IV. Affected Environment

This chapter of the EA provides a description of the relevant baseline human, physical, and natural environment conditions that could potentially be affected by the Proposed Action. Specifically, the EA considers effects on the environmental resource categories identified in FAA Order 1050.1E.[1] The environmental impacts of the Proposed Action and the No Action alternative are presented in Chapter V, *Environmental Consequences*.

4.1 Generalized Study Area

For the purposes of describing the existing conditions in the area of the Proposed Action and the No Action alternative, the FAA developed a generalized study area (GSA) following the methodology described below and based on FAA's prior environmental experience with similar actions. The extent of the GSA allows for a reasonable evaluation of potential impacts associated with the aircraft flight path changes considered under the Proposed Action. Two overall objectives guided the development of the GSA:

- FAA Order 1050.1E, Appendix A, Paragraph 14.5e requires consideration of impacts of airspace actions from the ground up to 10,000 feet AGL if the study area is larger than the immediate vicinity of the airport or involves more than one airport.[2] Aircraft flight path elevations were identified for both the No Action alternative (based upon existing flight activity) and the Proposed Action (based upon routes defined in the airspace redesign). For this analysis, the GSA was designed to capture all flight paths identified in the radar data and Proposed Action design up to the point at which 95 percent of aircraft operating along these paths are above 10,000 feet AGL. In other words, the GSA encompasses the area in which 95 percent of the aircraft arriving at or departing from the EA Airports are at elevations between the ground and 10,000 feet AGL.
- The lateral extent of the GSA was concisely defined to focus on areas of traffic flow.

The following sections summarize the data acquired and methodology employed to define the GSA, both of which are further discussed in **Appendix F-1. Exhibit IV-1** presents the GSA developed for this EA.

[1] U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures,* March 20, 2006.

[2] U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures,* Appendix A, Paragraph 14.5e, March 20, 2006.

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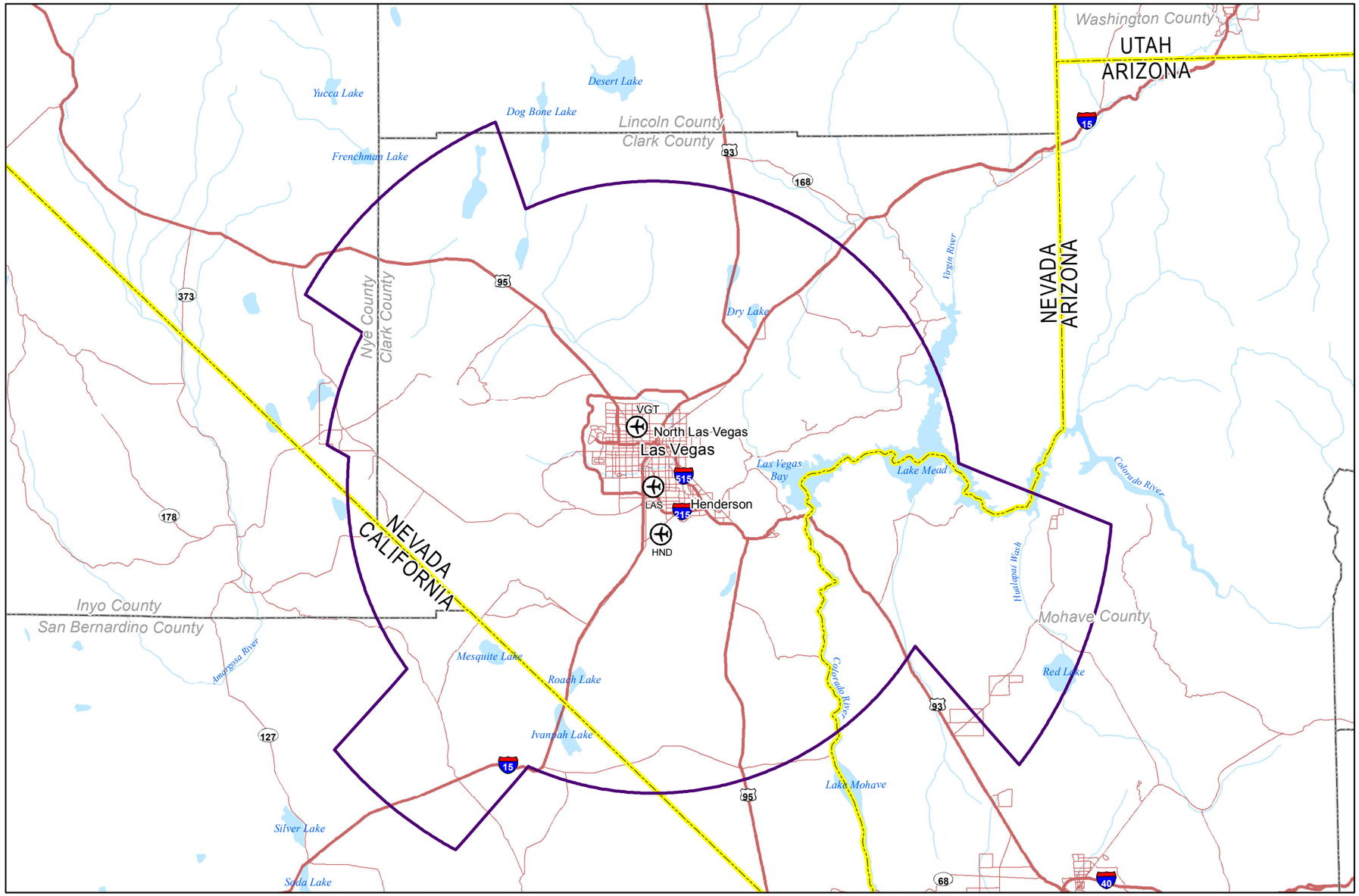

LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

Sources: Metron Aviation, July 2010 (generalized study area boundary); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-1

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north

Generalized Study Area

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4.1.1 Data Acquisition to Develop the Generalized Study Area

The bounds of the GSA were established to encompass the geographic areas where existing or future (i.e., Proposed Action) aircraft routes could potentially affect environmental resources. Existing routes were based on radar data that were collected and evaluated to understand the existing arrival and departure IFR flight paths in the Las Vegas Area within an initial 100-nautical-mile box centered on LAS. The initial 100-nautical-mile box was analyzed and subsequently reduced to a size that, while still larger than a typical GSA for this type of study, was based on a detailed analysis of radar data and topography, given the varied terrain in the Las Vegas area. The analysis of radar data included an assessment of existing flight tracks and profiles (altitudes) as well as consideration of proposed flight tracks and profiles. The need to capture 95 percent of aircraft operating within 10,000 feet of the ground, combined with the varied topography, is used to set the altitude limit of the GSA, for which the highest point is located in the northwest quadrant.[3]

Radar data collected for this EA covered multiple periods between May 2009 and November 2009. This data collection period was verified to represent day-to-day variations in numbers of aircraft operations to and from various destinations and origins, and in runway usage. Furthermore, non-typical activities that may affect runway usage, such as closure of a runway due to construction activities, did not occur during this period. Runway 7R-25L was closed for rehabilitation between November 2008 and April 2009; therefore, this period reflects nonstandard runway activity, so radar data from this period was not used to determine the GSA. The timeframe sampled, which excluded the period during which Runway 7R-25L was closed, was sufficient to reflect the variation in runway configuration usage for LAS, as discussed in **Appendix E**. Procedures developed for the Proposed Action were reviewed to ensure that the GSA boundaries captured areas that may be affected by the Proposed Action.

Given the varied terrain in the Las Vegas area, United States Geological Survey (USGS) data were acquired to define ground elevations throughout the study area.

4.1.2 Methodologies Used to Determine the Generalized Study Area

Two separate methodologies were employed to develop and refine the GSA, as discussed in Appendix F-1 and summarized in this section.

The GSA is a three-dimensional space designed to capture aircraft operations to and from the EA airports as they operate below 10,000 feet AGL. The top elevation of the GSA is defined by an altitude (10,000 feet) AGL and the lateral dimension defined by the point at which the arriving and departing aircraft penetrate the 10,000-foot AGL altitude based on analysis of historical radar data and proposed arrival and departure procedures for the Proposed Action. In other words, the GSA captures the maximum *range* of flight tracks (or distance from the airport[s]) where 95 percent of aircraft cross the *altitude* threshold of 10,000 feet AGL, referred to as the range-altitude methodology.

Initially, the highest point in the Las Vegas area was identified and used to define the preliminary top elevation of the GSA; however, given the varied terrain in the vicinity of the EA airports, the range-altitude methodology was applied on a finer scale to more closely reflect terrain conditions under the aircraft flight paths. Applying the range-altitude methodology based on local terrain conditions

[3] The highest point in the GSA is Mt. Charleston (11,800 feet above MSL) located 30 nautical miles northwest of LAS. The point 10,000 feet above Mt. Charleston defines the upper limit of the GSA at 22,000 feet above MSL (rounded up). Additional detailed information available in the Appendix F-1.

allowed for the definition of the lateral extent of the GSA to capture areas of primary aircraft flow within each quadrant of the airspace (the northeast, southeast, southwest, and northwest). This second step, referred to as the aircraft flow methodology, was used to focus the GSA boundaries on areas of aircraft flow and eliminate areas from the GSA of minimal to no aircraft flow. Correspondingly, the top elevation of the GSA varies by airspace quadrant and is established as the elevation 10,000-feet AGL above the highest point in each quadrant (22,000 feet above mean sea level [MSL] in the northwest quadrant, 17,000 feet above MSL in the northeast quadrant, 16,000 feet above MSL in the southeast quadrant, and 17,000 feet above MSL in the southwest quadrant).

4.2 Resource Categories Not Affected

This section identifies those FAA Order 1050.1E environmental resource categories that would not be affected by the Proposed Action, because the resources do not exist within the GSA or the types of changes associated with the Proposed Action would not affect the resources. Specifically, there are no construction activities or other ground-based activities associated with the Proposed Action. Therefore, land acquisition or ground disturbing activities would not occur under the Proposed Action.

The following environmental resource categories were considered for purposes of potential environmental impacts. However, the FAA determined that further detailed analysis would not be required because FAA evaluation has demonstrated that these resources typically are not affected by airspace redesign actions. These resource categories are:

- Coastal Resources—Neither coastal resources or barrier islands are located within the GSA.
- Construction Impacts—Implementation of the Proposed Action would not involve construction activities.
- Farmlands—The Proposed Action would not convert existing prime farmland to a non-agricultural use.
- Fish, Wildlife, and Plants (other than avian and bat species)—The Proposed Action would not affect habitat for non-avian animals, fish, or plants.
- Floodplains—The Proposed Action would not affect natural and beneficial floodplains values.
- Hazardous Materials and Solid Waste—The Proposed Action would not generate, disturb, or treat hazardous materials or solid waste.
- Natural Resources and Energy Supply (other than aircraft fuel)—The Proposed Action would not require the need for unusual natural resources and materials, or those in short supply.
- Secondary (Induced) Impacts—The Proposed Action would not change population movement or growth, change public service demands, or lead to changes in business and economic activity. Furthermore, the Proposed Action does not involve construction activities, so it would not involve the relocation of people or businesses.
- Water Quality—The Proposed Action would not increase impervious surfaces or otherwise affect water quality or ground water.
- Wetlands—The Proposed Action would not affect the hydrology of any wetlands.
- Wild and Scenic Rivers—No river or river segments included in the Wild and Scenic River System are located in the GSA.

4.3 Potentially Affected Resource Categories

This section provides information on the current conditions within the GSA for those environmental resource or impact categories that the Proposed Action could affect. These environmental resource categories include:

- Noise
- Compatible Land Use
- Department of Transportation Section 4(f) Resources
- Historic, Architectural, Archaeological, and Cultural Resources
- Fish, Wildlife, and Plants (avian and bat species)
- Socioeconomics and Environmental Justice
- Natural Resources and Energy Supply (aircraft fuel)
- Air Quality
- Climate Change
- Light Emissions and Visual Conditions

4.3.1 Aircraft Noise

Aircraft noise is often the most noticeable environmental effect associated with any aviation project. This section presents guidance and regulations established by the FAA for noise analyses, noise model input development, and the existing aircraft noise conditions, represented by 2009, the most current full calendar year as of the time of this analysis. **Appendix E** provides background on the physics of sound, the effects of noise on people, noise metrics, and how aircraft noise was modeled for this EA.

4.3.1.1 Noise Modeling Methodology

FAA has developed specific guidance and requirements for the assessment of aircraft noise in order to comply with the NEPA requirements. This guidance, specified in FAA Order 1050.1E, requires that aircraft noise be analyzed in terms of the yearly Day-Night Average Sound Level (DNL) metric. In practice, this requirement means that DNL is computed for the average annual day (AAD) of operations for the year of interest.

The DNL metric is a single value representing the aircraft sound level over a 24-hour period. DNL includes all of the time-varying sound energy within the period. To represent the greater annoyance caused by a noise event at night, the DNL metric includes a 10-decibel (dB) weighting for noise events occurring between 10:00 P.M. and 6:59 A.M. (nighttime). The nighttime event weighting helps to account for the annoyance caused by noise during periods when people are trying to sleep and ambient noise levels are lower. The weighting, in essence, equates 1 night flight to 10 day flights. In this document, for ease of reference, the format DNL 45 is used to represent a noise exposure level of DNL 45 dB. Additional details relating to the emergence of DNL as the metric of choice by FAA are available in **Appendix E.**

In addition to requiring the use of the DNL metric, FAA also requires that aircraft noise be evaluated using one of several authorized computer noise models. Specifically, for air traffic actions such as the Proposed Action, FAA specifies use of the Noise Integrated Routing System (NIRS) model.

FAA's Office of Environment and Energy (AEE) initially developed the NIRS model in 1995, in cooperation with the Office of Airspace Air Traffic Management (now Air Traffic Organization), for assessing the noise impacts of regional airspace design projects covering large geographic areas. AEE validated NIRS against FAA's Integrated Noise Model (INM) in 1997. The validation process involved providing both the NIRS model and INM with identical inputs and performing a detailed

comparison of the resulting outputs for representative jet, turboprop, and piston-prop aircraft for both arrival and departure operations. The models were found to give the same results in terms of both final noise values and intermediate-state parameters (such as aircraft position, altitude, thrust, and speed). An on-going program ensures compatibility of the two models. NIRS Version 6.1, the latest version of the model available at the time the noise analyses were conducted, was used for this EA.

An analysis of current and future noise within the GSA from aircraft operating IFR-filed flights between the surface and 10,000 feet AGL was conducted for this EA. Do to the topography of the area, aircraft noise from all modeled flight trajectories is computed by quadrant up to and including the altitudes noted for each quadrant, as adjusted for the highest elevation point of the GSA in each quadrant (see Section 4.1.2). Aircraft operating under VFR were not included in the analysis because their operations would not be affected by the Proposed Action.

The NIRS model was used to calculate noise levels for the following specific locations on the ground:

- Census Block Centroids—The NIRS model can be used to calculate noise exposure levels at the geographic centers (centroids) of census blocks to estimate the population exposed to varying levels of aircraft noise exposure. For this EA, population within the GSA was analyzed using 2010 United States Census Block geometries[4]. The census block centroid noise exposure level represents the noise exposure level for the total maximum potential population within that census block. Because noise levels are analyzed only at the centroid point and applied to the entire census block area population and because the area represented by each centroid varies depending on the density of population, the actual noise exposure level for individuals will vary from the reported level based on their proximity to the geographic centroid.
- Grid Points—The NIRS model can also be used to calculate noise exposure at evenly spaced grid points. For this EA, the entire GSA was covered with a 1.5 nautical mile by 1.5 nautical mile grid for use in identifying noise exposure levels within potential Department of Transportation (DOT) Act Section 4(f) resources such as parks or historic sites. See Section 4.3.3 for a discussion of what constitutes a DOT Act Section 4(f) resource and for a summary of existing conditions noise exposure levels at grid points representing potential Section 4(f) resources in the GSA.
- Unique Points—Noise levels at sites of interest too small to be captured in the 1.5 nautical mile grid can also be analyzed using the NIRS model. Such sites include individual DOT Act Section 4(f) resources that are less than 1 square nautical mile in area (such as county and municipal parks), and historic sites (such as individual buildings). See Section 4.3.3 for a discussion of DOT Act Section 4(f) resources and existing conditions noise exposure levels; and Section 4.3.4 for a discussion of historic properties in the GSA and for existing conditions noise exposure levels at unique points representing historic resources in the GSA.

In total, noise exposure levels were calculated at 12,249 census block centroids (centroids in the GSA that represent areas with population), 2,807 grid points, and 337 unique points throughout the GSA.

The NIRS model requires a variety of user-supplied inputs including local environment data (e.g., temperature, humidity, and runway layout), local terrain, aircraft operations, runway use, and flight tracks. Detailed information on aircraft operations within the GSA was assembled for input into NIRS, including specific fleet mix information such as aircraft type, arrival and departure times, and

[4] Applied Geographic Solutions, *2010 U.S. Census Block Data,* April 2010.

origin/destination airport. **Appendix F.2** provides a discussion of the environmental forecasts used for the noise modeling.

While the fleet mix defines the number and type of aircraft operations, runway use and flight track location/usage provide information on where and how aircraft travel within the GSA. For existing conditions, FAA developed flight tracks for modeling purposes from 38 individual days of sample radar data selected over the period from May 2009 to November 2009 Based on discussions with local FAA LAS air traffic control personnel, the radar data collected and analyzed was sufficient from a yearly seasonal variation perspective in that it captured a representative sample of operations and runway use configurations to adequately derive runway use and flight track characteristics representing an average annual day of LAS operations. The sufficiency of the radar data sample was explained from the perspective that weather conditions at LAS are VMC approximately 98 percent of the time and that the sample captured the runway use configurations typically in use at LAS from an average annual day perspective.[5] The radar data sample provided information on flight route geometry, aircraft usage by type and time of day, and flight profiles (i.e., altitudes). **Table IV-1** below identifies the radar data coverage analyzed in this study. Detailed information on radar data date selection is presented in **Appendix E.**

Table IV-1

Radar Data Sample

Sample Start Date	Sample End Date	Number of Days of Coverage
May 5, 2009	May 14, 2009	10
August 9, 2009	August 17, 2009	9
September 30, 2009	October 7, 2009	8
November 4, 2009	November 14, 2009	11
	Total Number of Days:	38

Source: Department of Transportation, Federal Aviation Administration, Las Vegas Airport Traffic Control Tower, Las Vegas Terminal Radar Approach Control Facility (L30), and Los Angeles Air Route Traffic Control Center (ZLA), May-November, 2009.
Prepared by: Metron Aviation, April 2011.

Typical sampling of runway use data would cover a full year (such as December 2008 through November 2009); however, rehabilitation of Runway 7R-25L from November 2008 through April 2009 precluded a full year of sampling because variation in runway operating configuration and/or runway usage due to the runway rehabilitation would skew a full year of sampled data. The closure of Runway 7R-25L for rehabilitation between November 2008 and April 2009 represented a non-standard operation that would not be considered representative of typical operations at LAS. For these reasons, radar data from December 2008 through April 2009 were not used to derive average annual day runway use and flight track characteristics, where sampled data between May and November 2009 was determined to be sufficiently representative of average annual day existing operations by FAA air traffic controllers at the LAS ATCT and L30.

[5] Las Vegas ATCT (LAS ATCT) and Las Vegas TRACON (L30) air traffic control specialists verified that the sample collected for this analysis is representative of existing conditions runway usage.

4.3.1.2 Existing Aircraft Noise Exposure

Exhibit IV-2 presents the results of noise modeling for baseline conditions (calendar year 2009, the last full calendar year prior to completion of this analysis) for the census block centroid locations in the GSA. The purpose of baseline data is to provide a reader the opportunity to relate current personal experience with aircraft noise exposure to the modeled noise exposure levels. Information provided refers to exposure levels only within the GSA. The exhibit provides a graphical representation of the existing conditions (represented by 2009) noise exposure levels within the GSA.

In general, the majority of area in the GSA is exposed to aircraft noise lower than DNL 45. As would be expected, the areas closer to the EA airports are exposed to the highest aircraft noise exposure levels with progressively lower levels as distance from the EA airports increases. As illustrated on the exhibit, the higher noise exposure areas are generally aligned with the primary runways and flight patterns.

As shown in **Table IV-2**, the majority (70.52 percent) of people residing within the GSA were exposed to aircraft noise levels less than DNL 45. Approximately 73 people (less than 0.01 percent of the study area population) in the vicinity of LAS experience aircraft noise of DNL 65 and higher within the GSA under current (2009) conditions. Table IV-2 presents the population count for each DNL range.

