanisma+blitoides>.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/009.html>.

Arctostaphylos glandulosa ssp. *crassifolia* - Del Mar manzanita

1. At-Risk Category:

Risk Group 1 (FE G5T1 S1.1 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	urban development
Fragmentation	High	Low	Long-term	prefer mature chaparral, not often found on edges
Invasives	Moderate	Moderate	Short-term	
Recreation/Human disturbance	Low	Low	Short-term	trails
Intentional removal by humans	Low	Low	Short-term	fire management activities such as fire breaks, discing, fuel thinning

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chamise chaparral, southern maritime chaparral (restricted to sandstone terraces and bluffs)

(b) narrowly distributed; sparse

4. Functional Group (plants); Generation time or life span (animals)

Shrub (facultative seeder)

Notes: This species is considered an indicator species of southern maritime chaparral. Some remaining populations occur on private lands. May hybridize with other *Arctostaphylos* spp.

Sources:

City of San Diego. 2002. Summary of Monitoring Results for *Arctostaphylos glandulosa* var. *crassifolia*.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/010.html>.

US Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Four Southern Maritime Chaparral Plant Taxa from Coastal Southern California and Northwestern Baja California, Mexico. Federal Register, 61(195): 52370-52384.

Arctostaphylos otayensis - Otay manzanita

1. At-Risk Category:

Risk Group 2 (G2 S2.1 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	High	High	Long-term	
Habitat loss	High	Low	Short-term	urban development
Invasives	Moderate	Moderate	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mixed chaparral, cismontane woodlands (closed cone forest and oak woodland)

(b) narrowly distributed; dense (location: Otay Mtn.)

4. Functional Group (plants); Generation time or life span (animals)

Shrub (obligate seeder)

Notes: Edaphically limited to gabbroic soils.

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/011.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Astragalus tener var. *titi* - Coastal dunes milk-vetch

1. At-Risk Category:

Excluded – No known populations in MSCP (FE/CE G1 S1.1)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal dunes

(b) extremely restricted range; extremely sparse (likely extirpated from MSCP area – Silver Strand is likely locale)

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: This species has been likely extirpated from San Diego County - many unsuccessful searches have been made since 1980 looking for this species; only known existing population in Monterey County.

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/003.html>.

US Fish and Wildlife Service. 2004. Recovery Plan for Five Plants from Monterey County, California. US Fish and Wildlife Service, Portland, Oregon xii + 159pp.

Baccharis vanessae - Encinitas baccharis

1. At-Risk Category:

Risk Group 1 (FT G1 S1.1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	urban development
Altered fire regime	High	High	Long-term	
Invasives	Moderate	Moderate	Short-term	
Recreation/Human disturbance	Low	Low	Short-term	trampling
Intentional removal by humans	Low	Low	Short-term	illegal aliens burning wood, fire management - fuel reduction

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mixed and chamise chaparral, coastal sage scrub, southern maritime chaparral

(b) moderately distributed; moderately dense (14 populations in 1992 with about 2,000 individuals total; locations include: Encinitas, Lake Hodges, Del Dios, Mt. Woodson, Mt. Israel, Escondido)

4. Functional Group (plants); Generation time or life span (animals)

Shrub (dioecious)

Notes: This is a very rare plant with specific edaphic requirements that restrict dispersal. The impact of fire on this species is not well understood. Population structure is important since it is a dioecious shrub.

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/003.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

US Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Four Southern Maritime Chaparral Plant Taxa from Coastal Southern California and Northwestern Baja California, Mexico. Federal Register, 61(195): 52370-52384.

Berberis nevinii - Nevin's barberry

1. At-Risk Category:

Excluded – No known natural populations in MSCP (G2 S2.2)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mixed chaparral, chamise chaparral, riparian (dry washes, sandy or coarse soils)

(b) extremely restricted range; extremely sparse (planted populations at Torrey Pines and Spring Valley, natural populations only on Palomar)

4. Functional Group (plants); Generation time or life span (animals)

Shrub (obligate resprouter)

Notes: Naturally occurs in small populations and appears to have naturally low rates of regeneration due to sporadic viable seed production; susceptible to infection by a rust *Puccinia graminis.* Current taxonomic issues with this species (taxon in question).

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/029.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Brodiaea filifolia - Thread-leaved brodiaea

1. At-Risk Category:

Excluded – No known populations in MSCP (G2 S2.1)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) vernal pools

(b) moderately distributed; sparse

4. Functional Group (plants); Generation time or life span (animals)

Geophyte (perennial herb)

Notes: As is true for all geophytes, this species may not appear aboveground every year, thus the population can contain many more bulbs than visible plants. Plants are easily missed during surveys except when blooming. This species may hybridize with other *Brodiaea* species (problem exacerbated by European honeybees). In San Diego County, it is mostly found in Vista-San Marcos-Carlsbad region.

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/034.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Brodiaea orcuttii - Orcutt's brodiaea

1. At-Risk Category:

Risk Group 3 (G3 S3.1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasives	High	High	Short-term	
Habitat loss	High	Moderate	Short-term	urban development
Altered hydrology	High	Moderate	Long-term	
ORVs	Moderate	Moderate	Short-term	

Pollution	Low	Low	Short-term	illegal dumping
Grazing	Low	Low	Short-term	wallowing

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mixed chaparral, coastal sage scrub, near vernal pools, grasslands, meadows, closed cone forest

(b) widely distributed; moderately dense

4. Functional Group (plants); Generation time or life span (animals)

Geophyte (bulb)

Notes: This species is found in mesic habitats with clay or serpentine soils, and is a relatively short-lived perennial (increases impact of invasives).

Sources:

City of San Diego. 2003. Summary of Monitoring Results for *Brodiaea orcuttii*.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/035.html>.

Riverside County Integrated Project. 2003. Final MSHCP Reference Document, Vol II-B, Species Accounts for Plants. <http://rcip.org/mshcpdocs/Vol2/appendixB/plants/orcuttsbrodiaea.pdf >.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Calamagrostis densa (now in *Calamagrostis koelerioides)* - Dense reed grass

1. At-Risk Category:

Excluded – Taxonomic debate/uncertainty (currently included in more common taxon)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chamise chaparral (ridges, openings, rocky areas)

(b) widely distributed

4. Functional Group (plants); Generation time or life span (animals)

Perennial grass

Notes: Populations of this species (*C. koelerioides*) are presumed stable.

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/003.html>.

Calochortus dunnii - Dunn's mariposa lily

1. At-Risk Category:

Risk Group 2 (FSC G2 S2.1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasives	Moderate	High	Short-term	
Habitat loss	Moderate	Low	Short-term	on private lands
Intentianal removal by humans	Low	Low	Short-term	collecting
Herbivory	Low	Low	Short-term	by turkeys

3. (a) Habitat Associations and (b) Spatial scale of species

(a) openings in pine forest, mixed chaparral, chamise chaparral (elevations of 1200-6000 ft)

(b) widely distributed; dense (20 known occurrences; limited to San Diego County mountains)

4. Functional Group (plants); Generation time or life span (animals)

Geophyte (bulb)

Notes: This species is edaphically restricted to gabbro soils. It does well with fire, but not if they are too frequent.

Sources:

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/042.html>.

San Diego Natural History Museum. Accessed 10/2005. *Calochortus dunnii*. <http://www.sdnhm.org/fieldguide/plants/gabbro.html>.

Caulanthus stenocarpus (now absorbed into *Caulanthus heterophyllus)* - Slender-pod jewelflower

At-Risk Category:

Excluded – Taxonomic debate/uncertainty – currently included in more common taxon (FSC/CR)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal sage scrub, low elevation chaparral

(b) moderately distributed; moderately dense

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: *C. heterophyllus* is widespread and commonly grows in disturbed and burnt areas.

Sources:

CalFlora: Wildflowers and Other Plants of Southern California. Accessed 10/2005. <http://www.calflora.net/bloomingplants/slenderpodjewelflower.html>.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Ceanothus cyaneus - Lakeside ceanothus

1. At-Risk Category:

Risk Group 2 (FSC G2 S2.2)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	High	High	Long-term	both suppression and increased fire frequency
Habitat loss	High	Moderate	Short-term	encroaching residential projects

3. (a) Habitat Associations and (b) Spatial scale of species

(a) inland mixed chaparral, closed cone forest

(b) restricted range; sparse (75% of major populations are included in the MSCP)

4. Functional Group (plants); Generation time or life span (animals)

Shrub - probably an obligate seeder

Notes: This species is not overly common where it is found, and many populations were burned in the Cedar Fire (2003). Intergeneric hybrids can superficially resemble this species.

Sources:

California Department of Fish and Game. Accessed 10/2005. Lands and Facilities Branch: Crestridge Ecological Reserve Focal Species. <http://www.dfg.ca.gov/lands/er/region5/crestridge/crestridge-cean-cya.html>.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/048.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Ceanothus verrucosus - Wart-stemmed ceanothus

1. At-Risk Category:

Risk Group 3 (G3 S2.2)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	Moderate	Moderate	Short-term	
Altered fire regime	High	High	Long-term	
Fragmentation	Moderate	Low	Long-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chamise chaparral

(b) narrowly distributed; sparse

4. Functional Group (plants); Generation time or life span (animals)

Shrub (probably an obligate seeder)

Notes: This species is common in canyons within a few miles of the coast, and does well on steep slopes.

Sources:

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/003.html>.

Cordylanthus maritimus ssp. *maritimus* - Salt marsh bird's-beak

1. At-Risk Category:

Risk Group 2 (FE/CE G4T2 S2.1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered hydrology	High	High	Long-term	grows above high tide line in salt marsh – sea level rise; draining and filling marshes
Invasives	Moderate	High	Short-term	vast majority of area

				invaded by exotics
Habitat loss	Moderate	Moderate	Short-term	occur in wetlands that are not highly threatened
Recreation/Human disturbance	Moderate	Moderate	Short-term	bike paths, jet skis, trampling
Pollution	Low	High	Long-term	
ORVs	Low	Low	Short-term	
Intentional removal by humans	Low	Low	Short-term	collecting

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal salt marsh

(b) extremely narrow distribution; extremely sparse (5 known populations at two sites: Imperial Beach and Chula Vista)

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: This species is susceptible to loss of genetic variation, and dependent on nearby upland habitat to support native pollinators. It is also limited by specific soil requirements.

Sources:

CalFlora: Wildflowers and Other Plants of Southern California. Accessed 10/2005. <http://www.calflora.net/bloomingplants/saltmarshbirdsbeak.html>.

California Department of Fish and Game. Accessed 10/2005. Habitat Conservation Planning Branch: California's Plants and Animals. <http://www.dfg.ca.gov/hcpb/cgi-bin/more_info.asp?idKey=ssc_tespp&specy=plants&query=Cordylanthus%20maritimus%20ssp.%20maritimus>.

Center for Plant Conservation: National Collection of Endangered Plant Profiles. Accessed 10/2005. <http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=1054>.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Draft Taxonomy - Species Salt Marsh Bird's-beak. Accessed 10/2005. <http://fwie.fw.vt.edu/WWW/esis/lists/e701013.htm>.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/066.html>.

Cordylanthus orcuttianus - Orcutt's bird's-beak

1. At-Risk Category:

Risk Group 1 (FSC G2? S1.1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
ORVs	High	High	Short-term	
Recreation/Human disturbance	High	High	Short-term	trails and trail development
Habitat loss	Moderate	Moderate	Short-term	urban expansion
Invasives	Moderate	Moderate	Short-term	almost half of area invaded by exotics but will increase with ORV activity
Altered hydrology	Low	High	Short-term	damming and river control activities may be an issue for this species

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal sage scrub (seasonally dry drainages and upland adjacent to riparian habitat)

(b) extremely narrow; extremely sparse (only known in Otay and Tijuana River Valley; 3 of 4 known populations in MSCP)

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: Many of the plants are found along trail and road edges.

Sources:

City of San Diego. 2003. Summary of Monitoring Results for *Cordylanthus orcuttianus*.

City of San Diego. 2004. Summary of Monitoring Results for *Cordylanthus orcuttianus*.

Johnson, M. Mar. 23, 2006. Personal communication concerning MSCP covered plant species.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/067.html>.

Cupressus forbesii - Tecate cypress

1. At-Risk Category:

Risk Group 1 (FSC G2 S1.1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	High	High	Long-term	illegal alien campfires and ORVs sources of ignition
Intentional removal by humans	Low	Low	Short-term	fire management - fire breaks, fuel reduction

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mixed chaparral, closed cone forest

(b) narrowly distributed; dense (only 3 known groves in San Diego County: Otay Mtn., Guatay Mtn., and Tecate Peak)

4. Functional Group (plants); Generation time or life span (animals)

Tree (cypress, serotinous)

Notes: This is the host plant for another MSCP covered species, Thorne's hairstreak butterfly. Fire is required to trigger germination in this species, and small population sizes make it susceptible to threats associated with genetic issues.

