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Pahrump Valley Desert Tortoise Habitat Conservation Plan

Nye County Planning Department

10/7/2009

Pahrump Valley

Desert Tortoise

Habitat Conservation Plan

Prepared by

Nye County Planning Department

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Acronyms

BLM	Bureau of Land Management
BOCC	Board of County Commissioners
County	Nye County
DTCC	Desert Tortoise Conservation Center
ESA	Endangered Species Act
HCP	Habitat Conservation Plan
NAC	Nevada Administrative Code
NEPA	National Environmental Policy Act
NRS	Nevada Revised Statutes
PRPD	Pahrump Regional Planning District
FWS	U.S. Fish and Wildlife Service
ITP	Incidental Take Permit

INTRODUCTION

This edition includes amendments from verbal comments made at the July 21, 2009 Nye County Commission HCP Workshop, written comments submitted at the workshop and public comments received by county staff in the following weeks up to the date on the front cover.

EXECUTIVE SUMMARY

Nye County is proposing this HCP to address the urban development of land within the limits of the Town of Pahrump and adjacent lands designated for disposal and sale by the Bureau of Land Management (BLM). The scope or Permit Area of this plan is 92,489 acres and includes the private land in Pahrump and 6,022 acres of public land administered by BLM and identified for disposal. The HCP estimates that up to 1,000 acres of desert tortoise habitat may be lost as a result of urban development within the Permit Area over the next 10 years.

The Pahrump Valley Desert Tortoise Habitat Conservation Plan (HCP) has been prepared to:

- Support an application for a Section 10(a)(1)(B) Incidental Take Permit (Permit) under the federal Endangered Species Act (ESA) for the incidental take of the desert tortoise, a species listed as threatened under the ESA on 1,000 acres of private land or BLM disposal lands, upon transfer of ownership to a non-federal entity, in the Pahrump Regional Planning District (PRPD), hereafter referred to as the Planning Area. The request for the incidental take of desert tortoises is based on tortoise surveys conducted by the BLM, Nye County, private land owners and others that indicate tortoises occur in relatively low densities in the Planning Area that will be defined hereafter.
- This HCP is intended to support the issuance, by the United States Fish and Wildlife Service (FWS) of a Section 10(a)(1)(B) incidental take permit (Permit) under the Endangered Species Act (ESA)which would allow the "take" of the threatened desert tortoise resulting from otherwise lawful activities on non-Federal property within the Planning Area.

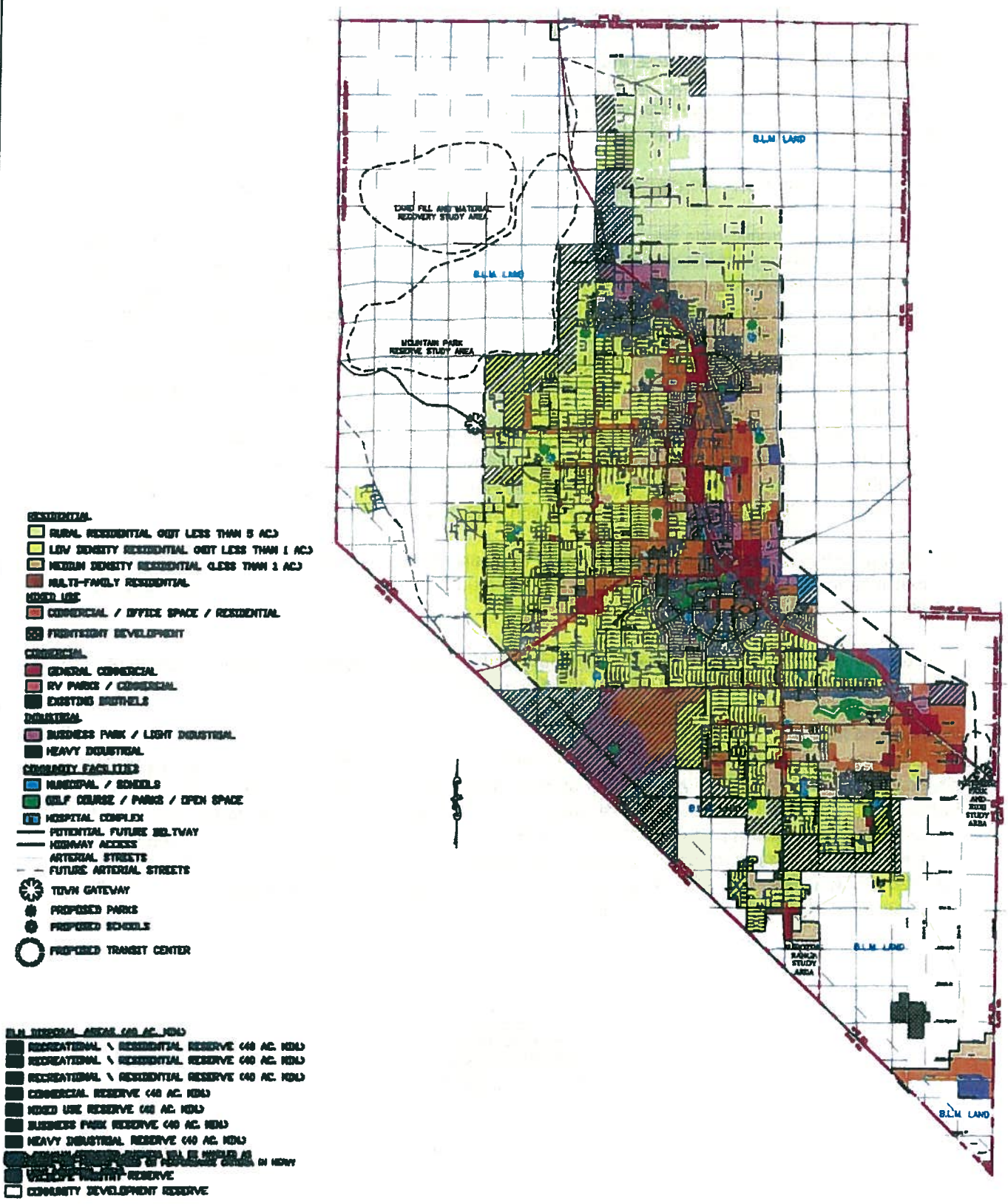
Subsequent to the issuance of a Permit, the Pahrump Valley Desert Tortoise Habitat Conservation Plan (HCP) will be implemented to minimize, mitigate, and monitor the impacts of incidental take of desert tortoise.