Table IV-2

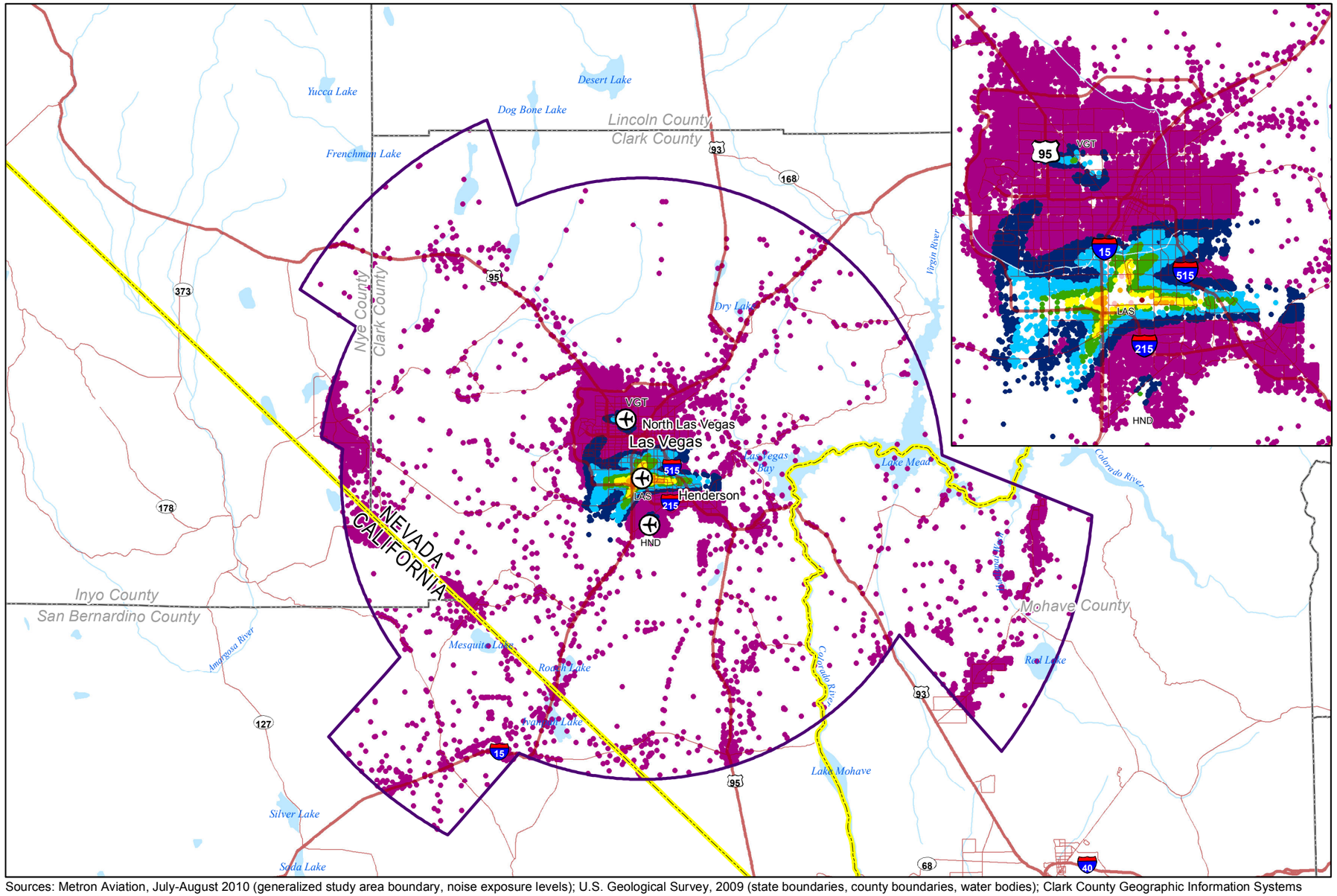
Maximum Population Exposed to Aircraft Noise within the GSA (2009)

DNL Range (dB)	Population	Percent of Total
Less than DNL 45	1,367,798	70.52%
DNL 45 to less than DNL 50	366,763	18.91%
DNL 50 to less than DNL 55	151,333	7.80%
DNL 55 to less than DNL 60	42,464	2.19%
DNL 60 to less than DNL 65	11,092	0.57%
DNL 65 to less than DNL 70	72	0.00%
DNL 70 to less than DNL 75	1	0.00%
Greater than or equal to DNL 75	0	0.00%
Total	1,939,523	100.00%

Note: Percent total may differ due to rounding. The population of census blocks on the GSA border was calculated based on the location of the census block centroid as opposed to the proportion of the census block area within the GSA as in the socioeconomic section 4.3.6. For this reason the population total presented may not agree with the population total in Table IV-6.

Sources: Metron Aviation, calculated using NIRS Version 6.1 and data described in Appendix E, August 2010 (existing noise exposure); and Applied Geographic Solutions, population counts for the counties of Clark, Nye, Mohave, San Bernardino, Inyo, and Lincoln, April 2010 (population data).

Prepared by: Metron Aviation, August 2010.



LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Noise Exposure Levels

- Less than 45 DNL
- 45 to less than 50 DNL
- 50 to less than 55 DNL
- 55 to less than 60 DNL
- 60 to less than 65 DNL
- 65 to less than 70 DNL
- 70 to less than 75 DNL
- 75 to less than 80 DNL
- Greater than or eqaul to 80 DNL

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-2

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2009 Existing Conditions – Population DNL Noise Exposure Levels

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4.3.2 Compatible Land Use

The GSA comprises approximately 8,373 square miles of area in six counties in three states (Clark, Nye and Lincoln Counties in Nevada, Inyo and San Bernardino Counties in California, and Mohave County in Arizona). The Las Vegas metropolitan area is located generally at the center of the GSA.

FAA obtained land coverage data from the USGS National Land Cover Database 2001 (NLCD 2001). Land coverage classifications located within the study area, include[6]:

- Developed, Low Intensity—mixture of developed areas and vegetation, such as single-family housing units. Impervious land cover accounts for 20 to 49 percent of total cover.
- Developed, Medium Intensity—mixture of developed areas and vegetation, such as single-family housing units. Impervious land cover accounts for 50 to 79 percent of total cover.
- Developed, High Intensity—highly developed areas such as apartment complexes, row houses, and commercial/industrial areas. Impervious land cover accounts for over 80 percent of total cover.
- Developed, Open Space—primarily vegetated areas with some mix of constructed materials such as large-lot single-family housing units, parks, golf courses, and vegetation. Impervious land cover accounts for less than 20 percent of total cover.
- Open Water—areas of open water, generally with less than 25 percent cover of vegetation or soil.
- Barren Land—barren areas of bedrock, desert pavement, scarps, talus, and slides, generally with less than 15 percent cover of vegetation.
- Forest—areas dominated by evergreen or deciduous trees generally greater than 5 meters tall.
- Shrublands—areas dominated by shrubs generally less than 5 meters tall.
- Grasslands—areas dominated by grammanoid or herbaceous vegetation that are not subject to intensive management such as tilling, but can be used for grazing.
- Pasture—areas of grasses used for livestock grazing or production of seed or hay crops.
- Cultivated Crops—areas used for the production of annual crops.
- Wetlands—vegetated areas where the soil or substrate is periodically saturated with or covered with water.

The distribution of land coverage types within the GSA is shown on **Exhibit IV-3. Table IV-3** provides the acreages of the various land coverage classifications within the GSA.

The GSA includes numerous large parks, recreational areas, and wilderness areas, and other types of resources managed by the U.S. Forest Service (USFS), the National Park Service (NPS), BLM, and the U.S. Fish and Wildlife Service (USFWS), as well as tribal areas. Section 4.3.3 provides further information on these resources.

[6] U.S. Geological Survey, National Land Cover Database, 2001.

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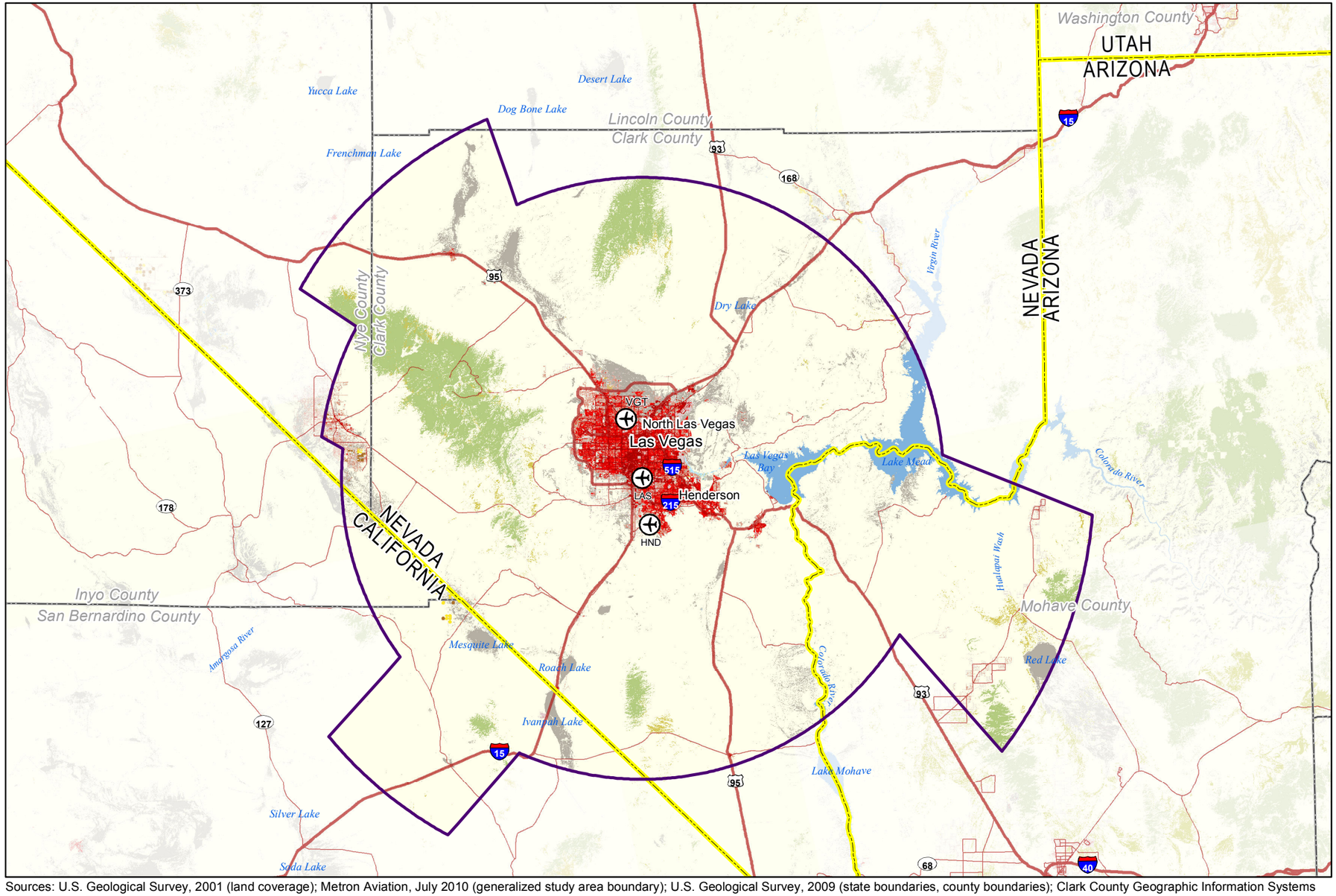

LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Generalized Study Area Boundary

Land Coverage Classifications*

- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Open Water
- Barren Land
- Forest (evergreen and deciduous)
- Scrublands
- Grasslands
- Pasture
- Cultivated Crops
- Wetlands

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport
*See text for definitions of land coverage categories

Projection: State Plane, Nevada East Zone

Sources: U.S. Geological Survey, 2001 (land coverage); Metron Aviation, July 2010 (generalized study area boundary); U.S. Geological Survey, 2009 (state boundaries, county boundaries); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-3

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Land Coverage within the GSA

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Table IV-3

Area by Land Coverage Classification with the GSA

Land Coverage Classification	Area (square miles)	Percent Coverage in GSA
Developed, Low Intensity	113.9	1.4%
Developed, Medium Intensity	126.8	1.5%
Developed, High Intensity	44.0	0.5%
Developed, Open Space	73.0	0.9%
Open Water	176.1	2.1%
Barren Land	322.9	3.9%
Forest (evergreen or deciduous)	448.0	5.4%
Shrublands	7,011.9	83.7%
Grasslands	48.4	0.6%
Pasture	2.4	<0.1%
Cultivated Crops	2.3	<0.1%
Wetlands	2.8	<0.1%
Total	8,372.4	100.0%

Note: Total may not add due to rounding.

Sources: Ricondo & Associates, Inc., calculated using ArcGIS version 9.3: U.S. Geological Survey, National Land Cover Database, 2001 (land cover classification) and Metron Aviation, July 2010 (generalized study area).
Prepared by: Ricondo & Associates, Inc., July 2010.

4.3.3 Department of Transportation Act, Section 4(f) Resources

This section addresses resources in the GSA that may be protected under special provisions of U.S. Department of Transportation Act[7] or the Land and Water Conservation Act. The Federal statute that governs the evaluation of impacts in this resource category is commonly known as the DOT Act, Section 4(f) provisions. Section 4(f) of the DOT Act, which was codified and renumbered as section 303(c) of 49 U.S.C., provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a public park; recreation area; or wildlife and waterfowl refuge of national, state, or local significance; or land from an historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such program, and the project includes all possible planning to minimize harm resulting from the use. This EA will refer to these as "Section 4(f)" rather than Section 303(c) resources.[8]

Data were collected from other recent FAA environmental studies to identify the potential Section 4(f) resources within the GSA that are shown on **Exhibit IV-4.**[9] Section 4.3.3 provides an overview of the individual potential Section 4(f) resources in the GSA and the existing conditions noise exposure levels for the potential Section 4(f) resources in the GSA. Given the extensive number of potential resources, this section provides a summary of the potential Section 4(f) resources, including managing agencies, types of resources, and descriptions of the primary federal resources located within the GSA.

7 Public Law 89-670, 49 U.S.C. 303(c), October 15, 1966.

8 U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, *Environmental Impacts: Policies and Procedures,* Appendix A, "Analysis of Environmental Impact Categories," Section 6, "Department of Transportation Act, Section 4(f)."

9 Vanasse Hangen Brustlin, Inc., January 2010.

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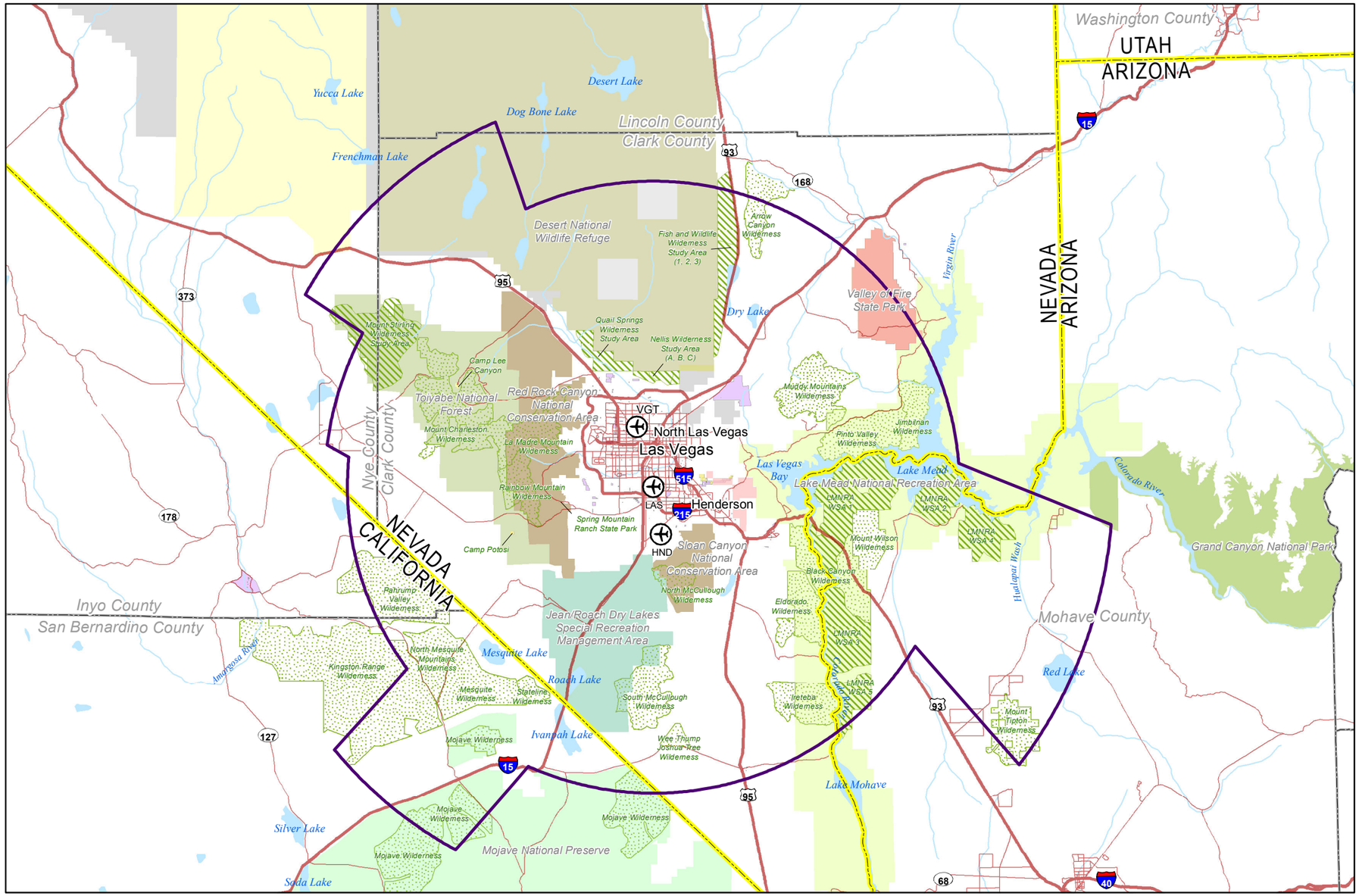

LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area
- Nellis Air Force Base
- Department of Defense (DOD)
- Bureau of Reclamation (BOR)
- Department of Energy (DOE)

Potential Section 4(f) Resources

- Wilderness (NPS, BLM, USFS, Other)
- Wilderness Study Area
- Wildlife Range
- County Park
- National Preserve (NPS)
- National Park Service
- State Park
- Wildlife Refuge
- Conservation Area
- National Forest
- Recreation Management Area
- National Recreation Area
- Municipal Parks

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport
NPS - National Park Service
BLM - Bureau of Land Management
USFS - U.S. Forest Service
LMNRA - Lake Mead National Recreation Area
WSA - Wilderness Study Area

Projection: State Plane, Nevada East Zone

Sources: Vanasse Hangen Brustlin, Inc., January 2010 (potential section 4(f) resources); Metron Aviation, July 2010 (generalized study area); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-4

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Potential Department of Transportation Act Section 4(f) Resources

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The FAA has not made a determination that the resources described in this section qualify for protection under Section 4(f); therefore, they are considered "potential" Section 4(f) resources. If during subsequent analysis of the Proposed Action a significant impact to a potential Section 4(f) resource is identified, further analysis would include additional evaluation of the affected resource's characteristics, including determination of Section 4(f) applicability and identification of whether the Land and Water Conservation Fund moneys were used to finance purchase of or interest in lands for state or local parks or historic sites, or to develop or redevelop recreation facilities at such sites, pursuant to the Land and Water Conservation Act. According to the NPS, approximately 179 grants, totaling over $24.5 million, have been approved for a variety of state and local agencies within the six counties that are wholly or partially located within the GSA.[10]

4.3.3.1 Agencies Responsible for Management of Section 4(f) Resources in the GSA

Four federal agencies, one state agency, and various counties and municipalities have management responsibility for potential Section 4(f) resources in the GSA. The federal and state agencies responsible for management of the primary potential Section 4(f) resources include:

- **Bureau of Land Management**—The BLM is an agency of the Department of the Interior and is responsible for the management and preservation of multiple resources across 253 million acres of federally owned lands in the United States. BLM land is concentrated in the western portion of the United States and amounts to approximately 13 percent of the nation's total land area. Resources managed by the BLM include energy and minerals, historic sites, recreation areas, and wilderness areas.
- **National Park Service**—The NPS is an agency of the Department of the Interior and manages 84 million acres of federally owned lands within the United States. These NPS managed areas are operated across 392 separate land units including national parks, preserves, reserves, recreation areas, and historic battlefields.
- **U.S. Forest Service**—The USFS is an agency of the Department of Agriculture charged with managing federally controlled forests and grasslands covering 193 million acres. In addition to managing public land, the USFS is the world's largest forestry research organization.
- **U.S. Fish and Wildlife Service**—The USFWS is an agency of the Department of the Interior and is primarily responsible for the conservation of fish and wildlife habitat in the United States. The USFWS manages 96 million acres of land across 548 units of land making up the National Wildlife Refuge System.
- **Nevada Division of State Parks**—The Nevada Division of State Parks is the state agency responsible for managing the lands of the state park system in Nevada. The agency is a division of Nevada's Department of Conservation and Natural Resources. There are currently 24 parks in the Nevada State Parks system.

