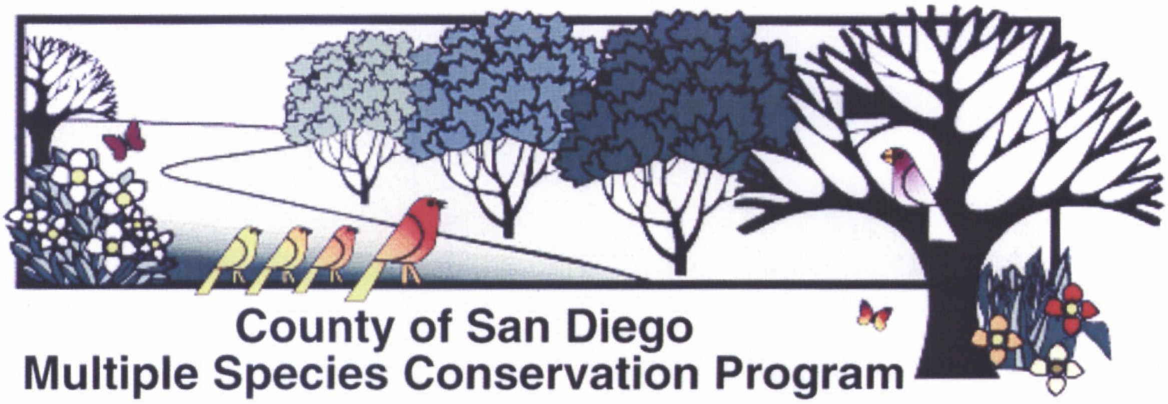
North County Subarea Plan



Habitat Evaluation Model

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1.0 INTRODUCTION

The major biological objectives of the North County Subarea Plan (NCSAP) preserve system are to:

- Maintain the full range of vegetation communities and successional phases in ecologically significant areas, with a focus on habitats considered sensitive, rare, or declining;

- Maintain viable populations of high priority species, including listed, endemic, or otherwise sensitive species, or species which may serve as "umbrella" species for others using similar habitats; and

- Maintain functional wildlife corridors and habitat linkages between core biological resource areas.

A quantitative habitat evaluation model was developed for rating and prioritizing biological resource areas within the 342,859-acre NCSAP study area in northwestern unincorporated San Diego County that would facilitate development of a preserve system to accomplish these objectives (see Figure 1). The model results will be used to help identify areas of key biological resources significance and to serve as a benchmark to evaluate preserve design.

2.0 HABITAT EVALUATION MODELING IN SAN DIEGO COUNTY

The basic framework for the habitat evaluation model used for the NCSAP project was originally developed for the San Diego Multiple Species Conservation Program (MSCP), which covers a 567,000-acre study area in southwestern San Diego County. The model was developed primarily by AMEC Earth & Environmental (formerly Ogden) biologists and Geographic Information System (GIS) specialists. The MSCP model was modified based on review and input by the Biological Task Force on Multiple Species Preserve Design, California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (USFWS), the Scientific Review Panel (representing the State's Natural Communities Conservation Planning [NCCP] program), other qualified scientists (including a panel representing the Endangered Habitats League), and outside review by the Working Group for the MSCP.

For the Multiple Habitat Conservation Program (MHCP) in northwestern San Diego County, the MSCP model was applied in essentially the same manner, with minor revisions to reflect ecological differences between the two study areas. The MHCP habitat evaluation model was reviewed in detail by the Biological Task Force on Multiple Species Preserve Design, SANDAG staff, and local CDFG and USFWS staff. These biologists have extensive field experience in the San Diego region and thus are qualified to comment on the specific biological differences between the MHCP and MSCP study areas.

For the MSCP and MHCP, the habitat evaluation model was used as one tool—along with the basic principles of preserve design—to create "biological core and linkage" maps (equivalent to biologically preferred preserve alternatives). These biological core and linkage maps were then overlaid with other land-use considerations—such as existing and planned land uses, ownership patterns, and economic factors—to identify and prioritize lands for conservation and management versus for other economic land uses. The MSCP and MHCP preserve boundaries were developed to capture as much of the biologically valuable land as possible, including areas identified as high and very high quality habitat by the habitat evaluation model, subject to other constraints on preserve design. Biological analyses for the MSCP and MHCP plans also used results of the habitat evaluation model as a metric for comparing among preserve alternatives, by calculating the acreage and proportions of the various habitat value classes to be conserved under different alternatives.

For the NCSAP program, the MSCP/MHCP habitat evaluation model has been refined by incorporating updated resource data, implementing changes to the modeling criteria to better reflect the NCSAP ecosystem, and adding some additional modeling criteria and factors to create a more robust model. The NCSAP model was created by AMEC biologist and GIS specialist with input and review from the Conservation Biology Institute (CBI), County of San Diego, USFWS, and CDFG biologists. Modifications introduced for the NCSAP model versus the MSCP/MHCP model include:

- Inclusion of key species models for the Stephens' Kangaroo Rat and Arroyo Southwestern Toad.
- Changes to the California Gnatcatcher component to include a second elevation threshold (inland populations extend up to 1,200 feet). The gnatcatcher component for the MSCP model also used population "core areas." Because the population core areas were not specifically defined for the NCSAP this additional criterion was not included in this version of the gnatcatcher component (the "core area" criterion was eliminated from the MHCP gnatcatcher model for the same reason).
- Addition of a Grasslands Evaluation component that prioritized grassland habitats based on patch size, soils, and edge effects (grasslands and grassland species are generally under-protected by the MSCP and MHCP plans).
- Replacement of the Potential to Support Target Species factor in the Habitat Value Index with a Number of Predicted Sensitive Species factor. The sensitive species distributions were based on the County of San Diego species distribution model.
- Creation of a more sophisticated Potential Wildlife Corridor Analysis component. The MSCP/MHCP corridor component used riparian vegetation to represent corridors. The wildlife corridor analysis for the NCSAP model identifies areas conducive to large mammal movement in a more robust and biologically defensible manner.

3.0 GENERAL METHODOLOGY

Systematically collected biological field data are not available for the entire study area. Consequently, the NCSAP model relies on biological and physical data relative to the potential presence of high priority species and other factors that contribute to biological diversity and ecological integrity. The modeling was organized and performed primarily using the GRID module of ARC/INFO. A cell size of 100 feet (approximately one quarter acre) was used throughout the analysis. This cell size was selected to minimize the loss of data based on the minimum mapping unit size used in the vegetation mapping procedures. A coordinated and iterative effort was undertaken between the GIS and biological staff to develop criteria used in this model.

Figure 2 includes a flow diagram of the NCSAP habitat evaluation model process and criteria, and Appendix A includes a table that summarizes the model criteria. The NCSAP model includes 24 modeling factors organized into the following five major components:

1. Habitat Value Index (HVI). The HVI component combines seven physical and biological factors to rank areas for biological resource diversity and value. These factors include habitat diversity index, ecotone index, soils known to support rare plant species, micro-habitat features (e.g., cliffs, springs, and mines), rarity of native habitats, number of predicted sensitive species, and edge effects.

2. Key Species Models. Individual habitat evaluation models were developed for the California Gnatcatcher, Stephens' Kangaroo Rat, and Arroyo Southwestern Toad.

3. Grassland Evaluation. Grassland habitat was prioritized based on patch size, slope, and edge effects.

4. High Priority Species Locations and Vernal Pool Habitat. All recorded observations of federal and state listed species, category 1 candidate species, and species proposed for listing (excluding the California Gnatcatcher, Stephens' Kangaroo Rat, Arroyo Southwestern Toad, and Coastal Cactus Wren) were buffered by 200 feet and assigned a Very High value. Coastal Cactus Wren data points were buffered by 500 feet which approximates the size of a large territory size. Species-specific model components replace buffered data points for the California Gnatcatcher, Stephens' Kangaroo Rat, and Arroyo Southwestern Toad. Vernal pool habitat and golden eagle nesting areas were also incorporated into this model component.

5. Potential Wildlife Corridors Analysis. This component prioritizes those areas that are conducive to large mammal movement based on terrain, habitat types, and habitat spatial patterns. Woodland and scrub habitats along canyon bottoms that connect blocks of habitat greater than 100 acres each were assigned the highest ranking. Grassland habitats along canyon bottoms were assigned the next highest ranking.

The composite model results were developed by taking the maximum value of each the five individual model components. If for a given grid cell any one of the five components resulted in a rank of very high then the composite model result for that grid cell was very high.

The GIS data layers used in the model included:

- Regional Vegetation
- Sensitive Species Locations
- Vernal Pool Habitats
- Elevation
- Soils
- National Wetlands Inventory
- Climate Zones
- Roads

4.0 MODEL USES AND LIMITATIONS

Interpreting the NCSAP habitat evaluation model requires an understanding of the model's goals and limitations. Below are a number of issues that address the model's limitations and intended use:

- The NCSAP model is a regional model designed to identify broad patterns of biological sensitivity and value. The GIS data used to create the model have generally been mapped at a regional scale of 1:24,000. **The results of the NCSAP model should not be used to interpret site-specific (i.e. parcel level) biological resources value.**

- The composite map provides an overall ranking of biological resource values to help identify key areas to preserve, to use in the gap analysis, and to compare among alternative preserve designs. However, individual model components or species-specific information are generally more revealing than the composite map for addressing certain resource-specific issues (e.g., while individual key species models are combined into the overall composite index, preserve design and analysis must also consider species-specific issues independent of the composite model).

- Areas shown as having relatively low site-specific biological value by the composite habitat evaluation map may nevertheless be important to preserve design when considering preserve landscape configuration (e.g., low value habitat areas may still be important for buffering or linking higher value areas).

