

Covered Species Habitat Loss by Ecosystem Tracking System

**Report from Clark County, Nevada, Department of Air Quality and Environmental Management,
Desert Conservation Program to Science Advisor, Desert Research Institute**

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Executive Summary

The Clark County Multiple Species Habitat Conservation Plan's (MSHCP: RECON 2000) Adaptive Management Program (AMP) tracks covered species habitat loss by ecosystem to determine the impacts of the Section 10(a) Incidental Take Permit (USFWS 2001b) on the seventy-eight (78) covered species. The results of a spatial analysis of land use trends (Clark County, Nevada 2007) was compared to species habitats and land management categories as described in the MSHCP. Results of this habitat analysis indicate that the majority of habitat loss (41,988 acres) has occurred in the Mojave Desert Scrub ecosystem, and those 41,988 acres represent approximately 1% of that ecosystem's distribution within Clark County. Recommendations for enhancement of the present covered species habitat loss by ecosystem tracking system are presented.

Introduction

The AMP is tasked in the MSHCP and Biological Opinion for the Section 10(a) Incidental Take Permit with tracking habitat loss by ecosystem in order to ensure balance between take and conservation. Thus, it can be inferred that habitat loss is equivalent to take or land disturbance under the Section 10(a) Incidental Take Permit. Data are available on the spatial extent of the ecosystems and land management categories defined in the MSHCP. A spatial analysis of disturbed areas within the term and geographic extent of the Section 10(a) Incidental Take Permit was recently conducted by Clark County, Nevada, Department of Air Quality and Environmental Management, Desert Conservation Program staff (Clark County, Nevada, 2007) and these results are herein compared to the MSHCP ecosystem and land management categories.

Methods and Materials

The intent of this analysis was to analyze MSHCP covered species habitat loss by ecosystem between 2001 and 2006 within Clark County. For the purpose of this analysis the 2001 and 2006 land use data sets created under the Land Use Trends Tracking System (Clark County, Nevada 2007) and the RECON ecosystem data set were used. As in the MSHCP (RECON 2000), ecosystems are used as surrogate measures of species habitat location and spatial extent. Using simple GIS spatial overlay techniques between the land use data sets and the RECON ecosystem data set, a summary of acres lost by ecosystem were produced. It must be noted that of the eleven (11) ecosystems defined in the MSHCP, there is currently no spatial data set available for the Spring ecosystem. The final analyses that were generated for this task are: species habitat loss for the entire County, species habitat loss within the Las Vegas Valley BLM Disposal Area, species habitat loss within all of the Clark County BLM Disposal Areas, species habitat loss outside of the BLM Disposal Areas but within the County, and percentage of acres lost within MSHCP ecosystem and land management categories. The MSHCP land management category data set divides the MSHCP area into four (4) categories of decreasing intensity of species-focused management actions: Intensively Managed Areas (IMA), Less Intensively Managed Areas

(LIMA), Multiple-Use Managed Areas (MUMA) and Unmanaged Areas (UMA). This data set is hereafter referred to as the IMA/LIMA/MUMA/UMA data set.

The following steps were taken to generate the summary totals. All of the GIS overlay analyses were performed using ArcGIS 9.2.

1. Union of the 2001 land use geodatabase with RECON's veg98 ecosystem data set.
2. Union the result of step one with the 2006 land use geodatabase. The resulting geodatabase was used in the calculation of habitat lost per ecosystem for the entire county.
3. Union the result of step two with the IMA/LIMA/MUMA/UMA data set. The resulting geodatabase was used in the calculation of habitat lost per MSHCP land management category.
4. Clip the result of step two using the BLM disposal boundary data set. The resulting geodatabase was used in the calculation of habitat lost per ecosystem within the full BLM disposal boundary.
5. Extract the Las Vegas Valley portion from the result of step 4. The resulting geodatabase was used in the calculation of habitat lost per ecosystem within the Las Vegas Valley portion of the BLM disposal boundary.
6. Exported the final geodatabase tables into Access database software.
7. In Access, fields were summarized by year, acres, and ecosystem.

QA/QC

Each field in the Access table was summarized and compared with acreages generated by the Land Use Trends Tracking System (Clark County 2007).

Results

The results of the analysis are show below. Figure 1 and Chart 1 show habitat loss within ecosystems from 2001 to 2006 for all of Clark County.

Figure 1: Map of habitat loss and MSHCP ecosystems between 2001 and 2006 in Clark County, Nevada.