4.3.3.2 Categories of Section 4(f) Resources in the GSA

Numerous Section 4(f) resources of various kinds are located within the GSA. This section describes the categories of Section 4(f) resources in the GSA. It is the FAA policy in its management of the navigable airspace over locations in national parks and other federally managed areas with unique noise-sensitive values to exercise leadership in achieving an appropriate balance between efficiency, technological practicability, and environmental concerns, while maintaining the highest level of

[10] U.S. Department of Interior, National Park Service, Land and Water Conservation Fund, Detailed Listing of Grants Grouped by County webpage, http://waso-lwcf.ncrc.nps.gov/public/index.cfm (accessed July 2, 2010).

safety.[11] If a significant or potentially controversial aircraft noise impact is identified in the assessment of aircraft operations within the GSA (i.e., up to 10,000 feet above AGL) over a property with noise-sensitive values, the FAA may consider assessing the noise effects of aircraft operating between 10,000 and 18,000 feet above AGL.[12]

- **National Parks**—National parks are administered by the NPS for the purpose of preserving and enhancing lands of natural, historical, or scenic interest and ensuring availability of these lands to the American public and future generations.
- **National Recreation Areas**—National recreation areas are established by Congressional Act and may be administered by a federal agency or federal-state agency partnership. National recreation areas are intended to provide outstanding outdoor recreation opportunities to as many users as can reasonably be accommodated. While a national recreation area may exhibit many of the same qualities as a national park, outdoor recreation is the primary management goal.
- **National Preserves**—National preserves are administered by the NPS in a manner similar to national parks. On national preserve land, activities such as hunting and mineral exploration and extraction are authorized whereas these activities are prohibited in national parks.
- **National Forests**—National forests are federal lands administered by the USFS. Each national forest is managed by a forest supervisor who oversees several ranger districts. The national forests are operated for public enjoyment as well as commercial forestry.
- **National Conservation Areas**—National conservation areas (NCAs) are congressionally designated lands administered by the BLM as part of the National Landscape Conservation System. The lands are managed to conserve exceptional examples of scientific, ecological, and cultural resources.
- **National Wildlife Refuges**—National wildlife refuges are part of the National Wildlife Refuge System operated by the USFWS for the purpose of preserving the viability of various wildlife habitats throughout the United States and its waters.
- **Wilderness Areas**—Wilderness areas are federally owned lands congressionally designated for the use and enjoyment of the American public. Designated wilderness areas can be managed by the BLM, NPS, USFS, or the USFWS. The lands designated as wilderness areas exhibit features defined by natural processes and are largely free from indications of human activities. Wilderness areas are required to have at least 5,000 acres of land and provide opportunities for solitude and primitive types of recreation.
- **Wilderness Study Areas**—Wilderness study areas share the same characteristics as wilderness areas and are managed in the same manner. Wilderness study areas are lands defined by federal management agencies in order to undergo a period of review for consideration as designated wilderness areas. The BLM was directed through Section 603(a) of the Federal Land Policy and Management Act to inventory roadless areas over 5,000 acres for wilderness characteristics and recommend the suitable of each area for designation as a wilderness. The BLM is required to manage these areas as a wilderness until Congress

[11] U.S. Department of Transportation, Federal Aviation Administration, "Appendix 9, Noise Policy for Management of Airspace Over Federally Managed Lands," of Order JO 7400.2G, *Procedures of Handling Airspace Matters,* Change 1, March 12, 2009.

[12] U.S. Department of Transportation, Federal Aviation Administration, Section 32-2-1(b)(2)(e) of Order JO 7400.2G, *Procedures of Handling Airspace Matters,* Change 1, March 12, 2009.

designates the area a wilderness or releases it from wilderness management restrictions.[13] These lands have not yet been designated as wilderness areas.

- **Special Recreation Management Areas**—Special recreation management areas are public lands managed by the BLM where off-highway vehicle recreational riding and related competitive events are permitted.
- **Areas of Critical Environmental Concern**—The area of critical environmental concern (ACEC) is a designation used exclusively by the BLM. This designation applies to lands with attributes such as cultural resources, threatened and endangered species and their habitats as well as sensitive ecosystems that are deemed important enough to warrant special management consideration above other BLM lands.
- **Nevada State Parks**—State parks in Nevada are managed by the Nevada Division of State Parks. These lands are maintained to protect areas of natural, scenic, and cultural value for public enjoyment.
- **County and Municipal Parks**—Parks and other recreation areas are managed by county and municipal jurisdictions to serve a variety of community needs. These parks are primarily located in the Las Vegas metropolitan area.

4.3.3.3 Potential Section 4(f) Resources in the GSA

The potential Section 4(f) resources in the GSA are discussed in this section. These resources are depicted on Exhibit IV-4. Noise exposure levels within these resources are summarized in **Table IV-4**.

Lake Mead National Recreation Area (NPS)

The Lake Mead National Recreation Area includes over 1.5 million acres of land administered by the NPS. The area is situated east of Las Vegas and covers portions of Nevada and Arizona. Lake Mead National Recreation Area offers multiple recreational opportunities to visitors. Activities range from lake-oriented forms of recreation like water-craft riding and swimming to resort-style lodging to primitive camping and hiking through the many wilderness areas on the property.

Several dedicated wilderness and wilderness study areas are located within the portion of the Lake Mead National Recreation Area within the GSA:

- **Black Canyon Wilderness**—The Black Canyon Wilderness is an area of approximately 44,000 acres of dedicated wilderness. The terrain is primarily mountainous in nature and provides opportunities for activities such as camping, wildlife viewing, and outdoor presentations.
- **Eldorado Wilderness**—The Eldorado Wilderness is an area of 32,000 acres of dedicated wilderness co-managed by the BLM and NPS. Approximately 26,000 acres of the wilderness lies within the Lake Mead National Recreation Area and is managed by the NPS. The terrain of the wilderness area varies between mountain range and lakeshore. Some of the activities permitted within the wilderness include primitive camping, wildlife viewing, and outdoor educational presentations.

[13] U.S. Department of the Interior, Bureau of Land Management, Wilderness Study Area webpage, http://www.blm.gov/ca/st/en/prog/wilderness/wsa.html, (accessed August 6, 2010).

Table IV-4

Summary of Noise Exposure at Potential Section 4(f) Resources in the GSA (2009)

Property Name	Number of Grid Points	Lowest DNL	Highest DNL	Average DNL
Lake Mead National Recreational Area	354	–	43.5	–
Black Canyon Wilderness	25	–	–	–
Eldorado Wilderness	18	–	–	–
Ireteba Peaks Wilderness	18	–	–	–
Jimbilnan Wilderness	12	–	–	–
Muddy Mountains Wilderness	24	–	–	–
Pinto Valley Wilderness	19	–	–	–
Five Wilderness Study Areas	96	–	–	–
Grand Canyon National Park [1/]	3	–	–	–
Toiyabe National Forest, Spring Mountain National Recreation Area	174	–	–	–
La Madre Mountain Wilderness	12	–	–	–
Mount Charleston Wilderness	27	–	–	–
Rainbow Mountain Wilderness	4	–	–	–
Mount Stirling Wilderness Study Area	29	–	–	–
Camp Lee Canyon	1	–	–	–
Camp Potosi	1	–	–	–
Mojave National Preserve	26	–	–	–
Mojave Wilderness Areas	30	–	–	–
Red Rock Canyon National Conservation Area [2/]	101	–	43.3	–
La Madre Mountain Wilderness	15	–	–	–
Rainbow Mountain Wilderness	11	–	–	–
Sloan Canyon National Conservation Area	29	–	45.9	–
North McCullough Wilderness	8	–	43.2	–
Jean/Roach Dry Lakes Special Recreation Management Area	119	–	44.4	–
Desert National Wildlife Refuge	317	–	–	–
Valley of Fire State Park	25	–	–	–
Designated Wilderness Areas (BLM)				
Arrow Canyon Wilderness	7	–	–	–
Kingston Range Wilderness	36	–	–	–
Mesquite Wilderness	26	–	–	–
Mount Tipton Wilderness	11	–	–	–
Mount Wilson Wilderness	12	–	–	–
North Mesquite Mountains Wilderness	16	–	–	–
Pahrump Valley Wilderness	38	–	–	–
South McCullough Wilderness	24	–	–	–
Stateline Wilderness	5	–	–	–
Wee Thump Joshua Tree Wilderness	3	–	–	–
Wilderness Study Areas (BLM)				
Nellis A, B, C Wilderness Study Areas	4	–	–	–
Fish and Wildlife No. 1, 2, 3 Wilderness Study Areas	16	–	–	–
Quail Springs Wilderness Study Area	9	–	–	–
County and Municipal Parks	301	–	61.4	40.0

Notes:

– Indicates noise exposure levels below DNL 40.

1/ Only a small portion of the Grand Canyon National Park is located within the GSA, and the portion of the National Park was not captured by the 1.5 nautical mile by 1.5 nautical mile grid overlay of the GSA. Thus, the reported noise exposure levels for grid points are the nearest grid points.

2/ Includes Spring Mountain Ranch State Park.

Sources: Metron Aviation, calculated using NIRS Version 6.1 and data described in Appendix E, August 2010 (existing noise exposure).
Prepared by: Ricondo & Associates, Inc. May 2012.

- **Ireteba Peaks Wilderness**—The Ireteba Peaks Wilderness is an area of approximately 33,000 acres of dedicated wilderness co-managed by the BLM and NPS. 22,000 acres of the Ireteba Peaks Wilderness lies within the Lake Mead National Recreation Area and is managed by the NPS. The wilderness terrain is mountainous and supports activities such as camping, wildlife viewing, and outdoor educational presentations.
- **Jimbilnan Wilderness**—The Jimbilnan Wilderness comprises approximately 22,000 acres of dedicated wilderness within the Lake Mead National Recreation Area. The wilderness terrain is primarily mountainous with areas of lakeshore. Uses permitted within the Jimbilnan Wilderness include activities such as camping, wildlife viewing, and outdoor educational presentations.
- **Muddy Mountains Wilderness**—The Muddy Mountains Wilderness is an area of over 480,000 acres of dedicated wilderness, of which approximately 3,000 thousand acres lies within the Lake Mead National Recreation Area. The terrain is primarily mountainous. Primitive camping and wildlife viewing are permitted uses in the wilderness.
- **Pinto Valley Wilderness**—The Pinto Valley Wilderness covers approximately 40,000 acres within the Lake Mead National Recreation Area. The terrain is dominated by hills and desert. The opportunity for solitude within the wilderness is a noise sensitive characteristic. Permitted uses within the wilderness that may be sensitive to noise include camping, wildlife viewing and outdoor educational presentations.
- **Five Wilderness Study Areas**—Five wilderness study areas within Lake Mead National Recreation Area are located within the GSA. The wilderness study areas combined cover more than 190,000 acres of the Lake Mead National Recreation Area. Camping is a permitted activity in the wilderness study areas.

Grand Canyon National Park (NPS)

Grand Canyon National Park lies to the east of Las Vegas. Grand Canyon National Park includes over 1 million acres of park land, less than 600 acres of which are located within the GSA. The portion of the park located within the GSA is near the plains of the Grand Wash Cliffs. This area is located away from developed campgrounds and other lodging. The 1995 Grand Canyon National Park General Management Plan, the most recent management plan that covers the area of the Grand Canyon National Park within the GSA, notes that as of 1995, the park received over four million visits annually. However, most of these visits are concentrated in the South Rim area of the Park, approximately 100 miles from the GSA. Although most backcountry park activity is focused away from the GSA, primitive camping may occur in the portion of the property located within the GSA. The park is home to lands held sacred by Native American groups.

The 1987 National Parks Overflights Act[14] required restoration of natural quiet in the Grand Canyon National Park. Since the passage of this act, many steps have been taken to restore natural quiet in the Park, including the establishment of a Special Flight Rules Area (SFRA). The FAA enforces rules for aircraft operating in the Grand Canyon National Park SFRA. These rules permit overflight of certain areas of the Park as long as minimum flight altitudes are maintained.[15] The vertical dimensions of the SFRA extend from the ground up to but not including 18,000 feet MSL. Approximately 0.77 square miles of the 4,294 square miles of total land area underlying the SFRA is located within the GSA. Because the GSA captures aircraft operations up to 10,000 feet AGL, if the

[14] Public Law 100-91.

[15] Title 14 Code of Federal Regulations, Part 93, Subpart U.

Proposed Action includes changes in standard instrument procedures over the Grand Canyon National Park, the need to consider the impacts of aircraft noise above 10,000 feet AGL may be needed.

Toiyabe National Forest (USFS), Spring Mountain National Recreation Area

Toiyabe National Forest is part of the Humboldt-Toiyabe National Forest, the forest management area administered by the USFS that stretches across the state of Nevada and an eastern portion of California. The portion of the Toiyabe National Forest located within the GSA is designated as the Spring Mountain National Recreation Area. Spring Mountain National Recreation Area lies west of Las Vegas and covers more than 320,000 acres within the GSA. Included within this boundary are three wilderness areas, one wilderness study area, and two county parks administered by Clark County, which are discussed below.

- **La Madre Mountain Wilderness**—The La Madre Mountain Wilderness spans over 19,000 acres of Toiyabe National Forest. The terrain of the wilderness is mountainous. Primitive camping and wildlife viewing are permitted within the wilderness. The wilderness area extends into the Red Rock Canyon NCA.
- **Mount Charleston Wilderness**—The Mount Charleston Wilderness consists of over 55,000 acres of wilderness land within Toiyabe National Forest. The terrain is primarily mountainous. Primitive camping and wildlife viewing are permitted in the wilderness.
- **Rainbow Mountain Wilderness**—The Rainbow Mountain Wilderness comprises approximately 25,000 acres of wilderness of which 4,500 acres are part of the Toiyabe National Forest. The terrain features rock formations and forest. Primitive camping and wildlife viewing are permitted within the wilderness. The boundaries of this wilderness area extend into the Red Rock Canyon NCA.
- **Mount Stirling Wilderness Study Area**—The Mount Stirling Wilderness Study Area covers over 62,000 acres of wilderness land, more than 56,000 acres of which lies inside of the Toiyabe National Forest. The terrain is mountainous and forested. Primitive camping and wildlife viewing are permitted within the wilderness.
- **Camp Lee Canyon**—Camp Lee Canyon is a 17-acre site managed by the Clark County Department of Parks and Recreation through a special-use permit with the USFS. The camp is used as an overnight camp for youth.
- **Camp Potosi**—Camp Potosi is a small facility located approximately 20 miles west of Las Vegas. The Camp is available for rent through the Clark County Department of Parks and Recreation to accommodate group meetings. Overnight stays are not permitted.

Mojave National Preserve (NPS)

The Mojave National Preserve consists of 1.6 million acres over two separate federally owned land areas in the California Desert. The GSA encompasses the smaller 37,000-acre portion of the preserve to the north. Of the larger southern area of the preserve, 89,500 acres are included in the GSA. The preserve is of special significance to the Mojave peoples. Ethnographic resources may be located throughout the area. The Nipton community, a small settlement that provides overnight lodging and campgrounds, is located within the GSA.

Areas of the Mojave National Preserve are designated as wilderness. Collectively, these non-contiguous wilderness areas are referred to as the Mojave Wilderness. In total, 52,120 acres of the Mojave Wilderness are located within the GSA. These wilderness areas are desert terrain. Primitive camping and wildlife viewing are permitted in the wilderness areas.

Red Rock Canyon National Conservation Area (BLM)

The Red Rock Canyon NCA consists of over 195,000 acres of BLM-administered land west of Las Vegas and is located entirely within the GSA. The Red Rock Canyon NCA encompasses portions of the La Madre Mountain and Rainbow Mountain Wildernesses as well as Spring Mountain Ranch State Park. Camping is permitted throughout the NCA.

- **La Madre Mountain Wilderness**—Approximately 28,000 acres of the La Madre Mountain Wilderness lies within the Red Rock Canyon NCA. The terrain is mountainous, and primitive camping and wildlife viewing are permitted uses throughout the wilderness. The wilderness area extends into the Spring Mountain National Recreation Area of the Toiyabe National Forest.
- **Rainbow Mountain Wilderness**—More than 20,000 acres of the Rainbow Mountain Wilderness lie within the Red Rock Canyon NCA. The terrain features rock formations and forest. Primitive camping and wildlife viewing are permitted within the wilderness. The wilderness area extends into the Spring Mountain National Recreation Area of the Toiyabe National Forest.
- **Spring Mountain Ranch State Park**—Spring Mountain Ranch State Park comprises 520 acres of land within the Red Rock Canyon NCA. The land is administered by the Nevada Division of State Parks and features a working ranch. Guided tours and outdoor presentations are offered at the park.

Sloan Canyon National Conservation Area (BLM)

The Sloan Canyon NCA comprises 48,000 acres of BLM administered land southeast of Las Vegas. The Sloan Canyon NCA includes all 14,000 acres of the North McCullough Wilderness. The NCA contains cultural resources, and a portion of the North McCullough Wilderness has been designated as an ACEC to protect these resources. Primitive camping and wildlife viewing are permitted within the wilderness and the remainder of the NCA with the exception of some specific sites.

Jean/Roach Dry Lakes Special Recreation Management Area (BLM)

The Jean/Roach Dry Lakes Special Management Area covers approximately 225,000 acres of desert in southern Nevada southwest of Las Vegas. The area is managed by the BLM and is utilized for off-road vehicle use so long as such use is in accordance with USFWS guidelines for preservation of wildlife habitat. Camping is also permitted.

Desert National Wildlife Refuge (USFWS)

The Desert National Wildlife Refuge is part of the Desert National Wildlife Refuge Complex. The refuge is north of Las Vegas and stretches across 1.5 million acres of the Mojave Desert. Primitive camping and wildlife viewing are permitted within the refuge.

Valley of Fire State Park (Nevada Division of State Parks)

The Valley of Fire State Park is administered by the Nevada Division of State Parks. The 70,000-acre park is located 55 miles northeast of Las Vegas and is known for its geologic features including red sandstone formations and petrified forests. The area also features multiple artifact scatters and petroglyph sites.[16] The area is considered sacred by the people of the Moapa Band of Paiute Indians residing on a nearby reservation.[17] Camping is a common activity at the park.

[16] Nevada Division of State Parks, *Valley of Fire State Park General Management Plan,* 2010.

[17] The Moapa Band of Paiutes website, http://www.moapapaiutes.com/about_us.htm (accessed August 3, 2010).

Designated Wilderness Areas (BLM)

BLM-managed lands include the following designated wilderness areas.

- **Arrow Canyon Wilderness**—The Arrow Canyon Wilderness encompasses approximately 27,000 acres and is located 35 miles northeast of Las Vegas along the periphery of the GSA. Rock art and geologic formations are prominent in the wilderness. Primitive camping is allowed in the wilderness.
- **Kingston Range Wilderness**—The Kingston Range Wilderness is approximately 200,000 acres of wilderness land in the California Desert of San Bernardino County, California. Primitive camping is allowed in the wilderness.
- **Mesquite Wilderness**—The Mesquite Wilderness is approximately 45,000 acres of wilderness land in the California Desert of San Bernardino County, California. Primitive camping is allowed in the wilderness.
- **Mount Tipton Wilderness**—The Mount Tipton Wilderness is approximately 33,000 thousand acres of wilderness land located in Mohave County, Arizona. Camping and wildlife viewing activities attract visitors to the wilderness.
- **Mount Wilson Wilderness**—The Mount Wilson Wilderness includes approximately 24,000 acres located 30 miles southeast of Las Vegas in Mohave County, Arizona. The terrain and climate are harsh, making recreational activities difficult.
- **North Mesquite Mountains Wilderness**—The North Mesquite Mountains Wilderness includes approximately 30,000 acres in the California Desert of San Bernardino County, California. Camping and wildlife viewing activities attract visitors to the wilderness.
- **Pahrump Valley Wilderness**—The Pahrump Valley Wilderness is approximately 74,000 acres of California Desert wilderness stretching across Inyo and San Bernardino Counties. Primitive camping is allowed in the wilderness.
- **South McCullough Wilderness**—The South McCullough Wilderness is approximately 44,000 acres of mountainous wilderness located 35 miles south of Las Vegas. A portion of this wilderness is located within in the Jean/Roach Dry Lakes Special Management Recreation Area. Camping and wildlife viewing activities attract visitors to the wilderness.
- **Stateline Wilderness**—The Stateline Wilderness is approximately 7,000 acres of wilderness located in the California Desert of San Bernardino County, California. Camping and wildlife viewing activities attract visitors to the wilderness.
- **Wee Thump Joshua Tree Wilderness**—The Wee Thump Joshua Tree Wilderness is approximately 6,000 acres of desert wilderness located 45 miles south of Las Vegas. Camping and wildlife viewing activities attract visitors to the wilderness.

Wilderness Study Areas (BLM)

BLM-managed lands include the following wilderness study areas.

- **Mount Stirling Wilderness Study Area**—The Mount Stirling Wilderness Study Area lies primarily within the Toiyabe National Forest, and is discussed with the Toiyabe National Forest Wilderness Areas above.
- **Nellis ABC Wilderness Study Areas**—The Nellis ABC Wilderness Study Areas comprise approximately 5,700 acres of land adjacent to the Desert National Wildlife Refuge. Camping and hiking activities attract visitors to the wilderness.