- The NCSAP model is designed to prioritize areas purely from a biological perspective, and does not incorporate economic land-use considerations. However, because the model is intended to help prioritize areas for conservation, should not be overly conservative (i.e., all native habitats ranked as high or very high). Consequently, criteria used in the model were designed to be restrictive enough to differentiate the relative value of areas of native habitats.

5.0 MODEL COMPONENTS AND FACTORS

5.1 Habitat Value Index

The Habitat Value Index Component combines seven biological and physical factors to identify areas with higher biological diversity and value. Each factor was assigned a point value ranging from 0 to 3, with the exception of edge effects, which was assigned a point value ranging from -3 to 0.

5.1.1 Habitat Diversity Index (Figure 3)

Habitat diversity was measured by calculating the number of different types of habitat to occur within a circular "neighborhood" (0.5-mile radius) around each cell. The habitat diversity index was based on 33 vegetation categories (see Diversity Grouping column in Appendix B). Simpson's diversity index (Ludwig and Reynolds 1988) was used to calculate the proportional abundance of natural habitat types, after correcting for developed cells within each neighborhood. The index was rank-ordered according to 25-percentile blocks of equal area for assignment of point value. Those areas with greater habitat diversity tend to support a greater number of sensitive species.

5.1.2 Ecotone Index (Figure 4)

Concentrations of sensitive species tend to be found along the boundaries between habitat types (also called the inter-habitat interface). The Ecotone Index is a measure of the amount of common boundary between two different vegetation types. Only cells containing natural vegetation were used. Ecotone was evaluated for each cell using ten aggregated vegetation categories (see Ecotone Grouping column in Appendix B) and a 0.5-mile radius as the "neighborhood." The index was rank-ordered according to 25-percentile blocks of equal area for assignment of point values.

5.1.3 Soils Known to Support Sensitive Plant Species (Figure 5)

Using the Soil Conservation Service (1973) Soils Survey, County botanists (Tom Oberbauer) rated the soils based on their potential to support sensitive plant species (see Plant Soils column in Appendix C).

Coastal sandstone soils	Very High (3 pts)
Gabbro-derived soils	Very High (3 pts)
Metavolcanic soils	Very High (3 pts)
Metasedimentary soils	High (2 pts)
Clay soils	High (2 pts)

Soils within developed/agriculture and all other soils were assigned a Low ranking (0 pts).

5.1.4 Micro-habitat Features (Figure 6)

Some highly sensitive species are associated with certain micro-habitat features, such as cliffs, mines, vernal pool complexes, springs, ponds, and other wetlands. This factor attempted to map as many micro-habitat features as could be identified from regional data sources, including the National Wetlands Inventory (NWI) maps for drainages/ wetlands/ponds not otherwise mapped as wetlands in the regional vegetation data layer. Cliffs were defined as areas having slopes greater than 65 percent and were mapped using the regional digital elevation model (DEM). Springs and mines were identified from USGS topographic maps. Vernal pools were input from site-specific project reports and field observations. Water resources were mapped from the NWI maps. Areas mapped as micro-habitat features were assigned a Very High ranking (3 points).

5.1.5 Rarity of Natural Habitats (Figure 7)

This factor is based on the total acreage of each habitat type within the County of San Diego. Generally, natural habitats that totaled 2,500 acres or less within the County of San Diego study area were considered very rare and received 3 points. Natural habitats that totaled greater than 2,500 acres but less than 25,000 acres received 2 points. Natural habitats greater than 25,000 acres received 1 point (see Rarity Ranking column in Appendix B).

5.1.6 Number of Predicted Sensitive Species (Figure 8)

The County of San Diego has developed a model to predict the potential distribution of 370 sensitive species in the county based on vegetation, elevation, slope, parent soil materials, soil texture, and eco-regions. The county was divided into 12 eco-regions by Tom Oberbauer based on climate zones and major geographic breaks or clines. For each species included in the model, a confidence factor (high, moderate, low) was assigned to identify how well the model is expected to predict that given species distribution, based on our state of biological knowledge and the ability of existing digital data layers to meaningfully capture species requirements. For the NCSAP model, the predicted distributions of all high priority species having high or moderate confidence ratings were added together. The combined score was ranked into equal intervals and assigned points based on the following table:

Number of Species	Ranking
12-16	Very High (3 pts.)
7-11	High (2 pts.)
1-6	Moderate (1 pt)
0	Low (0 pts)

5.1.7 Edge Effects (Figure 9)

Edge effects from urban areas, agriculture, and roads were combined, weighted, and rank-ordered to reduce biological values along the development edge. Three "neighborhoods" were evaluated, corresponding to all cells within radial distances of 150, 300, and 600 feet from the focal cell. These distance values are consistent with empirical studies of adverse edge effects on various taxa (e.g., Andren et al. 1985; Andren and Angelstam 1988; Angelstam 1986; Brittingham and Temple 1983; Gates and Gysel 1978; Santos and Telleria 1992; Temple 1987; Wilcove 1985; Vissman, pers. comm.). The numbers of developed cells in each of the three neighborhoods were added together. Edge effects from urban areas were weighted twice those of agricultural edges. Roads with high traffic volumes were weighted more heavily. The total value of edge effects was rank-ordered for the assignment of point values based on the following:

Edge Effects	Ranking
Very High Edge Effect (76-100 percentile)	Very High (3 pts)
High Edge Effect (51-75 percentile)	High (2 pts)
Moderate Edge Effect (26-50 percentile)	Moderate (1 pts)
Low Edge Effect (1-25 percentile)	Low (0 pts)

5.1.8 Composite Results for Habitat Value Index (Figure 10)

Factors 1 through 7 were added together to assign the relative biological value of natural habitat in the NCSAP study area and specifically to identify areas that potentially have high biological value. The Habitat Diversity Index, Soils Known to Support Sensitive Species, and Rarity of Native Habitats were weighted 2 times. The highest possible overall score, with all maps combined, was 27 points. Scores were rank-ordered into quartiles (25 percentiles) of each area for assignment of final categories of habitat value and defined as Very High, High, Moderate, and Low habitat value.

5.2 Key Species Models

Within the NCSAP study area, three key species (California Gnatcatcher, Stephens' Kangaroo Rat, and Arroyo Southwestern Toad) were identified as having prime importance based on their regulatory status and the relative importance of the project area to their regional conservation. Species-specific habitat evaluation models have been created for each of these species.

5.2.1 California Gnatcatcher Habitat Evaluation

The purpose of the California Gnatcatcher Habitat Evaluation was to rank patches of scrub habitats based on nesting habitat value to the gnatcatcher. The criteria for determining habitat value were patch size and shape, slope, and elevation, all of which were shown to be correlated with use by the California Gnatcatcher. Habitat for gnatcatchers is identified as Coastal Sage Scrub (CSS) which includes the coastal sage scrub, mixed coastal sage scrub/chaparral, and alluvial fan scrub Holland (1986) vegetation types as mapped in the regional vegetation GIS data layer (refer to Appendix B – NCSAP Habitat Evaluation Model Vegetation Look-up Table). Gnatcatcher habitat is ranked based on the following criteria:

1) **Habitat patch size** (Figure 11). For gnatcatcher habitat within the Maritime and Coastal Climate Zones, a patch size equal to or greater than 25 acres was considered suitable gnatcatcher habitat. For gnatcatcher habitat east of the Maritime and Coastal

Climate Zones, a patch size equal to or greater than 50 acres was used because the density of gnatcatchers generally is lower farther from the coast. Patch size is based on the relatively large area requirements of the gnatcatcher and expected edge effects, which increase as patch size decreases. Research on home range and territory size indicates that territory size increases with distance from coast (ERCE 1991; Preston et al. 1998); therefore, the model reflects this patch size difference between climate zones. Patch shape (e.g., circular versus linear patches) is an important consideration for patch suitability as a result of increased edge effects on noncircular patches. An algorithm in the model filters out isolated small patches or isolated large narrow patches while leaving larger patches (and patch aggregations) in the model. After identifying the patches of CSS, the model searches the habitat matrix surrounding each patch to add smaller satellite patches that are likely to be used by gnatcatchers in the habitat matrix. A search radius of 1,600 feet was established by Mock (1992). Satellite patches within this radius are added to the central patch and are considered suitable habitat independent of satellite patch size.

2) **Elevation** (Figure 12). Atwood and Bolsinger (1992) documented that 94 percent of the known gnatcatcher sightings in San Diego County were below 800 feet in elevation. Data reviewed for the MSCP/MHCP studies found that approximately 92 percent of documented gnatcatcher sightings occurred below 950 feet. The 950-foot contour was adopted for the MSCP model. This threshold has been carried forward into the NCSAP model, such that areas below 950 feet can achieve a Very High value. More recent gnatcatcher sightings information has shown distributions up to 1,200 elevation. A second elevation criterion of 1,200 feet was therefore added for the NCSAP model so that habitats between 950 and 1200 feet elevations can achieve a High but not Very High ranking.

3) **Slope** (Figure 13). Detailed studies (Mock and Bolger 1992; Ogden 1992a) and other observations (e.g., Bontrager 1991, B. Wagner pers. comm.) suggest that gnatcatchers avoid nesting on very steep slopes (> 40%), although habitat on slopes greater than 40% may nevertheless be suitable for foraging and dispersal. Approximately 93 percent of the documented gnatcatcher sightings in the MSCP/MHCP study areas, occur on slopes less than 40%. Consequently, the 40% slope value was adopted for the MSCP/MHCP model and has been carried forward to the NCSAP model.

The four gnatcatcher habitat criteria were combined to identify areas that appear to have the best potential for supporting gnatcatchers, as follows:

Number of Criteria	Ranking
Meets all four criteria	Very High
Meets any three criteria	High
Meets any two criteria	Moderate
Meets one or no criteria	Low

The overall gnatcatcher evaluation results are shown in Figure 14.

