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**ECONOMIC ANALYSIS
OF CRITICAL HABITAT DESIGNATION
FOR THE DESERT TORTOISE
(MOJAVE POPULATION)**

DECEMBER 3, 1993

**Economic Analysis of Critical Habitat Designation
for the Desert Tortoise (Mojave Population)**

Prepared for the Office of Endangered Species
U.S. Department of the Interior
U.S. Fish and Wildlife Service

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Executive Summary

The U.S. Fish and Wildlife Service emergency listed the Mojave population of the desert tortoise as endangered on August 4, 1989. The Mojave population formally was listed as threatened on April 2, 1990. The Endangered Species Act of 1973, as amended, requires that the economic benefits and costs and other relevant effects of critical habitat designation be considered. The Secretary of the Interior may exclude from designation areas where the costs of designation are greater than the benefits, unless the exclusion would result in extinction of the species.

Desert tortoises are threatened by an accumulation of human- and disease-related mortality accompanied by habitat destruction, degradation, and fragmentation. Many desert tortoises are illegally collected for pets, food, and commercial trade. Others are accidentally struck and killed by vehicles on roads and highways or are killed by gunshot or vehicles traveling off-highway. Raven predation on hatchling desert tortoises has increased as raven populations in the desert have risen. An upper respiratory tract disease is suspected to be a major cause of mortality in the western Mojave Desert. This presumably incurable affliction presumably is thought to be spread through the release of infected tortoises into the desert.

The Service has proposed designating critical habitat in nine counties within four states. The 12 critical habitat units encompass 6.4 million acres of land, more than 80% federally owned. This region is economically and demographically diverse. Most of the land is sparsely settled and characterized as a hot desert ecosystem.

Major industries in the region include entertainment and lodging (primarily in Las Vegas), property development to accommodate the rapid population growth, and services. Millions of rural acres in the region are leased by the federal government for livestock grazing and used for mining. Overall economic benefits to the affected states derived from cattle and sheep grazing in the hot desert areas are minimal and, according to a recent U.S. General Accounting Office study (1991), local economies do not depend on the grazing of public lands for economic survival.

The economic analysis describes the economy in 1990, prior to designation, and estimates the effects of designation. The report estimates those incremental effects attributable to critical habitat

designation. Impacts attributable to listing the species were not considered in this analysis. Although critical habitat units have been designated in nine counties, two counties are omitted from the economic analysis because of the small proportion of critical habitat acreage they include. Three key activities (cattle grazing, mineral extraction, and off-road vehicle use) were studied in detail.

Even if livestock grazing and commercial off-road racing events were eliminated in the proposed critical habitat units, the potential incremental regional economic impacts would be extremely small. The findings in the report do not include the assumption that mining would be eliminated from critical habitat units, but rather that consultation may result in added mitigation and/or relocation of features.

Studies show that society will realize benefits from preservation of species and ecosystems. Survey-based studies confirm that benefits exist and are substantial in size, although these benefits often are not measured in traditional economic markets. The total benefit to society of desert tortoise preservation includes several components. Biodiversity in the Mojave and Colorado Deserts will be improved, some recreation values may increase, and gains in intrinsic value will be realized.

Critical habitat designation should result in the loss of fewer than 425 total jobs in the seven counties. These includes 340 direct ranching jobs and 85 indirect jobs in other industries. This estimated employment loss will not be permanent for most laborers, it is anticipated that over 85% will be reemployed within two years.

The economic consequences of designating critical habitat includes reduced ranch profits in the seven counties of \$4,470,000 [the estimated permanent decrease in ranch profits, capitalized at 10% for a 50-year period, in accordance with the methodology of Rice, et al. (1978)]. Second, the federal government will compensate allottees with a one-time payment estimated at \$376,000 for the loss of permanent improvements to grazing lands (pending BLM administrative decisions of partially affected allotments). Finally, discontinuing grazing leases will result in an annual reduction of \$170,000 in collected grazing fees that are divided among range improvements, the Federal Treasury, and local governments.

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I. Introduction

The U.S. Fish and Wildlife Service (Service) listed the desert tortoise on the Beaver Dam Slope in Utah as a federally threatened species in 1980 and designated critical habitat as required by the Endangered Species Act of 1973, as amended (Act). The Service emergency listed the Mojave population of the desert tortoise occurring north and west of the Colorado River as endangered on August 4, 1989. The Mojave population formally was listed as threatened on April 2, 1990, and critical habitat now is being proposed. The Act stipulates that the listing of species should not consider economic consequences, but when critical habitat is designated, the Secretary of the Interior (Secretary) must evaluate economic and other relevant impacts that result from its designation. The Secretary may exclude an area from critical habitat if it is determined that the economic or other benefits of exclusion outweigh the conservation benefits of designating the area as critical habitat, unless such exclusion would result in extinction of the species.

Incremental analysis is used to evaluate potential exclusions because the designation of critical habitat is the only action over which the Secretary, or the Director of the Service as delegated by the Secretary, currently has decision authority (i.e., to determine if the benefits of excluding areas from critical habitat outweigh the benefits of including areas). This economic analysis will serve as a decision document for use in evaluating economic consequences of the action to designate critical habitat. Since the economic costs of listing the species already have been incurred, and the economic effects of actions taken by other federal or state agencies are outside the purview of the Service, the focus of the economic analysis is on critical habitat.

A. Background

The desert tortoise is one of four land tortoises living in North America and is the only native tortoise in the Mojave Desert. The Mojave population of the desert tortoise lives in the Mojave and Colorado Deserts north and west of the Colorado River in southwestern Utah, northwestern Arizona, southern Nevada, and southern California. Desert tortoises are a long-lived terrestrial species that spend much of their lives in burrows, emerging primarily during late winter and early spring to forage.

The desert tortoise is herbivorous and grows to lengths of approximately 15 inches.

Desert tortoises are threatened by an accumulation of human- and disease-related mortality accompanied by habitat destruction, degradation, and fragmentation. The desert tortoise is extremely vulnerable to human vandalism and collection. Virtually every desert tortoise population has been affected by one or more of these factors. Many desert tortoises are illegally collected for pets, food, or commercial trade. Others are accidentally struck and killed by vehicles on roads and highways or are killed by gunshot or vehicles traveling off-highway. The substantial increase in raven population in the Mojave and Colorado Deserts has resulted in an increase in raven predation on hatchling desert tortoises. Disease, especially an upper respiratory tract disease, is suspected to be a major cause of mortality in the western Mojave Desert and perhaps elsewhere. This presumably incurable disease presumably may be spread by the release of infected desert tortoises into other areas of the desert.

B. Consultation under the Endangered Species Act

Section 7 of the Act requires federal agencies to ensure that activities they fund, authorize, or carry out are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat. Jeopardy is defined as any action that would reduce appreciably the likelihood of both the survival and recovery of the species, populations, or subpopulations. Destruction or adverse modification of critical habitat is defined as any direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of the species.

As required by 50 CFR 402.14, a federal agency must consult with the Service if it determines that an action may affect a listed species or its critical habitat. The Service reviews the agency's proposed action and prepares a biological opinion that determines if that action is likely to jeopardize the continued existence of the listed species or result in the destruction or adverse modification of critical habitat. The biological opinion also contains the Service's evaluation of the amount of incidental take associated with the action, reasonable and prudent measures to minimize that take, and recommendations to conserve the species. If the action is found to jeopardize the continued existence of the species or

destroy or adversely modify its critical habitat, the Service is required to provide, to the extent possible, reasonable and prudent alternatives to the proposed action. By definition, reasonable and prudent alternatives allow the proposed action to go forward while removing the conditions that jeopardize the species or destroy or adversely modify its critical habitat.

In cases where critical habitat has been designated, the Service also determines if the proposed action is likely to destroy or adversely modify critical habitat. The additional requirement for federal agencies to avoid destruction and adverse modification of critical habitat may result in incremental restrictions to agency actions beyond those required to avoid jeopardy. In cases where species are listed without critical habitat, the Service determines only if the proposed action is likely to jeopardize the continued existence of the species.

There are four possible results from formal consultation (Table 1). When the proposed action neither jeopardizes the continued existence of the species nor destroys or adversely modifies its critical habitat (Table 1, Case A), there are no economic costs attributable to critical habitat. A nonjeopardy but adverse modification opinion (Table 1, Case B) is a situation where the action agency may incur additional costs to avoid adverse modification of critical habitat. In the unlikely case where a proposed action jeopardizes the species but does not destroy or adversely modify critical habitat (Table 1, Case C), there are no additional costs from critical habitat. When both jeopardy and adverse modification occur (Table 1, Case D), the designation of critical habitat may cause additional economic costs if actions needed to avoid adverse modification exceed those required to avoid jeopardy.