Sources:

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/075.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

USDA Forest Service. Accessed 10/2005. Fire Effects Information System. <http://www.fs.fed.us/database/feis/plants/tree/cupfor/all.html>.

Cylindropuntia californica var. *californica* - Snake cholla

1. At-Risk Category:

Risk Group 2 (FSC G3T2 S1.1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	High	High	Long-term	
Invasives	Moderate	High	Short-term	seedling establishment issues
Fragmentation	Moderate	High	Long-term	
Recreation/Human disturbance	Moderate	Low	Short-term	golfing
ORVs	Moderate	Low	Short-term	including Border Patrol activities
Pollution	Moderate	Low	Short-term	illegal dumping

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal sage scrub (arid coastal slopes), chaparral, maritime succulent scrub

(b) narrowly distributed; sparse

4. Functional Group (plants); Generation time or life span (animals)

Shrub (succulent perennial cactus)

Notes: Although this species is killed directly by fire, it can also be threatened by lack of fire because it competes poorly with other shrub species. The taxonomy of this group is continually debated.

Sources:

CalFlora: Wildflowers and Other Plants of Southern California. Accessed 10/2005. <http://www.calflora.org/cgi-bin/species_query.cgi?where-cname=Prostrate%20valley%20cholla&ttime=1130874318>.

City of San Diego. 2002. Summary of Monitoring Results for *Cylindropuntia californica* var. *californica* (formerly *Opuntia parryi* var. *serpentina*).

Griffin, D. J. 2003. DRAFT 2003 Report of MSCP Covered Species at San Diego National Wildlife Refuge. Prepared for US Fish and Wildlife Service.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/183.html>.

Deinandra (=Hemizonia) conjugens - Otay tarplant

1. At-Risk Category:

Risk Group 1 (FT/CE G1 S1.1 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	>70% habitat loss has already occurred, probably secondary effects from development near only known populations
Fragmentation	High	High	Long-term	declining genetic variation, self-incompatible, and reduced pollination
ORVs	High	Moderate	Short-term	
Invasives	Moderate	High	Short-term	
Recreation/Human disturbance	Low	Moderate	Short-term	trampling
Grazing	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) grasslands, open coastal sage scrub, maritime succulent scrub

(b) extremely restricted range; moderately dense (locations include: Otay Mesa, Telegraph Canyon, Sweetwater, Bonita, Chula Vista, etc.)

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: The distribution of this species is highly correlated with clay soils or subsoils. It is estimated that only 3,400 ha of appropriate habitat remains, with fewer than 250 ha known to be occupied. This species appears to tolerate mild levels of disturbance (e.g., light grazing). The entire known population occurs within the MSCP region. Taxonomic recognition can be difficult in the field. Most populations are in the Otay Mesa area, which is heavily used by ORVs.

Sources:

City of San Diego. 2003. Summary of Monitoring Results for *Deinandra conjugens*.

City of San Diego. 2004. Summary of Monitoring Results for *Deinandra conjugens*.

City of San Diego. 2005. Rare Plant Monitoring Report, 2005: *Deinandra conjugens*.

Coulter, L., J. Williams, and D. Stow. 2004. Final Report: Image-Based Detection of Changes between 2001-2003 at the Otay Mesa Vernal Pool Restoration Site. San Diego State University, Department of Geography, Prepared for City of San Diego.

Griffin, D. J. 2003. DRAFT 2003 Report of MSCP Covered Species at San Diego National Wildlife Refuge. Prepared for US Fish and Wildlife Service.

Johnson, M. Mar. 23, 2006. Personal communication concerning MSCP covered plant species.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/112.html>.

US Fish and Wildlife Service. 1998. Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Four Plants From Southwestern California and Baja California, Mexico. Federal Register 63(197): 54938-54956.

US Fish and Wildlife Service. 2002. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Deinandra conjugens* (Otay tarplant); Final Rule. Federal Register 67(237): 76030-76053.

US Fish and Wildlife Service. 2004. Recovery Plan for *Deinandra conjugens* (Otay tarplant). Portland, OR. vii + 65 pp.

Dudleya blochmaniae ssp. *brevifolia* - Short-leaved dudleya

1. At-Risk Category:

Risk Group 1 (CE G2T1 S1.1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Recreation/Human disturbance	High	High	Short-term	trampling
ORVs	Moderate	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chamise chaparral (on extremely shallow sandy soils in open sites)

(b) extremely narrow distribution; extremely sparse (5 known occurrences in MSCP)

4. Functional Group (plants); Generation time or life span (animals)

Herbaceous perennial (succulent geophyte)

Notes: M. Johnson (City of San Diego) noted this species must be monitored within a short growing-window when leaves and flowers are present. Care should be taken to avoid damaging plants by trampling during monitoring efforts. Historically habitat loss was a major threat, but most or all of the known populations are currently on MSCP preserve or publicly-owned lands.

Sources:

Center for Plant Conservation: National Collection of Endangered Plant Profiles. Accessed 10/2005. <http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=1520>.

City of San Diego. 1999. Summary of Monitoring Results for *Dudleya blochmaniae* ssp. *brevifolia*.

City of San Diego. 2000. Summary of Monitoring Results for *Dudleya blochmaniae* ssp. *brevifolia*.

City of San Diego. 2001. Summary of Monitoring Results for *Dudleya blochmaniae* ssp. *brevifolia*.

City of San Diego. 2002. Summary of Monitoring Results for *Dudleya blochmaniae* ssp. *brevifolia*.

City of San Diego. 2003. Summary of Monitoring Results for *Dudleya blochmaniae* ssp. *brevifolia*.

City of San Diego. 2004. Summary of Monitoring Results for *Dudleya blochmaniae* ssp. *brevifolia*.

Johnson, M. Mar. 23, 2006. Personal communication concerning MSCP covered plant species.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/085.html>.

US Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants; Withdrawal of the Proposed Rule to List the Plants *Dudleya blochmaniae* ssp. *brevifolia* (Short-leaved Dudleya) as

Endangered, and *Corethrogyne filaginifolia* var. *linifolia* (Del Mar Sand-aster) as Threatened. Federal Register 61(195): 52402-52403.

Dudleya variegate - Variegated dudleya

1. At-Risk Category:

Risk Group 2 (FSC G2 S2.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasives	Moderate	High	Short-term	
Recreation/Human disturbance	Moderate	High	Short-term	trampling
Habitat loss	Moderate	Moderate	Short-term	
ORVs	Moderate	Moderate	Short-term	Border Patrol and public
Grazing	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chaparral, coastal sage scrub, southern needlegrass grassland, and near vernal pools at 3 to 550 meters (grows in openings)

(b) widely distributed; sparse (locations include: Otay, Kearny Mesa, etc.)

4. Functional Group (plants); Generation time or life span (animals)

Perennial (succulent, corm)

Notes: This is a cryptic species, except during spring and early summer; it needs to be monitored during this period. Populations seem to respond well to management (ORV prevention and restoration, including weed removal). It is unknown whether all individuals in a population 'come up' (exhibit aboveground parts) each year.

Sources:

City of San Diego. 2003. Summary of Monitoring Results for *Dudleya variegata*.

City of San Diego. 2004. Summary of Monitoring Results for *Dudleya variegata*.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Griffin, D. J. 2003. DRAFT 2003 Report of MSCP Covered Species at San Diego National Wildlife Refuge. Prepared for US Fish and Wildlife Service.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/087.html>.

Dudleya viscida - Sticky dudleya

1. At-Risk Category:

Risk Group 2 (FSC G2 S2.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	Moderate	Short-term	urban development, road construction
Recreation/Human Disturbance	Low	Low	Short-term	rock climbers

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mesic, steep rocky canyon slopes, cracks in vertical rock faces, bluffs in coastal sage scrub and chaparral

(b) moderately distributed; sparse (about 30 occurrences in California; distributed in northern, coastal areas of San Diego County - Pendleton, Oceanside, etc.)

4. Functional Group (plants); Generation time or life span (animals)

Perennial (succulent)

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/087.html>.

Riverside County Integrated Project. 2000. Plants: Western Riverside County MSHCP Species Accounts. <http://wildlife.ucr.edu/full.asp?sp_num=238>.

Riverside County Integrated Project. 2003. Final MSHCP Reference Document, Vol II-B, Species Accounts for Plants. <http://www.rcip.org/mshcpdocs/Vol2/appendixB/plants/stickyleaveddudleya.pdf>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Ericameria palmeri ssp. *palmeri* - Palmer's ericameria

1. At-Risk Category:

Risk Group 2 (FSC G4T2T3 S1.1 List 2)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Altered fire regime	High	High	Long-term	increased fire frequency
Erosion	High	Moderate	Short-term	
Invasives	Low	High	Short-term	
Fragmentation	Low	Moderate	Long-term	in urban areas

3. (a) Habitat Associations and (b) Spatial scale of species

(a) moist areas in coastal sage scrub, chaparral and riparian scrub

(b) moderate range; extremely sparse (known from 6 occurrences in San Diego County - more widespread in Baja California)

4. Functional Group (plants); Generation time or life span (animals)

Shrub (may be an obligate seeder)

Notes: The range of this species is currently on the edge of urban sprawl. It appears to tolerate some disturbance, and can be difficult to identify in the field.

Sources:

Griffin, D. J. 2003. DRAFT 2003 Report of MSCP Covered Species at San Diego National Wildlife Refuge. Prepared for US Fish and Wildlife Service.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/090.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Eryngium aristulatum var. *parishii* - San Diego button-celery

1. At-Risk Category:

Risk Group 2 (FE/CE G5T2 S2.1 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Invasives	High	High	Short-term	
Altered hydrology	High	High	Long-term	
ORVs	Moderate	Moderate	Short-term	
Recreation/Human disturbance	Low	Moderate	Short-term	trampling
Herbivory	Low	Moderate	Short-term	rabbits
Grazing	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) vernal pools

(b) moderately distributed; sparse

4. Functional Group (plants); Generation time or life span (animals)

Perennial herb (from taproot or rhizomes)

Sources:

Center for Plant Conservation: National Collection of Endangered Plant Profiles. Accessed 10/2005. <http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=1816>.

City of San Diego. 2004. Summary of Monitoring Results for Post Fire Evaluation of Vernal Pools.

Coulter, L., J. Williams, and D. Stow. 2004. Final Report: Image-Based Detection of Changes between 2001-2003 at the Otay Mesa Vernal Pool Restoration Site. San Diego State University, Department of Geography, Prepared for City of San Diego.

Greer, K., L. Coulter, and A. Hope. 2002. Utility of high spatial resolution multispectral for mapping and monitoring vernal pool habitat in transitional urban environments. Prepared for Earth Science Applications Directorate, National Aeronautics and Space Administration.

Johnson, M. Mar. 23, 2006. Personal communication concerning MSCP covered plant species.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/093.html>.

Riverside County Integrated Project. 2003. Final MSHCP Reference Document, Vol II-B, Species Accounts for Plants. <http://rcip.org/mshcpdocs/Vol2/appendixB/plants/sdbuttoncelery.pdf>.

US Fish and Wildlife Service. 1993. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Three Vernal Pool Plants and the Riverside Fairy Shrimp. Federal Register 58: 41384-41392.

US Fish and Wildlife Service. 1998. Vernal Pools of Southern California Recovery Plan. US Department of the Interior, Fish and Wildlife Service, Portland, OR.

Erysimum ammophilum - Coast wallflower

1. At-Risk Category:

Excluded – No known populations in MSCP (FSC List 1B)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) bluffs/coastal dunes, maritime scrub, maritime chaparral openings - sandy substrate required

(b) extremely narrow, extremely sparse range

4. Functional Group (plants); Generation time or life span (animals)

Short-lived perennial

Note: There is ongoing taxonomic debate as to whether the species found along the coast in San Diego County is *E. capitatum* (more common), or *E. ammophilum* (rare), or some intermediate genus. There are no known locations of *E. ammophilum* on MSCP lands, and if it does exist it has been almost extirpated in the county. A population has possibly been observed at Torrey Pines State Reserve.

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/094.html>.

Ferocactus viridescens var. *viridescens* - San Diego barrel cactus

1. At-Risk Category:

Risk Group 3 (FSC G4 S3.1 List 2)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Invasives	Moderate	High	Short-term	
ORVs	Moderate	Low	Short-term	including Border Patrol
Altered fire regime	Low	Low	Long-term	frequent fires kill individuals, but suppression in urban canyons may also be problematic because it gets outcompeted over time
Fragmentation	Low	Low	Long-term	in urban canyon populations
Intentional removal by humans	Low	Low	Short-term	collecting

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal sage scrub, chaparral, and grassland

(b) moderately distributed, moderately dense

4. Functional Group (plants); Generation time or life span (animals)

Shrub (succulent perennial)

Notes: This species prefers rocky, thin soils on southwest-facing slopes near the coast. Current fragmentation of populations may be due to very specific habitat requirements.