5.2.2 Stephens' Kangaroo Rat (SKR) Habitat Evaluation

SKR are closely associated with sparsely vegetated habitats having a high proportion of bare ground on deep, well-drained, loamy soils that facilitate burrowing (Grinnell 1933, Bleich 1973, O'Farrell and Uptain 1989, USFWS 1997). SKR are most abundant in annual grasslands or open coastal sage scrub (generally less than 30% canopy closure) that support a high proportion of annual forbs and sparse perennial vegetation. Although occasionally found on slopes approaching 45% (Davenport, personal communication), they are generally associated with and apparently prefer gentler slopes (about 7-11%; Bleich 1973, Moore-Craig 1984, Price and Endo 1989). The known geographic range of the SKR was significantly expanded into San Diego County in 1997 with the discovery of a population on highly suitable habitat in the Ramona grasslands (Ogden 1997). The following factors were combined to create the SKR model.

1) **Soils** (Figure 15). Soils were ranked as having High, Medium and Low potential to support SKR based on physical soil characteristics as described in the San Diego Area Soil Survey (USDA 1973). SKR generally require well-drained soils that allow easy burrowing to at least about 24" or as deep as 46". The soil must also be able to support a burrow (e.g., pure sands collapse too easily). The soil rankings considered the full description of soil attributes, with a bias to potentially over-representing soil value to SKR for soil types having highly variable characteristics (i.e., leading to potential errors of commission rather than omission). The following general guidelines were used in assigning value to each soil type in the study area (see Appendix C, Soils Look-Up Table, for the full listing of ranks):

    High: Generally, any deep to very deep loamy soils (including sandy loams, loamy sands, loams, and silt loams that are generally deeper than about 32") with relatively low gravel, rock, or cobble content, and that are friable and not often saturated.

    Moderate: Generally, soils that don't quite qualify as high due to higher potential for saturation or impediments to burrowing, such as loamy soils that are moderately deep (about 16-32") or that have hard subsoils. Soil types in a soil series otherwise classified as High were decremented to Moderate if they have very high rock, cobble, or gravel content. Soil series otherwise ranked as Low, but having potential "inclusions" of deep, friable loams, were incremented to Moderate.

    Low: Non-loam soils (sands, clays, silts) or otherwise "very hard" soils (e.g., some clay loams or sandy clays that are classified as very hard or extremely hard); shallow or very shallow soils (less than 12" to a very hard subsoil or 16" to an impenetrable layer); soils in floodplains subject to periodic inundation; or predominantly unsuitable soils that may have smaller inclusions of suitable soils (e.g., clays with occasional sandy loam hillocks).

None: All non-suitable soils or non-soil surfaces, including rock quarries, tidal flats, open water, gravel pits, etc.

2) **Vegetation** (Figure 16). SKR are strongly associated with open grasslands or very sparse coastal sage scrub. They are a pioneering species that may invade fallow agricultural fields or the edges of active agricultural areas (such as cattle pasture or edges of row crops). Vegetation was therefore ranked for SKR as follows (see Appendix B – Vegetation Look-Up Table):

    High: Grasslands (includes both native perennial and non-native annual grasslands, which are not differentiated in the vegetation database).

    Moderate: Most Extensive Agriculture (includes row crops, pastures, fallow lands, etc.). Extensive agricultural areas on highly suitable soils may rank high.

    Low: Coastal Sage Scrub (most coastal sage scrub in the study area is likely too dense to support the species, although SKR may occupy openings in coastal sage scrub or invade following disturbances, such as fire).

    None: All other vegetation communities, developed lands, or intensive agriculture (greenhouses, orchards, etc.).

3) **Slope** (Figure 17). Gentler slopes (less than 30%) were ranked as high, and slopes over 30% as low. Although SKR may sometimes occupy steeper slopes, they are most abundant on gentler slopes and seem to prefer slopes less than about 11%.

All possible combinations of soils, vegetation, and slope rankings were assigned a value of Very High, High, Moderate, or Low in the following matrices. Grasslands on high quality (deep loam) soils and gentle slopes rank Very High. As with most burrowing rodents, habitat suitability falls off quickly with decreasing soil suitability; and quality falls off as vegetation becomes denser or slopes steeper. The intent of the model is to differentiate those areas most capable of supporting SKR populations over the long term, and thereby most important to species conservation. This model is therefore not overly conservative (as it should be if the intent were to predict possible occurrence of SKR for regulatory reasons). The model might predict low or no habitat value on some areas that actually support small numbers of SKR in some years. For example, although it is possible some SKR occur in the study area on steep coastal sage scrub slopes having clay loam soils (e.g., along road berms), these should not be considered priority conservation areas for SKR relative to more open, gentle grasslands on deep loams.

Table 1
SKR Habitat Suitability Rankings

<30% slope

	Soil Suitability			
Vegetation Type	**High**	**Moderate**	**Low**	**None**
Grassland	Very High	Moderate	Low	None
Extensive Agriculture	High	Moderate	Low	None
Coastal Sage Scrub	Low	Low	None	None
Other	None	None	None	None

>30% slope

	Soil Suitability			
Vegetation Type	**High**	**Moderate**	**Low**	**None**
Grassland	Moderate	Low	None	None
Extensive Agriculture	Low	Low	None	None
Coastal Sage Scrub	Low	Low	None	None
Other	None	None	None	None

The overall SKR habitat evaluation results are shown in Figure 18.

5.2.3 Arroyo Southwestern Toad Habitat Evaluation (Figure 19)

The habitat evaluation for the arroyo southwestern toad (arroyo toad) was based on the habitat modeling effort used by the USFWS to determine the critical habitat areas for this species. All arroyo toad habitat evaluation results are confined to the USFWS determined critical habitat areas. The modeling approach used by the USFWS was a GIS modeling process conceptually similar to that used for the California Gnatcatcher and Stephens' Kangaroo Rat model components of this NCSAP Habitat Evaluation Model. To identify and map areas essential to the conservation of the species, the USFWS used the known arroyo toad habitat characteristics, data on known arroyo toad locations, and criteria in the recovery plan for reclassification of the species. Spatial data on stream gradients were used to determine the extent of suitable breeding habitat in these areas. To delineate upland habitat areas, the USFWS used a GIS-based modeling procedure to identify alluvial terraces and valley bottomlands adjacent to the previously identified stream habitat. Elevation above the stream channel was used as an indicator of the extent of alluvial habitat because data on geomorphology was lacking. Based on some experimental sampling, the USFWS determined that elevations less than 80 feet above the stream channel were most likely to contain suitable alluvial upland habitat essential for arroyo toads.

The boundaries for arroyo toad critical habitat delineated by the USFWS in the final rule (Federal Register: February 7, 2001, Rules and Regulations, [(Vol. 66, No. 26) Pp. 9413-9474]) are mapped as contiguous blocks of 250-m-by-250 m cells of a Universal Transverse Mercator (UTM) grid. Therefore, for the NCSAP Habitat Evaluation Model, several additional modeling steps were necessary to rank arroyo toad habitat value within the critical habitat area. First, the modeled upland habitat boundaries were regenerated (alluvium at elevations less than 80 feet above stream channels) and overlain within the critical habitat areas. Then areas mapped as agriculture and developed areas were identified based on the vegetation map. Then using this GIS data, arroyo toad habitat values were assigned to critical habitat areas as follows: (1) Very High – areas of native vegetation within 500 feet of the stream course, (2) High – all other areas of native vegetation, (3) Moderate – areas mapped as extensive agriculture, (4) Low to None – areas mapped as developed.

5.3 Grassland Evaluation

For the MSCP/MHCP habitat evaluation modeling, grassland habitats tended to rank lower in value than other, more "sensitive" vegetation communities. Within the NCSAP study area, grassland habitats are of greater importance as habitat for critical sensitive species (Stephens' kangaroo rat, grasshopper sparrow) and for raptor foraging. In addition, the NCSAP study area includes some of the last remaining major patches of grasslands within the County, near Ramona and Rancho Guejito. A grassland component was introduced into the overall habitat evaluation model for the NCSAP study area to ensure grassland habitats were assigned adequate biological value. Grassland habitats are prioritized based on the following criteria to:

1) **Habitat type** (Figure 20). Grassland habitats (see Grasslands column in Appendix B) were assigned 2 points.

2) **Habitat patch size** (Figure 21). Grassland patches greater than 100 acres were given 1 point.

3) **Soils Known to Support Grassland Species** (Figure 22). Soils within grassland that support grassland species (see Grassland Soils column in Appendix C) were given 1 point.

4) **Edge Effects** (Figure 23). The portions of grasslands within 600 feet of developed and intensive agriculture were given a negative 1 point. If a grassland patch was less than 30 acres and included some edge effects, the entire grassland patch was given negative 2 points.

The four grassland habitat criteria were added together to rank grassland habitats based on the following classification:

Score	Ranking
4	Very High
3	High
2	Moderate
1	Low

The overall grassland evaluation results are shown in Figure 24.

5.4 Potential Wildlife Corridors Analysis (Figure 25)

This component identifies potential movement corridors for large mammals (deer and mountain lion) based on topography, connectivity, and vegetation communities. The model ranks potential movement corridors as High value if they are naturally vegetated valley floors that connect meaningfully between large habitat blocks, and have no major discontinuities or constrictions due to development or intensive agriculture. Areas within such corridors were elevated to Very High value if they are vegetated with woody vegetation (trees and shrubs), which provide hiding cover for deer and mountain lions.