The approval of the Permit would be a requisite for the development and implementation of a long term desert tortoise habitat conservation plan for the Planning Area.

Purpose and Need

The purpose of developing this HCP is to minimize and mitigate the effects of ongoing urban development within the Planning Area (see Figure 1) on the desert tortoise. The HCP will be submitted by the Nye County Planning Department on behalf of Nye County to support an application for a Permit to incidentally take tortoises. The Permit would authorize the incidental take of tortoise on 1,000 acres of desert tortoise habitat that may be subject to development over a ten (10) year period. The applicant needs to obtain a Permit because desert tortoises are wide ranging and occur throughout the Planning Area; therefore, take of the tortoise may be unavoidable as a result of urban growth in the valley.

Figure 1 Planning Area



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Measures to Minimize and Mitigate Take

The applicant proposes the following measures to minimize, mitigate and monitor incidental take:

Minimization Measures

- Desert tortoises will be cleared from construction sites prior to ground disturbing activities.
- A desert tortoise education program will be developed by the County and approved by FWS, which will be presented to all personnel involved in development activities. The program will consist of instructing on-site workers about desert tortoise biology, what to do if a tortoise is encountered, and terms of the HCP.
- Public outreach activities will be developed, such as course curriculum for Junior High and High School science classes on desert biology, and school assemblies that will teach the students about the desert tortoise.
- Fencing will be required around new development in accordance with this HCP.

Mitigation Measures

- Off-road vehicle activities on non-Federal public lands within the Planning Area will be limited to existing roads recognized by Nye County.
- Appropriate roads that cross through or into tortoise habitat will be posted with signs warning of the presence of tortoises.
- Speed limits will be limited to 25 miles per hour along unsigned dirt roads.
- A litter control program will be implemented to minimize predation on tortoise by ravens.
- Fees from development will be contributed to the Desert Tortoise Conservation Center (DTCC).

Reporting

Local government agencies [Nye County Planning – Building Departments, etc.] will be required to keep accurate records regarding:

- The disposition of all desert tortoises collected and/or taken;
- The amount of all land disturbed within the permit area;
- All fees collected or paid
- Administrative costs and habitat rehabilitation efforts and expenses.
- Conservation projects funded by disturbance fees and costs associated with these projects.

The records will be maintained by Nye County and summarized in an annual report to the FWS.

Funding

Minimization measures will not totally offset the potential impact from land development activities on the desert tortoise and its habitat within the Planning Area. Therefore, a fee of $550 per acre will be assessed for disturbance of up to 1,000 acres of potentially suitable desert tortoise habitat on non-federal property within the designated Fee Zone of the Planning Area. When building/ grading permits are being requested for work on properties greater than one half acre in size within the fee zone, the private developer will pay the per acre fee. The fees will then be put into an interest bearing account by Nye County where the fees will be held until the fees are used in support of implementation of this Plan.