Sources:

CalFlora: Wildflowers and Other Plants of Southern California. Accessed 10/2005. <http://www.calflora.net/bloomingplants/coastbarrelcactus.html>.

California Native Plant Society. Accessed 10/2005. Inventory of Rare and Endangered Plants. <http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Show?_id=ferocactus_viridescens>.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Griffin, D. J. 2003. DRAFT 2003 Report of MSCP Covered Species at San Diego National Wildlife Refuge. Prepared for US Fish and Wildlife Service.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/098.html>.

Lepechinia cardiophylla - Heart-leaved pitcher sage

1. At-Risk Category:

Risk Group 2 (FSC G2 S2.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	High	High	Long-term	suppression
Invasives	Moderate	Moderate	Short-term	
Recreation/Human disturbance	Low	Moderate	Short-term	several minor dirt roads on Iron Mtn.
Habitat loss	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chaparral, mixed conifer, oak woodland (550-1370 m)

(b) extremely restricted range; moderately dense (only one known population in the MSCP)

4. Functional Group (plants); Generation time or life span (animals)

Shrub

Notes: This species is reportedly a fire-follower; it is found more often in burned than unburned areas.

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/136.html>.

Riverside County Integrated Project. 2000. Plants: Western Riverside County MSHCP Species Accounts. <http://ecoregion.ucr.edu/dudek/accounts/Plants.pdf>.

Riverside County Integrated Project. 2003. Final MSHCP Reference Document, Vol II-B, Species Accounts for Plants. <http://rcip.org/mshcpdocs/Vol2/appendixB/plants/heartleavedpitchersage.pdf>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/full.asp?sp_num=161>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Lepechinia ganderi - Gander's pitcher sage

1. At-Risk Category:

Risk Group 2 (FSC G2 S2.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	Moderate	Moderate	Short-term	
Invasives	Moderate	Moderate	Short-term	
Altered fire regime	Low	High	Long-term	
Recreation/Human disturbance	Low	Low	Short-term	BLM plans to increase recreation on Otay Mtn

3. Spatial scale of species and Habitat Associations

(a) chaparral, coastal sage scrub, and grassland

(b) extremely restricted range; moderately dense (known from fewer than 10 occurrences in San Diego County, including: Otay, San Miguel Mountain, Jamul Mountain, Marron Valley)

4. Functional Group (plants); Generation time or life span (animals)

Shrub

Note: This species is associated with Tecate cypress.

Sources:

NatureServe Explorer: An Online Encyclopedia of Life. Accessed 10/2005. <http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Lepechinia+ganderi>.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/137.html>.

Lessingia filaginifolia var. *filaginifolia* (previously *Corethrogyne filaginifolia* var. *linifolia*) - Del Mar Mesa sand aster

1. At-Risk Category:

Excluded – Taxonomic debate/uncertainty – currently included in more common taxon (FSC G4T1 S1.1)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal sage scrub and mixed chaparral (canyons and coastal mesas)

(b) widespread

4. Functional Group (plants); Generation time or life span (animals)

Perennial subshrub (or herb)

Sources:

City of San Diego. 2003. Summary of Monitoring Results for *Lessingia filaginifolia*.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/069.html>.

US Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants; Withdrawal of the Proposed Rule to List the Plants Dudleya blochmaniae ssp. brevifolia (Short-leaved Dudleya) as Endangered, and Corethrogyne filaginifolia var. linifolia (Del Mar Sand-aster) as Threatened. Federal Register 61(195): 52402-52403.

Lotus nuttallianus - Nuttall's lotus

1. At-Risk Category:

Risk Group 1 (FSC G1 S1.1 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes

Invasives	High	High	Short-term	iceplant overtaking habitat at Mission Bay sites
Recreation/Human disturbance	Moderate	High	Short-term	trampling
Military activities	Moderate	Moderate	Short-term	
Habitat loss	Low	High	Short-term	
ORVs	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal dunes

(b) extremely restricted range, extremely sparse

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Note: This species has been almost extirpated in San Diego County; historical vouchers exist for Silver Strand, Ocean Beach, Pacific Beach, Pt. Loma, Pendleton, etc.

Sources:

City of San Diego. 2001. Summary of Monitoring Results for *Lotus nuttallianus*.

City of San Diego. 2002. Summary of Monitoring Results for *Lotus nuttallianus*.

City of San Diego. 2003. Summary of Monitoring Results for *Lotus nuttallianus*.

City of San Diego. 2004. Summary of Monitoring Results for *Lotus nuttallianus*.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/151.html>.

Monardella hypoleuca ssp. *lanata* - Felt-leaved monardella

1. At-Risk Category:

Risk Group 3 (SSC? G4T2 S2.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasives	High	High	Short-term	
Altered fire regime	Moderate	High	Long-term	suppression

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mixed and chamise chaparral, oak woodland

(b) widely distributed; extremely sparse (about 50 occurrences on federal, state, and private land; found primarily in East County, including: Otay, Tecate Peak, Iron Mountain, etc.)

4. Functional Group (plants); Generation time or life span (animals)

Suffrutescent (perennial subshrub, rhizomatous)

Notes: This species is endemic to the west slope of the Peninsular Range, and grows in the understory of shrublands.

Sources:

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/166.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Monardella linoides ssp. *viminea* (=*Monardella viminea*) - Willowy monardella

1. At-Risk Category:

Risk Group 2 (FE/CE G2 S2.1 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasives	High	High	Short-term	does not compete well with other plants
Recreation/Human disturbance	Moderate	High	Short-term	trampling

Erosion	Moderate	High	Long-term	due to increased urban runoff and post-fire
Habitat loss	Moderate	Moderate	Short-term	urban development, degradation
ORVs	Low	Low	Short-term	
Mining	Low	Low	Short-term	sand and gravel affect population on private property

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chaparral, mixed conifer, riparian (cobbly stream beds, shallow alluvial terraces above drainages in coastal and foothill canyons), coastal sage scrub, sandy washes and floodplains

(b) extremely restricted; sparse (locations on City MSCP lands include: Otay Lakes, Sycamore Canyon, Lopez Canyon, Spring Canyon/East Elliott, and Marron Valley)

4. Functional Group (plants); Generation time or life span (animals)

Perennial herb

Notes: Current taxonomic work is underway on this species. Many of the known populations occur on Miramar. Some of the southern MSCP populations (e.g., on Otay Mountain) were recently determined to be *Monardella stoneana*. Transplant projects by Mike Kelly are ongoing. In one study, no viable seed was found and recruitment was virtually non-existent.

Sources:

California Native Plant Society. 2005. Fremontia. Vol. 33, No. 1. <http://www.cnps.org/publications/fremontia/Fremontia_Vol33-No1.pdf>.

City of San Diego. 2000. Summary of Monitoring Results for *Monardella linoides* ssp. *viminea*.

City of San Diego. 2001. Summary of Monitoring Results for *Monardella linoides* ssp. *viminea*.

City of San Diego. 2002. Summary of Monitoring Results for *Monardella linoides* ssp. *viminea*.

City of San Diego. 2003. Summary of Monitoring Results for *Monardella linoides* ssp. *viminea*.

City of San Diego. 2004. Summary of Monitoring Results for *Monardella linoides* ssp. *viminea*.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Johnson, M. Mar. 23, 2006. Personal communication concerning MSCP covered plant species.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/167.html>.

US Fish and Wildlife Service. 1998. Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Four Plants From Southwestern California and Baja California, Mexico. Federal Register 63(197): 54938-54956.

Muilla clevelandii (=*Bloomeria clevelandii*) - San Diego goldenstar

1. At-Risk Category:

Risk Group 2 (FSC G2 S2.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasives	High	High	Short-term	
Recreation/Human disturbance	Moderate	Moderate	Short-term	trampling
ORVs	Moderate	Moderate	Short-term	
Military activities	Moderate	Low	Short-term	
Habitat loss	Low	Low	Short-term	grading, water lines, etc
Pollution	Low	Low	Short-term	illegal dumping

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chaparral, coastal sage scrub, grasslands associated with vernal pools

(b) narrowly distributed; moderately sparse

4. Functional Group (plants); Generation time or life span (animals)

Geophyte

Notes: This species is difficult to identify when not flowering; during low rainfall years it may bloom in limited numbers or not at all. It is quite unique phylogenetically – there is current debate regarding taxonomy - it may be put in own genus soon.

Sources:

City of San Diego. 2003. Summary of Monitoring Results for *Muilla clevelandii*.

City of San Diego. 2004. Summary of Monitoring Results for *Muilla clevelandii*.

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/171.html>.

Navarretia fossalis - Prostrate navarretia

1. At-Risk Category:

Risk Group 1 (FT G2? S2.1? List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered hydrology	High	High	Long-term	
Invasives	High	High	Short-term	
Habitat loss	High	Moderate	Short-term	
ORVs	Moderate	Moderate	Short-term	
Recreation/Human disturbance	Low	Moderate	Short-term	trampling
Grazing	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) primarily vernal pools (prefers deeper pools)

(b) moderately distributed; sparse (fewer than 30 populations exist in the US, including: Otay, Sweetwater, San Marcos, etc.)

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: Populations of this species are fairly restricted by habitat and fluctuate dramatically depending on rainfall.

Sources:

Center for Plant Conservation: National Collection of Endangered Plant Profiles. Accessed 10/2005. <http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=2930>.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/174.html>.

Riverside County Integrated Project. 2000. Plants: Western Riverside County MSHCP Species Accounts. <http://ecoregion.ucr.edu/dudek/accounts/Plants.pdf>.

Riverside County Integrated Project. 2003. Final MSHCP Reference Document, Vol II-B, Species Accounts for Plants. <http://rcip.org/mshcpdocs/Vol2/appendixB/plants/spreadingnavarretia.pdf>.

Spencer, S. C., and L. H. Rieseberg. 1996. Evolution of Amphibious Vernal Pool Specialist Annuals: Putative Vernal Pool Adaptive Traits in Navarretia (Polemoniaceae). *in* C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren Jr., and R. Ornduff, editor. Ecology, Conservation, and Management of Vernal Pool Ecosystems Conference Proceedings. California Native Plant Society, Sacramento, CA.

US Fish and Wildlife Service. 1998. Vernal Pools of Southern California Recovery Plan. US Department of the Interior, Fish and Wildlife Service, Portland, OR.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/full.asp?sp_num=237>.

Nolina interrata - Dehesa beargrass

1. At-Risk Category:

Risk Group 1 (PT/CE G1 S1.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Invasives	Moderate	High	Short-term	
Altered fire regime	Moderate	High	Long-term	too frequent fires
Intentional removal by humans	Low	Low	Short-term	collecting for nursery trade
Habitat loss	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mixed and chamise chaparral, grassland

(b) extremely restricted range; sparse (local endemic, restricted to McGinty Mountain, Sycuan Peak, and Dehesa Valley; 9 known populations in San Diego County, all within a 15.6 square km area, estimated population = 9,000 individuals)

4. Functional Group (plants); Generation time or life span (animals)

Shrub (dioecious, perennial)

Notes: If a natural fire regime is restored, this species may repopulate historically occupied areas. The aboveground parts of the plant are removed by fire, but it resprouts post-fire.

Sources:

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Griffin, D. J. 2003. DRAFT 2003 Report of MSCP Covered Species at San Diego National Wildlife Refuge. Prepared for US Fish and Wildlife Service.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/179.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

US Fish and Wildlife Service. 1998. Endangered and Threatened Wildlife and Plants; Withdrawal of Proposed Rule to List Nolina interrata (Dehesa beargrass) as Threatened. Federal Register 63(197): 54972-54974.

US Fish and Wildlife Service; International Affairs. Accessed 10/2005. Profiles of some U.S. Plant Species listed in the CITES Appendices. <http://www.fws.gov/international/animals/nolina.html>.

Orcuttia californica - California Orcutt grass

1. At-Risk Category:

Risk Group 1 (FE/CE List 1B - one of rarest plants in SD County)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
ORVs	High	High	Short-term	including Border Batrol
Altered hydrology	High	High	Long-term	
Grazing	High	Moderate	Short-term	wallowing, consumed by cattle
Invasives	Moderate	High	Short-term	
Recreation/Human disturbance	Low	High	Short-term	trampling

Habitat loss	Low	Low	Short-term	road shoulders encroaching into vernal pools at Otay

3. (a) Habitat Associations and (b) Spatial scale of species

(a) vernal pools (deep basins)

(b) narrowly distributed; moderately dense

4. Functional Group (plants); Generation time or life span (animals)

Annual grass

Sources:

Center for Plant Conservation: National Collection of Endangered Plant Profiles. Accessed 10/2005. <http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=3038>.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/186.html>.