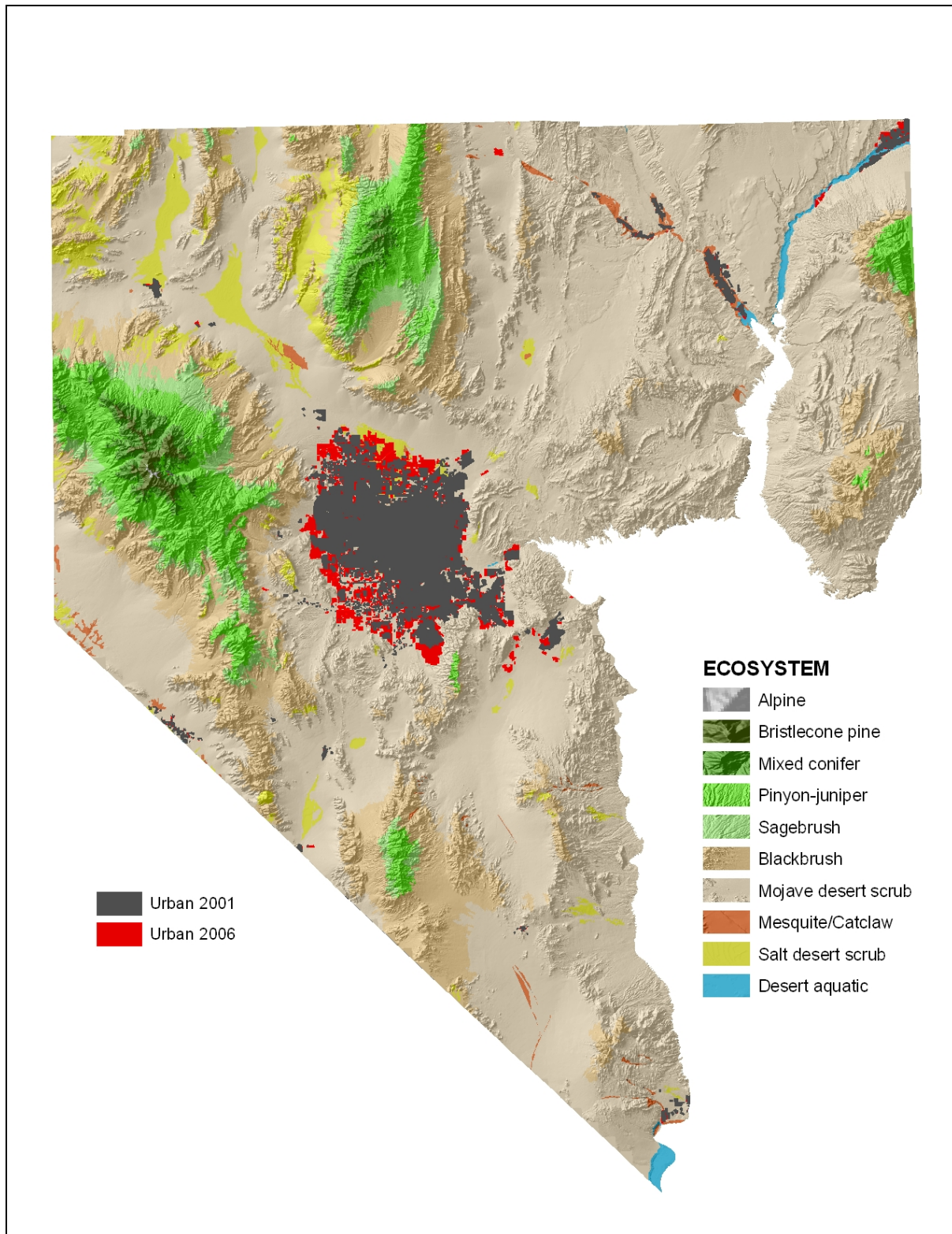


Chart 1: Acres of habitat loss by MSHCP ecosystem category within Clark County, Nevada.

| ECOSYSTEM | County Total | 2001 Urban | 2006 Urban | Acres lost |
|---------------------|--------------|------------|------------|------------|
| Alpine | 479 | 0 | 0 | 0 |
| Blackbrush | 831,531 | 0 | 23 | 23 |
| Bristlecone pine | 15,856 | 0 | 0 | 0 |
| Desert aquatic | 21,599 | 3,451 | 4,036 | 585 |
| Mesquite/Catclaw | 34,466 | 6,718 | 7,531 | 813 |
| Mixed conifer | 56,413 | 5 | 5 | 1 |
| Mojave desert scrub | 3,467,118 | 183,625 | 225,613 | 41,987 |
| Pinyon-juniper | 281,695 | 52 | 52 | 0 |
| Sagebrush | 138,949 | 0 | 0 | 0 |
| Salt desert scrub | 208,565 | 7,239 | 13,492 | 6,253 |
| | | | | |
| | | | Total | 49,662 |

Charts two through 4 show habitat loss within ecosystems from 2001 to 2006 for all Federal Disposal Areas within Clark County, the Las Vegas Valley Disposal Area, and areas external to Federal Disposal Areas within Clark County respectively. In each case, the majority of acres lost were in the Mojave Desert Scrub ecosystem.