Costs incurred by a federal agency as a result of avoiding actions that would jeopardize the species (Table 1, Case C and most of Case D), plus costs associated with implementing other requirements of the Act (such as the requirement under section 9 to avoid "take" of the species) occur in the absence of critical habitat. These costs are referred to hereafter as listing impacts because they are associated with listing the species and occur regardless of whether critical habitat is designated. In addition, if a proposed action was limited or prohibited by another statute or regulation, it is presumed that those economic costs would not be attributable to either listing or critical habitat designation. All of these cases currently exist with the desert

tortoise. The incremental economic costs and benefits resulting from the requirement to avoid adverse modification of critical habitat are the subject of this economic analysis.

Table 1. *Possible results from section 7 consultations.*

Case	Species listed, no critical habitat	Species listed, with critical habitat
A	No jeopardy	No jeopardy No adverse modification
B	No jeopardy	No jeopardy Adverse modification
C	Jeopardy	No adverse modification
D	Jeopardy	Adverse modification

C. Proposed Critical Habitat Units

Critical habitat is the area considered necessary for survival and eventual recovery of a designated species. In 1980, the Service stated that "critical habitat designation applies only to federal agencies, and is an official notification to these agencies that their responsibilities under section 7 of the Endangered Species Act are applicable" (Federal Register, volume 45, number 163, page 55663).

The proposed critical habitat units (CHUs) for the desert tortoise are based on recommendations for establishing Desert Wildlife Management Areas (DWMAs) outlined in the *Draft Recovery Plan for the Desert Tortoise (Mojave Population)* (Draft Recovery Plan) (U.S. Fish and Wildlife Service 1993), which was available for public comment from March 30 to June 30, 1993. The Draft Recovery Plan described six recovery units in which viable populations should be maintained to ensure the survival of the species. The Draft Recovery Plan recommended implementation of 14 DWMAs within those recovery units.

The Service proposes designation of 12 CHUs on 6.4 million acres of desert tortoise habitat. Whereas the location of the CHUs is generally the same as the DWMA's recommended in the Draft Recovery Plan, some modifications have been made. Boundaries of the CHUs must conform to precise legal descriptions, whereas DWMA boundaries were approximations. Three areas, the Desert National Wildlife Range managed by the Service, the Joshua Tree National Monument managed by the National Park Service, and the Desert Tortoise Natural Area managed by the U.S. Bureau of Land Management (BLM), were not included in the proposed designation as they are currently managed for the desert tortoise and designation would not afford additional benefits.

Proposed critical habitat includes portions of Mohave County, Arizona; Imperial, Kern, Los Angeles, Riverside, and San Bernardino Counties, California; Clark and Lincoln Counties, Nevada; and Washington County, Utah. This area includes portions of the Mojave and Colorado Deserts in northwestern Arizona, southwestern Utah, southern Nevada, and southern California. (Maps of CHUs are located in Appendix I.)

D. Land Ownership

Eighty percent of the 6,448,000 acres proposed for critical habitat designation is federally owned, 17% is titled in private ownership, 3% is in state ownership, and 1,600 acres are tribal lands (Fig. 1 and Appendix I). The BLM administers 4.8 million acres (93%) of the federal land; the Department of Defense manages 243,000 acres (5%) on five bases (Appendix II); and the National Park Service is responsible for 148,000 acres (3%) within Lake Mead National Recreation Area, which adjoins three CHUs (Appendix I). Privately owned land on CHUs exceeds 1 million acres and is present in all 12 units. Private property ranges from 1,300 acres on Gold Butte-Pakoon (0.3% of the CHU) to 276,000 acres on Chuckwalla (27% of the CHU). Although private lands are included in CHU boundaries, designation of critical habitat does not affect these lands unless activities are funded, authorized, or carried out by a federal agency.

More than 4,755,000 acres of critical habitat are in California (74%), 1,225,000 acres are in Nevada (19%), 339,000 acres are in Arizona (5%), and 129,000 acres are in Utah (2%).

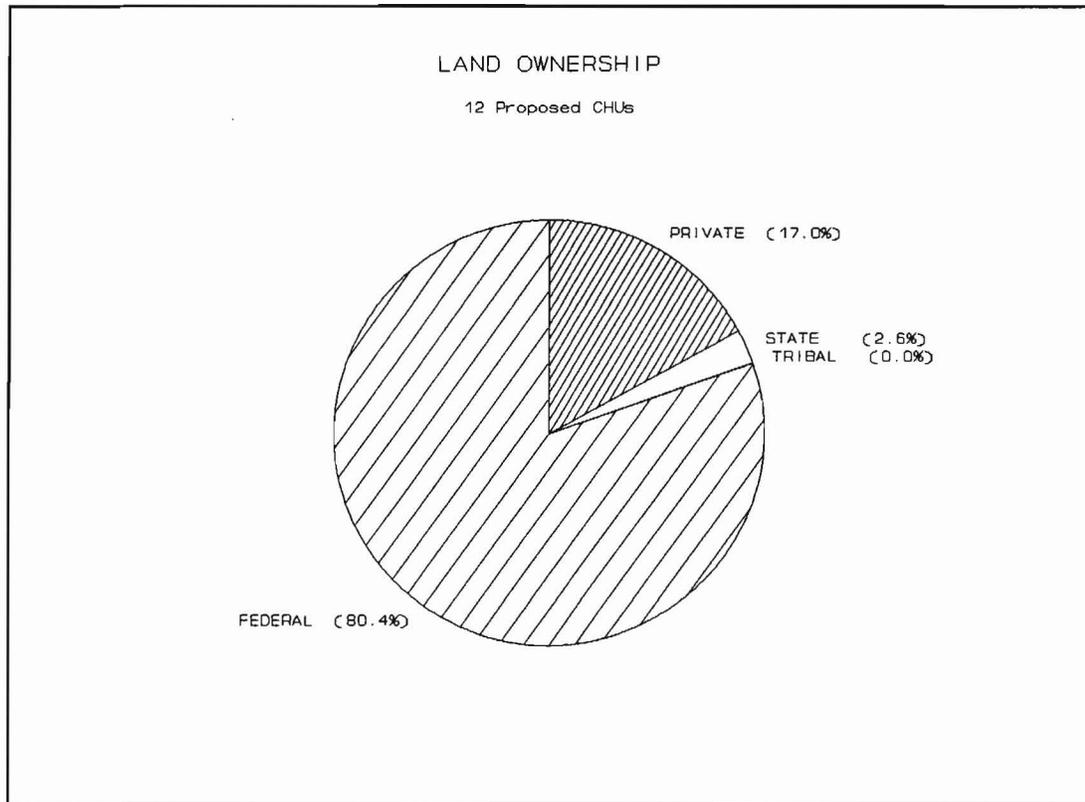


Fig. 1. Land ownership of critical habitat units.

II. Baseline Conditions and Analysis Framework

A. Baseline Conditions

This economic analysis examines the costs and benefits of precluding or limiting specific land uses within areas designated as critical habitat. It is cast in a "with" critical habitat versus a "without" critical habitat framework and seeks to measure the net change in the various categories of benefits and costs when the critical habitat designation is imposed on the existing baseline.

The Act provides two levels of protection for populations of listed species. Listing provides significant and in most cases the preponderance of protection by virtue of the jeopardy standard under section 7 of the Act. Critical habitat provides incremental protection to the species by

adding the adverse modification standard. The estimated economic effects of critical habitat designation, as well as the conservation benefits, exclude effects created by listing the desert tortoise as threatened and the effects of earlier actions taken by federal and state agencies to protect the species under other statutes and authorities. Critical habitat effects are thus incremental and represent only a portion of the total effect of desert tortoise conservation, in terms of protection of the species, other benefits, costs to the national economy, and economic impacts to the regional economy. Since the species already has been listed, designating critical habitat assumes that the economic and other effects of listing already are in place, and they therefore are not considered in the incremental economic analysis of critical habitat designation.

The economic analysis evaluates national economic costs and benefits (efficiency) that reflect changes in social welfare resulting from habitat designation. The standard measure of those costs and benefits is economic surplus in the form of economic rents and consumer surplus. The Service recognizes, however, that in the case of the desert tortoise, one region of the country and primarily one sector of that region's economy is affected by this action. The analysis includes examination of some of the primary regional economic impacts (distributional) expected to occur, such as employment changes, county revenue impacts, and social costs to the affected communities.