- **Fish and Wildlife No. 1, 2, 3 Wilderness Study Areas**—The Fish and Wildlife No. 1, 2, 3 Wilderness Areas comprised approximately 50,300 acres of land, of which 35,300 acres lies within the GSA. Camping and hiking activities attract visitors to the wilderness.
- **Quail Springs Wilderness Study Area**—The Quail Springs Wilderness Study Area comprises approximately 12,100 acres of land within the GSA. Camping and hiking activities attract visitors to the wilderness.

County and Municipal Parks

Over 200 county and municipal parks were identified in the GSA. Given the extensive number of parks, a list of the parks identified for and considered in this EA is included in Appendix E, Table E.2-1.

4.3.4 Historic, Architectural, and Cultural Resources

The National Historic Preservation Act of 1966 requires FAA to consider the effects of its undertakings on properties in or eligible for listing in the National Register of Historic Places (NRHP). Compliance requires consultation with the Advisory Council on Historic Preservation, the State Historic Preservation Officer (SHPO), and/or the Tribal Historic Preservation Officer (THPO). The following sections outline the results of historic resource investigations conducted to identify historical sites within the GSA. Historic properties are defined, for the purposes of this EA, as resources that are in or eligible for listing in the NRHP or relevant SHPO listings, or that have been identified through tribal consultations, for values other than their archaeological qualities. As noted in Section 4.2, the Proposed Action does not involve ground disturbance that could potentially impact archaeological resources. Thus, archaeological resources are not addressed in this EA.

It is possible that changes in aircraft flight routes could increase aircraft routing over historic resources, which could lead to adverse aircraft noise or visual impacts. Thus, historic resources in the GSA have been identified for this EA.

4.3.4.1 Historic, Architectural, and Cultural Resources in the GSA

Characteristics of the 37 historic sites listed in the NRHP or SHPO registries as well as the existing aircraft noise exposure levels at those sites are summarized in **Table IV-5.** The locations of these sites are depicted on **Exhibit IV-5.**

The majority of the historic sites (sites 1-22) are within the developed area of Las Vegas. These sites represent various eras of cultural, architectural, and economic development in the Las Vegas area from prehistoric Native American life to the 1950s. Sites within Las Vegas include several examples of historic residential, institutional, and commercial architecture as well as examples of historic community planning evident in the three historic districts and one historic park in the urbanized Las Vegas vicinity.[18] One site (site 1), exemplifies one instance of prehistoric Native American life in the area around one of the few sources of drinking water in the Las Vegas area.

[18] The Tule Springs Ranch historic property is an historic working/demonstration ranch with a municipal park, Floyd Lamb Park at Tule Springs. The Floyd Lamb Park at Tule Springs is identified as a municipal park in the list of potential Section 4(f) resources assessed in this EA. A second historic site currently used as a park – the Willow Beach Gauging Station – is located outside of the Las Vegas urbanized area, but, within the Lake Mead National Recreation Area, a property identified EA as a potential Section 4(f) resource.

Table IV-5 (1 of 2)

Historic, Architectural, and Cultural Resources within the GSA

Site Number	Site Name	Current Use	Primary Areas of Significance	Aircraft Noise Exposure (DNL)
1	Las Vegas Mormon Fort	Museum	• Architecture • Aboriginal-Historic	41.0
2	Kiel Ranch	Agriculture	• Architecture • Landscape Architecture	41.5
3	Las Vegas High School Academic Building and Gymnasium	Office	• Architecture • Education	40.6
4	Jay Dayton Smith House	Commercial	• Architecture	41.1
5	Moulin Rouge Hotel	Hotel and Theater	• Ethnic Heritage: Black	41.6
6	Huntridge Theater	Recreation and Culture	• Entertainment and Recreation • Architecture	41.1
7	Clark Avenue Railroad Underpass	Transportation	• Social History • Ethnic Heritage: Black	41.2
8	Las Vegas High School Neighborhood Historic District	Education	• Architecture • Community Planning and Development	40.8
9	John S. Park Historic District	Residential	• Community Planning and Development • Architecture	42.4
10	Washington School	Education	• Architecture	41.8
11	Railroad Cottage Historic District	Residential	• Architecture • Exploration/Settlement	41.0
12	Woodlawn Cemetery	Cemetery	• Community Planning and Development • Social History	41.4
13	Berkley Square Historic District	Residential	• Ethnic Heritage: Black • Community Planning and Development	42.2
14	Morelli House	Office, Museum and Gallery	• Architecture	40.3
15	Las Vegas Boulevard Grammar School	Government	• Architecture • Education	40.8
16	D Street Grammar School	Government	• Architecture • Education	41.6
17	Green Shack	Commercial	• Commerce	40.8
18	U.S. Post Office and Courthouse	Government	• Architecture • Politics/Government	40.7
19	Little Church of the West	Commercial	• Commerce • Architecture	58.6
20	The "Welcome to Fabulous Las Vegas" Sign	Sign	• Entertainment and Recreation	61.6
21	Las Vegas Springs	Recreation and Culture	• Archaeology: Prehistoric • Agriculture	42.1
22	Eureka Locomotive	Transportation	• Transportation • Engineering	42.0

Table IV-5 (2 of 2)

Historic, Architectural, and Cultural Resources within the GSA

Site Number	Site Name	Current Use	Primary Areas of Significance	Aircraft Noise Exposure (DNL)
23	Tule Springs Ranch	Park	• Agriculture • Commerce	–
24	Boulder Dam Hotel	Hotel	• Commerce	–
25	The Old Boulder City Hospital	Resort	• Social/Humanitarian	–
26	Willow Beach Gauging Station	Park	• Engineering	–
27	Boulder City Historic District	Commercial	• Architecture • Community Planning	–
28	Hoover Dam	Energy Facility and Water Works	• Commerce • Engineering	–
29	Goodsprings Schoolhouse	Education	• Education • Architecture	–
30	Pioneer Saloon	Commercial and Entertainment	• Commerce • Entertainment and Recreation	–
31	Camp Lee Canyon	Camp	• Government and Politics	–
32	Sandstone Ranch	Agriculture	• Agriculture • Economics	–
33	Walking Box Ranch	Education	• Agriculture • Architecture	–
34	Mormon Well Spring	Government	• Aboriginal-Historic/Prehistoric • Cattle and Horse Ranching	–
35	Potosi	Commercial and Industrial	• Engineering • Industry/Commerce	–
36	Hidden Forest Cabin	Government/Wildlife Refuge	• Agriculture • Bootlegging	–
37	Old Spanish Trail—Mormon Road Historic Trail District	Recreation	• Event • Information Potential	N/A [1/]

Notes:

– Indicates noise exposure levels below DNL 40.

N/A Not applicable

1/ Several routes of the Old Spanish Trail traverse the Area of Potential Effects (APE) in a primarily northeast-southwest orientation. Based on the results of a grid point noise analysis over federal lands in the APE (i.e., Potential Section 4(f) properties managed by agencies such as the National Park Service, the National Forest Service, and the Bureau of Land Management), federal lands through which the Old Spanish Trail traverses, the Old Spanish Trail is not expected to experience changes in noise exposure that would be considered significant or otherwise warrant disclosure under the Proposed Action.

Sources: U.S. Department of Interior, National Park Service, National Register of Historic Places, http://nrhp.focus.nps.gov/natreghome.do?searchtype=natreghome, (accessed May, 23 2010); William Collins, State Historic Preservation Office, Arizona State Parks, "RE Arizona State Historic State Listings," email to Joel E. Donham, Ricondo & Associates, Inc., May 5, 2010 (Arizona historic resources); California State Parks Office of Historic Preservation Registration Programs, Inyo County and San Bernardino County, http://www.parks.ca.gov/listed_resources/, (accessed May 12, 2010) (California historic resources); Nevada Department of Museums, Library and Arts, "Morelli House Nevada Register of Historic Places registration Form," October 11, 2001 (Nevada historic resources); Nevada Department of Museums, Library and Arts, "Pioneer Nevada Register of Historic Places registration Form," December 11, 2007 (Nevada historic resources); Karyn de Dufour, Nevada Department of Cultural Affairs, "RE: State of Nevada Historical Registry GIS data," email to Joel E. Donham, Ricondo & Associates, Inc., May 10,2010 (Nevada historic resources); and Karyn de Dufour, Nevada Department of Cultural Affairs, "RE: State of Nevada Historical Registry GIS data," email to Joel E. Donham, Ricondo & Associates, Inc., May 12,2010 (Nevada historic resources).

Prepared by: Ricondo & Associates, Inc., July 2010.

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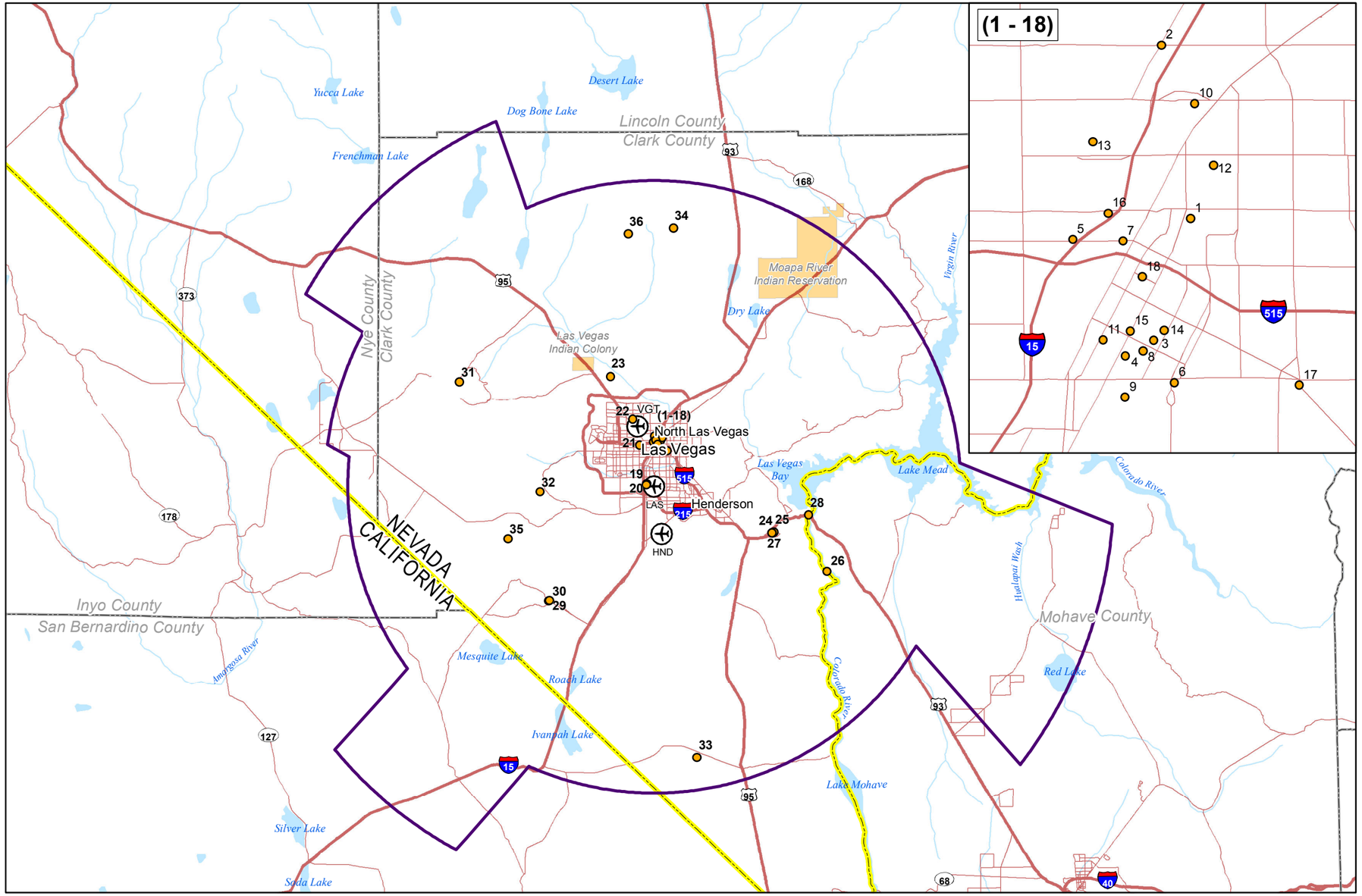

LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- Indian Reservation

List of Resources

1	Las Vegas Mormon Fort
2	Kiel Ranch
3	Las Vegas High School Academic Building and Gymnasium
4	Jay Dayton Smith House
5	Moulin Rouge Hotel
6	Huntridge Theater
7	Clark Avenue Railroad Underpass
8	Las Vegas High School Neighborhood Historic District
9	John S. Park Historic Park
10	Washington School
11	Railroad Cottage Historic District
12	Woodlawn Cemetary
13	Berkley Square Historic District
14	Morelli House
15	Las Vegas Boulevard Grammar School
16	D Street Grammar School
17	Green Shack
18	U.S. Post Office and Courthouse
19	Little Church of the West
20	The "Welcome to Fabulous Las Vegas" Sign
21	Las Vegas Springs
22	Eureka Locomotive
23	Tule Springs Ranch
24	Boulder Dam Hotel
25	The Old Boulder City Hospital
26	Willow Beach Gauging Station
27	Boulder City Historic District
28	Hoover Dam
29	Goodsprings Schoolhouse
30	Pioneer Saloon
31	Camp Lee Canyon
32	Sandstone Ranch
33	Walking Box Ranch
34	Mormon Well Spring
35	Potosi
36	Hidden Forest Cabin
37	Old Spanish Trail*

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport
*Old Spanish Trail passes through the GSA and central Las Vegas. Not shown on map.

Projection: State Plane, Nevada East Zone

Sources: U.S. Department of the Interior, National Park Service, National Register of Historic Places, 2007 (historic resources); Nevada State Historic Preservation Office, 1998, 1999, 2001, 2007 (historic resources); Metron Aviation, July 2010 (generalized study area boundary); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-5

0 15 NM

north

Historic, Architectural, and Cultural Resources within the GSA

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Outlying sites preserve areas associated with the natural resources of the area including those that supported ranching or mining activities, springs, and the hydroelectric capacity of the Colorado River realized by the Hoover Dam (sites 26 and 28). Additional outlying sites preserve structures built to support residents in Clark County including schools and housing, children's summer camp (site 31), a saloon, a hospital, and a hotel. The Mormon Well Spring (site 34) provides another example of prehistoric Native American life.[19]

Additionally, the entire GSA is traversed by the Old Spanish Trail, an historic trade route between Santa Fe, New Mexico and Los Angeles, California, passing through the location of modern-day Las Vegas. The trail commemorates the historic trade route while providing a modern recreational amenity.

4.3.4.2 Tribal Lands in the GSA

Two Indian Reservations are located within the GSA, as shown on Exhibit IV-5. The Las Vegas Indian Colony lies completely inside the GSA while the Moapa River Indian Reservation is situated along the periphery of the GSA with a portion of the land outside. Also in the general area, the Hualapai Reservation consists of land spread across three Arizona counties, the main portion of which is located adjacent to the Ground Canyon National Park, but outside of the GSA. A summary of the tribal lands located within the GSA follows:

- **Moapa River Indian Reservation**—This reservation is home to the Moapa Band of Paiute Indians. The total land area under tribal control is over 70,000 acres and lies northeast of the City of Las Vegas along Interstate 15. The land is governed by a tribal council under a constitution recognized by the Department of the Interior.[20] Existing aircraft noise exposure (as modeled at 33 grid points) ranged from DNL 10.9 to 20.9, with an average DNL 17.2.
- **Las Vegas Indian Colony**—The Las Vegas Indian Colony is the home of the Las Vegas Paiute Tribe. The reservation was historically situated on 10 acres of land within the City of Las Vegas, but has been expanded to a 3,800-acre area northwest of the city along State Highway 95. The tribe now operates a large golf resort at this location.[21] Existing aircraft noise exposure (as modeled at 2 grid points) ranged from DNL 19.5 to 22.9, with an average DNL 21.2.

Other lands in the GSA are known to have special significance to tribes with historic ties to the area. These lands, which are shown on Exhibit IV-4, include:

- **Sloan Canyon National Conservation Area**—The Sloan Canyon NCA is a location of tribal interest to the Southern Paiute, Chemehuevi, and Mohave peoples. Native Americans currently use the area to gather for rituals and singing associated with the character of the land.[22] Existing aircraft noise exposure (as modeled at 29 grid points as reported in Table IV-4) ranged from DNL 35.2 to 45.9, with an average DNL 39.2.

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[19] U.S. Department of the Interior, National Park Service, National Register of Historic Places, http://nrhp.focus.nps.gov/natreghome.do?searchtype=natreghome (accessed May, 23 2010).

[20] The Moapa Band of the Paiutes website, http://www.moapapaiutes.com/about_us.htm (accessed July 19, 2010).

[21] The Las Vegas Paiute Tribe, Tribe History webpage, http://www.lvpaiutetribe.com/index-1.html (accessed July 19, 2010).

[22] The Bureau of Land Management, Las Vegas Field Office, *The Sloan Canyon National Conservation Area Record of Decision for the Approved Resource Management Plan/Final Environmental Impact Statement and Approval of the North McCullough Wilderness Management Plan,* Appendix C, "Cultural Resources Management Plan," May 2006.

- **Desert National Wildlife Range**—Tribal interest in the Desert National Wildlife Range is inferred from a document prepared for the USFWS titled, *Coyote Named This Place "Pakonapanti."* In the report, Native American tribal elders are interviewed and quoted as stating, "our relatives lived here and are buried here." Based on this record, it has been determined that there is a significant interest in the Desert National Wildlife Range among existing Native American tribes.[23] Existing aircraft noise exposure (as modeled at 317 grid points as reported in Table IV-4) ranged from less than DNL 1 to DNL 22.4, with an average DNL 6.2.
- **Grand Canyon National Park**—The Grand Canyon General Management Plan states, "[s]ix American Indian groups, represented by eight tribal governments, have close and sacred cultural ties to the Grand Canyon, with some considering the canyon their original homeland and place of origin."[24] Existing aircraft noise exposure (as modeled at 3 grid points as reported in Table IV-4[25]) ranged from DNL 29.8 to 32.5, with an average DNL 31.2.
- **Mojave National Preserve**—According to the NPS, the Mojave National Preserve contains archaeological and cultural resources dating back thousands of years. The Mojave National Preserve General Management Plan states that one of the purposes of the preserve is to "[p]reserve and protect cultural resources representing human use associated with Native American cultures."[26] Other than general information about cultural resources within the preserve, little information about locations of specific sites of Native American interest is available. Existing aircraft noise exposure (as modeled at 26 grid points as reported in Table IV-4) ranged from DNL 22.7 to 36.1, with an average DNL 28.9.
- **Valley of Fire State Park**—As mentioned in Section 4.3.3.3, the Moapa Band of Paiutes considers this land sacred. Existing aircraft noise exposure (as modeled at 25 grid points as reported in Table IV-4) ranged from DNL 19.9 to 31.6, with an average DNL 27.4.

4.3.5 Socioeconomic Impacts and Environmental Justice Considerations

To understand the existing socioeconomics and environmental justice characteristics of the population located within the GSA, census block level data were acquired in Geographic Information System (GIS) format. Each census block is defined by various fields of information such as area, numbers of households, numbers of inhabitants, and average income. Census blocks with populations of zero were discarded. In order to assess the overall GSA population, population of census blocks intersecting the GSA were weighted based on the corresponding area located inside the GSA. For instance, if 75 percent of a census block intersected by the GSA boundary falls inside the GSA, 75 percent of the population of this census block was included in the GSA population count.

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[23] HRA, Inc. Conservation Archaeology, *Coyote Named This Place "Pakonapanti,"* prepared for the U.S. Fish and Wildlife Service, Desert National Wildlife Refuge, July 31, 2007.

[24] U.S. Department of Interior, National Park Service, Denver Service Center, *General Management Plan, Grand Canyon National Park, Arizona*, August 1995, p. 8.

[25] Only a small portion of the Grand Canyon National Park is located within the GSA, and the portion of the National Park was not captured by the 1.5 nautical mile by 1.5 nautical mile grid overlay of the GSA. Thus, the reported noise exposure levels for grid points are the nearest grid points.

[26] U.S. Department of Interior, National Park Service. *Mojave National Preserve General Management Plan, San Bernardino County, California,* April 2002.

4.3.5.1 Socioeconomic Impacts

The GSA includes areas in six counties located within three states: Clark, Nye and Lincoln Counties in Nevada, San Bernardino and Inyo Counties in California, and Mohave County in Arizona. **Table IV-6** presents the 2009 population counts within each of the six counties intersecting the GSA.

Table IV-6

Existing (2009) Population by County within the GSA

County	Population in the GSA	Percent of Total GSA Population
Clark County (Nevada)	1,914,966	98.9%
Nye County (Nevada)	18,569	1.0%
Mohave County (Arizona)	3,301	0.2%
San Bernardino County (California)	149	0.0%
Inyo County (California)	118	0.0%
Lincoln County (Nevada)	0	0.0%
Total	1,937,103	100.0%

Note: Percent total may differ due to rounding.