Riverside County Integrated Project. 2003. Final MSHCP Reference Document, Vol II-B, Species Accounts for Plants. <http://rcip.org/mshcpdocs/Vol2/appendixB/plants/caorcuttgrass.pdf>.

US Fish and Wildlife Service. 1993. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Three Vernal Pool Plants and the Riverside Fairy Shrimp. Federal Register 58: 41384-41392.

US Fish and Wildlife Service. 1998. Vernal Pools of Southern California Recovery Plan. US Department of the Interior, Fish and Wildlife Service, Portland, OR.

Pinus torreyana ssp. *torreyana* - Torrey pine

1. At-Risk Category:

Risk Group 1 (FSC G1T1 S1.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	High	High	Long-term	
Herbivory	High	High	Long-term	bark beetle infestations follow drought years
Pollution	Low	High	Long-term	air

3. (a) Habitat Associations and (b) Spatial scale of species

(a) closed cone forest

(b) extremely narrow distribution; sparse

4. Functional Group (plants); Generation time or life span (animals)

Tree (pine)

Notes: Infrequent, severe fires are best for seedling establishment in this species.

Sources:

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/197.html>.

USDA Forest Service. Accessed 10/2005. Fire Effects Information System. <http://www.fs.fed.us/database/feis/plants/tree/pintor/all.html>.

Pogogyne abramsii - San Diego Mesa mint

1. At-Risk Category:

Risk Group 2 (FE/CE G2 S2.1 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	urban development
Invasives	High	High	Short-term	
Altered hydrology	High	High	Long-term	
Military activities	Moderate	High	Short-term	
Pollution	Low	Low	Short-term	dumping

3. (a) Habitat Associations and (b) Spatial scale of species

(a) vernal pools

(b) extremely narrow distribution; sparse

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: This species is endemic to San Diego County, with the major population occurring on Miramar. It can only be censused during spring or summer, and not in drought years.

Sources:

Johnson, M. Mar. 23, 2006. Personal communication concerning MSCP covered plant species.

McMillan Biological Consulting, and Conservation Biology Institute. 2002. 2001 MSCP Rare Plant Survey and Monitoring Report. Prepared for the City of San Diego.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/199.html>.

US Fish and Wildlife Service. 1993. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Three Vernal Pool Plants and the Riverside Fairy Shrimp. Federal Register 58: 41384-41392.

US Fish and Wildlife Service. 1998. Vernal Pools of Southern California Recovery Plan. US Department of the Interior, Fish and Wildlife Service, Portland, OR.

Pogogyne nudiuscula - Otay Mesa mint

1. At-Risk Category:

Risk Group 1 (FE/CE G1 S1.1 List 1B) (close to extinction)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	urban development
Invasives	High	High	Short-term	
ORVs	High	High	Short-term	
Altered hydrology	High	High	Long-term	
Grazing	High	Moderate	Short-term	wallowing
Recreation/Human disturbance	Low	Moderate	Short-term	trampling
Pollution	Low	Low	Short-term	illegal dumping

3. (a) Habitat Associations and (b) Spatial scale of species

(a) vernal pools (in chamise chaparral and open grasslands)

(b) extremely restricted range; sparse

4. Functional Group (plants); Generation time or life span (animals)

Annual herb

Notes: This species is only known to occur in Otay Mesa vernal pool complexes.

Sources:

Bauder, E. T., and S. McMillan. 1996. Current Distribution and Historical Extent of Vernal Pools in Southern California and Northern Baja California, Mexico. *in* C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren Jr., and R. Ornduff, editor. Ecology, Conservation, and Management of Vernal Pool Ecosystems Conference Proceedings. California Native Plant Society, Sacramento, CA.

Center for Plant Conservation: National Collection of Endangered Plant Profiles. Accessed 10/2005. <http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=3554>.

Coulter, L., J. Williams, and D. Stow. 2004. Final Report: Image-Based Detection of Changes between 2001-2003 at the Otay Mesa Vernal Pool Restoration Site. San Diego State University, Department of Geography, Prepared for City of San Diego.

Greer, K., L. Coulter, and A. Hope. 2002. Utility of high spatial resolution multispectral for mapping and monitoring vernal pool habitat in transitional urban environments. Prepared for Earth Science Applications Directorate, National Aeronautics and Space Administration.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/200.html>.

US Fish and Wildlife Service. 1998. Vernal Pools of Southern California Recovery Plan. US Department of the Interior, Fish and Wildlife Service, Portland, OR.

Rosa minutifolia - Small-leaved rose

1. At-Risk Category:

Risk Group 1 (CE G3 S1.1 List 2; one transplanted population in US)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Fragmentation	High	High	Long-term	
ORVs	Low	High	Short-term	population currently fenced

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chaparral, coastal sage scrub, maritime scrub

(b) extremely restricted range; extremely sparse (one dense thicket remains)

4. Functional Group (plants); Generation time or life span (animals)

Shrub

Notes: One transplanted population in MSCP, surrounded by a fence. Natural populations were wiped out by the border fence. This species is more widespread in Baja.

Sources:

CalFlora: Wildflowers and Other Plants of Southern California. Accessed 10/2005. <http://www.calflora.net/bloomingplants/smallleavedrose.html>.

Dodero, M. W., and J. J. Hodge. 1999. As-built plan for Dennery Canyon vernal pool, coastal sage scrub, and mule fat scrub restoration and preservation plan. Section 404/Section 7 Mitigation and Monitoring Plan for California Terraces and Otay Corporation.

Ertter, B. 2001. Native California Roses, *Rosa minutifolia*. <http://ucjeps.berkeley.edu/ina/roses/roses.html>.

Johnson, M. Mar. 23, 2006. Personal communication concerning MSCP covered plant species.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/210.html>.

Satureja chandleri - San Miguel savory

1. At-Risk Category:

Risk Group 3 (SSC? G4 S3.2? List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	Moderate	High	Long-term	
Habitat loss	Low	Low	Short-term	
Recreation/Human disturbance	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chamise chaparral, coastal sage scrub, grasslands, oak woodland, riparian woodlands

(b) moderately distributed; sparse (mostly inland distribution, including: Jamul, San Vicente, Iron Mountain, San Miguel and McGinty)

4. Functional Group (plants); Generation time or life span (animals)

Shrub (perennial)

Notes: This species is extremely rare. There are few recent reports and occurrences are spotty; all known populations currently thought to be stable, however.

Sources:

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/215.html>.

Riverside County Integrated Project. 2000. Plants: Western Riverside County MSHCP Species Accounts. <http://ecoregion.ucr.edu/dudek/accounts/Plants.pdf>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates. <http://wildlife.ucr.edu/full.asp?sp_num=220>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Senecio (=Packera) ganderi - Gander's butterweed

1. At-Risk Category:

Risk Group 2 (FSC/CR G2 S2.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	Moderate	High	Long-term	suppression
Invasives	Moderate	Moderate	Short-term	
ORVs	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) mixed chaparral

(b) widely distributed; sparse (fewer than 15 known occurrences on both public and private land; found inland in areas such as: El Cajon, McGinty, Cuyamaca, and Alpine)

4. Functional Group (plants); Generation time or life span (animals)

Perennial herb

Notes: This species is endemic to San Diego County, edaphically limited to gabbro soils, and most often found on recently burned sites. It grows in the understory and naturally occurs in small populations (possible reproductive issues). Overall, it is very rare and there is little available data.

Sources:

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/221.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Solanum tenuilobatum (now *Solanum xanti*, a more widespread taxon) - Narrow-leaved nightshade

1. At-Risk Category:

Excluded – Taxonomic debate/uncertainty – currently included in more common taxon (FSC G2G3 S1.2)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chaparral, coastal sage scrub

(b) widespread

4. Functional Group (plants); Generation time or life span (animals)

Perennial to subshrub

Sources:

NatureServe Explorer: An Online Encyclopedia of Life. Accessed 10/2005. <http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Solanum+tenuilobatum>

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/003.html>.

Tetracoccus dioicus - Parry's tetracoccus

1. At-Risk Category:

Risk Group 3 (FSC G3 S2.2 List 1B)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	High	High	Long-term	increased frequency
Habitat loss	High	Moderate	Short-term	orchard expansion, development
ORVs	Low	Moderate	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chamise chaparral, coastal sage scrub (dry, stony slopes)

(b) widely distributed; moderately dense (inland distribution, locations include: Barona, Dehesa, McGinty, Fallbrook, Rainbow, etc.)

4. Functional Group (plants); Generation time or life span (animals)

shrub

Notes: This species is edaphically restricted to gabbro and clay soils, but can be abundant at sites where it is found (note: may cause a bad skin reaction).

Sources:

County of San Diego Multiple Species Conservation Program. 2002. Sensitive Plant Monitoring Final Report. Prepared for California Department of Fish and Game.

NatureServe Explorer: An Online Encyclopedia of Life. Accessed 10/2005. <http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Tetracoccus+dioicus>.

Rebman, J. Nov. 3, 2005. Personal interview concerning MSCP covered plant species.

Reiser, C. 1994. Rare Plants of San Diego County. Unpublished. Aquafir Press, San Diego, California. Available online at: <http://sandiego.sierraclub.org/rareplants/230.html>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Plants. <http://208.187.37.229/USFS_Species_Info/plantpeerlist.asp?strclass=plants>.

Appendix B: Information Sheets for Covered Animal Species

Accipiter cooperii - Cooper's hawk

1. At-Risk Category:

Risk Group 3 (SSC G5 S3 PIF: TB-r = 3, PT-r = 3, CC = no, RC = no)*

*Note: The ranking system code definitions are provided in Appendix C

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Roads	Low	Low	Short-term	collisions with cars

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging - urban/suburban areas; breeding - oak woodland, mature riparian woodland, now in urban Eucalyptus trees

(b) widespread; dense (locally common)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident; life span 5-10 years

Notes: This species has readily adapted to urban environments and is increasing in numbers. Consumption of poisoned prey (rodents, etc.) may pose a small secondary threat

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Coopers_Hawk_dtl.html >.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/full.asp?sp_num=56>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

Wildlife Research Institute. 2005. Final Report for NCCP/MSCP Raptor Monitoring Project (January 1, 2001 - December 31, 2003). Prepared for California Dept. of Fish and Game.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Agelaius tricolor - Tricolored blackbird

1. At-Risk Category:

Risk Group 1 (FSC/SSC G2G3 S2 PIF: TB-r = 4, PT-r = 3, CC = yes, RC = yes - see Cook et al. 2005 which supports a ranking of 1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	development of uplands/foraging habitat
Altered hydrology	High	High	Long-term	affects nesting habitat
Predation	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging - grasslands and croplands; breeding (nest in colonies) - freshwater emergent marshes

(b) widely distributed; sparse (colonies scattered but few – 5000-8000 birds in 20-30 colonies - some of these no longer viable and number is decreasing)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident, life span ~16 years

Notes: Development is causing declines in populations of this species; few colonies remain in the MSCP area. Monitoring the establishment, size, and shifting locations of colony sites may be important. Tricolored blackbirds are closely tied to grassland communities.

Sources:

Beedy, E. C., and W. J. Hamilton III. 1999. Tricolored Blackbird, *in* A. P. a. F. Gill (eds). The Birds of North America. Academy of Natural Sciences, Philadelphia, PA.

Cook, L., and C. A. Toft. 2005. Dynamics of extinction: population decline in the colonially nesting Tricolored Blackbird (*Agelaius tricolor*). Bird Conservation International **15**:73-88.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://ecoregion.ucr.edu/full.asp?sp_num=87>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Aimophila ruficeps canescens - California rufous-crowned sparrow

1. At-Risk Category:

Risk Group 3 (FSC/SSC G5T2T4 S2S3 PIF: TB-r = 3, PT-r = 3, CC = no, RC = no)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	Moderate	Short-term	
Fragmentation	High	Moderate	Long-term	extremely sensitive to this threat
Predation	Low	High	Short-term	native and domestic

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding – coastal sage scrub (primary habitat within MSCP), open or burned chaparral, grassland with scattered shrubs

(b) widespread; moderately dense

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident (nests on the ground), ~ 5-10 years

Notes: Within San Diego County, the MSCP area comprises a substantial portion of its original range. This species can reportedly use man-made areas like fire breaks as habitat. Past populations on Pt. Loma may be extirpated.