A number of factors affect the baseline used in this analysis. The Draft Recovery Plan has been developed; discussions with several state, municipal, and private entities have occurred; consultation with the military concerning uses of their facilities has occurred; and numerous other actions and activities are ongoing that contribute to the conservation of the desert tortoise. (The occurrence of consultations does not imply unanimity of opinion among these agencies with respect to proposed conservation measures.) The proposed CHUs include the DWMA and other areas that already have received some level of protection through listing and subsequent recovery planning and conservation measures. The Service has determined that activities that modify critical habitat may be curtailed further, including those activities that impact vegetation, soil structure, or other physical attributes of the habitat. These activities include grazing, off-road vehicle (ORV) use, and surface disturbances such

as those created by mining. Examples of activities that may be restricted further by critical habitat designation include:

- Utah - The Beaver Dam Slope population previously received protection when it was listed in 1980, and critical habitat subsequently was designated. Habitat conservation planning currently is underway for Washington County as part of the application for an incidental take permit for desert tortoises under section 10 of the Act. Critical habitat may overlap some "take" areas under this Habitat Conservation Plan (HCP), and some "take" areas may adversely modify critical habitat. Designation of critical habitat will not affect habitat permitted to be "taken" under an acceptable HCP. If an HCP is not approved for the Upper Virgin River CHU proposed actions may be curtailed under the jeopardy standard and thus it is possible that no incremental effects of habitat designation would be realized.
- California - The 1992 California Statewide Desert Tortoise Management Policy provides guidance to the BLM regarding management protection for the Mojave population which includes restricted grazing and ORV use. A number of other planning activities are underway to further protect tortoise habitat in the Mojave Desert, and several CHUs are under other agency control that prohibit habitat destruction. Prior protection measures have greatly reduced grazing and ORV use, and critical habitat designation will further reduce these activities in California.
- Nevada - The Piute Valley Tortoise Management Area was established in 1991 as part of an HCP, which eliminated grazing through acquisition of permits from willing sellers; thus, no further grazing restrictions are possible in this area. ORV use will be curtailed further as a result of critical habitat designation. In other Nevada areas, grazing already has been restricted partially, and critical habitat designation may result in additional grazing restrictions.

- Arizona - Grazing has been partially restricted in Arizona, however, critical habitat will result in additional grazing restrictions. Additionally, development of land near the Virgin River in Arizona eventually may be restricted by critical habitat designation.

Most other proposed activities will be subject to either listing or adverse modification rulings under section 7 consultations. Other than grazing and ORV use, most proposed actions are expected to proceed under the reasonable and prudent limitations of the Act. Economic effects are expected to be minimal, therefore, and would be limited to project modifications to reduce the adverse modification standard.

B. Framework of Analysis

The smallest subdivision with standard, meaningful economic data normally is an individual county; thus, economic impacts are based upon county data for local and regional effects, whereas statewide or nationwide data and effects are addressed only if they become economically relevant.

The regional economy is defined to include seven counties in four states that contain over 98% of the proposed CHU acreage. Kern and Los Angeles Counties in California contain such small amounts of CHU acreage, and in such remote locations, that they were excluded from a description of the regional economy.

The regional economy includes the full economic activity of each county in which proposed CHUs are located. CHUs generally are located in remote areas containing a very small fraction of the human population and total economic activity within a county. The entire county economy may not be affected by establishing CHUs; thus, the size of the relevant regional economy may be overstated. Likewise, important activities in rural areas may appear to be insignificant when compared to the entire regional economy. For example, mining does not appear to be an important employer in the seven counties but may contribute significantly to the economies of small rural communities that offer few other employment opportunities.

B.1. Methods and data sources -- regional economy profile

Economic conditions of the region in 1990 serve as the base year for economic analysis because it precedes designation of critical habitat and because numerous economic data bases use 1990 as a benchmark. The description of the economy before designation is based on 1990 data, unless otherwise noted.

The profile of the regional economy before designation uses information drawn from MicroIMPLAN, an input-output modeling software developed by the U.S. Forest Service that describes in detail the relationships among the industries in a regional economy (U.S. Forest Service 1993). The IMPLAN data base, along with public information sources cited (e.g., U.S. Census Bureau, U.S. Bureau of Economic Analysis, etc.), provided data for the economic analysis. Acreage data were derived from ARC/INFO geographic information system analysis provided by the National Ecology Research Center.

The economic influence of urban centers in the region (such as Las Vegas, San Bernardino, and Riverside) and highly productive irrigated agriculture overwhelm the effects of habitat designation on the small rural communities likely to be affected by designating CHUs. For example, because San Bernardino County contains the city of San Bernardino (population 164,000), the effects of habitat designation on Barstow (population 21,500) may appear insignificant. San Bernardino is more than 30 miles from the nearest proposed CHU; Barstow, in contrast, is encircled by proposed CHUs and may experience more significant local consequences as a result of critical habitat designation. Three activities may be exceptions to this generalization: cattle ranching, mineral extraction, and some recreational uses. These activities occur in rural areas and impacts may not be obscured, as with some other economic activities.

B.2. Methods and data sources -- economic effects of designation

The economic analysis is restricted to anticipated economic impacts within the proposed CHUs. The effects of critical habitat designation on federal agencies and other entities were determined from responses received to inquiries made by the Service. Letters were sent to federal agencies known by the Service to be involved in the management of lands or in the funding or approval of projects within the region (Appendix III).

Recipients were asked to provide a list of existing or planned (within the foreseeable future) projects or activities that involve desert tortoise habitat destruction, modification, or fragmentation, and a list of existing or planned projects or activities that may have secondary or indirect impacts that will affect or be affected by the designation of critical habitat. A list of section 7 consultations that the Service is conducting and has conducted is provided in Appendix IV.

Costs of designating CHUs are the net economic costs of precluding or significantly restricting land uses over the period of analysis. Costs are estimated as differences between a given resource's value in its highest and best use without critical habitat and its next best use when only a lower use is allowed. Certain economic variables, such as taxes or veterans' payments, are transfer payments within a region and do not constitute measures of economic efficiency.

The economic efficiency effects of designation include those that result in changes in social welfare. Regional economic impacts often represent transfers among people, groups, and/or geographic regions. For simplicity, economic efficiency effects are referred to as benefits and costs, while distributional effects are cited as economic impacts. National economic efficiency effects may include, but not be restricted to:

- Net change in aggregate value of capital (e.g., lands) due to critical habitat designation.
- Wage earnings foregone from a significant number of employees permanently displaced through critical habitat designation.
- Opportunity costs of foregone or precluded economic activities (e.g., curtailed or terminated land development).
- Benefits of retention of genetic and biological diversity through specific species protection measures.

Regional (distributional) economic impacts may include:

- Changes in specific county tax revenues due to changes in land use (e.g., developed real estate versus raw, undeveloped land).

- Regional social costs and benefits from factors such as transient unemployment, job training, or redistribution of existing job-mix categories (e.g., transitioning from underemployment in seasonal range or mine work to full employment in other sectors).

The analysis of effects of critical habitat designation contains both national economic efficiency effects and regional (distributional) impacts. These include effects on the net returns of local ranch operations, foregone grazing fees, and compensation to allottees for permanent improvements to land leased from the federal government for grazing, changes in total employment and the portion of grazing fees that would be shared with local governments. These consequences are presented in the context relative to the amount of value added of the counties in which the grazing impacts would be realized to illustrate the relative magnitude of economic effects of critical habitat designation.

The regional economic analysis does not include effects on privately owned lands. Activities on private lands are affected when federal land or federal authorization is necessary for access, federal funding is involved, or in similar situations where a federal nexus exists. Only the incremental increase in species protection provided by the designation of critical habitat and the incremental change in costs, regional or national impacts, and benefits that the designation produces are relevant to the economic analysis.

III. Regional Economy

The seven counties examined herein contain vast, unpopulated areas with most inhabitants concentrated in a few cities and towns. The region's population grew 63% to nearly 3.6 million during the 1980s, more than six times the 10% growth of the nation (Table 2). The regional growth rate was highest in Washington County, Utah, which increased 86% to 48,600.

In this analysis, "sector" refers to major business aggregations (e.g., construction or services) composed of individual "industries" (e.g., new residential or doctors/dentists). This structure provides consistent aggregation and allows better analysis and comparison of the region to the national economy. The profile of this regional economy

before habitat designation identifies key economic sectors and compares the regional economy to the national economy. Grazing, mineral extraction, and recreation are three primary activities (described in section III.D.) that may be impacted by critical habitat designation. The economy of the seven-county region included nearly 450 industries in 1990, which have been grouped into ten sectors. Key economic data for the region and nation are provided in accompanying tables. A detailed description of sectors is provided in Appendix V.

Table 2. *Population growth in the region, 1980 to 1990.*

County, state	1980 population	1990 population	Change (%)
Mohave, Arizona	55,900	93,500	67
Imperial, California	92,100	109,300	19
Riverside, California	663,200	1,170,400	77
San Bernardino, California	895,000	1,418,400	59
Clark, Nevada	463,100	741,500	60
Lincoln, Nevada	3,700	3,800	1
Washington, Utah	<u>26,100</u>	<u>48,600</u>	86
TOTAL REGION	2,199,100	3,585,400	63

Source: U.S. Bureau of the Census (1983). U.S. Bureau of the Census (1992a).

NOTE: Numbers may not add due to rounding.

The region's favorable climate, California's 1980s boom economy, the expansion of the Los Angeles metropolitan area into western Riverside and San Bernardino Counties, and the retiree-based migration to the desert communities provided numerous catalysts for growth.