Chapter 1: Introduction and Background

Overview

The rapid growth in southern Nevada, especially in nearby Las Vegas, has created heavy demand for quality residential and commercial properties in the largest neighboring community, the Town of Pahrump. Development within and immediately around Pahrump will result in the loss of potentially suitable habitat for the desert tortoise. See Figure 2, Region Map.

Nye County, (applicant), is proposing this HCP to address the urbanized development of land within the limits of the Town of Pahrump and adjacent lands designated for disposal and sale by the Bureau of Land Management (BLM). The Planning Area for this HCP is defined as the boundaries of the PRPD. This area is approximately 209,239 acres in size. The Permit Area, which lies within the boundaries of the PRPD, is 92,489 acres and includes the private land in Pahrump and 6,022 acres of public land administered by BLM that are identified for disposal. The Permit Area includes a 23,717 acre Fee Zone and a 62,750 acre No Fee Zone. The zones were delineated based on the general quality and condition of desert tortoise habitat. The No Fee Zone generally encompasses the central part of Pahrump on the west side of State Route 160, where most of the land has been developed for residential or commercial purposes, or is dominated by abandoned agricultural fields and salt desert scrub. The Fee Zone generally encompasses areas with higher quality tortoise habitat which are located on the northern, eastern, and southern edges of the town boundaries. The plan proposes to disturb up to 1,000 acres of desert tortoise habitat over a period of ten (10) years as a result of urban development anywhere within the Fee Zone during the time of the Permit.

This document is being prepared as Phase I in the preparation of a long-term desert tortoise conservation plan in the PRPD, in support of an application for a more expansive permit pursuant to Section 10 (a)(1)(B) of the ESA.

Purpose and Need

The purpose of developing this HCP is to minimize and mitigate the effects of ongoing urban development within the Planning Area on the desert tortoise. The HCP will be submitted by the Nye County Planning Department on behalf of Nye County to support an application for a Permit for the tortoise. The permit would authorize the incidental take of desert tortoise habitat that will be subject to development. The applicant needs to obtain a Permit because desert tortoises are wide ranging and occur throughout the Planning Area; therefore, take of the tortoise may be unavoidable as a result of urban growth in the valley.

Proposed Action and Permit Duration

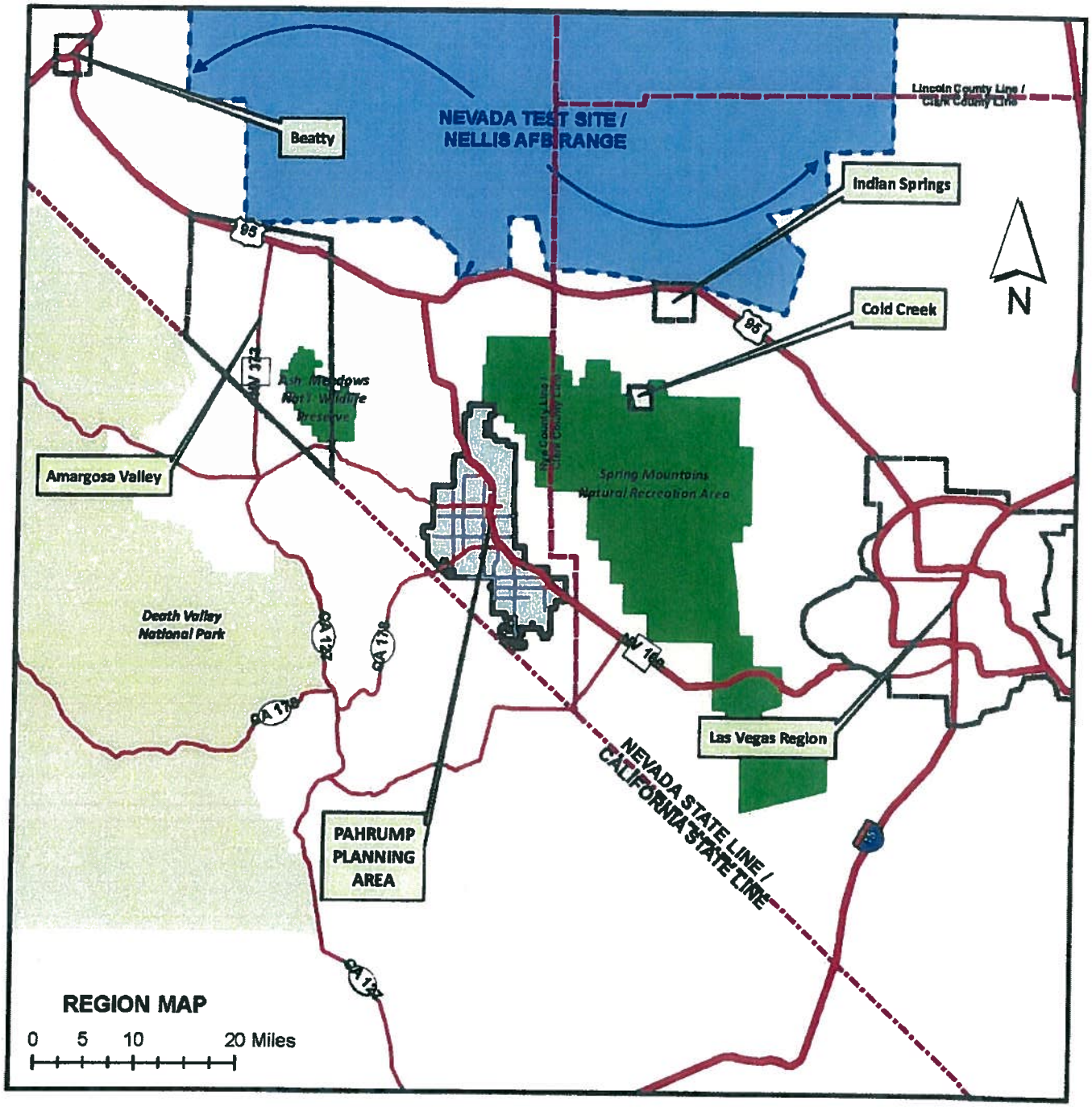
The applicant proposes to authorize activities associated with urban development on up to 1,000 acres of desert tortoise habitat for a period of ten (10) years.