Sources:

Bent, A. C. 1968. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. Smithson. Inst. Press, Washington, D.C.

Bolger, D. T., T. A. Scott, and J. T. Rotenberry. 1997. Breeding bird abundance in an urbanizing landscape in Coastal Southern California. Conservation Biology 11:406-421.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Morrison, S. A., and D. T. Bolger. 2002. Variation in a sparrow's reproductive success with rainfall: food and predator-mediated processes. Oecologia 133(3): 315-324.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://ecoregion.ucr.edu/full.asp?sp_num=44>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Aquila chrysaetos - Golden eagle

1. At-Risk Category:

Risk Group 2 (BEPA/SSC G5 S3 PIF: TB-r = 3, PT-r = 3, CC = no, RC = no – risk ranking based on low numbers found in San Diego County – see note below).

Note: Under this classification strategy, this species should be in Risk Group 3. However, the risk ranking has been elevated due to the low numbers found in San Diego County and local population declines over the past 16 years. The current ranking (see Table 2) reflects this species' degree of risk relative to other covered animal species (for example, this species is believed to be less threatened than the Arroyo toad).

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Recreation/Human disturbance	High	High	Short-term	sensitive to human presence/activity near nest sites, including rock climbers and residential
Power lines	Moderate	Low	Short-term	
Poisoning	Low	Low	Long-term	secondary – eat prey killed by poisons

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging – grasslands, breeding – primarily cliffs

(b) widespread; sparse (only 15 pairs or so left in MSCP – represent about 30% of all breeding pairs in SD County)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident, life span 15-20 years

Notes: Sixteen years of consistent monitoring data exist for breeding pairs, during that time the number of pairs has been approximately cut in half. Half of current breeding pairs are in imminent danger of being extirpated (WRI 2005). P. Unitt suggests annual or biannual monitoring would make sense for this species, and that monitoring this species may provide information on other raptor species (e.g., Ferruginous hawk).

Sources:

Baldeagleinfo.com. Accessed 11/2005. Golden Eagle. <http://www.baldeagleinfo.com/eagle/eagle7.html>.

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/ Golden_Eagle_dtl.html >.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, < http://wildlife.ucr.edu/full.asp?sp_num=61>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Wildlife Research Institute. 2005. Final Report for NCCP/MSCP Raptor Monitoring Project (January 1, 2001 - December 31, 2003). Prepared for California Dept. of Fish and Game.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Branchinecta sandiegonensis - San Diego fairy shrimp

1. At-Risk Category:

Risk Group 1 (FE G1 S1 EN/A2c)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	development
Invasives	High	High	Long-term	plants
Altered hydrology	High	High	Long-term	
Predation	High	High	Short-term	non-native bullfrog
ORVs	Moderate	High	Short-term	crushing
Pollution	Low	Low	Long-term	water contamination, dumping

3. (a) Habitat Associations and (b) Spatial scale of species

(a) vernal pools (shallower pools)

(b) moderately distributed; sparse

4. Functional Group (plants); Generation time or life span (animals)

Invertebrate, life span short (<1 year)

Sources:

NatureServe Explorer: An Online Encyclopedia of Life. Accessed 10/2005. Comprehensive Report: San Diego Fairy Shrimp. <http://www.natureserve.org/explorer/servlet/NatureServe?sourceTemplate=species_RptDistribution.wmt&loadTemplate=species_RptComprehensive.wmt&paging=&elKey=113643&save=false&page=1>.

Sweetwater Authority. Accessed 11/2005. Habitat Management: threatened or endangered species within Sweetwater Authority ownership and/or management responsibility. <http://www.sweetwater.org/habitat/fairy_shrimp.html>.

US Fish and Wildlife Service. 1998. Vernal Pools of Southern California Recovery Plan. US Department of the Interior, Fish and Wildlife Service, Portland, OR.

US Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants: Proposed Designation of Critical Habitat for the San Diego Fairy Shrimp. Federal Register 65(46): 12181-12201. <http://www.fws.gov/endangered/federalregister/2000/p000308b.pdf>.

US Fish and Wildlife Service. 2002. Species Description: San Diego Fairy Shrimp. <http://ecos.fws.gov/docs/life_histories/K049.html>.

Branta canadensis - Canada goose

1. At-Risk Category:

Excluded - No known threats in MSCP (no ranking)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) forage in freshwater or salt marshes

(b) widespread in winter but sparse

4. Functional Group (plants); Generation time or life span (animals)

Breeding/migrant (mid-Nov. to late Feb.; some released captives become non-migratory residents), life span 10-25 years

Notes: Habitat loss may pose a threat by leading to domestication, nuisance problems, and relocation of wintering grounds.

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Canada_Goose_dtl.html >.

Lutz, H., and T. Dewey. 2002 (accessed 11/2005). Branta canadensis (On-line), Animal Diversity Web, University of Michigan Museum of Zoology. <http://animaldiversity.ummz.umich.edu/site/accounts/information/Branta_canadensis.html>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Bufo microscaphus californicus - Arroyo southwestern toad

1. At-Risk Category:

Risk Group 2 (FE/SSC G2G3 S2S3 EN/A2ac)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	urbanization, dam construction; affected by

				upstream habitat modifications
Predation	High	High	Short-term	by non-native aquatic species and mesopredators
Altered hydrology	High	High	Short-term	due to dams
Altered fire regime	Low	High	Long-term	
Invasives	Low	Moderate	Short-term	plants – habitat alteration
ORVs	Moderate	Moderate	Short-term	crushing
Erosion	Low	High	Long-term	erosion of streambeds
Mining	Low	Low	Short-term	sand and gravel

3. (a) Habitat Associations and (b) Spatial scale of species

(a) riparian (prefer sandy washes and streambeds and adjacent shallow pools with low gradients)

(b) extremely limited distribution due to highly specialized habitat requirements (found in 2 of 7 sites surveyed in MSCP –Boden Canyon and Cottonwood Creek in Marron Valley)

4. Functional Group (plants); Generation time or life span (animals)

Amphibian, life span ~5 years

Notes: Arroyo toads have the most specialized habitat requirements of any amphibian in California. They also disperse from stream sites during the non-breeding season.

Sources:

Atkinson, A. J., B. S. Yang, R. N. Fisher, R. Ervin, T. J. Case, N. Scott, and H. B. Shaffer. 2003. MCB Camp Pendleton Arroyo Toad Monitoring Protocol: 1. Summary of results from a workshop on August 27, 2002; 2. Monitoring protocol and targeted studies. US Geological Survey, Prepared for Marine Corps Base Camp Pendleton. Available online: <http://www.werc.usgs.gov/sandiego/pdfs/MCB-protocol-3-2003.pdf>.

Brown, C. W., and R. N. Fisher. 2002. Survey results for the Arroyo Toad (*Bufo californicus*) in the San Bernardino National Forest, 2001. USGS Western Ecological Research Center, Prepared for US Department of Agriculture, US Forest Service. Available online at: <http://www.werc.usgs.gov/sandiego/pdfs/AT_2001_Final.pdf>.

Meyer, K., E. Ervin, M. Madden-Smith, S. Hathaway, and R. Fisher. 2003. Arroyo Toad and Western Pond Turtle in the San Diego Multiple Species Conservation Program Area, 2002. US Geological Survey, Prepared for County of San Diego and California Department of Fish and Game.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 10/2005. Field Guide: Reptiles and Amphibians. < http://www.sdnhm.org/fieldguide/herps/bufo-cal.html >.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates. <http://ecoregion.ucr.edu/full.asp?sp_num=16>.

US Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants: determination of endangered status for the Arroyo Southwestern Toad. Federal Register 59(241): 64589-64866. Available online: <http://www.fws.gov/endangered/r/fr94568.html>.

Buteo regalis - Ferruginous hawk

1. At-Risk Category:

Risk Group 3 (FSC/SSC NT)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Recreation/Human disturbance	Moderate	Moderate	Short-term	general human disturbance
Poisoning	Low	Low	Long-term	secondary poisoning through poisoned prey

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging - grasslands, open fields

(b) widespread across SD County; sparse (uncommon winter visitor (Oct-Mar) to the MSCP region)

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant; life span 10-20 years

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Ferruginous_Hawk_dtl.html>

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates. <http://wildlife.ucr.edu/full.asp?sp_num=59>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Wildlife Research Institute. 2005. Final Report for NCCP/MSCP Raptor Monitoring Project (January 1, 2001 - December 31, 2003). Prepared for California Dept. of Fish and Game.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Buteo swainsoni - Swainson's hawk

1. At-Risk Category:

Excluded - No currently known occurrences in MSCP (CT)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) riparian woodland, grassland

(b) not found in MSCP

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant, life span 5-10 years

Notes: This species no longer nests anywhere in Southern California; its main migration corridor falls outside the MSCP. Rare migrants may be sighted.

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Coopers_Hawk_dtl.html>

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/full.asp?sp_num=84>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

Wildlife Research Institute. 2005. Final Report for NCCP/MSCP Raptor Monitoring Project (January 1, 2001 - December 31, 2003). Prepared for California Dept. of Fish and Game.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Campylorhynchus brunneicapillus couesi (ssp. *sandiegensis*) - Coastal cactus wren

1. At-Risk Category:

Risk Group 1 (FSC/SSC G5T2T3Q S2S3 PIF: TB-r = 2, PT-r = 3, CC = no, RC = no)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Invasives	High	High	Long-term	can negatively affect cactus species
Altered fire regime	High	High	Long-term	
Fragmentation	High	High	Long-term	reduces dispersal corridors

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding - cactus thickets in coastal sage scrub (prickly pear or cholla)

(b) moderately distributed; sparse

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident, life span ~7 years

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Cactus_Wren_dtl.html>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates. <http://wildlife.ucr.edu/full.asp?sp_num=80>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Charadrius alexandrinus nivosus - Western snowy plover

1. At-Risk Category:

Risk Group 1 (FT/SSC G4T3 S2 no PIF ranking)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Predation	High	High	Short-term	crows prey on eggs
Recreation/Human disturbance	High	High	Short-term	presence of humans and dogs can cause nest abandonment
Habitat loss	Low	High	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding - beaches, salt flats (areas of bare ground)

(b) extremely restricted; extremely sparse (fewer than 10 breeding sites in SD County), more common as migrant and winter visitor

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident (but can migrate up to 500 miles), life span ~3 years

Notes: The Western snowy plover is one of San Diego's scarcest and most threatened breeding birds. Most of the county's breeding population is concentrated at Camp Pendleton and the Silver Strand (any changes in military policy towards endangered species could quickly change the status of this species). Its nesting habitat is restricted to beaches and salt flats. Human disturbance and increases in both domestic and urban-related predators pose serious threats to nesting success.

Sources:

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/full.asp?sp_num=91>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Charadrius montanus - Mountain plover

1. At-Risk Category:

Excluded – No currently known occurrences in the MSCP (SSC VU/A2bc+3bc C1)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) open plains, plowed fields of bare dirt (occupies similar habitat as Burrowing Owl)

(b) only a single migrant reported in San Diego County since 1991

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant, life span 3-5 years

Notes: Majority of threats this bird faces occur in its breeding grounds, outside San Diego County; it is seriously threatened throughout its range.

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Mountain_Plover_dtl.html>

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates. <http://wildlife.ucr.edu/full.asp?sp_num=70>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Circus cyaneus - Northern harrier

1. At-Risk Category:

Risk Group 3 (SSC G5 S3 PIF: TB-r = 4, PT-r = 2, CC = no, RC = yes)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	loss of nest sites due to development
Recreation/Human disturbance	High	High	Short-term	trampling and disturbance near nest sites – hikers with dogs (spatial scale based on breeding distribution)
ORVs	High	High	Short-term	
Fragmentation	Moderate	Moderate	Long-term	edge effects for nesting stability

3. Spatial scale of species and Habitat Associations

(a) foraging - coastal salt marsh, wetlands, grassland, open coastal sage scrub, and agricultural fields; breeding – on the ground in wetlands

(b) widespread; sparse (pairs scattered around, Los Penasquitos Canyon, Tijuana estuary, etc.)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident (winter migrant), life span 10-15 years

Notes: This is a transcontinental species, so the entire population is robust to disturbances within the MSCP region. The Northern harrier requires large territories, and has a short-term response to major threats. Populations also vary with rainfall due to lower prey availability in low rainfall years. Potentially good representative of birds of prey.