The economic profile before designation includes three measures: employment, value added, and exports. Employment was selected to represent the importance of sectors and industries on the livelihood of residents of the region. Value added illustrates the contribution from

industries in the region to national economic production. Exports depict the reliance of the region on the rest of the national economy, and world economy to the extent of foreign exports.

The region's economy is founded on small businesses. Ninety-five percent of the businesses in the region employed fewer than 50 employees in 1990, and companies employing 250 or more workers represented 0.6% of all businesses, figures that match the national profile (U.S. Bureau of the Census 1990b).

A. Employment

The region's employment base in 1990 measured just over 1.5 million workers. The region was more heavily dependent on services, construction, and agriculture for jobs than was the national economy (Table 3). Construction was spurred by the building boom across the Southwest, and services sector employment included the lodging and recreation industries of Las Vegas. The region's agricultural employment was inflated by Imperial County, California, a nationally significant farm production area (primarily fruits and nuts, vegetables, and dairy) that includes the fertile Imperial Valley. The county has minimal CHU acreage and annually produces substantial agricultural output, although it contains few cattle ranches. Agriculture employed more than one-third of labor in Imperial County; in the remaining six counties, agriculture employed less than 3% of labor.

In contrast, manufacturing employed 7% of regional labor, half the 14% proportion employed by manufacturing in the national economy. Industrialization was concentrated in the far western edge of the California counties. In most other employment sectors, the region was similar to the national economy.

The region's top 10 industries employed almost 42% of all workers in 1990, a slightly higher concentration than the rest of the nation, where the 10 largest industries employed 35% of labor. The principal industrial employers reflect the importance of tourism (lodging and restaurants) and development (new residential construction, real estate, maintenance-other) in the region (Table 4).

Table 3. *Employment, 1990 by sector.*

Sector	USA (%)	Region (%)
Agriculture	3.1	4.0
Mining	0.6	0.2
Construction	6.8	10.6
Manufacturing	14.4	7.3
Transportation	4.4	4.1
Wholesale	4.8	3.4
Retail	16.5	17.2
F.I.R.E. ^a	6.9	6.2
Services	26.5	31.4
Government	16.0	15.6

^aFinance, insurance, real estate.

Source: IMPLAN.

NOTE: Numbers may not add due to rounding.

Table 4. *Employment in region, 1990 top 10 industries.*

Industry	Number of workers	Share (%)
Hotels and lodging	128,100	8.3
State/local government - non education	101,100	6.6
Restaurants	84,300	5.5
State/local government - education	59,700	3.9
New residential construction	57,400	3.7
Real estate	50,300	3.3
Federal government - military	43,300	2.8
Food stores	39,500	2.6
Miscellaneous retail	39,100	2.5
Maintenance and repair - other buildings	<u>38,700</u>	<u>2.5</u>
TOP 10 INDUSTRIES	641,300	41.8
ALL INDUSTRIES	1,535,100	100%

Source: IMPLAN.

NOTE: Numbers may not add due to rounding.

The beef cattle industry employed 4,600, or 0.30%, of the region's labor. (In this report, "beef cattle" includes two IMPLAN industries: ranch- and range-fed cattle and calves. Beef cattle excludes dairy and feedlots, unless otherwise noted.) The mining sector employed 3,300 in 1990, or 0.21%, of regional labor. Natural gas/crude petroleum employed the most labor among mining industries (1,800 in 1990, or 0.11% of labor in the region).

B. Value added

Value added represents the costs of labor and capital added in the region to the direct production expenses of an industry. The aggregate of value added represents the cost of processing materials during production

and thus indicates the "value added" by the region to raw materials during the process. IMPLAN includes four components in this statistic:

- Employee Compensation - salary and wages, benefits, social security and pension plan contributions.
- Property Income - income earned by sole proprietorships.
- Indirect Business Taxes - amount paid for sales, excise and value added taxes.
- Other Property Income - income from rental property and investment income from dividends and interest.

The more labor-intensive sectors, services, retail, and government, comprised the largest proportion of total value added (Table 5). Though a minor sector for some economic measures, Finance, Insurance, and Real Estate (F.I.R.E.) was a significant regional sector in this category because real estate income and investment income are value added components. The region adds little value to agricultural or mineral production because outputs essentially are raw materials. The value added in processing agricultural and mineral products was divided among industries in the manufacturing sector.

Highly intensive use of local capital or labor, complex assembly, or interrelatedness with other sectors are typical traits of industries associated with high levels of value added. The 10 industries in the region with the highest level of value added repeat a familiar theme: the reliance of this region's economy on property development (Table 6). Four of the 10 industries listed were related to real estate or construction, and three are government industries. Lodging again proved to be an important industry in the region. The concentration of value added in the 10 highest producing industries is similar to the national economy, though the distribution is different.

According to IMPLAN data, two beef cattle industries in 1990 generated \$167 million or 0.29% of value added in the region. Natural gas/crude petroleum contributed the most value added of the mining industries, adding almost \$500 million or 0.85% of regional value added.

Table 5. *Value added in region, 1990 by sector.*

Sector	Value added (\$mm)	Share (%)
Agriculture	\$ 948	1.6
Mining	704	1.2
Construction	5,498	9.4
Manufacturing	5,175	8.9
Transportation	4,343	7.4
Wholesale	2,634	4.5
Retail	5,771	9.9
F.I.R.E.	10,973	18.8
Services	13,843	23.7
Government	<u>8,574</u>	<u>14.7</u>
TOTAL	\$58,463	100%

Source: IMPLAN.

Table 6. *Value added in region, 1990 top 10 industries.*

Industry	Value added (\$mm)	Share (%)
Real estate	\$5,383	9.2
Hotels and lodging	4,029	6.9
Owner-occupied dwellings	3,988	6.8
State/local government - non education	3,820	6.5
Doctors and dentists	1,831	3.1
Federal government - military	1,494	2.6
State/local government - education	1,391	2.4
Maintenance and repair - other buildings	1,389	2.4
New residential construction	1,389	2.4
New industrial and commercial buildings	<u>1,346</u>	<u>2.3</u>
TOP 10 INDUSTRIES	\$26,059	44.6
ALL INDUSTRIES	\$58,463	100%

Source: IMPLAN.

C. Exports

Exports are a key factor in determining the nature and growth of any economy. Sales outside a given region's boundaries allow expansion beyond self-support by bringing in dollars from nonresidents. Exports consist of domestic (out-of-region) and foreign (out-of-country) transactions. Exports may include both physical products sold outside the given region to, and services purchased inside by, nonresidents. The lodging industry provides an example of the latter: spending for lodging by Americans who are not residents of the region is a domestic export, though the transaction occurs within the region, because the dollars are brought in from outside the region.

Exports were an essential activity in the region's economy in 1990. That year, 40% of the region's 443 industries each exported at least

\$10 million of goods and services, and 60% of the industries sold more than one-half of final demand outside the seven-county region. Final demand measures consumption of products for final use in their final form.

Nearly 40% of the region's exports in 1990 were manufactured goods (Table 7). Almost 10% of manufacturing exports were produced by four defense-related industries, the highest concentration in the manufacturing sector of a family of related industries. The lodging and the entertainment industries in Las Vegas combined to export almost \$5 billion, close to 90% of 1990 service sector exports from the region. Construction, an important sector in employment and production, reported trivial exports in 1990 because most of the sector's exports would be reported as real estate transactions, once building was complete.

Table 7. *Exports from region, 1990 by sector.*

Sector	Exports (\$mm)	Share (%)
Agriculture	\$1,968	9.1
Mining	936	4.3
Construction	683	3.2
Manufacturing	8,614	39.9
Transportation	563	2.6
Wholesale	377	1.7
Retail	581	2.7
F.I.R.E.	1,687	7.8
Services	5,961	27.6
Government	<u>217</u>	<u>1.0</u>
TOTAL	\$21,589	100%

Source: IMPLAN.

NOTE: Numbers may not add due to rounding.

Two industries accounted for over one-quarter of the region's exports in 1990 (Table 8). The lodging industry, concentrated in Las Vegas, generated over 20% of the region's exports. This is more than three times

the level of real estate (6.7%), the second largest industry. The concentration of exports in the ten top industries (48%) is slightly lower than the 53% found in the national economy, which also relies on manufactured products for international sales.

Beef cattle exports totaled \$164 million in 1990 or 0.76% of total regional exports. Natural gas/crude petroleum exports represented 2.7% of the regional total, fifth highest among industries.

Table 8. *Exports from region, 1990 top 10 industries.*

Industry	Value of exports (\$mm)	Share (%)
Hotels and lodging	\$4,700	21.8
Real estate	1,446	6.7
Miscellaneous plastic products	716	3.3
Agricultural services	707	3.3
Natural gas and crude petroleum	591	2.7
Dairy farm products	480	2.2
Amusement and recreation	477	2.2
Guided missiles	431	2.0
Aircraft and missiles	395	1.8
Maintenance-other facilities	<u>383</u>	<u>1.8</u>
TOP 10 INDUSTRIES	\$10,325	47.8
ALL INDUSTRIES	\$21,589	100%

Source: IMPLAN.