The process followed for this component entailed several steps:

1. The GIS was used to identify topographic features conducive to large mammal movement—specifically valley floors. The GIS model used the San Diego regional 10-meter digital elevation model (DEM) to identify valley floors by searching out to an elevational rise of 50 feet from each watercourse that drains a minimum watershed area of 1 km^2.
2. Areas mapped as developed, intensive agriculture, or extensive agriculture were then overlaid on this map.
   - Developed areas were eliminated as potential corridors.
   - Agricultural areas were treated conditionally, as potential movement barriers or corridor constrictions, as described in step 3.
3. Each reach of undeveloped valley floor was then subject to a series of decision rules to eliminate those reaches considered highly unlikely to function as large mammal movement corridors:
   - Eliminate "dead ends," or valley floors that do not connect between two or more habitat patches of at least 100 acres each, because these were considered highly unlikely to be used by deer or mountain lion.
     - Development was considered an absolute barrier to movement regardless of the length of crossing.
     - Intensive agriculture was only considered a movement barrier if the crossing was greater than 500 feet.
     - Extensive agriculture was not considered a barrier to movement, regardless of crossing length.
   - Eliminate highly constricted corridors:
     - Valley reaches constricted by development on either side were eliminated if they average less than 500 feet in width over a length of 500 feet or more. This eliminates long, narrow corridors through urbanized areas, which are unlikely to be used by deer and mountain lions.
     - Valley reaches constricted on either side by intensive agriculture were eliminated if they average less than 500 feet in width over a length of 1,000 feet or more. This also eliminates long, narrow corridors, but with a greater minimum length than development-constricted corridors,

because agriculture is less likely to deter use by large mammals than urban development.

  - o Extensive agriculture on either side of a corridor was not considered a constriction.

4. Vegetation communities were overlaid onto the corridor map to identify corridors having cover types most conducive to use by deer and mountain lion:
   - All potential corridors remaining through step 3 and supporting non-woody natural vegetation (e.g., grasslands, marshes) were rated High for wildlife movement value.
   - Those areas supporting vegetation communities dominated by trees or shrubs were elevated to Very High. Woodlands, forests, and chaparral or sage scrub communities offer cover for deer and mountain lions and therefore represent the most likely movement corridors for these species.

5.5 High Priority Species and Vernal Pool Habitat (Figure 26)

The High Priority Species and Vernal Pool Habitat component is included to ensure areas with known locations of priority species or vernal pools are assigned higher ranking. In general, this component of the model relies on field survey data of species locations and vernal pool habitats. These data sources are not comprehensive across the entire study area.

All federal and state listed species, Category 1 species, and species proposed for listing were mapped as a separate map layer. Individual sightings were provided a 200-foot buffer to account for potential inaccuracy in the geographic positioning of sighting locations. In addition, historic, current, and potential nest sites of golden eagles (data from Dr. Tom Scott) were plotted. The golden eagle represents an apex (top) carnivore important in preserve design.

The California Gnatcatcher, Stephens' Kangaroo Rat, and Arroyo Southwestern Toad species were addressed in the Key Species Modeling component and are not included in this analysis. Cactus Wren point locations were provided a 500-foot radial buffer polygon. This buffered polygon totals 18 acres, an area more than three times the reported mean territory size for the Coastal Cactus Wren (Rea and Weaver 1990). Vernal pool complexes also were mapped as part of this layer because they were not included in the vegetation communities layer. All grid cells that included species or vernal pool polygons received Very High ranking. All other cells received a Low to None ranking.

5.6 Composite Habitat Evaluation Model Results (Figure 27)

The final model results take the maximum value of each of five model components. (See Table 2). Some general trends of the final model results include:

- Riparian, oak woodland, grassland, and wetland habitats almost always rank a Very High or High.
- Coastal Sage Scrub tends to rank a High or Very High, except for some larger patches

to the east at higher elevations.

- Areas with a mosaic or diverse habitat mix tend to score higher.
- Large patches of Chaparral tend to rank lowest, unless they have sensitive soils or known sensitive species locations.
- The Habitat Value Index component has the largest influence on the composite model results because it ranks habitat for the entire study area. All of the other components are focused on specific geographic extents.

Table 2
NCSAP Habitat Evaluation Model Results

Category	Acres *
Very High	86,224
High	60,771
Moderate	37,193
Low	51,888
Extensive Agriculture	3,432
Intensive Agriculture	62,487
Developed	40,864
Total NCSAP Study Area **	342,859

* Acres based on GRID modeling

** The overall NCSAP study area includes 29,994 acres of tribal lands. The County of San Diego has no regulatory authority within tribal lands. Habitat evaluation model results are shown within tribal lands to provide context for regional planning.

6.0 REFERENCES

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Appendix A -
North County Subarea Plan (NCSAP)
Habitat Evaluation Model Criteria Summary

Component	Factor	Criteria	Score	Source Data	Notes
5.1 Habitat Value Index					
5.1.1	**Habitat Diversity Index**	The number of different types of habitats within a circular neighborhood.		Aggregated vegetation.	.5 mile radius
		Calculated with Simpson's diversity index		(See	300' cellsize
		Equal Area[1] class breaks.		Appendix A -	
		75 - 100 quartile	Very High (3)	Diversity	
		50 - 75 quartile	High (2)	Grouping)	
		25 - 50 quartile	Moderate (1)		
		0 - 25 quartile	Low (0)		
5.1.2	**Ecotone Index**	The amount of natural habitat boundaries within a circular		Aggregated vegetation.	.5 mile radius
		neighborhood. Equal area class breaks.		(See	
		75 - 100 quartile	Very High (3)	Appendix A -	
		50 - 75 quartile	High (2)	Ecotone	
		25 - 50 quartile	Moderate (1)	Grouping)	
		0 - 25 quartile	Low (0)		
5.1.3	**Soils Known**	Soil types ranked based on:		Soils	
	To Support Sensitive Plant	Coastal sandstone, gabbro-derived, metavolcanics	Very High (3)		
	Species	Metasedimentary, clay soils	High (2)		
		All other soils	Low (0)		
		(See Appendix D - Plant Soils Column)			
5.1.4	**Micro-habitat Features**	Slope > 65%,	Very High (3)	Slope (elevation)	
		Mines,	Very High (3)	USGS quads	
		Vernal Pool Complexs,	Very High (3)	MSCP/MHCP/ Ramona	
		Springs,	Very High (3)	USGS quads	
		NWI outside wetland veg mapping	Very High (3)	NWI inventory	
		Ponds	Very High (3)	USGS quads	
5.1.5	**Rarity of**	Vegetation ranked based on acreages		Vegetation	
	Natural	within the county and study area.			
	Habitats	(See Appendix C - Rarity Column)			
		Very rare	Very High (3)		
		Rare	High (2)		
		Abundant	Moderate (1)		
		Very abundant	Low (0)		

Appendix A -
North County Subarea Plan (NCSAP)
Habitat Evaluation Model Criteria Summary

Component	Factor	Criteria	Score	Source Data	Notes
5.1.6	**Number of Predicted Sensitive**	The combination of high priority species having high or moderate confidence ratings		Species Distribution Model	
	Species	Equal interval class breaks for			
		60 target species.			
		12 - 16 species	Very High (3)		
		7-11 species	High (2)		
		1 - 6 speceis	Moderate (1)		
		0 species	Low (0)		
5.1.7	**Edge Effects**	Edge effects with 600 feet of		Vegetation	
		agriculture and developed.			
		Equal Area[1] class breaks.			
		Weighting: dev = 2, ag = 1.			
		Road Class used to assign weights to roads {2 or 1}.		Roads	
		High edge effect.	Very High (-3)		
		Moderate edge effect.	High (-2)		
		Low edge effect.	Moderate (-1)		
		No edge effect	Low (0)		
5.1.8	**Composite**	Seven factors combined with additive			
	Habitat Value	weighting.			
	Index	(Soils, HDI, and Rarity x2 weight)			
		Equal Area[1] class breaks.			
		75 - 100 quartile	Very High (3)		
		50 - 75 quartile	High (2)		
		25 - 50 quartile	Moderate (1)		
		0 - 25 quartile	Low (0)		
5.2 Key Species Models					
5.2.1 California Gnatcatcher Habitat Evaluation					
	California Gnatcatcher Habitat	Coastal sage scrub, alluvial fan scrub (see Appendix C - California Gnatcatcher Habitat Column)		Vegetation	
	Habitat Patch	Coastal: CG habitat patch size > 25 ac.	Yes	GC habitat,	Core/Satellite
	Size	Inland: CG habitat patch size > 50 ac.		climate zones	approach

Appendix A -
North County Subarea Plan (NCSAP)
Habitat Evaluation Model Criteria Summary

Component	Factor	Criteria	Score	Source Data	Notes
	Elevation 950	Below 950 feet	Yes	CG habitat, elevation	
	Elevation 1200	Below 1200 feet elevation	Yes	CG habitat, elevation	
	Slope	Less than 40% slope	Yes	CG habitat, slope (elevation)	
	Final California	CG habitat that meets:			
	Gnatcatcher	All four criteria	Very High (3)		
	Model	Three criteria	High (2)		
		Two criteria	Moderate (1)		
		One or no criteria	Low (0)		
5.2.2 Stephens' Kangaroo Rat (SKR) Habitat Evaluation					
	Soils	Deep loamy soils	High	Soils	
		Soils with impediments	Moderate		
		Non-loam soils	Low		
		Other	None		
	Vegetation	Grassland	High	Vegetation	
		Extensive Agriculture	Moderate		
		Coastal Sage Scrub	Low		
		Other	None		
	Slope	0 to 30%	High	DEM	
		30% +	Low		
	Final SKR	Based on SKR habitat suitability	Very High (3)		
	Model	ranking matrix	High (2)		
			Moderate (1)		
			Low (0)		
5.2.3 Southwestern Arroyo Toad Habitat Evaluation					
	Final AST Model	Arroyo toad habitat within Critical Habitat Areas		Critical Habitat	Can have values assigned
		Near a river (500 feet)	Very High (3)	Areas	to agriculture
		Upland Habitat	High (2)	Vegetation	areas
		Agriculture	Moderate (1)		
		Urban or outside toad habitat areas	Low (0)		

Appendix A -
North County Subarea Plan (NCSAP)
Habitat Evaluation Model Criteria Summary