Covered Activities

Applicant's activities which may result in incidental take of the desert tortoise and / or its habitat includes the following:

- Land clearance operations
- Activities associated with the construction of buildings and infrastructure.

Figure 2 Region Map



Activities to be Covered Under this HCP

Covered Activities for this HCP include proposed land development (i.e., residential, commercial and other master planned activities) that will occur within the Planning Area (defined in Chapter 2) to support the urban growth in the Pahrump Valley. The construction-related activities associated with the proposed land development to be covered by the Permit for this HCP include the following:

- Earth work and site work operations including use of equipment, including heavy equipment, vegetation removal, excavation, trampling of vegetation, fill and compaction of soils, ground disturbance, and grading;
- Infrastructure development, maintenance, repair, and modification, as needed, including construction of roadways, and installation of utilities, landscaping, sidewalks, fences, signage, drainage and irrigation systems;
- Construction of residential and commercial buildings and other improvements; and
- Storage of heavy equipment.

Regulatory Framework

Federal Endangered Species Act (ESA)

The ESA and its implementing regulations prohibit the taking of listed species without prior approval. The ESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Federal regulation 50 CFR 17.3 further defines the term harm in the take definition to mean any act that actually kills or injures a federally listed species, including significant habitat modification or degradation.

Section 10 of the ESA establishes a process for obtaining a Permit which authorizes nonfederal entities to incidentally take federally listed wildlife or fish subject to certain conditions. Incidental take is defined by ESA as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Preparation of a conservation plan, generally referred to as a Habitat Conservation Plan (HCP), is required for all Section 10 (a) (1) (B) permit applications.

Section 10 Habitat Conservation Plan Requirements and Guidelines

During the HCP development phase, the permit applicant prepares a plan that integrates the proposed project or activity with the protection of listed species. An HCP submitted in support of a Permit application must include the following information:

- impacts likely to result from the proposed taking of the species for which permit coverage is requested
- measures that will be implemented to minimize, mitigate, and monitor impacts
- funding that will be made available to undertake such measures
- procedures to deal with unforeseen circumstances
- alternative actions considered that would not result in take
- additional measures that the FWS may require as necessary or appropriate for purposes of the plan

A Section 10 Permit is granted upon a determination by FWS that all requirements for permit issuance have been met. Statutory criteria for issuance of the permit specify that:

- the taking will be incidental
- the impacts of incidental take will be minimized and mitigated to the maximum extent practicable
- adequate funding for the HCP and procedures to handle unforeseen circumstances will be provided

- the taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild
- FWS has received assurances, as may be required, that the HCP will be implemented

During the post-issuance phase, Nye County and other responsible entities implement the HCP. The public is notified of permit issuance by means of the Federal Register.