D. Economic Activities - Detailed Review

For reasons explained earlier, the three primary activities that may be affected by critical habitat designation are ranching and grazing, mineral extraction, and recreation.

D.1. Ranching and grazing

Ranchers and farmers in the seven-county region owned more than 58,000 head of beef cattle and calves on December 31, 1987 (U.S. Bureau of the Census 1990a). (Note that figures reported in this section do not include the inventory of Imperial County, California, which is not reported due to confidentiality requirements given the limited number of ranches.) This inventory represented 3.1% of the four-state beef cattle inventory and 0.18% of the nation's beef cattle numbers on that date (Table 9).

Table 9. *Beef cattle inventory in region. Number of beef cattle and calves on farms December 31, 1987.*

County	Beef cattle (000 head)	State share (%)	National share (%)
Mohave, Arizona	20	6.0	0.06
Imperial, California	^a	^a	^a
Riverside, California	8	0.8	0.02
San Bernardino, California	10	1.1	0.03
Clark, Nevada	4	1.3	0.01
Lincoln, Nevada	6	2.1	0.02
Washington, Utah	<u>11</u>	3.1	<u>0.03</u>
TOTAL REGION	58	3.1	0.18

^aNot reported to protect confidentiality.

Source: U.S. Bureau of the Census (1990a).

NOTE: Numbers may not add due to rounding.

Within the affected counties, Mohave County ranchers owned the most beef cattle at the time of the 1987 census. The county contained 6.0% of all beef cattle in Arizona and 0.06% of all beef cattle in the nation. No other county in the region held more than 0.03% of the national inventory at that time.

Public lands across the four states in 1990 furnished nearly 3,000 operators with cattle grazing permits that provided more than 3 million animal unit months (AUMs) (Table 10). Grazing permits specify the quantity of forage the allotment provides, expressed in AUMs. An AUM is the forage required to feed one cow/calf pair or one horse or five sheep for a period of one month. The proposed CHUs would partially or totally affect 51 cattle permits that provided 59,000 AUMs. The effect of CHU restrictions on grazing varies widely among the states, from 0.6% of cattle AUMs in Nevada to 9.6% of cattle AUMs in California. Across the four states, CHUs may affect 1.7% of livestock grazing AUMs.

Table 10. *Cattle grazing in region affected by critical habitat units.*

State	Grazing permits on CHUs	AUMs		
		CHUs ^a	State ^a	%
Arizona	12	10,580	514,674	2.1
California	13	28,240	295,676	9.6
Nevada	17	11,790	1,821,875	0.6
Utah	<u>9</u>	<u>8,870</u>	<u>770,143</u>	1.2
TOTAL	51	59,480	3,402,368	1.7

^aIncludes cattle and sheep.

Source: U.S. Bureau of Land Management (1991). U.S. Bureau of Land Management, district offices, personal communications (1993).

NOTE: The data in the preceding table were drawn from different sources. Data for specific CHUs were provided by BLM district offices for the most recent year available. The state-level data were obtained from Public Land Statistics (1990). While the data sources and time periods may not match, they provide a useful comparison.

Production of beef cattle provided direct employment to about 4,600 workers in the seven-county region in 1990, according to IMPLAN. This labor demand totaled about 7.5% of the agriculture sector employment and 0.30% of total regional employment. Imperial County is a substantial agricultural producing area, but it is very unlikely to experience

sizeable impacts due to the small amount of its area proposed for critical habitat and the nature of its agricultural production (fruits and nuts, vegetables, and dairy). Direct employment in the two beef cattle industries totaled 2,600 in 1990 in the remaining six counties.

D.2. Mineral extraction

The four states impacted by desert tortoise habitat designation were among the nation's top 10 states in 1990 in value of nonfuel mineral production. Arizona, California, and Nevada filled the top three spots, while Utah ranked ninth (U.S. Bureau of Mines 1992c). Nonfuel minerals produced in these states in 1990 totaled almost \$10 billion (Table 11). Copper, gold, sand and gravel, cement, and boron were among the minerals produced commercially.

Table 11. *Value (\$000) of nonfuel mineral production, 1990.*

Mineral	Arizona	California	Nevada	Utah	Total
Boron	\$ ---	\$ 436,176	\$ ---	\$ ---	\$ 436,176
Cement	^a	604,080	^a	^a	604,080
Clay	2,318	40,217	4,098	1,774	48,407
Copper	2,657,649	^a	^a	^a	2,657,649
Gold	62,191	368,300	2,196,191	^a	2,626,682
Sand/gravel	92,166	674,055	59,008	44,923	870,152
Silver	26,836	3,209	109,653	22,750	162,448
Stone ^b	13,500	200,600	5,000	20,200	239,300
Other	<u>210,788</u>	<u>453,162</u>	<u>236,926</u>	<u>1,244,363</u>	<u>2,145,239</u>
TOTAL	\$3,065,448	\$2,779,799	\$2,610,876	\$1,334,010	\$9,790,133

^aIncluded in "Other."

^bEstimated.

Source: U.S. Bureau of Mines (1992).

The seven counties historically have produced large quantities of nonfuel minerals, though less than other counties in the four

states outside proposed critical habitat. Portions of the CHUs are deemed to have high potential for future development of a variety of minerals (U.S. Bureau of Mines 1985; U.S. Bureau of Mines 1992a; U.S. Bureau of Land Management 1993b).

California ranked fourth among states in oil production in 1990, though output declined for a fifth consecutive year (U.S. Bureau of Mines 1992c). None of the other three states recorded significant fuel production in 1990. Although federal leases have been issued in the region for oil and gas, and geothermal, there are currently no active operations on federal leases within any of these CHUs.

According to Arizona BLM, CHUs do not contain ongoing mining operations on federal lands or leases of leasable minerals, nor do they contain known geological structures (KGSs) or known geothermal resource areas (KGRAs).

Nevada CHUs presently include two sand and gravel leases, three sand and gravel community pits, and five free-use permit areas. CHUs in the state include over 13,000 mining claims, at least half of which the BLM expects to be dropped at year end in response to a proposed increase in fees (U.S. Bureau of Land Management 1993b). Many of these claims are top- or cross-filed (i.e., they cover the same acreage). The areas do not contain KGRAs.

CHUs in Utah contain one active mining operation: a small sandstone quarry. There are four current and four pending leasable mineral leases on Upper Virgin River CHU; however, the last oil drilling on CHUs occurred in 1959. Beaver Dam Slope has low potential for leasable minerals. The two Utah CHUs contain 428 locatable mineral sites, 80% of which are in Upper Virgin River CHU. The Utah CHUs do not contain community pits, free-use areas, active federal highway material sites, or KGRAs (U.S. Bureau of Land Management 1993d).

California CHUs generally have a more active mining history than the other states and appear to have more prospective mineral sites. There is little uniformity among CHUs, however, as activity and prospects are widely disparate. The northern CHUs contain most of the several hundred active mines (e.g., gold, clay, cinders), while the southern CHUs are nearly devoid of currently active mining operations. KGRAs have been identified on Fremont-Kramer CHU.

Ivanpah CHU lies within the East Mojave National Scenic Area. The U.S. Bureau of Mines estimates that the scenic area contains \$5 billion in nonfuel minerals including gold, clays, and limestone (U.S. Bureau of Mines 1990). The U.S. Bureau of Mines report estimates the value of deposits but does not comment on the present economic feasibility of extraction or development of the deposits.

D.3. Recreation

Public lands under the BLM jurisdiction in Arizona, California, Nevada, and Utah drew almost 46 million user visits in 1990 (U.S. Bureau of Land Management 1991b). California attracted more than 26 million of those visits and Arizona 9 million. Together the four states accounted for nearly two-thirds of all recreational visits to BLM-managed lands in the nation (Appendix VI).

Camping was the most popular activity in the four states, in terms of visitor hours of recreation use. More than one-third of the 374 million visitor hours spent in the four states in 1990 were used for trips whose primary purpose was bivouacking outdoors (U.S. Bureau of Land Management 1991b). Motorized travel (e.g., sightseeing, ORVs) accounted for 31% of visitor hours on BLM lands in the four states and nonmotorized travel (e.g., hiking, biking) accounted for 9%.

ORV use on all BLM lands totaled an estimated 63 million hours in 1990, 53 million hours of which occurred in the four states. California riders accounted for 45 million ORV use hours, over 70% of all ORV use that occurred on BLM land (U.S. Bureau of Land Management 1991b). Among 11 categories of recreational activities, ORV riding ranked second in popularity in Nevada, third in California, fifth in Utah, and eighth in Arizona.