Chart 2. Habitat loss in MSHCP ecosystems between 2001 and 2006, within all Federal Disposal Areas in Clark County, Nevada.

| ECOSYSTEM | Total Acres | 2001 Urban | 2006 Urban | Acres Lost |
|---------------------|-------------|------------|------------|------------|
| Blackbrush | 1,614 | 0 | 0 | 0 |
| Desert aquatic | 121 | 0 | 0 | 0 |
| Mesquite/Catclaw | 2,835 | 399 | 1,112 | 713 |
| Mojave desert scrub | 380,124 | 170,501 | 208,097 | 37,595 |
| Salt desert scrub | 21,337 | 6,087 | 12,290 | 6,203 |
| | | | | |
| | | | Total | 44,512 |

Chart 3. Habitat loss in MSHCP ecosystems between 2001 and 2006, within the Las Vegas Valley Disposal Area in Clark County, Nevada.

| ECOSYSTEM | Total Acres | 2001 Urban | 2006 Urban | Acres Lost |
|---------------------|-------------|------------|------------|------------|
| Blackbrush | 1,364 | 0 | 0 | 0 |
| Mesquite/Catclaw | 1,529 | 348 | 1,060 | 713 |
| Mojave desert scrub | 367,113 | 169,615 | 206,633 | 37,019 |
| Salt desert scrub | 20,326 | 6,063 | 12,261 | 6,198 |
| | | | | |
| | | | Total | 43,929 |

Chart 4. Habitat loss in MSHCP ecosystems between 2001 and 2006, external to Federal Disposal Areas in Clark County, Nevada.

| ECOSYSTEM | Total Acres | 2001 Urban | 2006 Urban | Acres Lost |
|---------------------|-------------|------------|------------|------------|
| Alpine | 479 | 0 | 0 | 0 |
| Blackbrush | 829,916 | 0 | 23 | 23 |
| Bristlecone pine | 15,856 | 0 | 0 | 0 |
| Desert aquatic | 21,478 | 3,451 | 4,036 | 585 |
| Mesquite/Catclaw | 31,630 | 6,320 | 6,419 | 100 |
| Mixed conifer | 56,413 | 5 | 5 | 1 |
| Mojave desert scrub | 3,086,994 | 13,124 | 17,516 | 4,392 |
| Pinyon-juniper | 281,695 | 52 | 52 | 0 |
| Sagebrush | 138,949 | 0 | 0 | 0 |
| Salt desert scrub | 187,228 | 1,153 | 1,202 | 50 |
| | | | | |
| | | | Total | 5,150 |

Chart five shows the percent of total habitat loss in each management category for each ecosystem from 2001 to 2006 for all of Clark County. This chart is presented as percentage of habitat loss to compensate for a flaw in the original RECON vegetation map. The number of acres of an ecosystem remaining in the County or specific area cannot be calculated using the total acres from the tables. The classification system used in the RECON vegetation map included urban and agriculture in several of the ecosystem types (e.g. Mojave desert scrub, salt desert scrub). Thus some of the acres included in the totals were actually already urban or agriculture at the time the vegetation map was created (1998). Unfortunately, urban and agriculture cannot be easily separated from the ecosystems to perform this analysis because they were mapped at a coarse scale and tend to overestimate the amount of each present in 1998.

Chart 5. Percentage (%) habitat loss in MSHCP ecosystems and MSHCP land management categories between 2001 and 2006, in Clark County, Nevada.

| MSHCP ECOSYSTEM | IMA | LIMA | MUMA | UMA | OVERALL ECOSYSTEM % LOSS |
|---|------|------|------|-------|--------------------------|
| Alpine | 0 | n/a | n/a | n/a | 0 |
| Blackbrush | 0 | 0 | 0 | 0.26 | 0.003 |
| Bristlecone pine | 0 | 0 | n/a | 0 | 0 |
| Desert aquatic | 1.1 | n/a | 1.3 | 4.43 | 2.71 |
| Mesquite/Catclaw | 0.01 | n/a | 3.81 | 2.79 | 2.36 |
| Mixed conifer | 0 | 0 | n/a | 0.04 | 0.001 |
| Mojave desert scrub | 0.03 | 0.07 | 1.34 | 5.78 | 1.21 |
| Pinyon-juniper | 0 | 0 | 0 | 0.002 | 0 |
| Sagebrush | 0 | 0 | 0 | 0 | 0 |
| Salt desert scrub | 0 | 0 | 3.93 | 20.56 | 3 |
| OVERALL LAND MANAGEMENT CATEGORY % LOSS | 0.02 | 0.02 | 1.14 | 6.12 | |