Source: Ricondo & Associates, Inc., July 2010, based on Applied Geographic Solutions, Population Counts for the Counties of Clark, Nye, Mohave, San Bernardino, Inyo, and Lincoln, April 2010.
Prepared by: Ricondo & Associates, Inc., July 2010.

As defined by the U.S. Office of Management and Budget, the Las Vegas-Paradise Metropolitan Statistical Area (MSA) consists of Clark County.[27] For the purposes of this socioeconomic analysis, the Las Vegas-Paradise MSA was selected to be representative of the GSA based on its population. As presented in Table IV-6, 98.9 percent of the GSA population resides in Clark County, i.e. in the Las Vegas-Paradise MSA, with a total of 1,914,966 inhabitants compared with a total GSA population of 1,937,103 inhabitants.

Exhibit IV-6 depicts population density within the GSA. Densely populated areas are mostly located within the municipal boundaries of Las Vegas, North Las Vegas, Henderson, and Boulder City. In addition, population centers are also located within the boundaries of several unincorporated communities surrounding Las Vegas (Winchester, Sunrise Manor, Spring Valley, and Paradise). Accordingly, approximately 89 percent of the total population of Clark County resides within the boundaries of the cities and unincorporated communities listed above. The remaining 11 percent of the total population of Clark County is located within small unincorporated communities and rural areas.

Selecting the Las Vegas-Paradise MSA as a framework of study provided access to readily available datasets maintained by the U.S. Bureau of Labor Statistics (BLS) for socioeconomic data presented herein.

Table IV-7 presents nonfarm employment data for the Las Vegas-Paradise MSA by supersector, as reported by BLS in the North American Industry Classification System (NAICS) supersector database.

[27] U.S. Office of Management and Budget, *Current Lists of Metropolitan and Micropolitan Statistical Areas and Definitions*, *OMB Bulletin No. 09-01*, November 2008.

Table IV-7

Las Vegas-Paradise MSA Nonfarm Payroll Employees

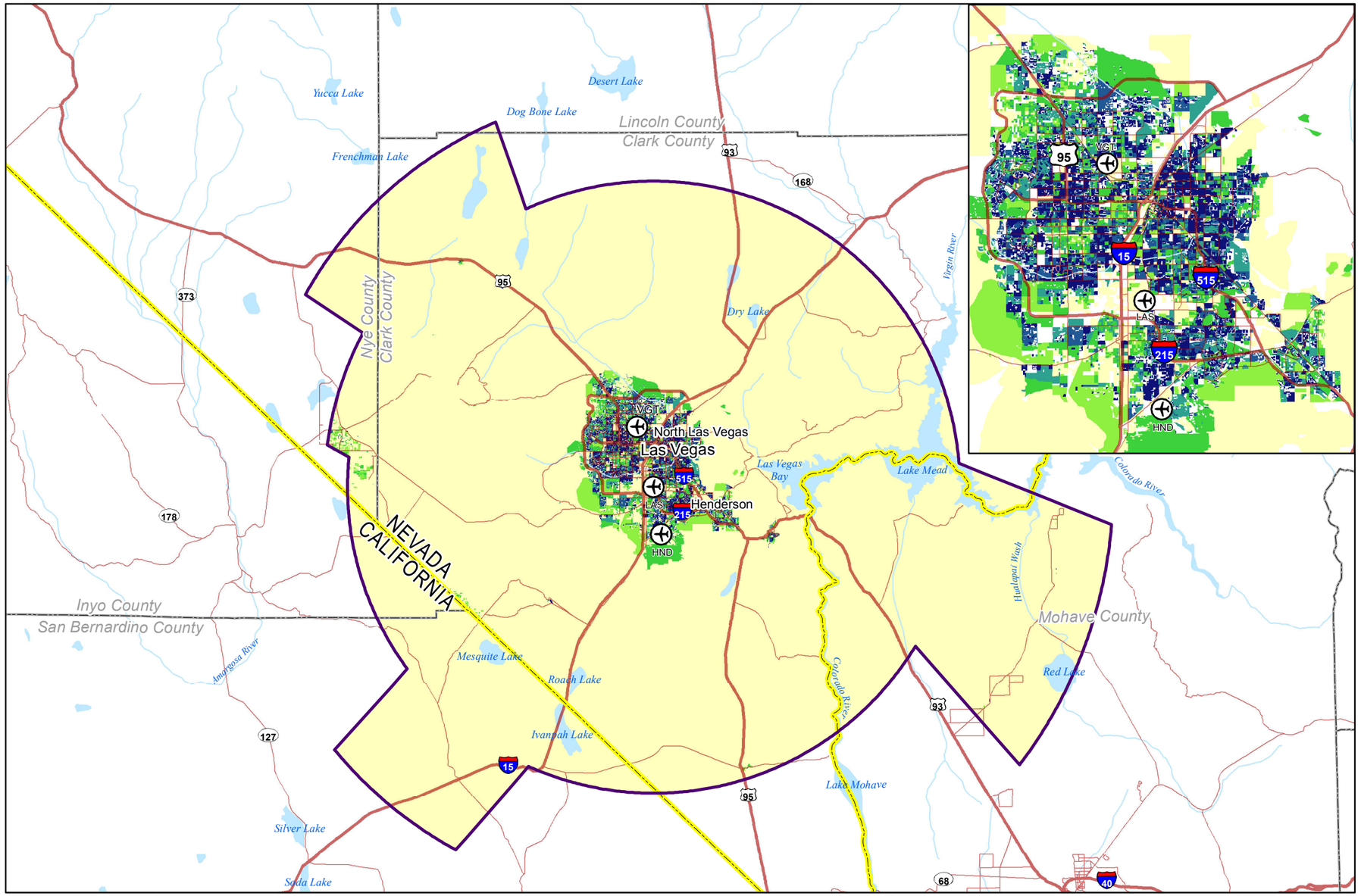
Supersectors	2007 Employees (thousands)	2007 Percent of Total	2007 Rank	2008 Employees (thousands)	2008 Percent of Total	2008 Rank	2009 Employees (thousands)	2009 Percent of Total	2009 Rank
Leisure and Hospitality	273.1	29%	1	269.5	30%	1	250.7	30%	1
Trade, Transportation and Utilities	161.1	17%	2	160.9	18%	2	148.1	18%	2
Professional and Business Services	116.2	13%	3	111.6	12%	3	99.9	12%	3
Government	97.5	11%	5	101.7	11%	4	98.6	12%	4
Education and Health Services	63.4	7%	6	66.4	7%	6	67.6	8%	5
Construction	102.7	11%	4	92.4	10%	5	64.4	8%	6
Financial Activities	50.0	5%	7	47.4	5%	7	42.5	5%	7
Other Services	25.6	3%	9	25.7	3%	8	23.6	3%	8
Manufacturing	26.7	3%	8	25.4	3%	9	21.1	3%	9
Information	11.3	1%	10	11	1%	10	9.6	1%	10
Mining/Logging	0.5	0%	11	0.4	0%	11	0.3	0%	11
Totals	928.1	100%		912.4	100%		826.4	100%	

Notes:
1/ Supersectors are sorted based on the 2009 ranks
2/ Percent totals may differ due to rounding.

Source: Ricondo & Associates, Inc., July 2010, based on U.S. Bureau of Labor Statistics, Establishment Data State and Area Employment Annual Averages, Nonfarm Payroll Employees, July 2010.
Prepared by: Ricondo & Associates, Inc., July 2010.

As shown in Table IV-7, employment in the Las Vegas-Paradise MSA was led by the leisure and hospitality supersector, representing approximately 30 percent of the total nonfarm employees in 2009. The leisure and hospitality supersector ranked as the largest employer within the MSA, as the Las Vegas-Paradise MSA relies heavily on its tourism-based activities for employment. As an indicator of the degree of specialization of the local economy, a location quotient can be calculated to represent the ratio of the percentage of local employment in an industry or sector to the percentage of national employment in the same industry or sector. As expected, BLS reported a 2009 location quotient of 2.82 for the leisure and hospitality supersector in Las Vegas-Paradise MSA.[28] A location quotient greater than 1 (in this instance, 2.82), is evidence of the local economy of the Las Vegas-Paradise MSA being highly specialized, and therefore dependent, on the tourism industry.

[28] U.S. Department of Labor, Bureau of Labor Statistics, *Location Quotient Calculator*, http://www.bls.gov/cew/cewlq.htm (accessed July 1, 2010).



LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Population Density (Persons/Square Mile)

- 0 - 500
- 501 - 1000
- 1001 - 2500
- 2501 - 5000
- 5001 - 7500
- 7501 and Greater

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

Sources: U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Metron Aviation, July 2010 (generalized study area boundary); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers); Applied Geographic Solutions: April 2010 Release (census blocks).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-6

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north

Existing (2009) Population Density within the GSA

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The trade, transportation, and utilities supersector and the professional and business services supersector consistently ranked second and third between 2007 and 2009, employing approximately 18 percent and 12 percent of the total 2009 nonfarm workforce, respectively. The trade, transportation and utilities supersector includes employment in the following industries: wholesale and retail trade, transportation, warehousing, and utilities. The professional and business services supersector includes employment within the industries of professional, scientific, and technical services; management of companies and enterprises; administrative; support; waste management; and remediation services. The government supersector and the education and health services supersector employed approximately 12 percent and 8 percent of the total nonfarm employees in 2009, ranking number four and five, respectively. Employment within the construction supersector declined between 2007 and 2009, from rank number 4 to rank number 6, employing approximately 8 percent of the total nonfarm employees in 2009. Combined, the largest six supersectors listed in Table IV-7 employed approximately 88 percent of the total nonfarm employees in 2009.

As reported by the Nevada Department of Employment, Training, and Rehabilitation, the top 25 employers in Clark County in 2009 belonged to three supersectors, as follows:[29]

- Leisure and Hospitality: Wynn Las Vegas; Bellagio, LLC.; MGM Grand Hotel/Casino; Mandalay Bay Resort and Casino; Caesars Palace; the Venetian Casino Resort; Mirage Casino-Hotel; the Rio Suite Hotel & Casino; the Palazzo Casino Resort; Flamingo Las Vegas; Encore Las Vegas; Luxor; Paris Las Vegas; Harrahs Las Vegas, Inc.; Treasure Island Hotel Casino; Bally's Casino Hotel; and Excalibur Hotel & Casino.
- Government: Clark County; Las Vegas Metropolitan Police; City of Las Vegas; and City of Henderson.
- Education and Health Services: Clark County School District; University of Nevada Las Vegas; University Medical Center of Southern Nevada; and Sunrise Hospital and Medical Center.

4.3.5.2 Environmental Justice

Environmental justice is defined by the U.S. Environmental Protection Agency (EPA) as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[30]

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, sets forth requirements for each Federal agency to achieving environmental justice by "identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."[31] In April 1997, the U.S. DOT issued DOT Order 5610.2, *To Address Environmental Justice in Minority Populations and Low-Income Populations,* to set standards to incorporate the requirements of Executive Order 12898 into the Department's various programs, policies, and activities.

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[29] Nevada Department of Employment, Training, and Rehabilitation, *Nevada's Top Employers by County 2009/2000*, http://www.nevadaworkforce.com/article.asp?ARTICLEID=2187 (accessed July 21, 2010).

[30] U.S. Environmental Protection Agency, http://www.epa.gov/environmentaljustice (accessed July 21, 2010).

[31] The White House, Presidential Documents, Federal Register Vol. 59, No. 32, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, February 16, 1994.

DOT Order 5610.2 defines the concepts of minority and low-income as follows:[32]

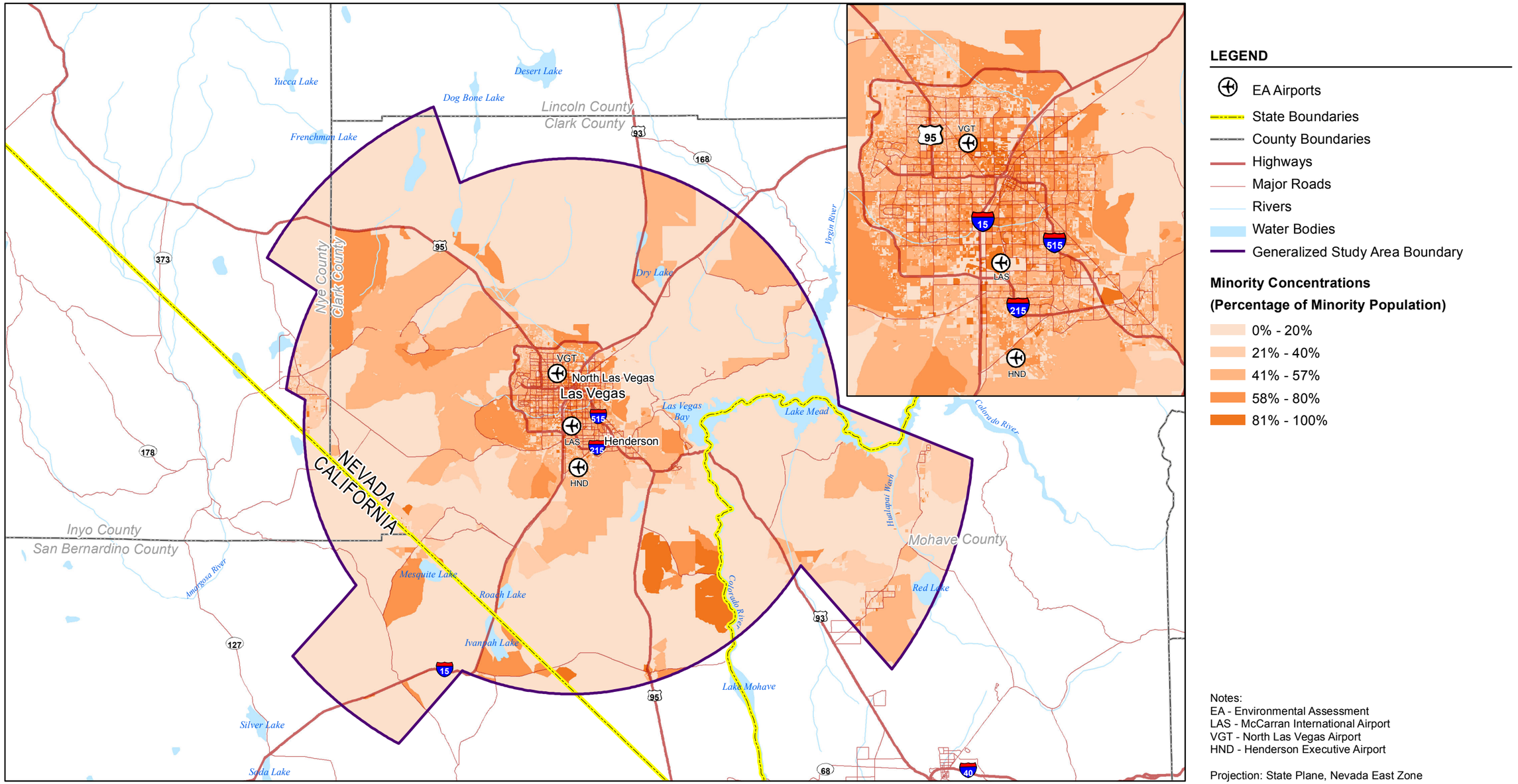
- Minority means a person who is:
  - Black (a person having origins in any of the black racial groups of Africa);
  - Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
  - Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or
  - American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).
- Low-income means a person whose median household income is at or below the U.S. Department of Health and Human Services (HHS) poverty guidelines.

Based on these definitions, DOT Order 5610.2 defines minority and low-income populations as follows:

- Minority Population means any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed DOT program, policy, or activity.
- Low-Income Population means any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed DOT program, policy, or activity.

GIS analysis and mapping was used to identify minority and low-income population information for each census block within the GSA. **Exhibit IV-7** depicts the concentrations of minority population within the GSA. As depicted, census blocks with high concentrations of minority population are located around the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City, as well as within surrounding unincorporated communities and rural areas across the GSA. **Exhibit IV-8** depicts the concentrations of low-income households within the GSA. As depicted, census blocks with high concentrations of low-income households are located around the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City, as well as several unincorporated communities and rural areas scattered throughout the GSA.

[32] U.S. Department of Transportation, Federal Register Vol. 62, No. 72, *Department of Transportation Order to Address Environmental Justice in Minority and Low-Income Populations*, April 15, 1997.



LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Minority Concentrations
(Percentage of Minority Population)

- 0% - 20%
- 21% - 40%
- 41% - 57%
- 58% - 80%
- 81% - 100%

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

Sources: U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Metron Aviation, July 2010 (generalized study area boundary); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers); Applied Geographic Solutions: April 2010 Release (census blocks).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-7

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north

Concentrations of Minority Population within the GSA

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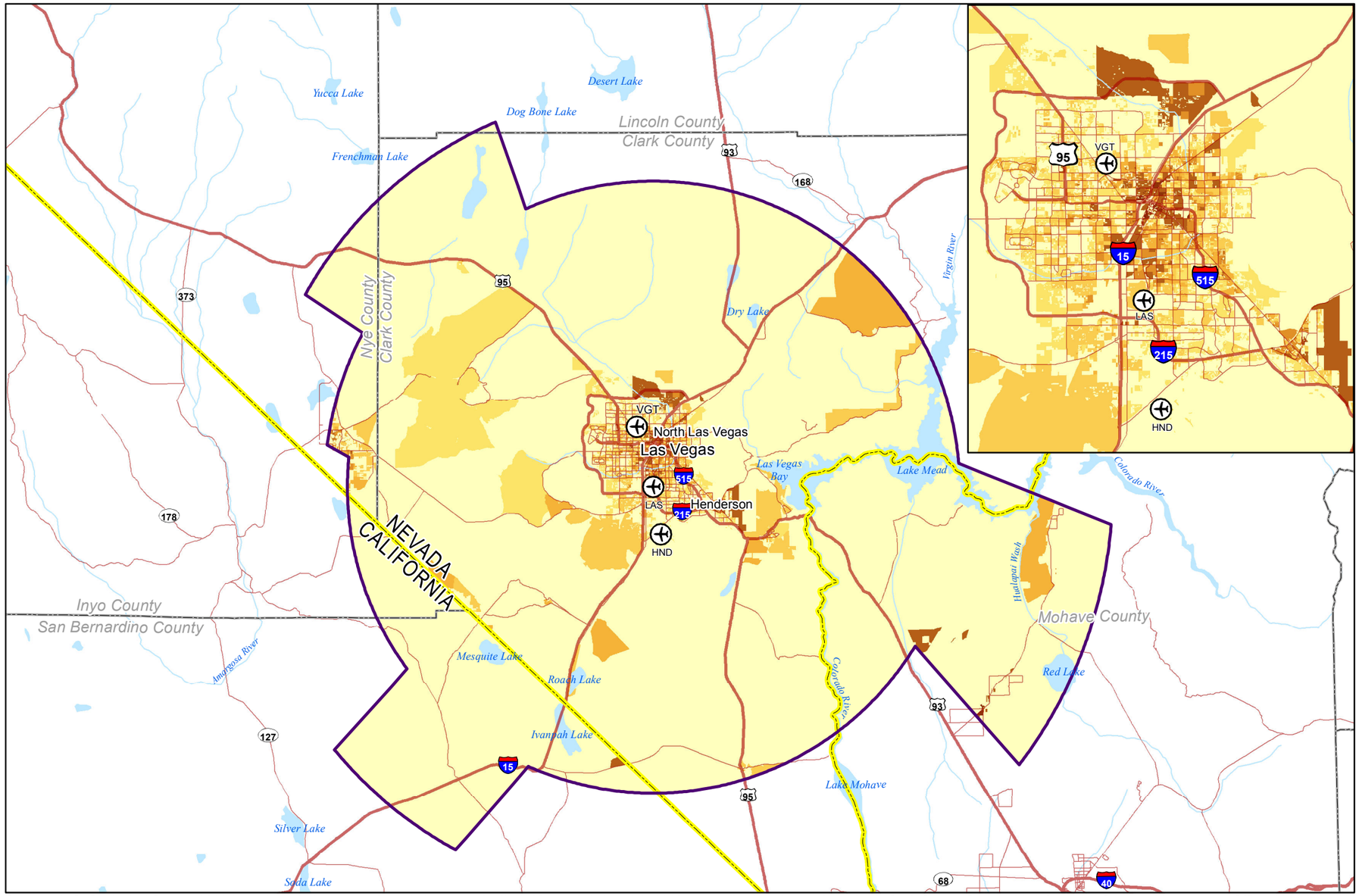

LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Low-Income Concentrations
(Percentage of Low-Income Households)

- 0% - 6%
- 7% - 11%
- 12% - 18%
- 19% - 24%
- 25% - 30%
- 31% - 50%
- 51% - 75%
- 76% - 100%

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

Sources: U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Metron Aviation, July 2010 (generalized study area boundary); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers); Applied Geographic Solutions: April 2010 Release (census blocks).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-8

0 15 NM

north

Concentrations of Low-Income Population within the GSA

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For the purposes of this environmental justice analysis, minority population census blocks and low-income population census blocks were defined and identified as follows:

- A minority census block is defined as a block having a minority population percentage greater than the average minority population percentage of the GSA. Based on the 2009 data, the average percentage of minority population residing in the GSA was 58 percent. Therefore, every census block with a percentage of minority population greater than 58 percent was identified as a census block of environmental justice concern.
- A low-income population census block is defined as a block having a greater percentage of low-income population than the average percentage of low-income population residing in the GSA. Based on the 2009 Poverty Guidelines identified by the HHS, the poverty threshold for a household of three persons[33] was set at $18,310 for the 48 contiguous states, and therefore is applicable to the State of Nevada.[34] The household income data acquired for this analysis was recorded using income intervals of $5,000. Therefore, for the purposes of identifying low-income population census blocks, a threshold of $20,000 was used, providing for a more conservative analysis compared with the HHS threshold of $18,310. Based on the 2009 data, the average percentage of low-income population (i.e., with a household annual income of less than $20,000) residing in the GSA was 12 percent. Therefore, every census block with a percentage of low-income population greater than 12 percent was identified as a census block of environmental justice concern.