Component	Factor	Criteria	Score	Source Data	Notes
5.3 Grassland Evaluation					
	Habitat Type	Grassland habitat	2	Vegetation	
	Habitat Patch Size	Grassland "aggregates" formed by combining patches that are:	1	Vegetation	Cluster approach
		1) Within a maximum distance of 1600 ft and			
		2) "Aggretate" size greater than 100 acres			
	Soils Known to Support Grassland	Soils: SKR soils and clay soils	1	Vegetation, Soils	
	Species	(See Appendix D - Grassland Soils)			
	Edge Effects	Grassland within 600 feet of developed or intensive agriculture	-1	Vegetation	
		Grassland patch < 30 acres with some edge effects	-2		
	Final Grassland	Score = 4	Very High (3)		
	Evaluation	Score = 3	High (2)		
		Score = 2	Moderate (1)		
		Score = 1	Low (0)		
5.4 Potential Wildlife Corridors Analysis					
	1	Canyon bottoms - Areas within 50 foot elevation rise from streams of watershed draining > 1KM2		Elevation	
	2	Eliminate developed areas and agricultural areas (conditionally)		Vegetation	
	3	Eliminate reaches considered unlikely to function as large mammal movement corridors based on decision rules		Biologist review of landscape maps	
	4	Identify corridor habitat cover types:		Vegetation	
		Natural Woody Vegetation.	Very High (3)		
		Non-woody vegetation.	High (2)		

Appendix A -
North County Subarea Plan (NCSAP)
Habitat Evaluation Model Criteria Summary

Component	Factor	Criteria	Score	Source Data	Notes
5.5 High Priority Target Species and Vernal Pool Habitat					
	T&E Species	Category 1 species (200 foot buffer)	Very High (3)		
	Final Map	Cactus Wren (500 foot buffer)	Very High (3)		
		Historic, potential, and current Golden Eagle nest sites	Very High (3)		
		Vernal Pools & Complexes	Very High (3)		
5.6 Composite Habitat Evaluation Model Results					
	Final Habitat Evaluation Model	Maximum value from each of the model components:			
		Habitat Value Index			
		Key Species Models			
		California Gnatcatcher			
		Stephens' Kangaroo Rat			
		Arroyo Southwestern Toad			
		Grassland Evaluation			
		Potential Wildlife Corridors Analysis			
		High Priority Species and Vernal Pool Habitat			

Appendix B -
NCSAP Habitat Evaluation Model
Vegetation Lookup Table

Holland Code	Vegetation (Holland)	Developed	Developed or Agriculture	Ecotone Grouping	Diversity Grouping	Ca. Gnatcatcher Habitat	Rarity Ranking	Grasslands	Agriculture Type	Poor Corridor	Wetlands	SKR Suitability	SD County Acres	NCSAP Vicinity Bubble Acres	NCSAP Study Area Acres
11100	Eucalyptus Woodland	0	0	154	3	0	0	0	0	1	0	0	4,387	1,959	1,320
11200	Disturbed Wetland	0	0	120	4	0	3	0	0	1	1	0	969	142	28
11300	Disturbed Habitat	1	1	0	0	0	0	0	0	1	0	0	28,733	4,443	626
12000	Urban/Developed	1	1	0	0	0	0	0	0	1	0	0	387,027	89,739	41,372
13100	Open Water	0	0	8	8	0	2	0	0	1	1	0	68	19	16
13110	Marine	0	0	8	9	0	0	0	0	1	1	0	38,014		
13111	Marine - Subtidal	0	0	8	9	0	0	0	0	1	1	0	75,371		
13112	Marine - Intertidal	0	0	8	9	0	0	0	0	1	1	0	85		
13130	Estuarine	0	0	8	16	0	0	0	0	1	1	0	1,190		
13131	Estuarine - Subtidal	0	0	8	16	0	3	0	0	1	1	0	12	7	
13133	Esturaine - Brackishwater	0	0	8	16	0	3	0	0	1	1	0	12	12	
13140	Freshwater	0	0	8	8	0	2	0	0	1	1	0	11,538	1,738	586
13200	Non-Vegetated Channel, Floodway, Lakeshore	0	0	7	7	0	3	0	0	1	0	0	3,895	801	401
13300	Saltpan/Mudflats	0	0	7	118	0	3	0	0	1	0	0	321	14	
13400	Beach	0	0	7	30	0	3	0	0	1	0	0	1,391	5	
18000	General Agriculture	1	2	0	0	0	0	0	2	1	0	2	5,205	2,147	1,098
18100	Orchards and Vineyards	1	2	0	0	0	0	0	2	1	0	2	80,882	64,879	59,387
18200	Intensive Agriculture	1	2	0	0	0	0	0	2	1	0	2	6,899	3,926	2,829
18300	Extensive Agriculture	1	2	0	0	0	0	0	1	1	0	2	48,053	16,642	10,900
18310	Field/Pasture	1	2	0	0	0	0	0	1	1	0	2	15,641	4,647	3,709
18320	Row Crops	1	2	0	0	0	0	0	1	1	0	2	5,896	1,732	1,332
21230	Southern Foredunes	0	0	7	30	0	0	0	0	1	0	0	521		
31200	Southern Coastal Bluff Scrub	0	0	38	42	0	3	0	0	0	0	0	317	1	
32400	Maritime Succulent Scrub	0	0	38	42	1	0	0	0	0	0	1	1,922	8	
32500	Diegan Coastal Sage Scrub	0	0	38	45	1	1	0	0	0	0	1	247,841	66,669	39,719
32700	Riversidian Sage Scrub	0	0	38	48	1	0	0	0	0	0	1	15,923		
32720	Alluvial Fan Scrub	0	0	38	48	1	3	0	0	0	0	1	1,311	499	499
35200	Sagebrush Scrub	0	0	51	63	0	0	0	0	0	0	0	3,203		
37000	Chaparral	0	0	68	70	0	0	0	0	0	0	0	93,677	23,813	12,393
37120	Southern Mixed Chaparral	0	0	68	70	0	0	0	0	0	0	0	162,376	99,697	75,484
37121	Granitic Southern Mixed Chaparral	0	0	68	70	0	0	0	0	0	0	0	27,587	3,185	589
37130	Northern Mixed Chaparral	0	0	68	70	0	0	0	0	0	0	0	107,587	14,108	7,814
37131	Granitic Northern Mixed Chaparral	0	0	68	70	0	0	0	0	0	0	0	169,977	8,810	334

Appendix B -
NCSAP Habitat Evaluation Model
Vegetation Lookup Table

Holland Code	Vegetation (Holland)	Developed	Developed or Agriculture	Ecotone Grouping	Diversity Grouping	Ca. Gnatcatcher Habitat	Rarity Ranking	Grasslands	Agriculture Type	Poor Corridor	Wetlands	SKR Suitability	SD County Acres	NCSAP Vicinity Bubble Acres	NCSAP Study Area Acres
37132	Mafic Northern Mixed Chaparral	0	0	68	70	0	0	0	0	0	0	0	19,167	3,534	
37200	Chamise Chaparral	0	0	68	76	0	0	0	0	0	0	0	61,230	8,422	5,401
37210	Granitic Chamise Chaparral	0	0	68	76	0	0	0	0	0	0	0	24,204	734	
37300	Red Shank Chaparral	0	0	68	79	0	0	0	0	0	0	0	82,445		
37500	Montane Chaparral	0	0	68	81	0	0	0	0	0	0	0	3,247	7	7
37520	Montane Manzanita Chaparral	0	0	68	81	0	0	0	0	0	0	0	903		
37530	Montane Ceanothus Chaparral	0	0	68	81	0	0	0	0	0	0	0	450		
37540	Montane Scrub Oak Chaparral	0	0	68	81	0	3	0	0	0	0	0	6,539	171	153
37830	Ceanothus crassifolius Chaparral	0	0	68	88	0	3	0	0	0	0	0	4,665	4,616	2,268
37900	Scrub Oak Chaparral	0	0	68	89	0	0	0	0	0	0	0	13,568	1,829	463
37C30	Southern Maritime Chaparral	0	0	68	93	0	3	0	0	0	0	0	3,153	1,038	487
37G00	Coastal Sage-Chaparral Scrub	0	0	38	94	0	1	0	0	0	0	0	37,173	15,750	6,696
37K00	Flat-topped Buckwheat	0	0	68	95	0	0	0	0	0	0	0	6,891	992	369
39000	Upper Sonoran Subshrub Scrub	0	0	68	80	0	0	0	0	0	0	0	1,576		
42000	Valley and Foothill Grassland	0	0	97	98	0	1	1	0	1	0	3	28,038	6,265	2,570
42100	Native Grassland	0	0	97	99	0	2	1	0	1	0	3	191	31	
42110	Valley Needlegrass Grassland	0	0	97	99	0	2	1	0	1	0	3	30,845	2,310	697
42200	Non-Native Grassland	0	0	97	102	0	1	1	0	1	0	3	87,034	31,389	24,467
42400	Foothill/Mountain Perennial Grassland	0	0	97	102	0	2	1	0	1	0	3	25,542	1,169	191
45000	Meadow and Seep	0	0	97	111	0	3	1	0	1	0	3	423	133	133
45100	Montane Meadow	0	0	97	111	0	0	1	0	1	0	3	619		
45110	Wet Montane Meadow	0	0	97	111	0	3	1	0	1	0	3	5,203	276	
45120	Dry Montane Meadows	0	0	97	111	0	0	1	0	1	0	3	1,695		
45300	Alkali Meadows and Seeps	0	0	97	111	0	3	1	0	1	0	0	134	132	27
45320	Alkali Seep	0	0	97	111	0	3	1	0	1	0	0	1,258	174	152
45400	Freshwater Seep	0	0	97	111	0	3	1	0	1	0	0	2,204	60	58
52120	Southern Coastal Salt Marsh	0	0	120	123	0	3	0	0	1	1	0	2,450	83	
52300	Alkali Marsh	0	0	120	124	0	3	0	0	1	1	0	132	132	30
52310	Cismontane Alkali Marsh	0	0	120	124	0	3	0	0	1	1	0	907	66	
52400	Freshwater Marsh	0	0	120	126	0	3	0	0	1	1	0	1,222	27	9
52410	Coastal and Valley Freshwater Marsh	0	0	120	126	0	3	0	0	1	1	0	1,560	518	160
52440	Emergent Wetland	0	0	120	130	0	3	0	0	1	1	0	784	440	4
61000	Riparian Forests	0	0	131	132	0	2	0	0	0	1	0	87	47	21