In its 1990 off-highway vehicle (OHV) users guide, California listed 24 OHV recreation areas managed by federal, state, and other agencies in Imperial, Riverside, and San Bernardino Counties (State of California 1990). (OHV includes travel off paved roads and encompasses more types of vehicles than ORV. For example, OHV may include vehicles intended for use on rough roads but not off-road. ORVs may include such vehicles as dune buggies and motocross motorcycles, designed primarily for use off roads of any quality.)

Four sites in the guide lie just outside proposed CHUs: Spangler Hills OHV recreation area is just north of the proposed boundaries of Fremont-Kramer CHU, Stoddard Valley and Johnson Valley OHV recreation areas are near Ord-Rodman CHU, and Park Moabi lies near Chemehuevi CHU (State of California 1990; C. Roholt, U.S. Bureau of Land Management, personal communication 1993). Critical habitat designation as proposed will not affect ORV/OHV use at these four sites. The Draft Recovery Plan proposes eliminating ORV use on Piute-Eldorado CHU on the border of Nevada and California. Little information is available at this time to determine economic activity attributable to ORV use in these areas.

Long-term visitor areas (LTVAs) are BLM-managed facilities that provide sites for extended camping, often used during winter months by out-of-state visitors in recreational vehicles. The BLM's California Desert District issued 1,530 LTVA permits in fiscal year 1992 and collected about \$19,000 in LTVA-use fees, 44% of the direct costs attributed to LTVA use (C. Roholt, U.S. Bureau of Land Management, personal communication 1993).

IV. Economic Effects of Critical Habitat Designation

The entire acreage of the proposed CHUs lies within the boundaries of California, Nevada, Arizona, and Utah (maps of CHU locations are located in Appendix I). The affected lands are primarily federal acreage, and most of the rest is privately owned. Because the proposed CHUs lie within counties of different states, each state is discussed separately. Certain CHUs (e.g., Beaver Dam Slope) lie across two or more state lines and in more than one county. Any resultant economic impacts are discussed with respect to each county and state.

Earnings discussed throughout this section include household income from wages, salaries, other labor, and proprietor income, as well as interest, dividends, rent, and transfer payments (e.g., veterans payments, social security payments), less leakages (e.g., social security contributions).

The U.S. Treasury's portion of grazing fees collected by BLM in fiscal year 1989 was insufficient to cover the direct costs of administering grazing programs in eight BLM districts in the hot

deserts of the southwest. According to the U.S. General Accounting Office's (GAO) report (1991) the BLM collected grazing fees totaling \$3.97 million from the eight BLM desert districts. Half of this amount (\$1.98 million) was returned to the grazing programs for range improvements, the U.S. Treasury received a maximum 37.5% (\$1.49 million) of the fees, and local governments received a minimum of 12.5% (\$496,000). The U.S. Treasury thus received no more than \$1.49 million, 53% of the \$2.79 million expense for grazing management in the eight BLM districts. According to GAO:

"Critics of livestock grazing could argue that the costs of managing livestock grazing...exceeded the funds available to the Treasury to offset these management costs. Proponents could counter that...grazing fees more than offset...management costs and provided funds for state and county projects as well as for range improvements.

No matter how costs are analyzed, the resources currently being spent on range management, as earlier GAO reports have shown, are insufficient to perform all essential tasks. For example, we have pointed out that insufficient funding and staffing have been instrumental in BLM's inability to restore degraded riparian areas, deal with overstocked grazing allotments, and detect livestock grazing trespass. Consistent with our findings, BLM has concluded that its current budget is inadequate to perform all needed land management tasks throughout the public lands" (U.S. General Accounting Office 1991).

Based on the GAO's findings, the U.S. Treasury may realize a net financial gain of approximately \$1.3 million from discontinuing or reducing federal grazing programs in the hot desert (assuming administrative costs were reduced accordingly, and not reassigned). This analysis does not replicate the GAO study, nor were specific losses estimated for the economic units as defined herein.

A. Arizona

Portions of both Beaver Dam Slope and Gold Butte-Pakoon proposed CHUs lie within Mohave County, Arizona. The portion of these two areas in Arizona total approximately 339,000 acres. Federal acreage constitutes 98% of the Mohave County acreage in the proposed CHUs, and private lands total 0.2%.

Of the 109,300 Mohave County residents in 1993, governmental offices confirm that there are fewer than 400 people currently residing near either Beaver Dam Slope or Gold Butte-Pakoon CHUs (Mohave County Assessor's Office, personal communication 1993; Western Arizona Council of Governments, personal communication 1993). As of April 1993, there were 229 registered voters in the very northwestern portion of the county (i.e., the Littlefield-Beaver Dam area), plus a school enrollment of approximately 115. This totals less than 0.5% of Mohave County's entire population residing near the closest CHU. There is no indication of permanent residents on the 635 private acres enclosed within the two proposed CHUs (Mohave County Assessor's Office, personal communication 1993; Western Arizona Council of Governments, personal communication 1993).

Households in Mohave County earned over \$1.29 billion in 1991 (Table 12). Most of the manufacturing, wholesale, retail, government, and services industries for Mohave County are located 30 to 40 miles south of the two proposed CHUs. Most people living in the nearest populated area (Littlefield-Beaver Dam) travel westward to Mesquite, Nevada, to earn their living and purchase most goods and services (Western Arizona Council of Governments, personal communication 1993); thus, only an extremely small portion of the entire Mohave County economic base is located near Beaver Dam Slope or Gold Butte-Pakoon CHUs.

Table 12. *Earnings in Mohave County, 1991 by sector.*

Sector	Earnings (\$000)	Share (%)
Agriculture	\$ 10,132	0.8
Mining	1,735	0.1
Construction	84,339	6.5
Manufacturing	67,975	5.3
Transportation	46,642	3.6
Wholesale	19,206	1.5
Retail	123,939	9.6
F.I.R.E.	28,028	2.2
Services	178,889	13.8
Government	114,984	8.9
Other	<u>617,854</u>	<u>47.8</u>
TOTAL	\$1,293,723	100%

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (1993).

Although most of Mohave County's economic activity occurs outside the proposed CHU, other activities are ongoing nearby. The county may propose that approximately 210 federal acres (in T. 41 N., R. 15 W., sec. 33) be utilized for "schools (and) county offices...(although) no application has been received for this proposal at the present time, but is expected in the near future" (U.S. Bureau of Land Management-Arizona, personal communication 1993). Although this acreage does not lie within a proposed CHU, the construction may require section 7 consultation prior to final approval.

The BLM notes that their grazing program in Mohave County includes 25 livestock grazing permits currently authorized on federal lands. Of these, 12 are "allotments that are located within desert tortoise habitat on the strip" on which an estimated 1,764 head of cattle are grazed. The effect of eliminating the allotments inside the CHU boundaries for critical habitat designation includes about 1,480 head of cattle in Mohave County, and a maximum 10,300 AUMs (U.S. Bureau of Land Management 1993a; U.S. Bureau of Land Management-Arizona, personal communication 1993). In

the hypothetical case where the BLM terminated every federal grazing lease within the proposed CHUs, collection of BLM grazing fees would be reduced by approximately \$20,300 annually.¹ Administrative costs to the BLM to manage these allotments must be deducted from the gross fees to derive a net loss or gain to the U.S. Treasury.

Current data indicate that fewer than 75 total jobs will be lost in Mohave County due to the reduction of federal grazing permits (see Table 16). This includes 60 direct ranching jobs and 15 indirect jobs in other industries. The maximum total job loss in Mohave County represents 0.2% of the 36,600 employees recorded in 1990. These job losses will be reduced if affected permits are replaced by nonaffected lands (federal or private), or if those laborers transfer to jobs on unaffected ranch lands. These estimated employment losses will not be permanent for most laborers, it is anticipated that over 85% will be reemployed within two years. Estimated economic losses due to foregone wages are extremely low.

Following the methodology of the Rice et al. (1978) study, ranch earnings (1993 dollars) would be reduced by approximately \$514,000 (estimating herd size); this is the estimated permanent reduction in earnings, capitalized at 10% over 50 years. This assumes no economic leakages (i.e., dollars earned in the county spent outside Mohave County).²

While federal law stipulates that "a rancher is not entitled to compensation for any value added to the fee by revocable permits authorizing the use of adjoining public lands issued under the Taylor Grazing Act because such permits carry no property rights" (U.S. vs. Fuller, 409 U.S. 488 1973), range improvement permits issued by the BLM may require compensation to the allottee (Interagency Land Acquisition Conference 1973; U.S. Bureau of Land Management-Arizona, personal

¹These calculations are predicated upon the total number of AUMs (19,610) supplied by the BLM, and the \$1.97 figure cited in the U.S. General Accounting study of the three hot deserts of the nation. Calculations of other states (Utah, Nevada, and California) were derived similarly.