As a result, census blocks of environmental justice concern are defined as those in which either the concentration of minority population and/or the concentration of low-income population are higher than their respective averages of the GSA. For instance, Census Block #2439 was identified to be of environment justice concern as both its percentage of minority population (67 percent) and its percentage of low-income population (40 percent) exceeded the GSA averages of 58 percent and 12 percent, respectively. **Table IV-8** presents the analysis results of minority and low-income population for the purposes of this environmental justice analysis.

Exhibit IV-9 depicts the census blocks of environmental justice concern located within the GSA. In examining Exhibit IV-9, it is important to note that the amount of data sampled in a census block is not proportional to the geographic area covered by the census block. Hence, a large census block may inherit the population and socioeconomics attributes of a small population set. In summary, the census blocks of environmental justice concern are located around the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City. Other areas of environmental justice concern are located to the southwest of Las Vegas, along Interstate 15 in the vicinity of the Mesquite Lake area; to the southeast along U.S. Route 95 and State Route 165; to the east in Arizona along County Highway 25 near the eastern edge of Lake Mead; to the northeast near Moapa Valley and Overton along State Route 169; to the west around Summerlin South and Enterprise; and to the northwest around the City of Pahrump.

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[33] According to the U.S. Census Bureau 2006-2008 American Community Survey 3-Year Estimates, the average household size in Clark County is 2.66 persons (American FactFinder website, http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts, [accessed July 21, 2010]).

[34] U.S. Department of Health and Human Services, Federal Register Vol. 74, No. 14, *Annual Update of the HHS Poverty Guidelines*, January 23, 2009.

Table IV-8

Environmental Justice Concern – Minority and Low-Income Populations

Environmental Justice Concern	Existing Conditions
Minority Population	
Black	128,836
Hispanic	702,021
Asian American	112,586
American Indian and Alaskan Native	10,856
Others [1/]	169,978
Total Minority Population	1,124,277
Low-Income Population	
Total Number of Households	705,289
Number of Households with Income Below $20,000	86,095
Census Blocks	
Minority Population Census Blocks [2/]	4,854
Low-Income Population Census Blocks [3/]	3,577
Environmental Justice Census Blocks [4/]	6,303

Notes:

1/ The "Others" category includes: American Indian, American Hawaiian, and multiple races.

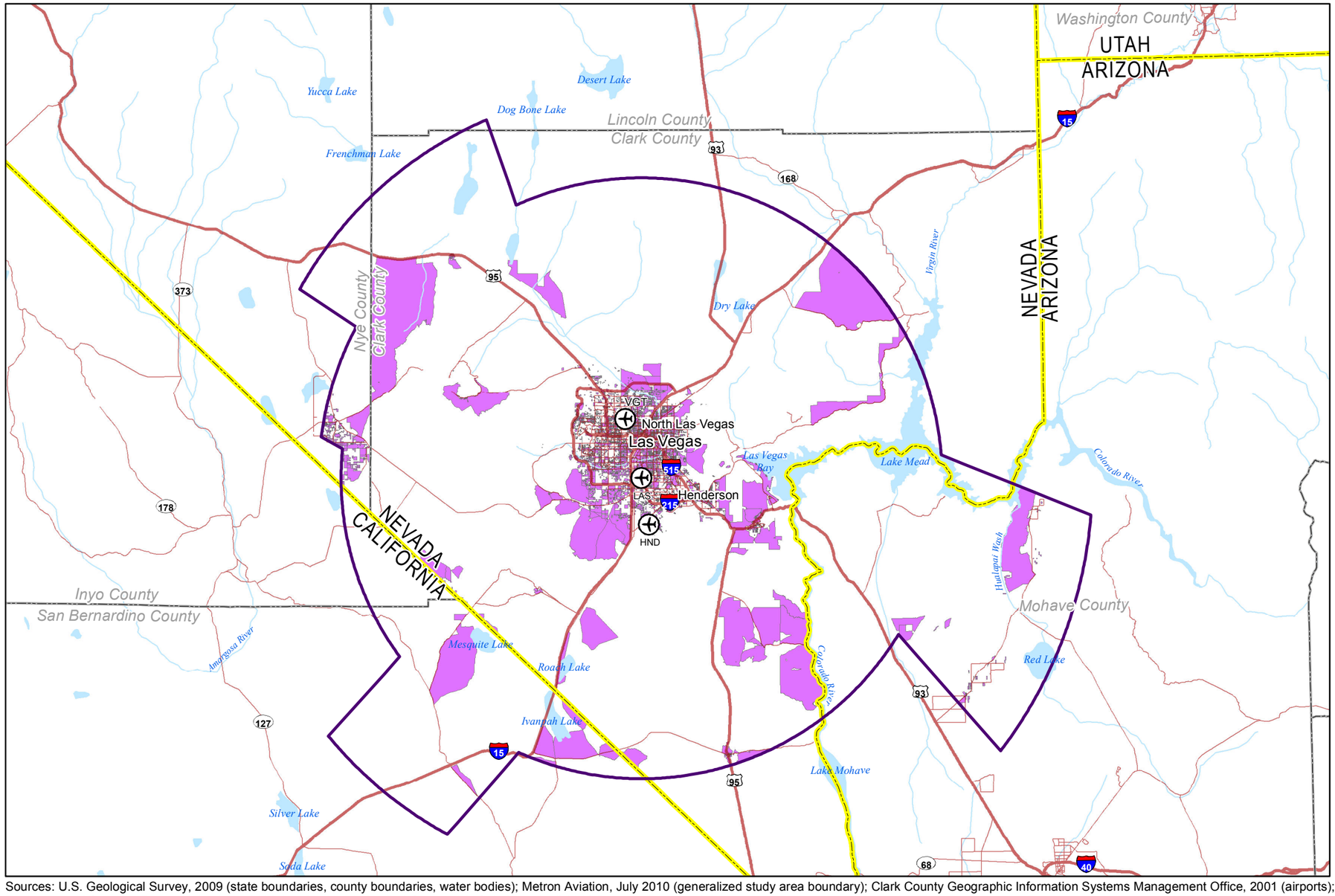
2/ For environmental justice purposes, a minority population census block is defined as a census block having a percentage of minority population greater than 58 percent (the average minority population percentage of the GSA).

3/ For environmental justice purposes, a low-income census block is defined as a census block having a percentage of low-income population greater than 12 percent (the average low-income population percentage of the GSA).

4/ An environmental justice census block is defined as a census block which either the concentration of minority population and/or the concentration of low-income population are higher than their respective averages of the GSA.

Source: Ricondo & Associates, Inc., July 2010, Applied Geographic Solutions, Population Counts for the Counties of Clark, Nye, Mohave, San Bernardino, Inyo, and Lincoln, April 2010.

Prepared by: Ricondo & Associates, Inc., July 2010.



LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- Areas of Environmental Justice Concern

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Census blocks of environmental justice concern are defined as those in which either the concentration of minority population (see Exhibit IV-7) and/or the concentration of low-income population (see Exhibit IV-8) are higher than their respective averages of the GSA.

Projection: State Plane, Nevada East Zone

Sources: U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Metron Aviation, July 2010 (generalized study area boundary); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers); Applied Geographic Solutions: April 2010 Release (census blocks).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-9

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north

Areas of Environmental Justice Concern

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4.3.6 Fish, Wildlife, and Plants

This section provides a discussion of the existing biotic resources within the GSA. The Proposed Action involves redesign of the airspace (specifically the standard instrument arrival and departure procedures primarily above 3,000 feet AGL and the supporting airspace management structure) serving the EA Airports. Therefore, this section is limited to a discussion of avian and bat species that may be present within the airspace of the GSA.

4.3.6.1 Federally Listed or Proposed Candidate Threatened or Endangered Avian and Bat Species, or Federally Designated or Proposed Critical Habitat

The policies that govern listed species include both federal and state regulations. Federally, the Endangered Species Act of 1973, Title 16 USC Section 1531-1544, must be considered. To satisfy the Endangered Species Act, the FAA must determine if a proposed action under its purview would affect a federally listed species or habitat critical to that species (critical habitat). Section 7(a)(2), Title 16 USC Section 1536(a)(2), requires federal agencies to consult with either the Secretary of the Interior or the Secretary of Commerce, as appropriate, through their respective authorized designees. An incidental take permit, obtained through a formal Section 7 consultation with USFWS would be required if there is potential for the proposed project to adversely impact federally listed species or their critical habitat. The BLM designates Nevada Special Status Species for those species that are designated sensitive by the State office or those listed by the USFWS or Nevada state law. Nevada Revised Statutes Chapter 501.110 mandates the Board of Wildlife Commissioners to classify wildlife species as either protected or unprotected. Protected species can be further classified as sensitive, endangered, or threatened.

The potential for federal and State listed avian and bat species was assessed based on agency lists and reports. Data from the Nevada Office of the USFWS were used to identify potential federally listed species.[35] The Nevada Natural Heritage Program (NNHP) at-risk animal tracking list[36] was used to identify potential state- and BLM-listed species. Additionally, the Revised Nevada Bat Conservation Plan[37] was used in conjunction with agency reports to determine the potential for listed bat species to occur within the GSA and cross-check the state-wide NNHP list. An element occurrence record (EOR) report was obtained from the NNHP in August 2010.[38] This report contains observation records for endangered, threatened, candidate, and at-risk avian and bat species within the boundaries of the GSA. EOR data from the NNHP report is shown on **Exhibit IV-10**. Based on these sources, federal and State listed avian and bat species known to occur or having the potential to occur in the GSA are listed in **Table IV-9**. Two federally endangered and eight state-listed bird species could potentially be present in the GSA. Eighteen BLM-listed and eight state-listed bat species have the potential to be present in the GSA.

[35] U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office, www.fws.gov/nevada/, (accessed July 31, 2010).

[36] Nevada Natural Heritage Program, Nevada At-risk Animal Tracking List, heritage.nv.gov/sensanim.htm, (accessed July 31, 2010).

[37] Bradley, P.V., M.J. O'Farrell, J.A. Williams, and J.E. Newmark, editors, *The Revised Nevada Bat Conservation Plan,* Nevada Bat Working Group, Reno, Nevada, 2006.

[38] Nevada Natural Heritage Program, Element Occurrence Record Report, (obtained August 2010).

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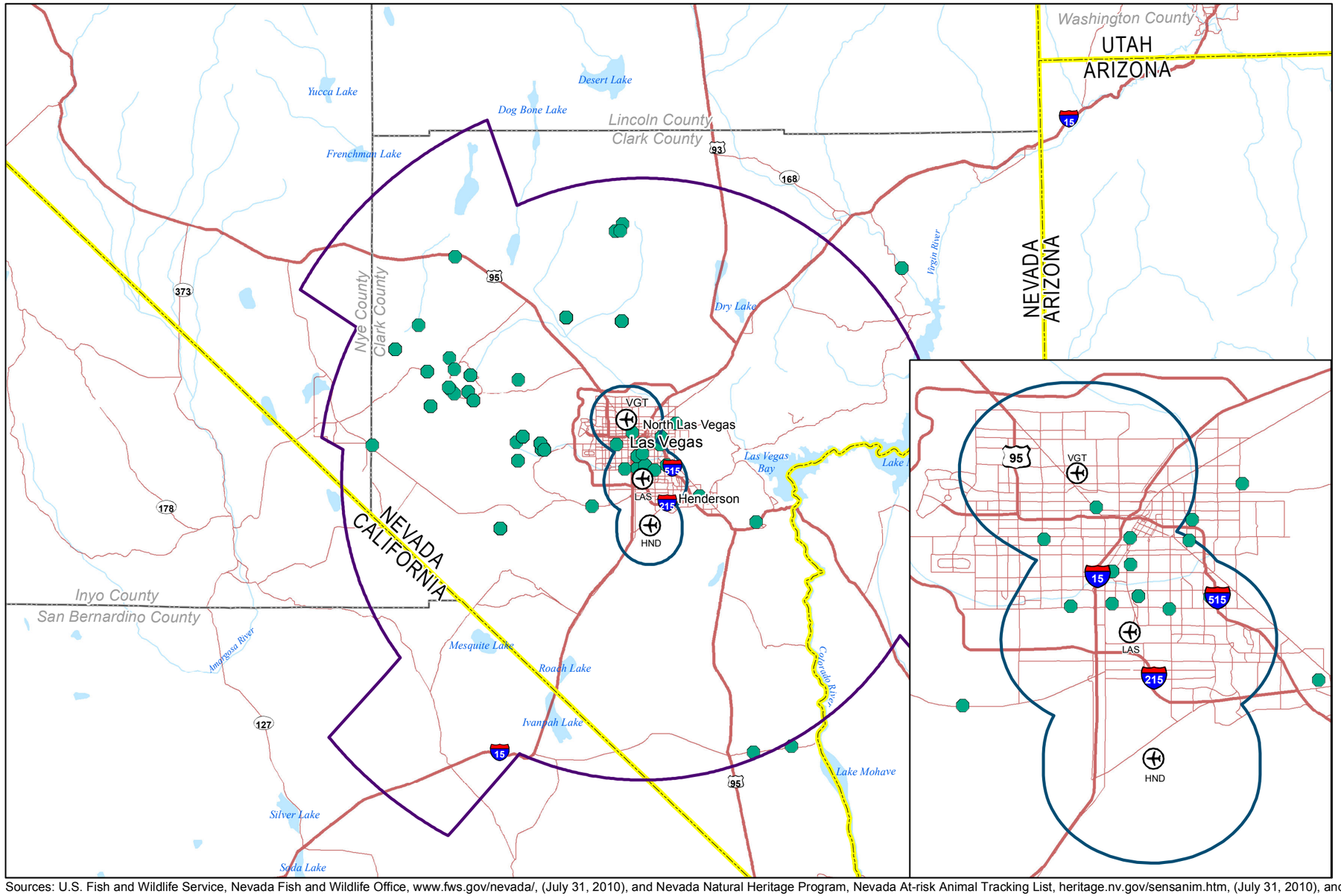

LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- EA Airports 5-mile buffer*
- Listed Avian or Bat Element Occurrence Record

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport
*The 5-mile buffer is calculated from the EA airport runways.

Projection: State Plane, Nevada East Zone

Sources: U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office, www.fws.gov/nevada/, (July 31, 2010), and Nevada Natural Heritage Program, Nevada At-risk Animal Tracking List, heritage.nv.gov/sensanim.htm, (July 31, 2010), and Nevada Natural Heritage Program, Element Occurrence Record Report, (August 2010) (avian/bat EORs); U.S. Geological Survey, 2009 (base map); Metron Aviation, July 2010 (GSA); Clark County GIS Management Office, 2001 (airports); ESRI, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-10

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north

Nevada Natural Heritage Program Element Occurrence Records for Listed Avian and Bat Species

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Table IV-9

Listed Bat and Avian Species in the GSA

Common Name	Scientific Name	USFWS[1/]	Nevada[2/]	BLM[2/]
Bats				
Allen's big-eared bat	*Idionycteris phyllotis*	NL	Y	Y
Big brown bat	*Eptesicus fuscus*	NL	-	Y
Big free-tailed bat	*Nyctinomops macrotis*	NL	-	Y
Brazilian free-tailed bat [3/]	*Tadarida brasiliensis*	NL	Y	Y
California leaf-nosed bat	*Macrotus californicus*	NL	Y	Y
Cave myotis	*Myotis velifer*	NL	-	Y
Fringed myotis	*Myotis thysanodes*	NL	Y	Y
Hoary bat [3/]	*Lasiurus cinereus*	NL	-	Y
Long-eared myotis	*Myotis evotis*	NL	-	Y
Long-legged myotis	*Myotis volans*	NL	-	Y
Western pipistrelle	*Pipistrellus Hesperus*	NL	-	Y
Silver-haired bat [3/]	*Lasionycteris noctivagans*	NL	-	Y
Spotted bat [3/]	*Euderma maculatum*	NL	Y	Y
Townsend's big-eared bat	*Corynorhinus townsendii*	NL	Y	Y
Western mastiff [3/]	*Eumops perotis*	NL	Y	Y
Western red bat	*Lasiurus blossevillii*	NL	Y	Y
Western small-footed myotis	*Myotis ciliolabrum*	NL	-	Y
Yuma myotis	*Myotis yumanensis*	NL	-	Y
Birds				
Ferruginous hawk	*Buteo regalis*	NL	Y	Y
Northern Goshawk	*Accipiter gentilis*	NL	Y	Y
Peregrine falcon [3/]	*Falco peregrines*	NL	Y	Y
Phainopepla	*Phainopepla nitens*	NL	Y	Y
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	Y	Y
Western least bittern	*Ixobrychus exilis hesperis*	NL	Y	Y
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	NL	Y	Y
Yuma clapper rail	*Rallus longirostris yumanensis*	E	Y	Y

Notes:

NL = Not Listed (USFWS)
E = Endangered (USFWS)
Y = Yes (Nevada and BLM)

1/ U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office, www.fws.gov/nevada/, (accessed July 31, 2010).

2/ Nevada Natural Heritage Program, Nevada At-risk Animal Tracking List, heritage.nv.gov/sensanim.htm, (accessed July 31, 2010); and Nevada Natural Heritage Program, Element Occurrence Record Report, (obtained August 2010).

3/ Species have a Nevada Natural Heritage Program element occurrence record within 5 miles of the EA airports.

Sources: Based on sources noted in footnotes 1 and 2 above.
Prepared by: CDM, August 2010.

Based on NNHP data, observations of three state-listed bat species and one state-listed bird species have been recorded within a 5-mile radius of the EA airports (see Exhibit IV-10). State-listed bat species include Brazilian free-tailed bat (*Tadarida brasiliensis*), spotted bat (*Euderma maculatum*), and western mastiff bat (*Eumops perotis*). Two BLM-listed bat species—silver-haired bat (*Lasionycteris noctivagans*) and hoary bat (*Lasiurus cinereus*)—also have been observed. Most of these bat species are solitary or roost in small groups of tens of individuals. In Nevada, colonies of Brazilian free-tailed bat are typically in the hundreds to thousands and they generally roost in mines, caves, buildings, bridges, and hollow trees. The peregrine falcon (*Falco peregrines*) is a state-listed bird with an EOR within 5 miles of the EA airports.

4.3.6.2 Migratory Birds

The Migratory Bird Treaty Act and Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, state that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected within the United States. This is, in part, to ensure that environmental analyses of federal actions required by NEPA or other established environmental review processes evaluate the effects of agency actions and agency plans on migratory birds. Therefore, this Act protects almost all birds that occur in, or migrate through, the GSA.

The GSA is located within the Pacific Migration Flyway, a bird migration flyway extending from Central America to the Arctic that generally follows the west coast of the United States and Canada as well as the Rocky Mountains. Nevada is between these two active areas of the Pacific Migration Flyway.

The Desert National Wildlife Refuge (NWR), discussed in Section 4.3.3.3 was established to conserve desert bighorn sheep (Ovis canadensis nelsoni), as well as the habitat vital to the sheep and other wildlife species. Fifty-two species of mammals and thirty-one species of reptiles and amphibians have been documented on the refuge. Over 240 different species of birds have been observed on the range, including many fall and spring migratory species. Of these, just over 100 birds nest locally. The refuge includes six major mountain ranges, running generally north to south and separated by relatively flat and narrow alluvial valleys. Portions of several valley floors consist of large dry lake beds or "playas." The valleys appear smooth at a distance, but contain numerous washes with sharply cut banks and large boulders. Elevations range from 3,000 feet to 9,900 feet.

Avian and bat species of concern of the Desert NWR include western small-footed myotis (*Myotis ciliolabrum*), long-legged myotis (*Myotis volans*), fringed myotis (*Myotis thysanodes*), long-eared myotis (*Myotis evotis*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), Northern goshawk (*Accipiter gentilis*), ferruginous hawk (*Buteo regalis*), burrowing owl *Athene cunicularia*), phainopepla (*Phainopepla nitens*), and loggerhead shrike (*Lanius ludovicianus*).[39]

[39] Desert National Wildlife Refuge, Refuge Habitat, 2010, www.fws.gov/desertcomplex/desertrange/habitat.htm (accessed July 30, 2010).

4.3.6.3 Existing Wildlife Strikes

National Wildlife Strike Summary

Commercial air traffic has increased alongside a successful period of wildlife management in North America. Increases in populations of many waterfowl species have resulted from successful habitat preservation and species management practices.[40] This increase of bird populations and air traffic has contributed to an increased probability of bird strikes.