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61300	Southern Riparian Forest	0	0	131	132	0	2	0	0	0	1	0	4,843	398	102
61310	Southern Coast Live Oak Riparian Forest	0	0	131	134	0	2	0	0	0	1	0	17,492	4,948	2,807
61320	Southern Arroyo Willow Riparian Forest	0	0	131	135	0	2	0	0	0	1	0	384	179	0
61330	Southern Cottonwood-willow Riparian Forest	0	0	131	136	0	2	0	0	0	1	0	6,250	3,261	2,734
61510	White Alder Riparian Forest	0	0	131	138	0	2	0	0	0	1	0	364	20	20
62000	Riparian Woodlands	0	0	131	145	0	0	0	0	0	1	0	22	7	
62400	Southern Sycamore-alder Riparian Woodland	0	0	131	145	0	2	0	0	0	1	0	4,452	2,277	1,589
63000	Riparian Scrubs	0	0	131	146	0	2	0	0	0	1	0	91	30	0
63300	Southern Riparian Scrub	0	0	131	146	0	2	0	0	0	1	0	9,553	2,160	820
63310	Mule Fat Scrub	0	0	131	146	0	2	0	0	0	1	0	1,647	1,099	990
63320	Southern Willow Scrub	0	0	131	146	0	2	0	0	0	1	0	6,699	1,131	652
63810	Tamarisk Scrub	0	0	131	146	0	2	0	0	0	1	0	441	20	8
63820	Arrowweed Scrub	0	0	131	146	0	2	0	0	0	1	0	0	0	
70000	Woodland	0	0	154	154	0	2	0	0	0	0	0	143	15	
71000	Cismontane Woodland	0	0	154	155	0	0	0	0	0	0	0	11		
71100	Oak Woodland	0	0	154	156	0	2	0	0	0	0	0	224	90	2
71120	Black Oak Woodland	0	0	154	156	0	2	0	0	0	0	0	1,520	447	
71160	Coast Live Oak Woodland	0	0	154	158	0	2	0	0	0	0	0	17,971	11,007	8,954
71161	Open Coast Live Oak Woodland	0	0	154	158	0	2	0	0	0	0	0	9,969	1,686	1,001
71162	Dense Coast Live Oak Woodland	0	0	154	158	0	2	0	0	0	0	0	37,495	9,395	5,281
71180	Engelmann Oak Woodland	0	0	154	161	0	3	0	0	0	0	0	1,428	1,425	1,102
71181	Open Engelmann Oak Woodland	0	0	154	161	0	3	0	0	0	0	0	17,532	6,121	3,108
71182	Dense Engelmann Oak Woodland	0	0	154	161	0	3	0	0	0	0	0	16,222	8,628	4,929
77000	Mixed Oak Woodland	0	0	154	172	0	2	0	0	0	0	0	13,826	5,009	
78000	Undifferentiated Open Woodland	0	0	154	172	0	2	0	0	0	0	0	1,090	174	
79000	Undifferentiated Dense Woodland	0	0	154	172	0	2	0	0	0	0	0	2,062	768	
81100	Mixed Evergreen Forest	0	0	175	177	0	1	0	0	0	0	0	11,089	1,893	
81300	Oak Forest	0	0	154	178	0	0	0	0	0	0	0	72		
81310	Coast Live Oak Forest	0	0	154	178	0	3	0	0	0	0	0	441	183	136
81320	Canyon Live Oak Forest	0	0	154	178	0	0	0	0	0	0	0	564		
81340	Black Oak Forest	0	0	154	178	0	3	0	0	0	0	0	4,680	695	247
83140	Torrey Pine Forest	0	0	182	184	0	0	0	0	0	0	0	162	0	
84000	Lower Montane Coniferous Forest	0	0	182	187	0	0	0	0	0	0	0	391		

Appendix B -
NCSAP Habitat Evaluation Model
Vegetation Lookup Table

Holland Code	Vegetation (Holland)	Developed	Developed or Agriculture	Ecotone Grouping	Diversity Grouping	Ca. Gnatcatcher Habitat	Rarity Ranking	Grasslands	Agriculture Type	Poor Corridor	Wetlands	SKR Suitability	SD County Acres	NCSAP Vicinity Bubble Acres	NCSAP Study Area Acres
84100	Coast Range, Klamath and Peninsular Conifer	0	0	182	188	0	1	0	0	0	0	0	14	14	14
84140	Coulter Pine Forest	0	0	182	189	0	1	0	0	0	0	0	1,571	212	212
84150	Bigcone Spruce (Bigcone Douglas Fir)-Canyon	0	0	182	190	0	1	0	0	0	0	0	8,163	6,183	2,502
84230	Sierran Mixed Coniferous Forest	0	0	182	192	0	0	0	0	0	0	0	9,732		
84500	Mixed Oak/Coniferous/Bigcone/Coulter	0	0	182	196	0	3	0	0	0	0	0	21,032	38	
85100	Jeffrey Pine Forest	0	0	182	195	0	1	0	0	0	0	0	14,204	182	

Appendix C -
NCSAP Habitat Evaluation Model
Soils Lookup Table

TITLE	ORDER	DESCRIPTION	Plant Soils	SKR Ranking	Grassland Soils	Acres within NCSAP bubble
AcG	OTHER	Acid igneous rock land	0	1	0	25,155.68
AtC	VERTISOLS	Altamont clay, 5 to 9 percent slopes	2	1	0	1,318.92
AtD	VERTISOLS	Altamont clay, 9 to 15 percent slopes	2	1	0	1,014.77
AtD2	VERTISOLS	Altamont clay, 9 to 15 percent slopes, eroded	2	1	0	361.36
AtE	VERTISOLS	Altamont clay, 15 to 30 percent slopes	2	1	0	1,244.49
AtE2	VERTISOLS	Altamont clay, 15 to 30 percent slopes, eroded	2	1	0	218.95
AtF	VERTISOLS	Altamont clay, 30 to 50 percent slopes	2	1	0	116.09
AuC	ENTISOLS	Anderson very gravelly sandy loam, 5 to 9 percent slopes	0	2	1	1,193.09
AuF	ENTISOLS	Anderson very gravelly sandy loam, 9 to 45 percent slopes	0	2	1	1,058.67
AvC	ALFISOLS	Arlington coarse sandy loam, 2 to 9 percent slopes	0	3	1	617.39
AwC	VERTISOLS	Auld clay, 5 to 9 percent slopes	2	1	0	616.63
AwD	VERTISOLS	Auld clay, 9 to 15 percent slopes	2	1	0	543.42
AyE	VERTISOLS	Auld stony clay, 9 to 30 percent slopes	2	1	0	61.64
BbE	ALFISOLS	Bancas stony loam, 5 to 30 percent slopes	0	1	0	741.79
BbE2	ALFISOLS	Bancas stony loam, 5 to 30 percent slopes, eroded	0	1	0	463.85
BbG	ALFISOLS	Bancas stony loam, 30 to 65 percent slopes	0	1	0	5,152.53
BeE	ALFISOLS	Blasingame loam, 9 to 30 percent slopes	0	1	0	664.90
BgE	ALFISOLS	Blasingame stony loam, 9 to 30 percent slopes	0	1	0	159.40
BgF	ALFISOLS	Blasingame stony loam, 30 to 50 percent slopes	0	1	0	4,613.23
BlC	ALFISOLS	Bonsall sandy loam, 2 to 9 percent slopes	0	2	1	1,658.04
BlC2	ALFISOLS	Bonsall sandy loam, 2 to 9 percent slopes, eroded	0	2	1	1,245.84
BlD2	ALFISOLS	Bonsall sandy loam, 9 to 15 percent slopes, eroded	0	2	1	1,081.70
BmC	ALFISOLS	Bonsall snady loam, thick surface, 2 to 9 percent slopes	0	3	1	854.94
BnB	ALFISOLS	Bonsall-Fallbrook sandy loams, 2 to 5 percent slopes	0	3	1	2,388.76
BoC	ALFISOLS	Boomer loam, 2 to 9 percent slopes	3	3	1	147.67
BoE	ALFISOLS	Boomer loam, 9 to 30 percent slopes	3	3	1	39.63
BrE	ALFISOLS	Boomer stony loam, 9 to 30 percent slopes	3	3	1	3,906.37
BrG	ALFISOLS	Boomer stony loam, 30 to 65 percent slopes	3	3	1	2,182.78
BsC	VERTISOLS	Bosanko clay 2 to 9 percent slopes	2	1	0	660.66
BsD	VERTISOLS	Bosanko clay, 9 to 15 percent slopes	2	1	0	385.55
BsE	VERTISOLS	Bosanko clay, 15 to 30 percent slopes	2	1	0	262.64
BtC	VERTISOLS	Bosanko stony clay, 5 to 9 percent slopes	2	1	0	22.92
BuC	ALFISOLS	Bull Trail sandy loam, 5 to 9 percent slopes	0	3	1	50.98
BuD2	ALFISOLS	Bull Trail sandy loam, 9 to 15 percent slopes, eroded	0	3	1	37.76
CaC	MOLLISOLS	Calpine coarse sandy loam, 5 to 9 percent slopes	0	3	1	388.30
CaD2	MOLLISOLS	Calpine coarse sandy loam, 9 to 15 percent slopes, eroded	0	3	1	95.65
CbB	INCEPTISOLS	Carlsbad gravelly loamy sand, 2 to 5 percent slopes	3	3	1	84.39
CbC	INCEPTISOLS	Carlsbad gravelly loamy sand, 5 to 9 percent slopes	3	3	1	157.47
CbD	INCEPTISOLS	Carlsbad gravelly loamy sand, 9 to 15 percent slopes	3	3	1	282.96
CbE	INCEPTISOLS	Carlsbad gravelly loamy sand, 15 to 30 percent slopes	3	3	1	28.46
CcE	INCEPTISOLS	Carlsbad-Urban land complex, 9 to 30 percent slopes	0	3	1	4.87
CfB	ALFISOLS	Chesterton fine sandy loam, 2 to 5 percent slopes	2	3	1	171.92
CfC	ALFISOLS	Chesterton fine sandy loam, 5 to 9 percent slopes	2	3	1	309.74
CfD2	ALFISOLS	Chesterton fine sandy loam, 9 to 15 percent slopes, eroded	2	3	1	140.86
ChA	MOLLISOLS	Chino fine sandy loam, 0 to 2 percent slopes	0	3	1	737.85
ChB	MOLLISOLS	Chino fine sandy loam, 2 to 5 percent slopes	0	3	1	156.45
CkA	MOLLISOLS	Chino silt loam, saline, 0 to 2 percent slopes	0	1	0	1,015.50
ClD2	ENTISOLS	Cieneba coarse sandy loam, 5 to 15 percent slopes, eroded	0	3	1	2,781.05
ClE2	ENTISOLS	Cieneba coarse sandy loam, 15 to 30 percent slopes, eroded	0	3	1	5,348.65
ClG2	ENTISOLS	Cieneba coarse sandy loam, 30 to 65 percent slopes, eroded	0	3	1	9,174.47
CmE2	ENTISOLS	Cieneba rocky coarse sandy loam, 9 to 30 percent slopes, eroded	0	3	1	13,845.58
CmrG	ENTISOLS	Cieneba very rocky coarse sandy loam, 30 to 75 percent slopes	0	1	0	59,842.15
CnE2	ENTISOLS	Cieneba-Fallbrook rocky sandy loam,9 to 30 percent slope,eroded	0	3	1	10,932.63
CnG2	ENTISOLS	Cieneba-Fallbrook rocky sandy loams, 30 to 65 percent slopes, eroded	0	3	1	58,183.59
Co	OTHER	Clayey alluvial land	3	1	0	848.46
CsB	ENTISOLS	Corralitos loamy sand, 0 to 5 percent slopes	3	3	1	626.87
CsC	ENTISOLS	Corralitos loamy sand, 5 to 9 percent slopes	3	3	1	936.66
CsD	ENTISOLS	Corralitos loamy sand, 9 to 15 percent slopes	3	3	1	486.86
CtE	MOLLISOLS	Crouch coarse sandy loam, 5 to 30 percent slopes	0	3	1	1,234.55
CtF	MOLLISOLS	Crouch coarse sandy loam, 30 to 50 percent slopes	0	3	1	914.43
CuE	MOLLISOLS	Crouch rocky coarse sandy loam, 5 to 30 percent slopes	0	3	1	520.31
CuG	MOLLISOLS	Crouch rocky coarse sandy loam, 30 to 70 percent slopes	0	3	1	3,323.00