National Environmental Policy Act

NEPA requires that federal agencies analyze the environmental impacts of their actions (in this instance, issuance of a Permit) and include public participation in the planning and implementation of their actions. The NEPA process helps federal agencies make informed decisions with respect to the environmental consequences of their actions and ensures that measures to protect, restore, and enhance the environment are included, as necessary, as a component of their actions.

Species to be Covered by the Permit

The threatened Mojave population of the desert tortoise (*Gopherus agassizii*) is the only species identified as a "Covered Species" related to the Permit. There are no other threatened or endangered species that will be affected by the proposed covered activities within the boundaries of the Planning Area.

Chapter 2: Planning Area

The Planning Area consists of those public and private lands within the 209,239 acre PRPD and includes the unincorporated Town of Pahrump and areas of take (the Permit Area) and mitigation such as the Desert Tortoise Conservation Center in Clark County. It is located in southwestern most Nye County adjacent to the California border. The Permit Area of 92,489 acres includes approximately 86,467 acres of private land of which 23,177 acres will be subject to the fee described herein. 6,022 acres of BLM disposal lands are also included.

Existing and proposed land uses within the Permit Area of this HCP include residential, commercial and industrial development and master planned activities described previously. Most of the heavy industrial and commercial land uses are located along State Highways 160 and 372. The permit being sought by Nye County would authorize the incidental take of the desert tortoise from these activities that occur within the Permit Area.

Environmental Setting

Climate

The Pahrump Valley has a typical low-latitude desert climate with very hot summers and arid conditions. Precipitation occurs sporadically from either winter rains or summer thundershowers. In the Pahrump area, the average annual temperature is 78.4°F; the monthly average temperature ranges from 58.0°F in January to 101.5°F in July. Precipitation in the region is scant, with average annual rainfall and snowfall of 5.17 inches. Average monthly precipitation ranges from 0.12 inch in June to 0.83 inch in February. As is typical of the Mojave Desert, the winter precipitation (November through March) is greater than 60 percent of the annual amount. Snowfall seldom occurs, with only 0.4 inch, on average.

Topography

The topography and drainage of southern Nye County is characteristic of the Basin and Range Province, with internally draining basins separated by mountains and mesas. The trend of these mountain ranges, composed mostly of exposed bedrock, is generally north to south. The Pahrump Valley is defined to the northeast by Mt. Charleston and the Spring Mountain Range, to the west by Last Chance Range and to the south by the Resting Spring, Nopah and Kingston ranges. To the southeast, Pahrump Valley is separated from Mesquite Valley by a low topographic divide on the Mount Potosi fan.

The Pahrump Valley basin has a total area of about 1,050 square miles. The valley floor ranges in elevation from approximately 2,460 to 2,700 feet above mean sea level. Pahrump Valley is a hydrographically closed basin; thus, all runoff from the mountainous watersheds drains via four main washes into two playas. Erosional forces transport materials down slope from the mountains where the material coalesces into alluvial fans along the margins of the valleys and basins. These deposits are being actively eroded and dissected by deep gullies.

Geology and Soils

Soil surfaces within the Planning Area are composed primarily of sandy loam with poorly sorted pebble, rock, and cobble. Alluvial deposits of gravel, sand, silt, and clay make up the Pahrump Valley land surface. Near the mountains, in the upper part of the alluvial aprons, the soil surfaces consist largely of highly permeable massive beds of coarse, well-rounded to angular, poorly assorted materials. Lower on the alluvial aprons the beds become more sandy and silty, and on the lowest parts of the alluvial aprons the beds consist of coarser materials.

Surface and Groundwater

Nye County has no major lakes, reservoirs, or rivers, but there are important surface and groundwater resources in many locations throughout the County. All of the surface and groundwater resources are derived from the precipitation that falls over the County or adjacent recharge areas.

In recent years, the demand on groundwater resources has grown significantly, in part reflecting the growth of the various economic sectors of the County (Buqo, 2004). According to the Groundwater Pumpage Inventory for Pahrump Valley (Basin 162), prepared by the Nevada Division of Water Resources, a total of 11,298 acre-feet of commercial, irrigation, golf course, Central Nevada Utilities, Inc., and quasi-municipal water rights were utilized in 2006. In addition to this volume, an estimated 10,826 acre-feet of water was utilized by domestic wells, for a total of 22,124 acre-feet. The vast majority of current water use falls into four (4) categories: public water supply systems, domestic wells, mining, and agriculture (i.e., farming, livestock, and dairies).