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Northern_Harrier_dtl.html >.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/list_head.asp?sp_num=74>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Wildlife Research Institute. 2005. Final Report for NCCP/MSCP Raptor Monitoring Project (January 1, 2001 - December 31, 2003). Prepared for California Dept. of Fish and Game.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Clemmys marmorata pallida - Southwestern pond turtle

1. At-Risk Category:

Risk Group 3 (FSC/SSC G3G4T2T3 S2 VU/A1cd)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered hydrology	High	High	Long-term	dams, channelization
Predation	High	High	Short-term	introduced aquatic species and urban-related predators like dogs, raccoons, skunks
Invasives	High	High	Short-term	plants alter habitat and competition with non-native turtles
Habitat loss	Moderate	Moderate	Short-term	
Habitat fragmentation	Low	High	Long-term	reduced genetic variability
Pollution	Low	Moderate	Long-term	water contamination

ORVs	Low	Low	Short-term	
Intentional removal by humans	Low	Low	Short-term	collecting for pet trade

3. (a) Habitat Associations and (b) Spatial scale of species

(a) rivers, streams, lakes, reservoirs, stock ponds, sewage treatment plants (open water with refugia/emergent vegetation); requires upland habitat for nesting

(b) potentially widespread (but turtles only observed at 3 out of 26 MSCP survey locations in 2002)

4. Functional Group (plants); Generation time or life span (animals)

Reptile, life span 50-70 years (requires 10 years to attain sexual maturity)

Notes: In a 2002 survey, more non-native turtles were found in the MSCP than native southwestern pond turtles; the threat from non-native turtles is unclear.

Sources:

LSA Associates. 2004. Western Pond Turtle Species Account for Solano County Water Agency. <http://scwa2.com/hcp/Species%20Descriptions%20(pictures%20included)/Pond%20Turtle.pdf>.

Meyer, K., E. Ervin, M. Madden-Smith, S. Hathaway, and R. Fisher. 2003. Arroyo Toad and Western Pond Turtle in the San Diego Multiple Species Conservation Program Area, 2002. US Geological Survey, Prepared for County of San Diego and California Department of Fish and Game.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://ecoregion.ucr.edu/full.asp?sp_num=41>.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Reptiles. <http://208.187.37.229/USFS_Species_Info/Peer/Southwestern%20Pond%20Turtle%20Peer%2004-02-02.doc>.

Cnemidophorus hyperythrus beldingi - Orange-throated whiptail

1. At-Risk Category:

Risk Group 3 (FSC/SSC G5 S2 DD)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Loss of prey base	High	High	Short-term	Argentine ants dislodge its native termite food source
Altered fire regime	Low	High	Long-term	too frequent fires reduce termite food source
Predation	Low	Low	Short-term	by domestic pets
ORVs	Low	Low	Short-term	soil compaction, habitat degradation

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chaparral, coastal sage scrub, oak woodland, associated with riparian (requires perennial shrubs)

(b) habitat generalist – potentially widespread

4. Functional Group (plants); Generation time or life span (animals)

Reptile, life span likely 5-10 years

Notes: This species is a food specialist – western subterranean termites are its primary food source, making up 85% of its diet (approaching 100% from Sept. - Nov.).

Sources:

California Department of Fish and Game. Accessed 10/2005. California Wildlife Habitat Relationships System. California Interagency Wildlife Task Group, <http://www.dfg.ca.gov/whdab/html/R038.html>.

Convention on International Trade in Endangered Species of Wild Fauna and Flora. Accessed 10/2005. Proposition 12.34, Consideration of proposals for amendment of Appendices I and II: Orange-throated whiptail. <http://www.cites.org/eng/cop/12/prop/E12-P34.pdf>.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Riverside County Integrated Project. 2002. Western Riverside County MSHCP Draft Species Accounts for Reptiles. <http://www.rcip.org/Documents/draft_2_mshcp_vol_2/b_08.pdf>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/full.asp?sp_num=29>.

Egretta rufescens - Reddish egret

1. At-Risk Category:

Excluded – Rarely visits MSCP region (FSC)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal wetlands

(b) extremely restricted; extremely sparse (San Diego County is the northern edge of its range, 2-3 reach County annually, Oct-Nov)

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant, life span 8-12 years

Notes: Number of visitors to San Diego appears to be slowly increasing (range expanding north from Baja).

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Savannah_Sparrow_dtl.html>

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Empidonax trailii extimus - Southwestern willow flycatcher

1. At-Risk Category:

Risk Group 1 (FE/CE G5T1T2 S1 PIF: TB-r = 5, PT-r = 3, CC = no, RC = no)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes

Habitat loss	High	High	Short-term	
Invasives	High	High	Short-term	
Altered fire regime	Low	High	Long-term	
Parasitism	Low	High	Short-term	cowbird nest parasitism
Altered hydrology	Low	Low	Long-term	
Recreation/Human disturbance	Low	Low	Short-term	
Erosion	Low	Low	Long-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding - riparian (woodlands)

(b) extremely restricted; extremely sparse (restricted to two known colonies and a few additional scattered pairs - largest colonies at San Luis Rey River and Santa Margarita River)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/migrant (here May-Aug), life span ~3-5 years

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://ecoregion.ucr.edu/full.asp?sp_num=83>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Falco peregrinus - American peregrine falcon

1. At-Risk Category:

Excluded – No known threats in the MSCP (DM/CE PIF: TB-r = 3, PT-r = 3, CC = no, RC = no)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) nest and forage on cliffs, urban, coastal areas (prey primarily shorebirds)

(b) residents extremely restricted, sparse; visitors widespread, moderately dense (San Diego Bay nucleus of visitor and breeding habitat)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident; life span 10-15 years

Notes: Major threats impact breeding grounds outside San Diego. Population in San Diego County is increasing. This species has adapted to urban environments, and its prey base (pigeons and mourning doves) is stable. Thus, the population is likely to continue increasing unless new threats are introduced.

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Peregrine_Falcon_dtl.htm>

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/full.asp?sp_num=77>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Wildlife Research Institute. 2005. Final Report for NCCP/MSCP Raptor Monitoring Project (January 1, 2001 - December 31, 2003). Prepared for California Dept. of Fish and Game.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Felis concolor - Mountain lion

1. At-Risk Category:

Risk Group 3 (protected)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Fragmentation	High	High	Long-term	requires large, continuous home range
Intentional removal by humans	Moderate	High	Short-term	indiscriminate killings/animal control
Loss of natural prey base	Low	High	Short-term	mule deer
Roads	Low	Low	Short-term	vehicular killings

3. (a) Habitat Associations and (b) Spatial scale of species

(a) open woodlands, chaparral, riparian (as corridors), mixed conifer

(b) widespread, large home ranges

4. Functional Group (plants); Generation time or life span (animals)

Mammal, life span ~12 years

Notes: The mountain lion's main prey is mule deer (makes up 60-80% of diet).

Sources:

Beier, P. 1993. Determining minimum habitat areas and habitat corridors for cougars. Conservation Biology **7**:94-108.

California Department of Fish and Game. Accessed 10/2005. California Wildlife Habitat Relationships System. California Interagency Wildlife Task Group, <http://www.dfg.ca.gov/whdab/html/M165.html>.

Crooks, K. R. 2002. Relative sensitivities of mammalian carnivores to habitat fragmentation. Conservation Biology **16**:488.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 10/2005. <http://www.sdnhm.org/exhibits/cats/sdcats.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://ecoregion.ucr.edu/full.asp?sp_num=113>.

USDA Forest Service. Accessed 10/2005. Fire Effects Information System. <http://www.fs.fed.us/database/feis/ wildlife/mammal/puco/all.html >.

Haliaeetus leucocephalus - Bald eagle

1. At-Risk Category:

Risk Group 2 (FT/CE PIF: TB-r = 3, PT-r = 3, CC = no, RC = no)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Recreation/Human disturbance	Moderate	Moderate	Short-term	disturbed by human presence/activities, includes: foot traffic, boating, recreational development, entanglement in fishing lines
Parasitism	Low	Low	Short-term	nest parasites
Power lines	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) lakes in foothills and mountains; uncommon winter migrant (Oct-Mar)

(b) moderate; sparse (rare but annual visitor)

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant, life span 20-30 years

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, California.

Unitt, Philip. 2005. Personal interview concerning MSCP covered bird species.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates. <http://wildlife.ucr.edu/full.asp?sp_num=93>.

Wildlife Research Institute. 2005. Final Report for NCCP/MSCP Raptor Monitoring Project (January 1, 2001 - December 31, 2003). Prepared for California Dept. of Fish and Game.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Mitoura thornei - Thorne's hairstreak butterfly

1. At-Risk Category:

Risk Group 1 (FSC G1 S1?)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered fire regime	High	High	Long-term	indirect, major threat to host plant
Loss of host plant	High	High	Short-term	Tecate cypress (host plant) threatened
Habitat loss	Low	Low	Short-term	fire break creation; trail creation

3. (a) Habitat Associations and (b) Spatial scale of species

(a) chaparral, closed cone forest

(b) extremely restricted range (Otay)

4. Functional Group (plants); Generation time or life span (animals)

Invertebrate, life span short

Notes: The host plant for this species is Tecate cypress, another highly threatened MSCP covered species.

Sources:

Hogan, D. 2005. Emergency Petition to List the Thorne's hairstreak Butterfly as Endangered Under the Endangered Species Act. Center for Biological Diversity, <http://www.sw-center.org/swcbd/species/hairstreak/petition.pdf>.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

USDA Forest Service. 2002. Species Information Peer Review: Draft Species Accounts for Invertebrates. <http://208.187.37.229/USFS_Species_Info/peerlist.asp?strClass=Invertebrates>.

Numenius americanus - Long-billed curlew

1. At-Risk Category:

Risk Group 3 (FSC/SSC NT - large range, relatively high numbers)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	Low	Low	Short-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging - salt marsh, tidal mudflats and open grassland along the coast

(b) restricted range; moderately dense in SD County (visitor populations in the hundreds)

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant; life span 5-10 years

Notes: Numbers of visiting birds have remained stable since the 1950s.

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/ Long-billed_Curlew_dtl.html>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Odocoileus hemionus fuliginata - Southern mule deer

1. At-Risk Category:

Risk Group 3 (game species)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	Low	Short-term	
Fragmentation	High	Low	Long-term	
Roads	Moderate	Low	Short-term	collisions with cars
Intentional removal by humans	Low	Low	Short-term	illegal hunting

3. (a) Habitat Associations and (b) Spatial scale of species

(a) require relatively large undisturbed tracts of chaparral, coastal sage scrub, grassland, oak woodland, mixed conifer forest, riparian woodlands

(b) widespread, dense

4. Functional Group (plants); Generation time or life span (animals)

Mammal, life span 10-12 years, sexual maturity 2 years

Notes: This species requires extensive dispersal corridors.

Sources:

California Department of Fish and Game. Accessed 10/2005. Lands and Facilities Branch: Crestridge Ecological Reserve Focal Species. <http://www.dfg.ca.gov/lands/er/region5/crestridge/crestridge-odoc-hem.html>.

Moore, D. 2000. Integrated Natural Resources Management Plan for Marine Corps Air Station Miramar. Prepared for Commanding General, Marine Corps Air Station Miramar and Commanding Officer, Engineering Field Activity West.

Nevada Department of Wildlife. Accessed 11/2005. Animals of Nevada – Fact Sheets. <http://www.ndow.org/wild/animals/facts/mule_deer.shtm>.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Panoquina errans - Salt marsh skipper butterfly

1. At-Risk Category:

Risk Group 1 (FSC G4G5 S1 LR/nt)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Altered hydrology	High	High	Long-term	storm damage
Pollution	High	High	Long-term	urban runoff
Habitat loss	Low	Low	Short-term	
Invasives	Low	Low	Long-term	habitat degradation

3. (a) Habitat Associations and (b) Spatial scale of species

(a) salt marsh, estuary

(b) extremely restricted; extremely sparse (only known location Tijuana Estuary, but more common in Mexico)

4. Functional Group (plants); Generation time or life span (animals)

Invertebrate, life span short

Notes: Specialized host plant - *Distichlis spicata* - is currently common and widespread.

Sources:

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

U.S. Army Corps of Engineers. 2002. Silver Strand Shoreline Imperial Beach, CA; Public review draft report. <http://www.ib-chamber.biz/PDF%20Files/02-07-15%20-%20Public%20Review%20Draft%20Main%20Rpt.pdf>.

U.S. Geological Survey: Northern Prarie Wildlife Research Center. Accessed 10/2005. Butterflies of North America. <http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/ca/520.htm>.