Appendix C -
NCSAP Habitat Evaluation Model
Soils Lookup Table

TITLE	ORDER	DESCRIPTION	Plant Soils	SKR Ranking	Grassland Soils	Acres within NCSAP bubble
CvG	MOLLISOLS	Crouch stony fine sandy loam, 30 to 75 percent slopes	0	3	1	2,001.33
DaC	VERTISOLS	Diablo clay, 2 to 9 percent slopes	2	1	0	1,124.52
DaD	VERTISOLS	Diablo clay, 9 to 15 percent slopes	2	1	0	1,189.22
DaE	VERTISOLS	Diablo clay, 15 to 30 percent slopes	2	1	0	210.79
DaE2	VERTISOLS	Diablo clay, 15 to 30 percent slopes	2	1	0	596.25
DaF	VERTISOLS	Diablo clay, 30 to 50 percent slopes	2	1	0	18.10
DoE	VERTISOLS	Diablo-Olivenhain complex, 9 to 30 percent slopes	2	1	0	103.78
EsC	INCEPTISOLS	Escondido very fine sandy loam, 5 to 9 percent slopes	0	3	1	1,253.88
EsD2	INCEPTISOLS	Escondido very fine sandy loam, 9 to 15 percent slopes, eroded	0	3	1	2,512.43
EsE2	INCEPTISOLS	Escondido very fine sandy loam, 15 to 30 percent slopes, eroded	0	3	1	2,503.04
EvC	INCEPTISOLS	Escondido very fine sandy loam, deep, 5 to 9 percent slopes	0	3	1	111.77
ExE	ENTISOLS	Exchequer rocky silt loam, 9 to 30 percent slopes	0	1	0	1,585.59
ExG	ENTISOLS	Exchequer rocky silt loam, 30 to 70 percent slopes	0	1	0	6,817.21
FaB	ALFISOLS	Fallbrook sandy loam, 2 to 5 percent slopes	0	3	1	675.51
FaC	ALFISOLS	Fallbrook sandy loam, 5 to 9 percent slopes	0	3	1	4,625.98
FaC2	ALFISOLS	Fallbrook sandy loam, 5 to 9 percent slopes, eroded	0	3	1	5,796.72
FaD2	ALFISOLS	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	0	3	1	24,051.04
FaE2	ALFISOLS	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	0	3	1	16,113.74
FaE3	ALFISOLS	Fallbrook sandy loam, 9 to 30 percent slopes, severely eroded	0	3	1	2,265.89
FeC	ALFISOLS	Fallbrook rocky sandy loam, 5 to 9 percent slopes	0	3	1	848.33
FeE	ALFISOLS	Fallbrook rocky sandy loam, 9 to 30 percent slopes	0	3	1	3,369.78
FeE2	ALFISOLS	Fallbrook rocky sandy loam, 9 to 30 percent slopes, eroded	0	3	1	3,915.43
FvD	ALFISOLS	Fallbrook-Vista sandy loams, 9 to 15 percent slopes	0	3	1	4,081.53
FvE	ALFISOLS	Fallbrook-Vista sandy loams, 15 to 30 percent slopes	0	3	1	5,413.56
FwF	MOLLISOLS	Friant fine sandy loam, 30 to 50 percent slopes	0	1	0	728.69
FxE	MOLLISOLS	Friant rocky fine sandy loam, 9 to 30 percent slopes	0	1	0	1,816.91
FxG	MOLLISOLS	Friant rocky fine sandy loam, 30 to 70 percent slopes	0	1	0	4,526.52
GaE	ENTISOLS	Gaviota fine sandy loam, 9 to 30 percent slopes	0	3	1	81.59
GaF	ENTISOLS	Gaviota fine sandy loam, 30 to 50 percent slopes	0	3	1	569.09
GoA	MOLLISOLS	Grangeville fine sandy loam, 0 to 2 percent slopes	0	3	1	90.84
GrA	ALFISOLS	Greenfield sandy loam, 0 to 2 percent slopes	0	3	1	1,613.56
GRAVEL PIT	OTHER	GRAVEL PIT	0	0	0	280.53
GrB	ALFISOLS	Greenfield sandy loam, 2 to 5 percent slopes	0	3	1	1,575.43
GrC	ALFISOLS	Greenfield sandy loam, 5 to 9 percent slopes	0	3	1	1,550.46
GrD	ALFISOLS	Greenfield sandy loam, 9 to 15 percent slopes	0	3	1	657.39
HmD	ALFISOLS	Holland fine sandy loam, 5 to 15 percent slopes	0	3	1	927.65
HmE	ALFISOLS	Holland fine sandy loam, 15 to 30 percent slopes	0	3	1	1,209.24
HnE	ALFISOLS	Holland stony fine sandy loam, 5 to 30 percent slopes	0	3	1	5,877.40
HnG	ALFISOLS	Holland stony fine sandy loam, 30 to 60 percent slopes	0	3	1	3,548.45
HoC	ALFISOLS	Holland fine sandy loam, deep, 2 to 9 percent slopes	0	3	1	39.64
HrC	ALFISOLS	Huerhuero loam, 2 to 9 percent slopes	2	2	1	4,885.93
HrC2	ALFISOLS	Huerhuero loam, 5 to 9 percent slopes, eroded	2	2	1	1,296.36
HrD	ALFISOLS	Huerhuero loam, 9 to 15 percent slopes	2	2	1	711.80
HrD2	ALFISOLS	Huerhuero loam, 9 to 15 percent slopes, eroded	2	2	1	771.40
HrE2	ALFISOLS	Huerhuero loam, 15 to 30 percent slopes, eroded	2	2	1	885.61
HuC	ALFISOLS	Huerhuero-Urban land complex, 2 to 9 percent slopes	2	3	1	118.61
LaE2	MOLLISOLS	La Posta loamy coarse sand, 5 to 30 percent slopes, eroded	0	3	1	23.73
LcE	MOLLISOLS	La Posta rocky loamy coarse sand, 5 to 30 percent slopes	0	3	1	908.75
LcE2	MOLLISOLS	La Posta rocky loamy coarse sand, 5 to 30 percent slopes, eroded	0	3	1	175.06
LeC	ALFISOLS	Las Flores loamy fine sand, 2 to 9 percent slopes	2	2	1	1,273.12
LeC2	ALFISOLS	Las Flores loamy fine sand, 5 to 9 percent slopes	2	2	1	1,797.63
LeD	ALFISOLS	Las Flores loamy fine sand, 9 to 15 percent slopes	2	2	1	135.95
LeD2	ALFISOLS	Las Flores loamy fine sand, 9 to 15 percent slopes, eroded	2	2	1	1,800.32
LeE	ALFISOLS	Las Flores loamy fine sand, 15 to 30 percent slopes	2	2	1	288.45
LeE2	ALFISOLS	Las Flores loamy fine sand, 15 to 30 percent slopes, eroded	2	2	1	450.81
LeE3	ALFISOLS	Las Flores loamy fine sand, 9 to 30 percent slopes, severely eroded	2	2	1	814.55
LfC	ALFISOLS	Las Flores-Urban land complex, 2 to 9 percent slopes	2	2	1	446.24
LpB	ALFISOLS	Las Posas fine sandy loam, 2 to 5 percent slopes	3	2	1	308.12
LpC	ALFISOLS	Las Posas fine sandy loam, 5 to 9 percent slopes	3	2	1	794.71
LpC2	ALFISOLS	Las Posas fine sandy loam, 5 to 9 percent slopes, eroded	3	2	1	790.23
LpD2	ALFISOLS	Las Posas fine sandy loam, 9 to 15 percent slopes, eroded	3	2	1	3,553.76
LpE2	ALFISOLS	Las Posas fine sandy loam, 15 to 30 percent slopes, eroded	3	2	1	3,287.63
LrE	ALFISOLS	Las Posas stony fine sandy loam, 9 to 15 percent slopes	3	2	1	6,315.32