Vegetation Communities

The Planning Area includes one main vegetation community: the creosote bush scrub plant community, which is dominated by creosote bush (*Larrea tridentata*) and (*Ambrosia dumosa*). Other plants commonly seen in the area include spiny menodora (*Menodora spinescens*), Nevada ephedra (*Ephedra nevadensis*), little leaf ratany (*Krameria parvifolia*), and the common matchweed (*Gutierreza sarothrae*). Mojave yucca (*Yucca schidigeera*) is also a dominant feature of the landscape. Western honey mesquite (*Prosopis glandulosa var. torreyana*) occurs along drainages and the edges of dry lake beds. The most common cacti are cottontop cactus (*Echinocactus polycephalus*), hedgehog cactus (*Echinocereus engelmannii*), and beavertail (*Opuntia basilaris*).

The majority of the lands within the town of Pahrump on the west side of State Route 160 are moderately to highly disturbed and vegetation observed in this area is not typical of the natural community. Russian thistle (*Salsola iberica*), Russian knapweed (*Acroptilon repens*), and salt cedar (*Tamarix ramosissima*) has invaded many of these disturbed plots of land. Other areas contain four-wing saltbush (*Atriplex canescens*) at densities varying from sparse (intermixed with mostly annuals) to very dense, with very little to no creosote bush. At the south end of the town of Pahrump, the private properties are quite disturbed and mostly cleared of vegetation or as described above for disturbed areas. The vegetation grades into less disturbed areas farther south just outside the town limits until it becomes typical of the native community. Vegetation at the north end of the town of Pahrump on both sides of State Route 160 and throughout the town on the east side of State Route 160 is typical of the native vegetation community.

Land Use

The Pahrump Regional Planning District Master Plan Update 2003 identified seven land use goals:

1. Future land use designations should attempt to accommodate existing land uses that preceded the Master Plan Update when possible.
2. Master planned communities and new subdivisions shall integrate design guidelines and a documented approach to infrastructure development for site plan approval.
3. Create a comprehensive zoning ordinance that designates what uses are allowed in each zoning category.
4. Open space and parks should be provided within the PRPD, especially within new master-planned communities
5. Develop mechanisms in the zoning ordinance to protect public health, safety, and welfare.
6. Community growth and development should maintain the limited, natural resources as an asset to the quality of life of residents.
7. Land use decision-making should be a succinct, participatory, and community-based process.

Since the publication of the Master Plan Update, the largest increase in land use has been medium and high density residential housing. In 2007, there were over 937 construction zoning reviews performed by Nye County Planning Department, the vast majority were for new homes.

Chapter 3: Covered Species

Desert Tortoise- Mojave Population

Scientific Name: *Gopherus agassizii*

Protection

Endangered Species Act

- August 4, 1989: Populations north and west of the lower Colorado River in Arizona and Utah (excluding the Beaver Dam slope population) listed as endangered under an emergency rule, without designated critical habitat (54 FR 32326—32331).
- April 2, 1990: Entire Mojave population west of the lower Colorado River in California and Nevada, and north of the lower Colorado River in Arizona and Utah, including the Beaver Dam slope, listed as threatened (55 FR 12178—12191).
- February 8, 1994: Critical Habitat Designated (59 FR 5820—5866).
- June 28, 1994: Final Recovery Plan approved (FWS 1994).

Nevada Administrative Code (NAC)

- Classified as Threatened under NAC 503.080 (Reptiles: Classification).

Other Rankings

- Nevada Natural Heritage Program State Imperiled (S2S3).

General Description

The desert tortoise is a large, herbivorous reptile found in portions of California, Arizona, Nevada, and Utah. It also occurs in Sonora and Sinaloa, Mexico. The Mojave population of desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Sonoran Desert in California. Desert tortoises reach 8 to 15 inches in carapace length. Adults have a domed carapace and relatively flat, unhinged plastron. Shell color is brownish, with yellow to tan scute centers. The forelimbs are flattened and adapted for digging and burrowing.

Ecology

Desert tortoises are most commonly found within the desert scrub vegetation type, primarily in creosote bush scrub. Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from 2 to 8 inches, where a diversity of perennial plants is relatively high and production of ephemerals is high (Luckenbach 1982, Turner 1982, Turner and Brown 1982). In addition, they occur in succulent scrub, cheesebush scrub, blackbrushscrub, hopsage scrub, shadscale scrub, microphyll woodland, Mojave saltbush-allscale scrub, and scrubsteppe vegetation types of the desert and semi desert grassland complex (FWS 1994). Within these vegetation types, desert tortoises potentially can survive and reproduce where their basic habitat requirements are met. These requirements include a sufficient amount and quality of forage species; shelter sites for protection from predators and environmental extremes; suitable substrates for burrowing, nesting, and over wintering; various plants for shelter; and adequate area for movement, dispersal, and gene flow.