Passerculus sandwichensis beldingi - Belding's Savannah sparrow

1. At-Risk Category:

Risk Group 3 (FSC/CE G5T3 S3 PIF: TB-r = 2, PT-r = 3, CC = no, RC = no)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Fragmentation	High	High	Long-term	due to sedentary nature,

				population exchange is rare
Altered hydrology	High	High	Long-term	tidal flushing required to maintain habitat quality
Recreation/Human disturbance	Low	High	Short-term	trampling
Predation	Low	High	Short-term	feral cats and non-native red foxes
Habitat loss	Low	Low	Long-term	development, filling, mostly a past threat

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding - salt marshes

(b) breeding and wintering range extremely restricted, extremely sparse

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident, life span 2-3 years

Notes: During winter, other subspecies of the Savannah sparrow come to San Diego County as winter visitors and invade this species' habitat

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Savannah_Sparrow_dtl.html>

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Passerculus sandwichensis rostratus - Large-billed Savannah sparrow

1. At-Risk Category:

Excluded – No known threats in MSCP (FSC/SSC)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) salt marshes, beaches, jetties

(b) moderate distribution, moderately dense (can occur anywhere within range along coast but has been more rare recently than in the past)

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant (winter visitor, Aug-Feb), life span 2-3 years

Notes: Main risks to species occurring in breeding range, outside San Diego County.

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Savannah_Sparrow_dtl.html.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Pelecanus occidentalis - California brown pelican

1. At-Risk Category:

Risk Group 2 (FE/CE - endangered but population has been increasing, DDT threat reduced)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Loss of prey or host plant	Low	High	Long-term	increased frequency of El Nino events and commercial harvesting negatively affects food supply (northern anchovy)

Recreation/Human disturbance	Low	Low	Short-term	injuries from fishing equipment and operations

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal lagoons, bays, estuaries, beach, coastal bluffs, open ocean; residents but nest (Mar.-May) on off-shore islands

(b) widespread along coast

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant, life span 25-30 years

Notes: DDT contamination caused historical declines in pelican populations; pesticides in water could potentially harm species.

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

U.S. Geological Survey. Accessed 11/2005. Biological and ecotoxicological characteristics of terrestrial vertebrate species residing in estuaries; Brown Pelican. <http://www.pwrc.usgs.gov/bioeco/bpelican.htm>.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Phrynosoma coronatum blainvillei - San Diego horned lizard

1. At-Risk Category:

Risk Group 3 (FSC/SSC G4T3T4 S2S3)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Loss of prey	High	High	Short-term	pesticides and introduction

base				of non-native Argentine ants, which replace the native ants that comprise 90% of diet
Habitat loss	Moderate	Moderate	Short-term	
Fragmentation	Moderate	Moderate	Long-term	
ORVs	Low	Low	Short-term	disturb ant colonies
Intentional removal by humans	Low	Low	Short-term	collection for the pet trade

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal sage scrub, grasslands, chaparral, oak woodland, riparian woodland, closed cone forest (prefers pockets of open microhabitats created by disturbance)

(b) widespread

4. Functional Group (plants); Generation time or life span (animals)

Reptile, life span in wild unknown but California horned lizards have survived in captivity for over 8 years

Notes: This species has specialized diet requirements (harvester ants) and site fidelity. Attempts at captive breeding appear unviable.

Sources:

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://ecoregion.ucr.edu/full.asp?sp_num=34>.

California Department of Fish and Game. Accessed 10/2005. Habitat Conservation Planning Branch: California's Plants and Animals. <http://www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=reptiles&idNum=41>.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 10/2005. Field Guide: Reptiles and Amphibians. <http://www.sdnhm.org/fieldguide/herps/phry-cor.html>.

Plegadis chihi - White-faced ibis

1. At-Risk Category:

Risk Group 3 (FSC/SSC G5 S1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Altered hydrology	High	High	Long-term	

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding - salt marsh, freshwater marsh, riparian (coastal lagoon, wetlands, river valleys)

(b) extremely restricted breeding range, moderate wintering distribution but sparse (only sporadic non-breeding visitors to MSCP region)

4. Functional Group (plants); Generation time or life span (animals)

Non-breeding/migrant (mostly winter visitors, but has been recorded to nest in SD County in small numbers); life span 10-15 years

Notes: This species has a large range and is a rare visitor to San Diego County.

Sources:

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, <http://wildlife.ucr.edu/full.asp?sp_num=93>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

SDNHM (http://www.sdnhm.org/research/birdatlas/species-accounts.html)

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Polioptila californica californica - California gnatcatcher

1. At-Risk Category:

Risk Group 2 (FT/SSC PIF: TB-r = 5, PT-r = 3, CC = yes, RC = yes)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Predation	Moderate	Moderate	Short-term	human subsidized predators
Altered fire regime	High	High	Long-term	
Parasitism	Low	Low	Short-term	cowbird nest parasitism
Invasives	Low	Low	Short-term	increase fire frequency, burn size, and decrease habitat quality

3. (a) Habitat Associations and (b) Spatial scale of species

(a) coastal sage scrub (prefers *Artemisia californica* and *Eriogonum fasciculatum* dominated patches)

(b) widespread; dense in its preferred habitat

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident, life span 3-5 years

Sources:

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates. <http://wildlife.ucr.edu/full.asp?sp_num=55>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Rallus longirostris levipes - Light-footed clapper rail

1. At-Risk Category:

Risk Group 1 (FE/CE G5T1T2 S1)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	filling, requires healthy tidal marsh environment
Altered hydrology	High	High	Long-term	siltation
Predation	Moderate	High	Short-term	domestic and urban-enhanced mesopredators
Recreation/Human disturbance	Low	High	Short-term	
Pollution	Low	High	Long-term	water contamination and noise

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding - coastal salt marshes, lagoons, sloughs, river estuaries, coastal ponds

(b) restricted range; sparse (Tijuana River estuary critical site)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident, life span 2-4 years

Notes: Captive breeding programs are currently underway for this species.

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Checklist of birds recorded in San Diego County, California. <http://www.sdnhm.org/research/birds/sdbirds.html>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Rana aurora draytonii - California red-legged frog

1. At-Risk Category:

Excluded - No currently known occurrences in MSCP (FT/SSC NT)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) streams, ponds, marshes (permanent water sources)

(b) not found in SD County

4. Functional Group (plants); Generation time or life span (animals)

Amphibian, life span 5-10 years

Notes: Has not been observed in San Diego County since the 1960s. If sighted in the future, likely risks include: altered hydrology, invasives, pollution, etc.

Sources:

Brown, S.L. 2000 (accessed 11/2005). *Rana aurora* (On-line).Animal Diversity Web. University of Michigan Museum of Zoology. <http://animaldiversity.ummz.umich.edu/site/accounts/information/Rana_aurora.html>.

California Department of Fish and Game. 2002 (accessed 11/2005). Department of Pesticide Regulations Endangered Species Project: California Red-Legged Frog Characteristics. <http://www.cdpr.ca.gov/docs/es/espdfs/crlfall.pdf>.

Davidson, C. 1996 (accessed 11/2005). *Rana aurora* – Red-legged Frog. Westward Frog. <http://ice.ucdavis.edu/CANVDecliningAmphibians/texthtml/aurora.html>.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

US Fish and Wildlife Service. 2002. Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). US Department of the Interior, Fish and Wildlife Service, Portland, OR.

Sialia mexicana - Western bluebird

1. At-Risk Category:

Excluded – No known threats in MSCP (PIF: TB-r = 3, PT-r = 3, CC = no, RC = no)

2. Risk Factors:

N/A

3. (a) Habitat Associations and (b) Spatial scale of species

(a) oak woodland, mixed conifer, montane meadow

(b) widespread; dense (common)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident; life span 3-7 years

Notes: This species is a secondary cavity nester, and potential urban adapter. Bluebirds will use nest boxes/bird houses and seem to be increasing their breeding range beyond the historic range in San Diego County. However, this species is reportedly declining throughout the rest of its range. Threats include loss of nest cavities due to logging and fire suppression.

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Western_Bluebird_dtl.html>

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Unitt, P. 2005. Personal interview concerning MSCP covered bird species.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Speotyto (=Athene) cunicularia (hypugea) - Burrowing owl

1. At-Risk Category:

Risk Group 1 (FSC/SSC G4 S2 PIF: TB-r = 4, PT-r = 2, CC = no, RC = no)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	development
Invasives	High	High	Long-term	conversion to exotic

				grassland
Predation	Low	Low	Short-term	
Roads	Low	Low	Short-term	collisions

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding - grassland, open scrub, can use artificial open areas (urban golf courses, cemeteries, etc)

(b) breeding range extremely restricted, extremely sparse; more widely distributed in winter but still extremely sparse

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident (winter migrant but some residents in SD County), life span 4-8 years

Notes: This species is nearing extirpation within San Diego County.

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Burrowing_Owl_dtl.html>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates. <http://wildlife.ucr.edu/full.asp?sp_num=51>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Sterna antillarum browni - California least tern

1. At-Risk Category:

Risk Group 1 (FE/CE G4T2T3Q S2S3)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	loss of suitable nesting sites

Altered hydrology	High	High	Long-term	silting
Predation	High	High	Short-term	
Recreation/Human disturbance	High	High	Short-term	trampling despite fencing around some nest sites
Invasives	Low	Moderate	Short-term	increased vegetative cover reduces nest site suitability

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging - bays, lagoons, estuaries, inland lakes; breeding - dunes, some nest in urbanized areas like Lindbergh field

(b) extremely restricted; sparse

4. Functional Group (plants); Generation time or life span (animals)

Breeding migrant (come to breed Apr-Sept), life span ~5 years

Notes: One problem for the tern is that breeding sites are now fixed and additional sites are not available, so predator discovery of a site (or other threats to breeding sites), are all the more serious.

Sources:

California Department of Fish and Game. Accessed 10/2005. Birds: Species Accounts. <http://www.dfg.ca.gov/hcpb/species/t_e_spp/t_e06birds.pdf>.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html#shorebirds>, < http://www.sdnhm.org/research/birdatlas/wrenderings/99fall-reports.html>, and <http://www.sdnhm.org/exhibits/cats/hunters.html>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Sterna elegans - Elegant tern

1. At-Risk Category:

Risk Group 3 (FSC/SSC NT)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Recreation/Human disturbance	Moderate	High	Short-term	
Predation	Moderate	High	Short-term	domestic and urban-enhanced mesopredators

3. (a) Habitat Associations and (b) Spatial scale of species

(a) foraging and breeding - salt marsh, mud and salt flats

(b) breeding range extremely restricted, dense (used to only use salt works in SDNWR at south SD Bay, but has expanded in recent years)

4. Functional Group (plants); Generation time or life span (animals)

Breeding/resident; life span ~5 years

Notes: Populations are numerous in San Diego County.

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Elegant_Tern_dtl.html >.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html#shorebirds >.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Streptocephalus woottoni - Riverside fairy shrimp

1. At-Risk Category:

Risk Group 1 (FE G1 S1 EN/A2c)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	development

Invasives	High	High	Long-term	plants
Altered hydrology	High	High	Long-term	
Predation	High	High	Short-term	non-native bullfrog
ORVs	Moderate	High	Short-term	crushing
Pollution	Low	Low	Long-term	water contamination, dumping

3. (a) Habitat Associations and (b) Spatial scale of species

(a) vernal pools (need longer duration water and deeper pools)

(b) narrowly distributed; extremely sparse (Miramar, Pendleton, and Otay complex in SD County)

4. Functional Group (plants); Generation time or life span (animals)

Invertebrate, life span short (<1 year)

Notes: Low genetic variability may be a problem for this species in the future.

Sources:

California Department of Fish and Game. 1998. California Vernal Pool Assessment, Preliminary Report. <http://www.dfg.ca.gov/whdab/wetlands/vp_asses_rept/index.htm#Contents>.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

Riverside County Integrated Project. 2003. Final Western Riverside County MSHCP Species Accounts for Invertebrates/Crustaceans. <http://rcip.org/mshcpdocs/Vol2/appendixB/Sec-03.Crustaceans/01.RiversideFairyShrimp.pdf>.

US Fish and Wildlife Service. 1998. Vernal Pools of Southern California Recovery Plan. US Department of the Interior, Fish and Wildlife Service, Portland, OR.

US Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Riverside Fairy Shrimp. Federal Register 65(184): 57136-57159.

US Fish and Wildlife Service. 2005. Critical Habitat Listing for the Riverside Fairy Shrimp. 70 FR 19154. <http://www.animallaw.info/administrative/adusfd70fr19154.htm>.