For the 19-year period from 1990 to 2008, 89,727 wildlife strikes throughout the United States were reported to the FAA. Birds were involved in 97.4 percent of the reported strikes, terrestrial mammals in 2.1 percent, bats in 0.3 percent, and reptiles in 0.1 percent.[41] The number of reported bird strikes increased from 1,759 in 1990 to 7,516 in 2008. This increase can be attributable to four factors: (1) an increased awareness of the wildlife strike issue, (2) an increase in aircraft operations, (3) an increase in populations of hazardous wildlife species, and (4) an increase in the number of strikes.[42, 43, 44]

The FAA National Wildlife Strike Database reports that 37 percent of wildlife strikes with aircraft occur during takeoff and climb-out, 2 percent while en route, 39 percent during the landing approach, and 17 percent during the landing roll.[45] The U.S. Department of Agriculture (USDA) reports that approximately 74 percent of bird strikes nationwide (including identified and unidentified birds) occurred when aircraft were at altitudes of less than 500 feet AGL, with 93 percent occurring under 3,500 feet AGL.[46] The study suggests that the incidence of bird strikes declined by 32 percent for every 1,000 foot increase in altitude, from 501 to 20,500 feet.

The USDA nationwide bird strike data for reported strikes above 3,500 feet AGL from 1990 to 2004 are summarized in **Table IV-10**. These data show that collectively, waterfowl, passerines (perching birds, songbirds), and gulls/terns account for approximately 85 percent of all reported bird strikes at altitudes greater than 3,500 feet AGL. However, of all the identified birds reportedly struck nationwide from 1990 to 2004 (16,727), less than two percent (331) were struck at an altitude greater than 3,500 feet AGL.[47]

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40 U.S. Department of Transportation, Federal Aviation Administration, *National Wildlife Strike Database, Serial Report Number 15, Report of the Associate Administrator for Airports*, Washington, DC, September 2009.

41 U.S. Department of Transportation, Federal Aviation Administration, *National Wildlife Strike Database, Serial Report Number 15, Report of the Associate Administrator for Airports*, Washington, DC, September 2009.

42 Dolbeer, R. A., "Birds and aircraft: fighting for airspace in crowded skies," pages 37-43 in *Proceedings of 19th Vertebrate Pest Conference,* University of California, Davis, California, 2000;

43 Dolbeer, R. A. and P. Eschenfelder, "Amplified bird-strike risks related to population increases of large birds in North America," pages 49-67 in *Proceedings of the 26th International Bird Strike Committee meeting*, volume 1, Warsaw, Poland, 2003.

44 U.S. Department of Transportation, Federal Aviation Administration, *National Wildlife Strike Database, Serial Report Number 15, Report of the Associate Administrator for Airports*, Washington, DC, September 2009.

45 U.S. Department of Transportation, Federal Aviation Administration, *National Wildlife Strike Database, Serial Report Number 15, Report of the Associate Administrator for Airports*, Washington, DC, September 2009.

46 Dolbeer, Richard A., *Height Distribution of Birds Recorded by Collisions with Civil Aircraft*, prepared for the U.S. Department of Agriculture, Wildlife Services, University of Nebraska, Lincoln, 2006.

47 Dolbeer, Richard A., *Height Distribution of Birds Recorded by Collisions with Civil Aircraft*, prepared for the U.S. Department of Agriculture, Wildlife Services, University of Nebraska, Lincoln, 2006.

Table IV-10

Species Groups of Identified Birds Reported Struck by Civil Aircraft in the United States at Heights Greater than 3,500 Feet AGL (1990–2004)

Species Group	Number of Birds Nationwide Struck at Height >3,500 feet AGL	Total Number of Birds Struck Nationwide	Percent of Total Strikes at Height >3,500 feet AGL
Passerines (*Passeriformes*)	55	4,729	16.6%
Gulls/Terns (*Laridae*)	49	4,582	14.8%
Pigeons/doves (*Columbidae*)	5	2,037	1.5%
Waterfowl (*Anatidae*)	177	1,993	53.5%
Raptors Hawks/Eagles/Kites (*Falconiformes*)	20	1,436	6.0%
Shorebirds (*Charadriiformes*)	7	573	2.1%
Herons/Egrets/Bitterns/Stork (*Ciconiiformes*)	2	391	0.6%
Vultures (*Cathartidae*)	11	367	3.3%
Owls (*Strigiformes*)	2	293	0.6%
Grouse (*Tetraonidae*)	0	99	0.0%
Cranes(*Gruidae*)	0	55	0.0%
Nighthawks/Swifts (*Caprimulgidae/Apodidae*)	1	53	0.3%
Pelicans(*Pelecanidae*)	1	31	0.3%
Cormorants (*Phalacrocoradicae*)	1	25	0.3%
Albatrosses (*Diomedeidae*)	0	14	0.0%
Rails/Coots (*Rallidae*)	0	11	0.0%
Loons/Grebes (*Gaviidae/Podicipedidae*)	0	10	0.0%
Miscellaneous birds	0	28	0.0%
Total	331	16,727	100.0%

Note: Percent total may differ due to rounding.

Source: Dolbeer, Richard A., *Height Distribution of Birds Recorded by Collisions with Civil Aircraft*, prepared for the U.S. Department of Agriculture, Wildlife Services, University of Nebraska, Lincoln, 2006.
Prepared by: CDM, August 2010.

A review of the data presented in Table IV-10 yields the following:

- Nationwide, waterfowl, passerines, and gulls/terns were struck by aircraft more often than other species at altitudes greater than 3,500 feet;
- Nationwide, passerines, pigeons/doves, and gulls/terns were struck by aircraft more often than other bird groups;
- Nationwide, the percentage of identified birds struck by aircraft at altitudes greater than 3,500 was less than two percent during the period 1990 to 2004;
- Nationwide, the overall total number of identified birds struck by aircraft at altitudes greater than 3,500 feet was (331 during the period 1990 to 2004; and
- Nationwide, the average number of identified birds per year struck by aircraft at altitudes greater than 3,500 AGL feet was approximately 22.[48]

[48] Dolbeer, Richard A, *Height Distribution of Birds Recorded by Collisions with Civil Aircraft,* U.S. Department of Agriculture, Wildlife Services, University of Nebraska, Lincoln, 2006.

Nevada and EA Airports Wildlife Strikes

Over the 19-year period (1990–2008) of records documented in FAA Wildlife Strike Database, 438 bird strikes, 8 terrestrial mammal strikes, no bat strikes, and no reptile strikes were recorded in the state of Nevada.[49]

Table IV-11 provides a listing, by species, of all wildlife strikes at the EA airports from 1990 to March, 2010.[50] The strikes listed are dominated by unknown birds, with those categories taking up more than 85 percent (i.e., 243 of 288) of the total strikes for the period. Only one species involved in a reported wildlife strike was a listed species. In March of 2010, a strike occurred involving a peregrine falcon during takeoff at LAS. The flight was aborted with minimal damage to the aircraft.[51]

Table IV-11

Total Wildlife Strikes for EA Airports (1990–2010)

Species	Number of Strikes	Species	Number of Strikes
American Kestrel	1	Hawks	4
Blackbirds	1	Killdeer	1
California Gulls	2	Mourning Dove	2
Canada Goose	1	Owls	2
Cinnamon Teal	1	Peregrine Falcon	1
Coyote	2	Pigeons	1
Domestic Cat	1	Rock Pigeon	9
Doves	2	Sparrows	1
Ducks	1		
Ducks, Geese, Swans	1	Unknown	97
European Starlings	1	Unknown Bird - Large	11
Foxes	4	Unknown Bird - Medium	37
Geese	2	Unknown Bird - Small	98
Gulls	4		
		Total	288

Source: U.S. Department of Transportation, Federal Aviation Administration, FAA Wildlife Strike Database, http://wildlife-mitigation.tc.faa.gov/wildlife/database.aspx, (accessed July 31, 2010 and August 5, 2010).
Prepared by: CDM, August 2010.

Specific trends in recent years at the EA airports deviate somewhat from the national trends discussed above (i.e., the percentage of strikes above 3,500 feet is higher at the EA airports than the national average). **Table IV-12** provides a segregation of wildlife strikes by elevation for the EA airports for the time period of 1990 to March 2010. For this time period, 42 percent of reported strikes occurred below 3,500 feet AGL with 34 percent occurring above 3,500 feet AGL. For the other 24 percent of reported strikes, no height was listed. Even though the FAA database documents

[49] U.S. Department of Transportation, Federal Aviation Administration, *National Wildlife Strike Database, Serial Report Number 15, Report of the Associate Administrator for Airports*, Washington, DC, September 2009.

[50] U.S. Department of Transportation, Federal Aviation Administration, FAA Wildlife Strike Database, http://wildlife-mitigation.tc.faa.gov/wildlife/database.aspx, (accessed July 31, 2010).

[51] U.S. Department of Transportation, Federal Aviation Administration, FAA Wildlife Strike Database, http://wildlife-mitigation.tc.faa.gov/wildlife/database.aspx, (accessed July 31, 2010).

98 bird strikes above 3,500 feet AGL, only two (i.e., about 2 percent) of these strikes actually had a reported effect or significant damage. One incident occurred on November 20, 2004 at 4,600 feet AGL during a climb-out from LAS. An unknown bird struck the aircraft resulting in a vibration and a return to the Airport with a precautionary landing. The second incident occurred on October 6, 2004 at 8,000 feet AGL during the descent to LAS. A Canada goose struck the aircraft resulting in significant damage to the aircraft but no reported effect on the flight. All the other strikes above 3,500 feet for the EA airports had no reported effect on flight operations and resulted in either no damage or minimal damage. It should be noted that no wildlife strikes of bats have been recorded for the EA airports or for the State of Nevada.

Table IV-12

Wildlife Strikes for EA Airports, by Height (1990–2010)

	Height Category of Strike			
Type of Strike	3,500 feet AGL or Less	Greater than 3,500 feet AGL	Unknown Height	Total
Identified Wildlife	27	4	14	45
Unknown Bird	21	39	37	97
Unknown Bird – Large	6	4	1	11
Unknown Bird - Medium	13	20	4	37
Unknown Bird - Small	55	31	12	98
Total	122	98	68	288
Percent of Total	42%	34%	24%	

Source: U.S. Department of Transportation, Federal Aviation Administration, FAA Wildlife Strike Database, http://wildlife-mitigation.tc.faa.gov/wildlife/database.aspx, (accessed July 31, 2010 and August 5, 2010).
Prepared by: CDM, August 2010.

4.3.7 Natural Resources and Energy Supply (Aircraft Fuel)

This section describes fuel consumption related to the existing movement of aircraft within the GSA arriving at and departing from the EA Airports. Aircraft fuel burn was calculated to estimate aircraft fuel consumption associated with air traffic flows in existing conditions (2009) using NIRS, which calculates fuel burn using the same input used for the calculating noise. According to the NIRS calculation, approximately 683,225 kilograms of fuel were burned in 2009 by IFR aircraft arriving at and departing from the EA Airports, while in flight through the GSA.

4.3.8 Air Quality

This section describes the air quality conditions within the GSA. In the United States, air quality is generally monitored and managed at the county level. Areas of Clark County comprise the majority of the GSA, with portions of the GSA extending into the five adjacent counties of Lincoln and Nye in Nevada, Inyo and San Bernardino in California, and Mojave in Arizona.

The U.S. EPA, pursuant to mandates of the federal Clean Air Act, as amended, has established National Ambient Air Quality Standards (NAAQS) to protect public health, the environment, and the quality of life from the detrimental effects of air pollution.[52] Standards have been established for the following criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2). Particulate matter standards have been established

[52] U.S. Environmental Protection Agency. National *Primary and Secondary Ambient Air Quality Standards*. 40 Code of Federal Regulations Part 50. November 25, 1971, as amended.

for coarse particulates ranging in diameter from 2.5 to 10 micrometers (μm) (PM_{10}) and fine particulates with diameters less than 2.5 μm ($PM_{2.5}$).

In accordance with the Clean Air Act Amendments (CAAA) of 1977,[53] U.S. counties and some sub-county geographical areas are classified by the U.S. EPA with regards to their compliance with the NAAQS based on air monitoring data compiled by U.S. EPA and local air quality agencies. An area with air quality better than the NAAQS is designated as an attainment area. An area with air quality worse than the NAAQS is designated as a nonattainment area. Nonattainment areas are further classified as extreme, severe, serious, moderate, and marginal by the extent the NAAQS are exceeded. Areas that have been reclassified from nonattainment to attainment are identified as maintenance areas. An area may be designated as unclassifiable when there is a temporary lack of data on which to base its attainment status.

The California Environmental Protection Agency Air Resources Board (CARB) maintains a separate but similar air quality standard system. The CARB system applies only to areas of the GSA within California. The system sets standards for the six NAAQS criteria pollutants plus visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

Table IV-13 summarizes nonattainment designations by criteria pollutant for the counties in the GSA. The U.S. EPA has designated portions of Clark County as being in nonattainment with CO, O_3 and PM_{10} standards, and portions of Inyo and San Bernardino Counties as being in nonattainment of the PM_{10} standard. CARB has designated both Inyo and San Bernardino counties as being in nonattainment of both O_3 and PM_{10} standards.[54] Because the majority of the study area is outside California, the NAAQS system will be used for the remainder of this discussion.

As noted above, portions of the GSA have been designated as being in nonattainment of standards for CO, O_3, and PM_{10}. A general description of these three criteria pollutants follows:

- CO is a colorless, odorless gas that is formed when carbon-based fuel is not burned completely. It is a component of motor vehicle exhaust, and higher levels of CO generally occur in areas with heavy traffic congestion. Sources other than motor vehicles typically include industrial processes, residential wood burning, and natural sources such as forest fires.
- O_3 is not usually emitted directly into the air, but is created at ground level by a chemical reaction between oxides of nitrogen (NO_X) and volatile organic compounds (VOC) in the presence of sunlight. O_3 is considered as "good" or "bad" depending on its location in the earth's atmosphere. In the lower atmosphere, ground-level O_3 is considered bad and is the primary constituent of smog. Sources generally include motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents.
- Particulate matter consists of solid and liquid particles of dust, soot, aerosols, and other matter small enough to remain suspended in the air for a long period of time. The two classes of particulate matter (PM_{10} and $PM_{2.5}$) represent that portion of particulate matter thought to represent the greatest hazard to public health. A portion of particulate matter in the air comes from natural sources, such as windblown dust and pollen. Manmade sources of particulate matter include open burning, operation of automobiles, operation of factories, and vehicle movement, or other manmade disturbances of unpaved areas. Secondary formation

[53] U.S. Congress, *Clean Air Act Amendments of 1977,* Public Law 95-95, August 7, 1977.

[54] California Environmental Protection Agency, Air Resources Board, 2010 State Area Designations, http://www.arb.ca.gov/desig/2010statedesig.htm, (accessed July 2, 2010).

of particulate matter may occur in some cases where gases such as oxides of sulfur (SO_X) and NO_X interact with other compounds in the air to form particulate matter.

Table IV-13

NAAQS Nonattainment Areas in the GSA as of May 2010

Criteria Pollutant	Nonattainment Status by County					
	Nevada			California		Arizona
	Clark	Nye	Lincoln	Inyo	San Bernardino	Mohave
CO	Nonattainment (Serious) [1/]	–	–	–	–	–
Pb	–	–	–	–	–	–
NO_2	–	–	–	–	–	–
O_3	Nonattainment [2/, 3/] (Subpart 1)	–	–	–	–	–
PM_{10}	Nonattainment [2/] (Serious)	–	–	Nonattainment [2/] (Moderate)	Nonattainment [2/] (Moderate)	–
$PM_{2.5}$	–	–	–	–	–	–
SO_2	–	–	–	–	–	–

Notes:
– Indicates county is in attainment/unclassifiable for criteria pollutant.
1/ On September 27, 2010, Clark County was redesignated as attainment/maintenance for CO.
2/ Nonattainment status designated for a portion of the county.
3/ "Subpart 1" denotes ozone nonattainment areas that are covered under Subpart 1, Part D, Title I of the Clean Air Act. Subpart 1 is considered nonattainment without a classification. Subpart 1 nonattainment areas have to comply with the more general nonattainment requirements of the Clean Air Act, as apart from classified areas with designated severity to their ozone problem (i.e., marginal, moderate, serious, severe, extreme).

Source: U.S. Environmental Protection Agency, http://www.epa.gov/air/oaqps/greenbook/.html (accessed May 7, 2010).
Prepared by: Ricondo & Associates, Inc., May 2010.

In Clark County, the Clark County Department of Air Quality and Environmental Management monitors NAAQS criteria pollutants to gauge real time compliance with the standards and in California, monitoring data is managed by CARB. As shown in **Table IV-14** and on **Exhibit IV-11,** 13 monitors in Clark County and 2 in the vicinity of the portion of the GSA located in California are actively monitoring the three criteria air pollutants of concern—CO, O_3, and PM_{10}.

As shown in Table IV-14, measurements of O_3 exceeded the NAAQS in 2009 at 8 of the 10 O_3 monitors located within the GSA. Measurements of CO did not exceed the NAAQS during the 2009 sampling period. In 2008, the Clark County Department of Air Quality and Environmental Management submitted a request to the U.S. EPA to redesignate Clark County from nonattainment to attainment status for CO.[55, 56] Clark County is also in nonattainment status for PM_{10}. The PM_{10} monitor in Apex Nevada, 30 Miles northeast of central Las Vegas recorded PM_{10} concentrations above the NAAQS in 2009.

[55] Clark County Department of Air Quality, 2008. Carbon Monoxide Redesignation Request and Maintenance Plan. http://www.accessclarkcounty.com/depts/daqem/aq/planning/Documents/CO/COSIP2008/CO_MaintPlan_revSept.pdf (accessed July 9, 2010).

[56] On September 27, 2010, Clark County was redesignated as attainment/maintenance for CO.

Table IV-14

Summary of Existing (2009) Air Monitoring Data (CO, PM_{10}, and O_3)

Air Quality Monitoring Station	2009 Maximum Concentration			
	CO 8-hour (ppm)	CO 1-hour (ppm)	PM_{10} 24-hour ($\mu g/m^3$)	O_3 8-hour (ppm)
National Ambient Air Quality Standard Level	9.0	35.0	150	0.075
Monitoring Sites within Study Area				
Sites in Nevada:				
Apex	—	—	159	0.077
Boulder City	—	—	85	0.076
Jean	—	—	81	0.079
Joe Neal	—	—	96	0.079
E. Craig Road	—	—	67	0.076
Palo Verde	—	—	57	0.073
Paul Meyer	—	—	84	0.074
Walter Johnson	—	—	—	0.081
JD Smith	2.4	3.3	78	0.076
Sunrise Acres	4.1	5.2	81	—
Winterwood	3.0	3.8	—	0.075
Green Valley	—	—	81	—
Monitoring Sites Outside Study Area				
Sites in Nevada:				
Mesquite	—	—	128	0.068
Sites in California:				
Death Valley Monument	—	—	76	0.086
Trona-Athol and Telegraph	—	—	60	0.078

Key: Within NAAQS
Exceeds NAAQS
— Data Not Available

Notes:
ppm = parts per million
$\mu g/m^3$ = microgram per cubic meter
1/ Data presented does not exclude exceptional data that may represent unique tropospheric events or errors involving monitoring equipment.

Source: Letter from Lewis Wallenmeyer, Director, Clark County Department of Air Quality & Environmental Management to Jared Blumenfield, Regional Administrator, Environmental Protection Agency – Region 9, April 14, 2010 (Nevada air quality monitoring data); California Air Resources Board website: www.arb.ca.gov (accessed July 2010) (California air quality monitoring data).
Prepared by: Ricondo & Associates, Inc., July 2010.