Throughout most of the Mojave Region, desert tortoises occur most commonly on gently sloping terrain with scattered shrubs, and where there is abundant inter-shrub space for growth of herbaceous plants. Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. Desert tortoises occur from below sea level to 5,300 feet, but the most favorable habitat occurs at elevations between approximately 1,000 and 3,000 feet (Luckenbach 1982).

Desert tortoises are most active during the spring and early summer, when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rainstorms. Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions of the desert. In Nevada and Arizona, desert tortoises are considered to be active from approximately March 15 through October 15.

Species Status

Planning Area

Within the Planning Area of this HCP, desert tortoise habitat occurs primarily on the east side of State Highway 160; however, tortoise habitat is present elsewhere in the Pahrump Valley at the rural/urban interface south/ southeast of Pahrump and extends out into undeveloped areas.

Desert tortoise habitat quality varies throughout Pahrump Valley, with higher quality less-disturbed habitat occurring on the east side of State Route 160 and in the northern and northwestern edges of the town boundary. In general, the habitat tends to be less disturbed and fragmented the farther east jt occurs from the highway. Habitat also occurs in southern areas of Pahrump, but is patchy and interspersed with sandy mesquite hummocks. In general, the central area of Pahrump on the west side of State Route 160 has either been developed for residential and commercial purposes, or is dominated by abandoned agricultural fields and salt desert scrub, and for the most part does not provide suitable habitat for the tortoise.

Estimates of desert tortoise densities in Pahrump Valley are generally very low to moderate. Survey data for Pahrump Valley is limited, and has been conducted mostly on the surrounding Federal lands managed by the BLM. A description of known desert tortoise surveys conducted in Pahrump Valley is summarized below.

The town of Pahrump is surrounded by lands administered by the BLM. Most of the desert tortoise habitat in Pahrump Valley occurs on BLM-managed lands. The BLM collected data on 1,425 standard triangular strip transects from 1979 through the mid-1990's to determine relative densities of desert tortoise habitat in southern Nevada. Approximately 50 of these transects were conducted in Pahrump Valley. Standard transects consisted of walking the perimeter of an equilateral triangle, 0.5 mile on each side, while recording observations of desert tortoise sign in a 33-foot wide area. Average total adjusted sign was determined, and relative desert tortoise density was calculated based on the formula developed by Berry and Nicholson (1984). Most transects were conducted southeast and northwest of Pahrump on BLM-managed land. No surveys were conducted on private land. Relative densities ranged from very low (0 to 10 tortoises per square mile) to high (90 to 140 tortoises per square mile), with most relative densities ranging between 10 and 45 tortoises per square mile.

In 1992, Dames & Moore biologists conducted a field survey of the 80-acre landfill expansion and sewage treatment facility site and surrounding areas within the Town of Pahrump. A combination of survey techniques were employed including a full survey of the site of the proposed project (80 acres), a full survey of other County-owned land adjacent to the project site (50 acres), and zone of influence transects adjacent to the County land (80 acres). The results of the 1992 survey were that one (1) tortoise was observed to the east of the site of the proposed project. Also, a total of 21 sign were observed including a tortoise, burrows, carcass, and scat. Then in 1994, one tortoise was found in a burrow on the site of the' proposed project (WESTEC 1994).

An HCP for the Nye County landfill was completed in 1995. The 80-acre project site was surveyed for desert tortoises prior to initiation of construction activities. Four tortoises were found, which were relocated to adjacent suitable habitat (Coburn 1996). In 1998, the project proponent reported one dead

tortoise which was found on the project site (Darling Environmental and Surveying 1999). The landfill is located in Township 20 South, Range 53 East, south half of the northeast quarter of section 2.

In 2006, Knight and Leavitt Associates was retained to collect biological data for the desert tortoise as well as estimate the numbers of cacti and yucca present for the proposed construction of a new access roadway and water tank on approximately 2.0 acres of private land on the eastern extension of Manse Road, across State Route, 160 south of Pahrump. A desert tortoise survey was conducted according to the FWS Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise within the project area and the zones of influence (ZOI) at 33, 100, 200, and 400' meters from the project area perimeter. However, no observations of Mojave Desert Tortoise or sign were encountered during the field inventory on March 7, 2006 for 'the proposed project area and surrounding lands (Knight & Leavitt Associates, Inc. 2006).