Recommendations

Future recommendations for the covered species habitat loss by ecosystem tracking analysis would be to enhance both of the 2001 and 2006 land use data sets (Clark County, Nevada, 2007). As new imagery and GIS data sets become more available, future land use data sets will become better products to work with. As with updating the current land use data sets, vegetation and ecosystem data sets could also be enhanced. The addition of an appropriate data set that shows the boundaries of the Springs ecosystem, perhaps based upon the National Wetlands Inventory (NWI), would also improve this analysis.

An additional recommendation would be to refine and update the RECON Vegetation and Ecosystem data set. This data set was completed in 1998 and there are new data sets that were not then available that would be useful to include. There are new or updated vegetation data sets available such as Mesquite and Acacia woodlands and riparian areas that could be merged into the RECON data set that would possibly alter the ecosystem boundaries. A proposed MSHCP project from the 2005-2007 Implementation Plan and Budget to enhance an existing Mojave Desert Scrub vegetation community GIS data set is currently under negotiation. Other vegetation layers may get updated within this project.

The RECON vegetation data set was clipped to an older (pre-2000) Clark County boundary. The Clark County boundary was realigned in the early 2000s. This data set should be clipped to the current Clark County boundary.

The IMA/LIMA/UMA/MUMA data set provided from RECON is out of date (1998) and a newer data set reflecting legislative changes to the land management categories is being produced by the BLM. This data set may be available soon and could be used for future analysis.

Another vegetation data set that could be used for habitat loss by ecosystem is the SWREGAP data set. This vegetation data set contains a more highly defined vegetation class schema than the RECON data set. GIS and satellite imagery from 1999/2000/2001 was used to create the SWREGAP data set. To perform future analysis the SWREGAP vegetation classes would have to be combined or merged to create the ecosystem categories.

A future benefit to the MSHCP would be a customized GIS or Internet based application that would perform on-the-fly landscape analysis. The ideal application would allow a user to input various GIS data sets along with land use/ land cover data sets and have the ability to run and summarize various landscape metrics. Having the ability to generate and output maps and summary data such as, land use proportion, patch analysis, and fragmentation metrics within a custom application would enable non GIS users to generate output data and maps simply.

There are a number of software packages that claims to have some of these capabilities. A few of the software packages that have been identified are Habitrak, ATtiLA, Fragstats, Patch Analyst, NatureServe, and IDRIS Andes. A few of these packages are free or can be purchased at a low cost but others may be expensive and would need significant upgrades to them to meet our needs. Habitrak has been integrated with the California Division of Fish and Game web site (<http://www.dfg.ca.gov/nccp/habitrak/>) and shows a lot of promise. A comprehensive software search and cost assessment needs to be completed to identify various software packages that would meet the MSHCP needs.

Reference Imagery/Data

Clark County 2001 land use geodatabase (2007)

Clark County 2006 land use geodatabase (2007)

The 2001 and 2006 urban data sets created for task 5.

RECON exmgt data (IMA/LIMA/MUMA/UMA 1998)

RECON VEG data (1998)

BLM Disposal Boundary areas

Literature Cited

Clark County, Nevada. 2007. Land Use Trends Tracking System. Unpublished report from Clark County, Nevada as Plan Administrator to Science Advisor, Desert Research Institute.

Clark County, Nevada. 2006. Adaptive Management Report for the Clark County, Nevada Multiple Species Habitat Conservation Plan. Unpublished report from Clark County, Nevada as Plan Administrator to US Fish and Wildlife Service. 116 pp.

[RECON] Regional Environmental Consultants, Inc. 2000. Final Clark County Nevada Multiple Species Habitat Conservation Plan and Environmental Impact Statement. Prepared for Clark County Administrative Services.

[USFWS] US Fish and Wildlife Services. 2001a. Biological Opinion for a Section 10 Take Permit for the Clark County Multiple Species Habitat Conservation Plan. Carson City, Nevada.

USFWS. 2001b. Section 10 Take Permit for the Clark County Multiple Species Habitat Conservation Plan. Carson City, Nevada.