²It is reasonable to assume, however, that leakages do occur, since two major cattle companies operate in three different counties in three different states, especially Utah and Arizona. Further, employees (for the most part) are not currently living on the BLM federal allotments, nor are they spending dollars in those relatively remote locations. Total economic impacts thus would be even smaller.

communication 1993). According to the BLM, partial repayment for wells or other nonremovable land improvements in Mohave County may total as much as \$65,000. Fences, cattle guards, corral materials, and other removable improvements normally would not require compensation.

It does not appear that current mining operations in Arizona would be impacted by establishing the proposed CHUs. The proposed CHU boundaries do not include any ongoing mining operations, nor do they include KGSs or KGRAs. There are no existing leases for leasable minerals on federal lands within either Beaver Dam Slope or Gold Butte-Pakoon CHUs in Mohave County, Arizona. The creation of new pits, sumps, or other surface disturbances in a CHU would be subject to section 7 consultation. Mitigation of disturbances or relocation of roads may be required as reasonable and prudent alternatives to surface expansion.

Because ORV use already has been restricted on category 1 and 2 lands within the proposed CHUs, no significant dollar loss to the federal government would result from critical habitat designation as a result of ORV restrictions (U.S. Bureau of Land Management-Arizona, personal communication 1993).

Economic impacts in Arizona would be economically insignificant, with national economic effects so small as to constitute "economic noise."³

B. Utah

A portion of Beaver Dam Slope and all of Upper Virgin River proposed CHUs lie within Washington County, Utah. These two units total approximately 129,000 acres. Federal lands constitute almost 70% of the Washington County acreage in the two proposed CHUs, state lands (including Utah Park and Recreation, and Utah State Wildlife Reserve) total 21%, and private and tribal lands together comprise the remainder.

Households in Washington County recorded more than \$620 million in earnings in 1991 (Table 13). Nearly all of the county's economic activity

³"Economic noise," originally discussed by Dougherty and Lohrenz (1977) and Oden, Mac Gillvray, and Lohrenz (1978), represents economic data which are only slightly measurable. It is at a level below both economic significance (generally 10% or greater) and economic insignificance (generally 3% or less). Any bid at a public lease sale of federal lands or minerals that is three or more standard deviations below the average of all other bids constitutes a "low noise bid." Thus, economic noise are data points which are barely detectable.

is conducted outside the proposed CHU, but some activities are within, or contiguous to, CHU boundaries.

Table 13. *Earnings in Washington County, 1991 by sector.*

Sector	Earnings (\$000)	Share (%)
Agriculture	\$ 4,557	0.7
Mining	5,531	0.9
Construction	43,587	7.0
Manufacturing	30,926	5.0
Transportation	25,342	4.1
Wholesale	14,700	2.4
Retail	64,066	10.3
F.I.R.E.	15,591	2.5
Services	102,168	16.5
Government	60,175	9.7
Other	<u>254,087</u>	<u>40.9</u>
TOTAL	\$620,730	100%

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (1993).

The BLM maintains a range grazing program in the county with allotments divided into custodial, maintenance, and intensive uses based on the type of terrain and management practices. According to the BLM, nine Utah allotments in the Upper Virgin River and Beaver Dam Slope CHUs would be affected; these allotments provide 8,867 AUMs and currently graze about 1,477 cattle (U.S. Bureau of Land Management 1993a; U.S. Bureau of Land Management-Utah, personal communication 1993). In the hypothetical situation where the BLM terminated every grazing lease in the proposed Utah CHUs annual grazing fee collection would fall by approximately \$15,500. This is not a net figure in that the reduced cost of managing allotments affected by critical habitat designation is not included in the calculation.

Current data indicate that fewer than 115 total jobs will be lost in Washington County due to the reduction of federal grazing permits (see Table 16). This includes 80 direct ranching jobs and 35 indirect jobs in other industries. The maximum total job loss in the county represents 0.6% of the 19,800 employees in 1990. These job losses will be reduced if affected permits are replaced by nonaffected lands (federal or private), or if those laborers transfer to jobs on unaffected ranch lands. These estimated employment losses will not be permanent for most laborers, it is anticipated that over 85% will be reemployed within two years. Estimated economic losses due to foregone wages are extremely low.

Following the Rice et al. (1978) methodology, ranch earnings (1993 dollars) in Washington County would be reduced by approximately \$411,000 (based on estimated current herd size); this is the estimated permanent effect of reduced earnings, capitalized at 10% over 50 years.⁴

Additional incremental costs would result if the BLM is required to provide reimbursement for non-movable range improvement items, such as sunk wells on allotments issued under range permits (as opposed to Taylor grazing permits cited previously). Such reimbursable improvements may total \$50,000.

According to BLM data, current mining operations on federal lands in Washington County will not be impacted by designating proposed CHU boundaries. There are nine sites in Upper Virgin River CHU that have locatable mineral potential and an additional seven in Beaver Dam Slope CHU. The mineral potential in the latter is considered to be high, but the current critical habitat proposal would not necessarily curtail any active operations. Additionally, there would be no impact on subsurface mining or extraction of minerals, but operations where surface disturbance is involved would require section 7 consultation. The BLM notes that "since 1981, no notices or plans have been submitted for work" for locatable minerals in this area, although there is "high potential for gold and silver, or gallium, germanium, uranium and copper" (U.S. Bureau of Land Management-Utah, personal communication 1993). Those locatable

⁴Even this level of estimated economic impact with leakages in the county economy would be an overestimate. For example, if all earned dollars by employees in grazing activities (those only addressed here) were not saved nor consumed in total within Washington County, there would be a lower overall economic impact. Since that level of a "micro-measurement" is not possible within the scope of this study, only potential maximum economic impacts are addressed in each case.

minerals, however, currently have potential, but do not constitute known reserves or economically recoverable reserves. They are neither strategic nor critical minerals on which the United States has import reliance.⁵

With respect to salable minerals, the BLM stated that "there are no community pits, free-use areas, or federal highway material sites" in these areas (U.S. Bureau of Land Management-Utah, personal communication 1993). There are no KGRAs nor are there active oil and gas leases in either of these areas. There are no leasable mineral leases at the present time.⁶ Any future impacts, currently not quantifiable, would result only if privately held mineral deposits were precluded from development due to the presence of a federal action or nexus. Any such federal nexus would require section 7 consultation.

Consistent with the Western Regional Corridor Study and according to the BLM, "approximately 12 miles of utility corridor are proposed for designation within critical habitat of the desert tortoise. They would be within the Beaver Dam Slope CHU and would involve some 7,000 acres" (U.S. Bureau of Land Management-Utah, personal communication 1993). Should plans for that corridor proceed, section 7 consultation would be required.

Because the BLM has already restricted ORV use on category 1 and 2 lands within the proposed CHUs in Utah, the federal government would not experience further loss from habitat designation, although the surface management agency may have additional sign and post requirements placed upon it (U.S. Bureau of Land Management, personal communication 1993).

Aggregate economic impacts to the state of Utah would be economically insignificant, with national effects so small as to be virtually nonexistent.

⁵See Smith and Mac Gillvray (1988) for discussion of the minerals that are most critical to the national needs and the source countries from which they were imported. Recent U.S. Bureau of Mines data confirm their listing to include such minerals as manganese, strontium, columbium (niobium), and others on which the U.S. has virtual 100% import reliance.

⁶According to BLM-Utah records, there are four oil and gas leases authorized plus four pending, but there are no operations nor submitted plans of operations on any of them (all in the Upper Virgin River area). The BLM further notes that the last actual drilling was over 34 years ago (early 1959) by Intex Oil Company (in T. 41 S., R. 13 W., sec. 28) which went about 3,000 feet deep and was "assumed to be a dry hole" since neither test nor production records were submitted to the BLM at that time (U.S. Bureau of Land Management 1993d).

C. Nevada

One proposed CHU lies entirely in Nevada (Mormon Mesa), as do portions of three others (Beaver Dam Slope, Gold Butte-Pakoon, and Piute-Eldorado). All of these areas are in Clark or Lincoln Counties. The four proposed areas total approximately 1,224,500 acres. More than 97% of the land is federally owned, about 35,800 acres are private lands, and Nevada does not own any land in the area. Seventy-eight percent of the Nevada CHU acres are in Clark County and 22% are in Lincoln County.

Clark County households recorded earnings in 1991 that were over 200 times larger than Lincoln County (Table 14). The services sector is the largest sector in both counties.

Clark County contains 200 times the population of Lincoln County and more than 60% of Nevada's entire population. Recent population and employment growth have been dynamic for Clark County (largely due to Las Vegas), while Lincoln County has been relatively static. Clement Associates, Inc., estimated that "newcomers account for over 98% of the annual population increase. In 1988, approximately 38,600 new residents moved to Clark County" (Clement Associates, Inc., and ICF, Inc. 1990). According to the State of Nevada Department of Taxation, Nevada State Demographer, and Nevada Employment Security Department, from July 1991 to July 1992, Clark County population increased from 817,450 to 854,780, and Lincoln County grew from 3,870 to 4,000. Clark County's workforce growth also has been substantial, while Lincoln County's has been moderate. The majority of the population in these adjoining counties does not reside within (or adjacent to) the four proposed CHUs.