On November 12 and 13, 2007, 100 percent pedestrian presence/absence surveys were conducted within the 120-acre project site of a proposed Federal detention facility located at 2250 East Mesquite Avenue in Pahrump (Louis Berger Group 2008). A total of 13 desert tortoise burrows were observed. Desert tortoise sign observed on the project site included six tortoise burrows and four burrows with tortoise scat, which indicates occupancy. One burrow was occupied by a burrowing owl, and two burrows were collapsed. No desert tortoises were encountered during the surveys. Based on results of the survey, the FWS estimated a relative density of 0 to 10 tortoises per square mile (FWS 2008).

Other HCPs in the Planning Area

A Permit for an HCP for the Nye County Landfill Expansion and Sewage Treatment Facility was issued on February 10, 1995, and is effective until February 10, 2025 (WESTEC 1994). The landfill and sewage treatment facility is located on the eastern edge of Pahrump and encompasses 80 acres. The permit was issued to Nye County. Preconstruction surveys for desert tortoises were required, and tortoises were relocated prior to initiation of construction activities.

Residential/Commercial Development and Master Plan Activities

Project Impacts to Desert Tortoise

The Pahrump Valley Desert Tortoise HCP addresses potential impacts to the desert tortoise that are related to possible development actions on private land. The permit would authorize the incidental take of tortoises on up to 1,000 acres of potentially suitable desert tortoise habitat on private land within the Fee Zone to meet the need for residential and commercial development in the Pahrump Valley.

Direct and Indirect Impacts / Anticipated Take

The Covered Activities will result in the loss of up to 1,000 acres of variable quality desert tortoise habitat, and the displacement of all desert tortoises that occur within this acreage. In addition, desert tortoises that wander on to construction sites may be incidentally injured or killed.

Trash deposition and accumulation within the Planning Area may attract and concentrate predators such as the common raven (*Corvus corax*) (Boarman and Berry 1995; Boarman et al. 1995; Boarman et al. 2006). Ravens and other predators such as coyotes (*Canis latrans*), kit fox (*Vulpes macrotis*), and free-roaming dogs tend to concentrate around urban areas where food resources are subsidized by human populations, thus increasing predation on available prey species such as desert tortoises. Raven numbers were shown to decrease with distance from urban sites in the west Mojave, placing tortoises that occur in the urban-desert interface at higher risk of predation (Kristan and Boarman 2003). Trash can also pose a threat to tortoises if eaten. Trash items known to be eaten by tortoises, including balloons, plastic, and other non-food items, can become lodged in the gastrointestinal tract or entangle heads and legs, causing injury or death (Burge 1989; USFWS 1994).

Urban development may promote the spread of invasive plants. Invasive plants outcompete and replace many native plants desert tortoises favor as a food source. Non-native plants may not be as nutritious as native plants. Recent studies have shown that calcium and phosphorus availability are higher in forbs than in grasses and that desert tortoises lose phosphorus when feeding on grasses but gain phosphorus when eating forbs (Hazard et al. 2002; Nagy et al. 1998). This suggests that the proliferation of non-native grasses such as *Schismus barbatus* (Mediterranean grass) and *Bromus madritensis* var. *rubens* (red brome) to the exclusion of native forbs and other plants places desert tortoises at a nutritional disadvantage (D'Antonio and Vitousek 1992).

The spread of invasive plants promotes greater frequency of wildfire. Wildfires in Pahrump Valley have resulted in the injury and death of wild desert tortoises (J. Krueger, USFWS, pers. comm.. 2009). Fire can also compromise the quality of tortoise habitat by reducing the vegetation that provides shelter, cover and nutrition for tortoises (Brooks and Esque 2002; Esque et al. 2003). Subsequent conversion of the native desert scrub vegetation to a non- native grassland can result in a change in the plant community that is less desirable for tortoises.

Urbanization promotes increased human use of the area and surrounding wildlands, which results in habitat degradation and destruction, and injury and mortality of tortoises. Unconfined pets may kill or wound tortoises, and unauthorized collection of desert tortoises results in uncontrolled loss of individuals from wild populations. Release of pet tortoises into wild populations promotes the spread of disease and dilution of the gene pool. Off-highway vehicle access, dumping of trash, and removal of vegetation or unimproved road proliferation are activities that occur in and beyond the urban-wildland

interface that may result in injury and mortality to tortoises and degradation of their habitats. Urbanization also promotes habitat fragmentation from the building of infrastructure such as residential fencing, roads, railroads, and utilities (Edwards et al. 2004; Brooks and Lair 2005). These barriers to movement and population connectivity have implications to exchange of genetic material, which can lead to inbreeding (Boarman and Sazaki 1996). Construction of new roads through desert tortoise habitat increases the chance of mortality from vehicle encounters.