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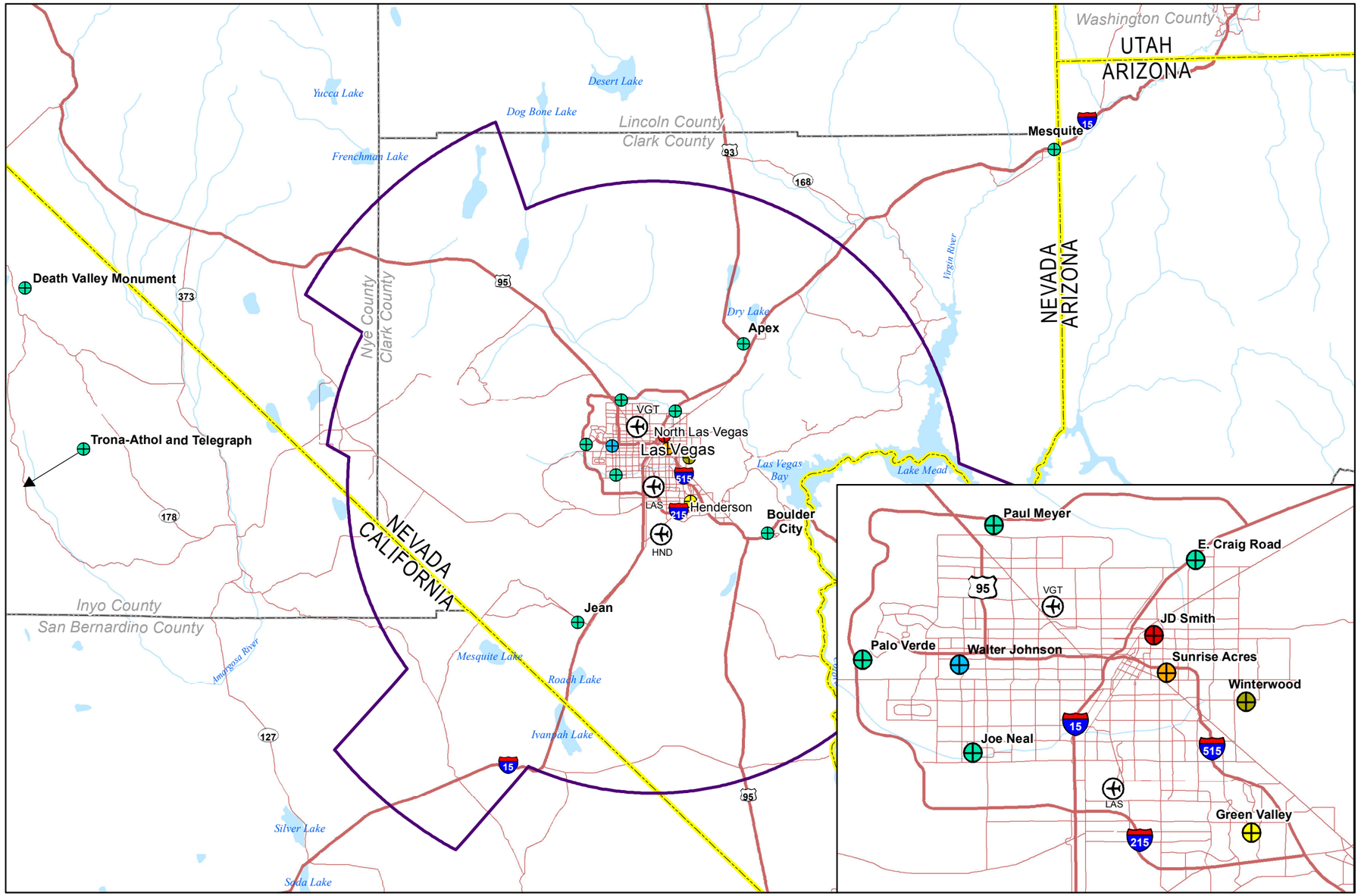

LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Air Quality Monitoring Sites

Criteria Pollutants

- O_3
- PM_{10}
- CO, O_3
- PM_{10}, CO
- PM_{10}, O_3
- PM_{10}, CO, O_3

Notes:
O_3 - Ozone
PM_{10} - Coarse Particulates
CO - Carbon Monoxide
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

Sources: Air Quality in Clark County, Clark County Department of Air Quality and Environmental Management, (http://ccaqapps5m.co.clark.nv.us/) accessed July 20, 2010 (air quality monitoring sites); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Metron Aviation, July 2010 (generalized study area boundary); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit IV-11

0 15 NM

north

Air Monitor Locations in the GSA

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4.3.9 Greenhouse Gases and Climate Change

The effect of proposed projects on climate change is a growing concern. Although there are no federal standards for aviation-related greenhouse gas (GHG) emissions, it is well-established that GHG emissions can affect climate.[57] Thus, this section presents a discussion of global climate change as it relates to aircraft emissions of GHGs, and then presents the GHG emissions calculated based on aircraft fuel burn estimated for existing conditions associated with the existing movements of aircraft within the GSA arriving at and departing from the EA Airports (see section 4.3.7 for a discussion of estimated fuel burn).

4.3.9.1 Global Climate Change Related to Aircraft Emissions of GHGs

Greenhouse gases are those that trap heat in the earth's atmosphere. Research has established a direct link between fuel combustion and GHG emissions. Inventories of GHG emissions for transportation projects report carbon dioxide (CO_2) emissions and often include other GHGs, such as water vapor (H_2O), CO_2, methane (CH_4), nitrous oxide (N_2O), and O_3. Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also greenhouse gases, but they are, for the most part, a product of industrial activities.

According to most international reviews, aviation emissions comprise a small but potentially important percentage of anthropogenic (human-made) GHGs and other emissions that contribute to global warming. The Intergovernmental Panel on Climate Change estimates that global aircraft emissions account for about 3.5 percent of the total quantity of greenhouse gas emitted from human activities.[58] In terms of relative U.S. contribution, the U.S. General Accounting Office (GAO) reports that aviation accounts "for about 3 percent of total U.S. greenhouse gas emissions from human sources" compared with other industrial sources, including the remainder of the transportation sector (23 percent) and the industry sector (41 percent).[59]

The scientific community is developing areas of further study to more precisely estimate aviation's effects on the global atmosphere. The FAA is currently leading and participating in several efforts intended to clarify the role that commercial aviation plays in greenhouse gas emissions and climate change. A comprehensive, multi-year program geared towards quantifying the climate change effects of aviation is the Aviation Climate Change Research Initiative (ACCRI) funded by the FAA and the National Aeronautics and Space Administration (NASA). ACCRI will reduce key scientific uncertainties in quantifying aviation-related climate impacts and provide scientific input to inform policy-making decisions.

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[57] *Massachusetts v E.P.A.,* 549 U.S. 497, 508-10, 521-23 (2007).

[58] Intergovernmental Panel on Climate Change Report, as referenced in U.S. General Accounting Office, *Aviation and the Environment: Aviation's Effects on the Global Atmosphere Are Potentially Significant and Expected to Grow*; GAO/RCED-00-57, February 2000, p. 4.

[59] Intergovernmental Panel on Climate Change Report, as referenced in U.S. General Accounting Office, *Aviation and the Environment: Aviation's Effects on the Global Atmosphere Are Potentially Significant and Expected to Grow*; GAO/RCED-00-57, February 2000, p. 14 (based on available U.S. Environmental Protection Agency data from 1997).

The State of Nevada has sponsored a statewide source emissions inventory. Based on the amount of aviation fuel dispensed in the state in 2005, statewide aviation activity generates 3.5 million metric tons of CO_2 equivalent emissions, representing 7 percent of total statewide emissions.[60]

Several states have enacted climate-change-based regulations. Many of the regulations enacted in western states are based on activities of the Western Climate Initiative (WCI). The WCI began in 2007 as an agreement among several states to participate in a regional-level initiative to manage GHGs. Nevada is an observer to the WCI. WCI partner jurisdictions have agreed to jointly set a regional emissions target and establish a cap-and-trade program covering multiple economic sectors. WCI partner jurisdictions have developed a comprehensive initiative to reduce regional GHG emissions to 15 percent below 2005 levels by 2020, or approximately 33 percent below business-as-usual levels. The regional target is designed to be consistent with existing targets set by individual member states and does not replace these goals. A cap-and-trade program, beginning in 2012, will cover emissions from electricity and large industrial and commercial sources, and it will cover emissions from transportation and other residential, commercial, and industrial fuel use beginning in 2015.

As of 2010, no U.S. regulations govern GHG as related to aircraft flight; however, the U.S. EPA has issued the following climate change/greenhouse gas regulations:

- Mandatory Reporting of Greenhouse Gases—The rule requires reporting of GHG emissions from specific sources, such as relatively large GHG emitters and suppliers of fossil fuels or industrial GHGs, with U.S. EPA's desire to collect emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or those engaged in activities that produce industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to U.S. EPA. In addition, facilities that operate certain sources, such power generators, are automatically required to report under this rule, regardless of whether the threshold of 25,000 metric tons is exceeded.[61]
- Greenhouse Gas Emissions Standards and Fuel Economy Standards—In April 2010, a final rule covered emissions from passenger cars, light-duty trucks, and medium-duty passenger vehicles for model years 2012 through 2016. The rule requires these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2per mile, which is equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2level solely through fuel economy improvements.[62]
- Stationary Source Emissions (Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule)—Historically, stationary sources subject to certain emissions levels have been subject to extensive regulations under the Clean Air Act New Source Review (NSR) process. U.S. EPA refined these regulations to include GHGs (i.e., tailoring rules).[63]

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60 Center for Climate Strategies, *Nevada Greenhouse Gas Inventory and Reference Case Projections, 1990-2020,* Spring 2007, Table 1.

61 Federal Register, Volume 74, Number 209, "Part 98—Mandatory Greenhouse Gas Reporting," October 30, 2009.

62 Federal Register, Volume 75, Number 88, Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, Final Rule," May 7, 2010.

63 Federal Register, Volume 74, Number 106, "Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, Final Rule," June 3, 2010.

4.3.9.2 Estimated GHG Emissions

As identified in Section 4.3.7, approximately 683,225 kilograms of fuel were burned in 2009 by IFR aircraft arriving at and departing from the EA Airports, while in flight through the GSA, which would result in the emission of 2,155,575 kilograms of CO_2.[64]

4.3.10 Light Emissions and Visual Conditions

The GSA includes approximately 8,373 square miles of developed and undeveloped areas in southern Nevada, southeastern California, and northwestern Arizona. The city of Las Vegas is a highly urbanized area at the center of the GSA, with military land uses to the north and undeveloped scrublands throughout the GSA. Sources of light emissions in the GSA vary significantly from the highly lit environment of the Las Vegas Strip to the unlit environment found in the numerous natural parks, preserves, and recreation areas surrounding Las Vegas throughout the GSA.

A large number of aircraft operations currently occur and numerous aircraft are visible within the GSA airspace, flying at various altitudes. Aircraft operations consist of aircraft arrivals, departures, and overflights. According to Federal Aviation Regulations, Section 91.209, all aircraft are required to operate with position lights. These position lights are intended for the safe movement of aircraft and do not produce significant light emissions; however, these lights are often visible from the ground.

4.4 Past, Present, and Reasonably Foreseeable Future Actions

Per FAA Order 1050.1E paragraph 405e, past, present, and reasonably foreseeable future actions should be considered in the evaluation of the cumulative effects of the Proposed Action. The Council on Environmental Quality regulations for implementing NEPA requires evaluation of cumulative effects of a proposed project and the no action alternative. **Table IV-15** provides a summary of projects that have been completed, are currently ongoing, or are anticipated to be completed in the foreseeable future and that could potentially affect similar resources as those affected by the Proposed Action.

Due to the nature of the resources affected by the Proposed Action, only projects with direct or indirect effects on aviation within the GSA were considered. Reasonably foreseeable actions were defined as those expected to be implemented within 5 years of the Proposed Action.

[64] Fuel burn and CO_2 emissions are generated in NIRS; the formula to convert fuel burn to CO_2 emissions is: CO_2=Fuel(kilograms)*3.155.

Table IV-15 (1 of 3)

Summary of Past, Present, and Reasonably Foreseeable Future Actions

Project	Description	Current Status
Projects at EA Airports		
Control Tower/TRACON Facility at LAS	Construct a new control tower at LAS. [1/]	Construction anticipated in June 2011). [2/]
LAS Terminal 3	Terminal 3 will provide additional space for ticketing, security, customs and border protection, baggage, parking areas, and 14 new passenger gates.[3/]	Under construction, project completion anticipated in 2012. [3/]
Repaving Ramp Areas at LAS	Repave ramp areas, includes temporary changes in passenger gate positions. [3/]	Anticipated to begin in fall 2010. [3/]
Other Regional Airport Projects		
Southern Nevada Regional Heliport	The project includes acquisition of land and construction and operation of a new heliport facility intended to reduce the noise impacts on residential Las Vegas caused by McCarran-based Grand Canyon helicopter tours. The facility is to be located 14 miles south of McCarran International Airport on the west side of Las Vegas Boulevard South. [4/]	Project is on hold as of February 2009 (35 percent design completed). Once restarted, final design and construction could be complete within approximately 2-1/2 years. [5/]
Southern Nevada Supplemental Airport	The Southern Nevada Supplemental Airport is a proposed supplemental commercial service airport intended to relieve airspace and airport congestion at McCarran International Airport. The supplemental airport is to be built on a site 30 miles south of McCarran International Airport. [6/]	Project design and environmental review was slowed down in June 2010. Anticipated construction date is unknown as of mid-2010. [6/]
Mesquite Airport	The city of Mesquite, Nevada, is evaluating the relocation of its single-runway general aviation airport.[7/]	The project is currently in the NEPA review process, anticipated construction is unknown.[7/]
St. George Airport Relocation	Due to capacity and expansion constraints at the original St. George Airport site, the airport is being relocated. The new airport is currently under construction on the southern edge of the city.[8/]	The replacement airport is under construction and scheduled to open in January, 2011.[8/]
Regional Airspace Projects		
Four Corner Post Plan	The Four Corner Post Plan was a redesign of the L30 terminal airspace and procedures to eliminate certain airspace conflicts and accommodate growth in eastbound departures. [9/]	Implemented
Area Navigation (RNAV) Visual Approach to LAS Runways 7L and 7R – Special	The procedure provided GPS guidance to a previously existing visual procedure to improve the predictability and repeatability of arrivals following the procedure. [10/] This is a special procedure developed by an airline, and can only be used by a specific airline if applied to and approved by FAA.	The procedure has received environmental approval, [10/] but has not been implemented as of April 2011.
Westpipe Arrival	The Westpipe Arrival defines a standard instrument arrival procedure from the northwest to LAS Runways 1L and 1R.	The procedure has received environmental approval, [11/] and was implemented in Fall 2010.
RNAV Visual Approach to LAS Runways 19L and 19R –Special	The visual RNAV approach procedure defines an arrival procedure with GPS guidance from the east and southwest that overlays existing procedures available for Southwest Airlines and US Airways to LAS Runways 19L and 19R. This is a special procedure developed by an airline, and can only be used by a specific airline if applied to and approved by FAA.	Implemented [12/]

Table IV-15 (2 of 3)

Summary of Past, Present, and Reasonably Foreseeable Future Actions

Project	Description	Current Status
BOACH and SHEAD SIDs	The BOACH SID defines a standard instrument departure procedure from all LAS runway ends departing to the south. The SHEAD SID defines a standard instrument departure procedure from all LAS runway ends departing to the west.	Implemented [13/]
COWBY and TRALR SIDs	The COWBY SID defines a standard instrument departure procedure from all LAS Runway ends departing to the east. The TRALR SID defines a standard instrument departure procedure from all LAS Runway ends departing to the north and east.	Implemented [14/]
HND RNAV STARs: NOOTN, MURFY, KNGMN, and JOMIX; HND RNAV SIDs: PALLY, ACSIN, and FLAMZ	The RNAV STARs and SIDs define standard instrument arrival and departure procedures to and from HND runways.	The procedures have received environmental approval, [15/] and were implemented in 2011.
NetJets HND SIDs	The NetJets HND SIDs were implemented on a temporary basis to determine the effectiveness of a new technology and measurement of possible impact on the environment. The procedures were named HARIK ONE RNAV and LARAH ONE RNAV.	The temporary procedures were in effect between June 18, 2009 and June 22, 2009. [16/]
Special Flight Rules Area in the Vicinity of Grand Canyon National Park, Actions to Substantially Restore Natural Quiet, Draft EIS	The NPS drafted an overflight plan to address the impacts of aircraft noise on park resources and visitor experiences. The preferred alternative in the Draft EIS caps annual and daily air-tour and air-tour related operations, defines seasonal air tour routes, moves non-air tour operators outside of the park, changes routes near sensitive areas (location, frequency, and altitudes), requires conversion to quiet technology within 10 years, establishes at least one hour of quiet time before sunrise and after sunset, does not change the four existing general aviation flight corridors, and raises flight-free ceilings to 17,999 feet.	The project is currently in the NEPA review process [17/]
Las Vegas Area Class B Airspace	An ad hoc committee was established, met five times, and submitted to FAA written recommendations to modify the Class B airspace center on LAS. FAA considered the recommendations and prepared an airspace proposal, which was presented to the public at three informal airspace meetings in August 2011. Verbal and written comments were received at the meeting and via website submittals during a 45-day comment period. Comments were addressed and the airspace proposal was slightly modified. FAA is reviewing and preparing for the proposal for submittal to FAA Headquarters, which will prepare a Federal Register notice of proposed rulemaking and a 60-day public comment period.	FAA is preparing a proposal for this project. [16/]
Transportation-Related Regional Projects		
California-Nevada High Speed Rail Project Proposals	Currently two competing concepts have been proposed to provide rail service between the Los Angeles area and Las Vegas along the Interstate 15 Corridor—the California-Nevada Maglev project connecting Las Vegas and Anaheim and the DesertXpress high-speed conventional rail project connecting Las Vegas and Victorville. Both have begun the environmental review process. [20/]	Neither project is funded, anticipated construction date is unknown as of mid-2010. [18/]
Interstate 215 and Airport Connector Interchange Improvements	Primary project components include widening Interstate 215 (from 6 to 8 lanes) from Las Vegas Boulevard to Windmill Lane, adding auxiliary lanes between ramps, and constructing a directional ramp from the southbound Airport Connector to eastbound Interstate 215. [21/]	Project is ready for construction, but not funded as of mid-2010. [19/]
Las Vegas Monorail System	Design, permit, and construction an extension of the Las Vegas Monorail system between McCarran International Airport and the MGM Hotel Monorail Station. [22/]	In planning phase, anticipated construction date is unknown as of mid-2010. [20/]

Table IV-15 (3 of 3)

Summary of Past, Present, and Reasonably Foreseeable Future Actions

Notes:

1/ U.S. Department of Transportation, Federal Aviation Administration, *Finding of No Significant Impact (FONSI) Airport Traffic Control Tower (ATCT) and Base Building Construction and Operation McCarran International Airport, Las Vegas, Nevada,* June 2009.
2/ U.S. Department of Transportation, Federal Aviation Administration, April 2011.
3/ McCarran International Airport, *Pardon Our Dust, Summer 2010* website, www.mccarran.com/pdf/Pardon Our Dust Summer 2010.pdf (accessed July 29, 2010).
4/ U.S. Department of Transportation, Federal Aviation Administration, Western-Pacific Region, *Finding of No Significant Impact and Record of Decision, Proposed Southern Nevada Regional Heliport, Las Vegas, Clark County, Nevada,* February 20, 2009.
5/ Clark County Department of Aviation, The Proposed Clark County Heliport webpage, http://www.mccarran.com/04_05_00_index.aspx?type=Heliport, accessed August 3, 2010.
6/ Clark County Department of Aviation, *Project Definition and Justification Proposal to Construct and Operate a New Supplemental Commercial Service Airport in the Ivanpah Valley,* August 2006.
7/ City of Mesquite, Nevada, "Proposed Replacement GA Airport Draft EIS" webpage, http://www.mesquitenv.com/SpotlightArticle/drafteis (accessed August 3, 2010).
8/ St. George Municipal Airport, Construction website, http://www.sguconstruction.com/ (accessed July 29, 2010).
9/ U.S. Department of Transportation, Federal Aviation Administration, *Four Corner-Post Plan Final Environmental Assessment,* July 2001.
10/ U.S. Department of Transportation, Federal Aviation Administration, *Categorical Exclusion Declaration, RNAV Visual to Runway 7 L/R,* November 2009.
11/ U.S. Department of Transportation, Federal Aviation Administration, Categorical Exclusion for Westpipe Arrival, May 2008.
12/ U.S. Department of Transportation, Federal Aviation Administration, Categorical Exclusion for Visual RNAV to 19s, Arrival, May 2008.
13/ U.S. Department of Transportation, Federal Aviation Administration, Categorical Exclusion for BOACH/SHEAD SIDs, February 24, 2009.
14/ U.S. Department of Transportation, Federal Aviation Administration, Categorical Exclusion for COWBY/TRALR SIDs, April 20, 2009.
15/ U.S. Department of Transportation, Federal Aviation Administration, Categorical Exclusion Henderson RNAV STARs and SIDs, January 2011.
16/ U.S. Department of Transportation, Federal Aviation Administration, email from R. Weller to L. Reznar, Ricondo & Associates, Inc., "Re: LAS Opti EA," June 26, 2012.
17/ U.S. Department of Interior, National Park Service, *Special Flight Rules Area in the Vicinity of Grand Canyon National Park, Actions to Substantially Restore Natural Quiet, Draft Environmental Impact Statement,* DES 10-60, February 2011.
18/ Packer, Adrienne, Comparing, Contrasting Southern Nevada Train Proposals, *Las Vegas Review Journal Online*, July 25, 2010. http://www.lvrj.com/news/comparing--contrasting-southern-nevada-train-proposals-99190559.html (accessed July 29, 2010).
19/ Clark County, Department of Public Works, "Overview of I-215 / Airport Connector Interchange Project for Consideration of Selection for Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant Funding from DOT American Recovery and Reinvestment Act of 2009," http://pwgate.co.clark.nv.us/arra/tiger/airport/Project%20Overview.pdf, (accessed August 3, 2010).
20/ Las Vegas Monorail, Airport Expansion webpage, http://www.lvmonorail.com/about/expansion/, (accessed August 3, 2010).

Sources: Based on sources noted in footnotes 1 through 23 above.
Prepared by: Ricondo & Associates, Inc., May 2011 and June 2012.