Appendix C -
NCSAP Habitat Evaluation Model
Soils Lookup Table

TITLE	ORDER	DESCRIPTION	Plant Soils	SKR Ranking	Grassland Soils	Acres within NCSAP bubble
LrE2	ALFISOLS	Las Posas stony fine sandy loam, 9 to 30 percent slopes, eroded	3	2	1	1,292.10
LrG	ALFISOLS	Las Posas stony fine sandy loam, 30 to 65 percent slopes	3	2	1	28,662.42
LsE	MOLLISOLS	Linne clay loam, 9 to 30 percent slopes	2	2	1	155.50
Lu	OTHER	Loamy alluvial land	2	3	1	1,260.06
LvF3	ALFISOLS	Loamy alluvial land-Huerhuero complex, 9 to 50 percent slopes, severely ero	2	3	1	2,721.87
MINE	OTHER	Mine and quarry	0	0	0	32.02
MIC	ENTISOLS	Marina loamy coarse sand, 2 to 9 percent slopes	3	3		21.60
MrG	OTHER	Metamorphic rock land	2	1	0	839.50
MvC	MOLLISOLS	Mottsville loamy coarse sand, 2 to 9 percent slopes	0	3		59.48
MvD	MOLLISOLS	Mottsville loamy coarse sand, 9 to 15 percent slopes	0	3	1	41.44
OhC	ALFISOLS	Olivenhain cobbly loam, 2 to 9 percent slopes	2	1	0	258.67
OhE	ALFISOLS	Olivenhain cobbly loam, 9 to 30 percent slopes	2	1	0	1,477.54
OhF	ALFISOLS	Olivenhain cobbly loam, 30 to 50 percent slopes	2	1	0	3,880.67
PeA	ALFISOLS	Placentia sandy loam, 0 to 2 percent slopes	0	2	1	498.74
PeC	ALFISOLS	Placentia sandy loam, 2 to 9 percent slopes	0	2	1	7,107.03
PeC2	ALFISOLS	Placentia sany laom, 2 to 9 percent slopes, eroded	0	2	1	2,215.74
PeD2	ALFISOLS	Placentia sandy loam, 9 to 15 percent slopes, eroded	0	2	1	1,617.57
PfA	ALFISOLS	Placentia sandy loam, thick surface, 0 to 2 percent slopes	0	3	1	755.40
PfC	ALFISOLS	Placentia sandy loam, thick surface, 2 to 9 percent slopes	0	3	1	3,345.62
RaA	ALFISOLS	Ramona sandy loam, 0 to 2 percent slopes	0	3	1	583.64
RaB	ALFISOLS	Ramona sandy loam, 2 to 5 percent slopes	0	3	1	3,334.67
RaC	ALFISOLS	Ramona sandy loam, 5 to 9 percent slopes	0	3	1	2,751.63
RaC2	ALFISOLS	Ramona sandy loam, 5 to 9 percent slopes, eroded	0	3	1	1,836.79
RaD2	ALFISOLS	Ramona sandy loam, 9 to 15 percent slopes, eroded	0	3	1	2,764.62
RcD	ALFISOLS	Ramona gravelly sandy loam, 9 to 15 percent slopes	0	3	1	310.90
RcE	ALFISOLS	Ramona gravelly sandy loam, 15 to 30 percent slopes	0	3	1	789.67
RdC	ALFISOLS	Redding gravelly loam, 2 to 9 percent slopes	2	2	1	3.71
ReE	ALFISOLS	Redding cobbly loam, 9 to 30 percent slopes	0	2	1	132.88
RkA	ENTISOLS	Reiff fine sandy loam, 0 to 2 percent slopes	0	3	1	540.66
RkB	ENTISOLS	Reiff fine sandy loam, 2 to 5 percent slopes	0	3	1	154.08
RkC	ENTISOLS	Reiff fine sandy loam, 5 to 9 percent slopes	0	3	1	110.47
Rm	OTHER	Riverwash	2	1	0	6,095.46
RuG	OTHER	Rough broken land	0	2	1	4,149.13
SbA	MOLLISOLS	Salinas clay loam, 0 to 2 percent slopes	2	2	1	460.74
SbC	MOLLISOLS	Salinas clay loam, 2 to 9 percent slopes	2	2	1	753.07
ScA	MOLLISOLS	Salinas clay, 0 to 2 percent slopes	2	2	1	126.31
ScB	MOLLISOLS	Salinas clay, 2 to 5 percent slopes	2	2	1	64.97
SmE	ALFISOLS	San Miguel rocky silt loam, 9 to 30 percent slopes	3	1	0	2,213.59
SnG	ALFISOLS	San Miguel-Exchequer rocky silt loams, 9 to 70 percent slopes	3	1	0	7,280.41
SpE2	MOLLISOLS	Sheephead rocky fine sandy loam,9 to 30 percent slopes,eroded	0	1	0	936.33
SpG2	MOLLISOLS	Sheephead rocky fine sandy loam,30 to 65 percent slopes,eroded	0	1	0	5,580.22
SsE	ENTISOLS	Soboba stony loamy sand, 9 to 30 percent slopes	0	2	1	4,433.63
StG	OTHER	Steep gullied land	0	2	1	4,248.18
SvE	OTHER	Stony land	0	1	0	1,612.12
TeF	OTHER	Terrace escarpments	0	1	0	2,155.85
Tf	OTHER	Tidal flats	0	0	0	149.58
ToE2	MOLLISOLS	Tollhouse rocky coarse sandy loam,5 to 30 percent slopes,eroded	0	2	1	47.29
ToG	MOLLISOLS	Tollhouse rocky coarse sandy loam, 30 to 65 percent slopes	0	2	1	6,209.99
TuB	ENTISOLS	Tujunga sand, 0 to 5 percent slopes	0	1	0	6,308.01
Ur	URBAN	Urban land	0	0	0	30.83
VaA	MOLLISOLS	Visalia sandy loam, 0 to 2 percent slopes	0	3	1	8,921.80
VaB	MOLLISOLS	Visalia sandy loam, 2 to 5 percent slopes	0	3	1	10,974.10
VaC	MOLLISOLS	Visalia sandy loam, 5 to 9 percent slopes	0	3	1	2,681.24
VaD	MOLLISOLS	Visalia sandy loam, 9 to 15 percent slopes	0	3	1	687.99
VbB	MOLLISOLS	Visalia gravelly sandy loam, 2 to 5 percent slopes	0	3	1	482.13
VbC	MOLLISOLS	Visalia gravelly sandy loam, 5 to 9 percent slopes	0	3	1	11.09
VsC	INCEPTISOLS	Vista coarse sandy loam, 5 to 9 percent slopes	0	3	1	3,734.61
VsD	INCEPTISOLS	Vista coarse sandy loam, 9 to 15 percent slopes	0	3	1	2,642.12
VsD2	INCEPTISOLS	Vista coarse sandy loam, 9 to 15 percent slopes, eroded	0	3	1	2,898.09
VsE	INCEPTISOLS	Vista coarse sandy loam, 15 to 30 percent slopes	0	3	1	5,087.91
VsE2	INCEPTISOLS	Vista coarse sandy loam, 15 to 30 percent slopes, eroded	0	3	1	3,497.07
VsG	INCEPTISOLS	Vista coarse sandy loam, 30 to 65 percent slopes	0	3	1	1,348.62

Appendix C -
NCSAP Habitat Evaluation Model
Soils Lookup Table

TITLE	ORDER	DESCRIPTION	Plant Soils	SKR Ranking	Grassland Soils	Acres within NCSAP bubble
VvD	INCEPTISOLS	Vista rocky coarse sandy loam, 5 to 15 percent slopes	0	3	1	4,546.34
VvE	INCEPTISOLS	Vista rocky coarse sandy loam, 15 to 30 percent slopes	0	3	1	3,250.68
VvG	INCEPTISOLS	Vista rocky coarse sandy loam, 30 to 65 percent slopes	0	3	1	1,907.40
WATER	WATER	WATER	0	0	0	1,552.85
WmB	ALFISOLS	Wyman loam, 2 to 5 percent slopes	2	3	1	971.23
WmC	ALFISOLS	Wyman loam, 5 to 9 percent slopes	2	3	1	1,491.86
WmD	ALFISOLS	Wyman loam, 9 to 15 percent slopes	2	3	1	311.50