Taxidea taxus - American badger

1. At-Risk Category:

Risk Group 3 (SSC G5 S4 - but might be much more rare and threatened in San Diego County)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Intentional removal by humans	Moderate	Low	Short-term	nuisance removal, baits, traps, poisons, etc.
Roads	Low	Low	Short-term	vehicular deaths
Farming operations	Low	Low	Short-term	disturbance of den sites

3. (a) Habitat Associations and (b) Spatial scale of species

(a) open areas in grasslands, savannahs, mountain meadows

(b) potentially widespread but little available data on current range in SD County

4. Functional Group (plants); Generation time or life span (animals)

Mammal, life span 10-15 years

Sources:

California Department of Fish and Game. 1995. Stanislaus River Basin and Calaveras River Water Use Program: Threatened and Endangered Species Report. Bay Delta and Special Water Projects Division. <http://www.delta.dfg.ca.gov/reports/stanriver/sr4415.asp>.

California Department of Fish and Game. Accessed 10/2005. Habitat Conservation Planning Branch: California's Plants and Animals. <http://www.dfg.ca.gov/hcpb/species/species.shtml>.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

SIBR.com. Accessed 10/2005. California Mammalia, Fact Sheets. <http://www.sibr.com/mammals/M160.html>.

Southern California Camping. Accessed 10/2005. Field Guide to Plants and Animals. <www.socalcamping.com/fieldguide/ mammal/americanbadger.html>.

USDA Forest Service. Accessed 10/2005. Fire Effects Information System. <http://www.fs.fed.us/database/feis/wildlife/mammal/tata/all.html>.

Vireo bellii pusillus - Least Bell's vireo

1. At-Risk Category:

Risk Group 2 (FE/CE G5T2 S2 NT PIF: TB-r = 4, PT-r = 3, CC = no, RC = no)

2. Risk Factors:

Threats	Risk	Spatial Scale	Temporal Scale	Notes
Habitat loss	High	High	Short-term	
Predation	High	High	Short-term	by corvids
Parasitism	High	High	Short-term	cowbird nest parasitism
Altered hydrology	Moderate	High	Long-term	changes in water flow, channelization, etc.
Invasives	Moderate	High	Short-term	
Recreation/Human disturbance	Low	Moderate	Short-term	
Fragmentation	Low	Moderate	Long-term	affects breeding and foraging success

3. (a) Habitat Associations and (b) Spatial scale of species

(a) riparian woodland

(b) widespread; moderately dense

4. Functional Group (plants); Generation time or life span (animals)

Breeding/migrant (breeding summer resident - Mar-Sept), life span 4-7 years

Sources:

Cornell Lab of Ornithology. Accessed 11/2005. All About Birds: Online Bird Guide. <http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Bells_Vireo_dtl.html >.

Mendelsohn, Mark. 2005. Personal interview concerning MSCP covered bird species.

Ogden Environmental and Energy Services, et al. 1995. Multiple Species Conservation Program (MSCP) Administrative Record. Prepared for City of San Diego.

San Diego Natural History Museum. Accessed 11/2005. Breeding Bird Species Accounts. <http://www.sdnhm.org/research/birdatlas/species-accounts.html>.

Understanding the Plants and Animals of the Western Riverside County MSHCP. Accessed 10/2005. Species List and Profiles. Profiles by Dudek and Associates, < http://wildlife.ucr.edu/full.asp?sp_num=65>.

Unitt, P. 2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, CA.

Winchell, Clark. 2005. Personal interview concerning MSCP covered bird species.

Appendix C: At-Risk Ranking System Definitions

Listing Status under Federal Endangered Species Act (FESA) or State Endangered Species Act (CESA)

FE = Federally Endangered

PE = Proposed for federal listing as Endangered

FT = Federally Threatened

PT = Proposed for federal listing as Threatened

DM = De-listed Taxon, Recovered

C = Candidate for federal listing

CE = State Endangered

CT = State Threatened

CR = State Rare

SSC = State Species of Special Concern

FSC = Federal Species of Concern

protected = moratorium on hunting

none = no state status

California Natural Diversity Database (CNDDB, California Department of Fish and Game)

Global Ranks

G1 = Extremely endangered: < 6 viable element occurrences (EO's) or < 1,000 individuals, or < 2,000 acres of occupied habitat

G2 = Endangered: about 6-20 EO's or 1,000-3,000 individuals, or 2,000-10,000 acres of occupied habitat

G3 = Restricted range, rare: about 21-100 EO's or 3,000-10,000 individuals, or 10,000-50,000 acres of occupied habitat

G4 = Apparently secure; this rank is clearly lower than G3 but some factors exist to cause some concern, such as narrow habitat or continuing threats

G5 = Demonstrably secure to ineradicable; commonly found throughout its historic range

State Ranks

S1 = Extremely endangered: < 6 viable element occurrences (EO's) or < 1,000 individuals, or < 2,000 acres of occupied habitat

S1.1 = very threatened

S1.2 = threatened

S1.3 = no current threats known

S2 = Endangered: about 6-20 EO's or 1,000-3,000 individuals, or 2,000-10,000 acres of occupied habitat

S2.1 = very threatened

S2.2 = threatened

S2.3 = no current threats known

S3 = Restricted range, rare: about 21-100 EO's or 3,000-10,000 individuals, or 10,000-50,000 acres of occupied habitat

S3.1 = very threatened

S3.2 = threatened

S3.3 = no current threats known

S4 = Apparently secure within California; this rank is clearly lower than S3 but some factors exist to cause some concern, such as narrow habitat or continuing threats

S5 = Demonstrably secure to ineradicable in California. NO THREAT RANK.

Q = taxonomic questions associated with the species

? = e.g. s2? is more certain than S2S3 but less certain than S2

T-Ranks

Subspecies receive a T-rank attached to the G-rank for the full species. The G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety. The S-rank, in this case, will refer to the status of the subspecies within California. The T-rank has the same general definitions as the global ranks.

California Native Plant Society Ranks (for plants only)

List

1A = Presumed extinct in California

1B = Rare, threatened, or endangered in California and elsewhere

2 = Rare, threatened, or endangered in California, but more common elsewhere

3 = More information needed

4 = Limited distribution - a watch list

Rarity (R)

1 = Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time

2 = Distributed in a limited number of occurrences, occasionally more if each occurrence is small

3 = Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported

Endangerment (E)

1 = Not endangered

2 = Endangered in a portion of its range

3 = Endangered throughout its range

Distribution (D)

1 = More or less widespread outside CA

2 = Rare outside CA

3 = Endemic to CA

The IUCN Red List of Threatened Species (for animals only) Version 2.3, 1994

Categories:

EX = Extinct

A taxon is Extinct when there is no reasonable doubt that the last individual has died.

EW = Extinct in the wild

A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CR = Critically Endangered

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria - A to E - as described below.

EN = Endangered

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria - A to E - as described below.

VU = Vulnerable

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria - A to E - as described below.

LR = Lower Risk

A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable.

Taxa included in the Lower Risk category can be separated into three subcategories:

1. cd = Conservation Dependent - taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years

2. nt = Near Threatened - taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable

3. lc = Least Concern – taxa which do not qualify for Conservation Dependent or Near Threatened

DD = Data Deficient

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NE = Not Evaluated

A taxon is Not Evaluated when it is has not yet been assessed against the criteria.

Criteria for Critically Endangered, Endangered and Vulnerable

Critically Endangered (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

a) direct observation

b) an index of abundance appropriate for the taxon

c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

d) actual or potential levels of exploitation

e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A reduction of at least 80%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

B) Extent of occurrence estimated to be less than 100 km2 or area of occupancy estimated to be less than 10 km2, and estimates indicating any two of the following:

1) Severely fragmented or known to exist at only a single location.

2) Continuing decline, observed, inferred or projected, in any of the following:

a) extent of occurrence

b) area of occupancy

c) area, extent and/or quality of habitat

d) number of locations or subpopulations

e) number of mature individuals

3) Extreme fluctuations in any of the following:

a) extent of occurrence

b) area of occupancy

c) number of locations or subpopulations

d) number of mature individuals

C) Population estimated to number less than 250 mature individuals and either:

1) An estimated continuing decline of at least 25% within three years or one generation, whichever is longer or

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a) severely fragmented (i.e. no subpopulation estimated to contain more than 50 mature individuals)

b) all individuals are in a single subpopulation

D) Population estimated to number less than 50 mature individuals.

E) Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer.

Endangered (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

a) direct observation

b) an index of abundance appropriate for the taxon

c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

d) actual or potential levels of exploitation

e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A reduction of at least 50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above.

B) Extent of occurrence estimated to be less than 5000 km2 or area of occupancy estimated to be less than 500 km2, and estimates indicating any two of the following:

1) Severely fragmented or known to exist at no more than five locations.

2) Continuing decline, inferred, observed or projected, in any of the following:

a) extent of occurrence

b) area of occupancy

c) area, extent and/or quality of habitat

d) number of locations or subpopulations

e) number of mature individuals

3) Extreme fluctuations in any of the following:

a) extent of occurrence

b) area of occupancy

c) number of locations or subpopulations

d) number of mature individuals

C) Population estimated to number less than 2500 mature individuals and either:

1) An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, or

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a) severely fragmented (i.e. no subpopulation estimated to contain more than 250 mature individuals)

b) all individuals are in a single subpopulation.

D) Population estimated to number less than 250 mature individuals.

E) Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer.

Vulnerable (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

a) direct observation

b) an index of abundance appropriate for the taxon

c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

d) actual or potential levels of exploitation

e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A reduction of at least 20%, projected or suspected to be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

B) Extent of occurrence estimated to be less than 20,000 km2 or area of occupancy estimated to be less than 2000 km2, and estimates indicating any two of the following:

1) Severely fragmented or known to exist at no more than ten locations.

2) Continuing decline, inferred, observed or projected, in any of the following:

a) extent of occurrence

b) area of occupancy

c) area, extent and/or quality of habitaty

d) number of locations or subpopulations

e) number of mature individuals

3) Extreme fluctuations in any of the following:

a) extent of occurrence

b) area of occupancy

c) number of locations or subpopulations

d) number of mature individuals

C) Population estimated to number less than 10,000 mature individuals and either:

1) An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, or

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a) severely fragmented (i.e. no subpopulation estimated to contain more than 1000 mature individuals)

b) all individuals are in a single subpopulation

D) Population very small or restricted in the form of either of the following:

1) Population estimated to number less than 1000 mature individuals.

2) Population is characterised by an acute restriction in its area of occupancy (typically less than 100 km2) or in the number of locations (typically less than five). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming Critically Endangered or even Extinct in a very short period.

E) Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

Partner's in Flight Species Assessment (for avian species only)

TB-r = Threats to Breeding score (regional score)

Indicates vulnerability due to the effects of current and probable future extrinsic conditions that threaten the ability of populations to survive and successfully reproduce in breeding areas within a given Bird Conservation Region (BCR, in this case 32 – Coastal California). Evaluation of TB-r includes threats to breeding habitats, as well as other factors that interfere with reproduction (e.g. competition with exotic species). Broad definitions of individual scores are as follows:

TB-r Score	Definition
1	Expected future conditions for breeding populations are enhanced by widespread human activities or land-uses.
2	Expected future conditions for breeding populations are expected to remain stable; no known threats.
3	Slight to moderate decline in the future suitability of breeding conditions is expected.
4	Severe deterioration in the future suitability of breeding conditions is expected.
5	Extreme deterioration in the future suitability of breeding conditions is expected; species is in danger of extirpation from substantial portions of range leading to a

	major range contraction, or has a low probability of successful reintroduction across a substantial former range.

PT-r = Population Trend score (regional, breeding-season score)

Indicates vulnerability due to the direction and magnitude of recent changes in population size within a given BCR. Species that have declined by 50% or more over 30 years are considered most vulnerable, whereas species with increasing trends are least vulnerable. Categorical definitions for scores are as follows:

PT-r Score	% Change over 30 yrs	Equivalent % annual change	Qualitative definitions
1	≥ 50% increase	≥ 1.36%	Large population increase
2	15-49% increase, OR < 15% change	0.47 to 1.36%, OR -0.54 to 0.47%	Possible or moderate population increase OR Population stable
3	Highly variable, OR Unknown	N/A	Uncertain population trend
4	15-49% decrease	< -0.54 to -2.28%	Possible or moderate population decrease
5	≥ 50% decrease	≤ -2.28%	Large population decrease

CC = Continental Concern species (yes or no)

Species must meet all of the following criteria in order to rank as Continental Concern within a given BCR:

- Listed on Watch List in PIF North American Landbird Plan (Rich et al. 2004)
- Occur regularly in significant numbers in the BCR, i.e. RD > 1
- Future conditions are not enhanced by human activities, i.e. Threat score > 1

RC = Regional Concern species (yes or no)

Species must meet all of the following criteria in the season(s) for which it is listed in order to rank as Regional Concern species within a given BCR:

- Regional Combined Score > 13
- High Regional Threats (> 3) or Moderate Regional Threat (3) combined with significant population decline (PT > 3)
- Occurs regularly in significant numbers in the BCR, i.e. RD > 1