The proposed **Beaver Dam Slope CHU** consists almost entirely of BLM land and is located in the southeastern corner of Lincoln County. There are no permanent residents nor towns in the immediate vicinity of this proposed CHU.

The proposed **Mormon Mesa CHU** also consists primarily of BLM land. It lies at the southern end of Lincoln County and the northern end of Clark County. There are no towns adjacent to Mormon Mesa CHU, except unincorporated Carp (population about 8 to 10 people). According to the

Table 14. *Earnings in Clark and Lincoln Counties, 1991 by sector.*

Industry	Clark (\$000)	Share (%)	Lincoln (\$000)	Share (%)
Agriculture	\$ 3,347	0.0	\$ 1,300	2.0
Mining	17,249	0.1	396	0.6
Construction	999,068	6.5	839	1.3
Manufacturing	329,301	2.1	a	a
Transportation	754,099	4.9	1,816	2.8
Wholesale	456,718	3.0	a	a
Retail	1,195,511	7.7	2,091	3.3
F.I.R.E.	540,525	3.5	505	0.8
Services	5,540,117	35.8	a	a
Government	1,630,549	10.5	13,956	21.8
Other	<u>4,012,231</u>	<u>25.9</u>	<u>20,257</u>	<u>31.5</u>
TOTAL	\$15,478,715	100%	\$64,139	100%

^aEarnings for two sectors have been omitted to avoid disclosure of confidential data for Lincoln County.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (1993).

Lincoln County Assessor's Office, Carp is "neither a town nor permanent living area for many people. It is simply a place where a very few people live, has no services whatsoever, nor does it have any telephone service lines." Some ranching and livestock grazing occurs within the area and this will be addressed below.

The proposed Piute-Eldorado CHU lies in extreme southern Clark County and surrounds the small town of Searchlight [mid-1992 estimated population of 693 (Clark County Department of Comprehensive Planning, personal communication 1993)]. The sections immediately surrounding Searchlight have been excluded from the proposed CHU. Almost all of the CHU acreage is managed by the BLM and the National Park Service; private land is less than 1% of the total area. Permanent residents are limited to CalNevAri,

Nevada, and the unincorporated site at the junction of U.S. Highway 95 and State Highway 163.

The Piute and Eldorado Valleys already have been designated as tortoise management areas through implementation of the "Short-Term Habitat Conservation Plan for the Desert Tortoise in the Las Vegas Valley, Clark County, Nevada" (RECON 1991). This HCP outlines mitigation requirements as required by the section 10(a)(1)(B) permit issued by the Service for incidental take of desert tortoises within Las Vegas, North Las Vegas, Henderson, and Boulder City. Mitigation includes removal of grazing privileges, designation of roads and trails, elimination of commercial and competitive OHV events (except on the perimeter of Eldorado Valley), and increased law enforcement. Critical habitat will result in no additional restrictions in this area.

The Nevada portion of the proposed **Gold Butte-Pakoon CHU** lies in the southern part of Clark County on the Nevada-Arizona border. There are no towns contiguous to this proposed area, no economic base of activities in the area, and very few permanent residents within the proposed boundaries. Almost all acreage is federal; less than 0.5% is private.

The BLM-Nevada manages an ongoing range program. In its 1991 report, "Biological Evaluation for Managing Livestock Grazing in Desert Tortoise Habitat" (U.S. Bureau of Land Management 1992), the BLM noted:

"Livestock grazing is authorized on approximately 3,174,000 acres of desert tortoise habitat in Nevada...*but active grazing use occurs on only about 2,154,000 acres.* Another 688,000 acres of public lands administered by the BLM are unallotted for grazing and consequently do not receive any livestock grazing.

Cattle is the predominate kind of livestock licensed within tortoise habitat in Nevada...Total desert tortoise habitat grazed by domestic sheep is approximately 60,000 acres. Most is in category 1 and 2 tortoise habitat.

Within the Stateline Resource Area, approximately 65% of the total acreage in the resource area is grazed during any given year, with some of the remaining 35% having been inactive up to 25 years" (emphasis added).

According to the BLM, about 17 allotments that provide 19,610 AUMs may be affected either totally or partially by the proposed CHU boundaries. In the hypothetical case where the BLM terminated every affected grazing lease in the county impacted by proposed CHUs, collection of grazing fees would be reduced by about \$38,640 annually. This amount is insignificant to the U.S. Treasury and may be reduced further if net effects were considered (i.e., after recognizing costs of administering the BLM's grazing program).

Employment effects in the two Nevada counties due to critical habitat designation are estimated to be a maximum of 135 total jobs (see Table 16). This includes 120 direct ranching jobs and 15 indirect jobs in other industries. The maximum total job loss in the county represents an insignificant proportion of the 446,800 employees in the two counties in 1990. These job losses will be reduced if affected permits are replaced by nonaffected lands (federal or private), or if those laborers transfer to jobs on unaffected ranch lands. These estimated employment losses will not be permanent for most laborers, it is anticipated that over 85% will be reemployed within two years. Estimated economic losses due to foregone wages are extremely low.

Following the methodology of Rice et al. (1978), reduced ranch earnings (1993 dollars) are estimated to total \$1,023,000; this is the estimated permanent effect of reduced earnings, capitalized at 10% over 50 years.

The value of all nonmovable range improvements affected by critical habitat designation is estimated to be \$52,400 (U.S. Bureau of Land Management-Nevada, personal communication 1993).

The BLM notes there are three active community sand and gravel pits at or near Henderson, Laughlin, and Mesquite. These sites likely will not be affected by habitat designation. Two sand and gravel leases, also not affected by the proposed CHUs boundaries, provide over \$10,000 annual revenue to the government (U.S. Bureau of Land Management-Nevada, personal communication 1993). Likewise, free-use permits extended to the Nevada Department of Transportation would not be impacted by establishing CHUs. Future expansion of these sites would require section 7 consultation. There are no KGRAs within either of the proposed CHUs. The Service recommended to the BLM (memorandum dated January 7, 1993, under informal consultation) that these areas should be closed to future fluid mineral leasing.

ORVs already are restricted to designated roads and trails in Piute Valley through Clark County's HCP, and they have been restricted on category 1 and 2 lands through the BLM's range management plans. Further, the Service recommended to the BLM (memorandum dated January 7, 1993) that "all noncompetitive, competitive, commercial, and organized OHV events should be prohibited...(since) such activities are incompatible with management of sensitive species and their habitats" (U.S. Bureau of Land Management, personal communication 1993).

Lands within desert tortoise habitat also should be maintained in federal ownership if they are not sold through legislation that supersedes the Act. Any future actions on federal lands within critical habitat must undergo section 7 consultation prior to approval. For example, future actions (such as locating power lines) would require section 7 consultations if they were to lie within any part of a CHU.

The economic impacts to the county, region, and nation attributable to establishing CHU boundaries in Nevada are economically insignificant.

D. California

Seven proposed CHUs lie entirely within California, and one lies partially in Nevada (Piute-Eldorado). The eight units cover about 4.75 million acres, roughly 74% of the total proposed critical habitat for all four states.

About 75% of the proposed acreage lies within San Bernardino County, the largest county in California and the U.S. Most of the remaining acreage is in Riverside County. Together, these two counties account for over 90% of all CHU acreage in California. Imperial County, the southernmost county in California, has about 7% of the proposed critical habitat, with the remaining 112,000 acres divided between Kern and Los Angeles Counties. Acreages by county are: San Bernardino, 3,557,500 acres (74.8%); Riverside, 744,200 acres (15.6%); Imperial, 341,800 acres (7.2%); Kern, 75,600 acres (1.6%); and Los Angeles, 36,200 acres (0.8%).

Household earnings for San Bernardino, Riverside, and Imperial Counties totaled \$47.0 billion in 1991 (Table 15).

The proposed **Fremont-Kramer CHU** covers about 518,000 acres and is the only CHU with land in Kern or Los Angeles Counties. About 36,000 acres are in Los Angeles County's northeast corner, including 12,160 uninhabited acres in the southern end of Edwards Air Force Base. Private lands in the

CHU in Los Angeles County total 22,400 acres, including a few dozen homes northeast of unincorporated Hi Vista. The remaining Fremont-Kramer CHU acreage (over 406,200 acres) is in San Bernardino County.

No cities or towns lie within this area, but a few residents live on private lands. The nearest cities are Barstow and Victorville (January 1, 1993, populations of 22,350 and 53,700, respectively) which are 10 to 25 miles east and about 10 miles southeast of the habitat, respectively. The acreage in the proposed CHU has little commercial development, and most of the economic base is many miles away.

The Johannesburg area and mines are specifically excluded from the proposed CHU, although surrounded by it. U.S. Bureau of Mines data indicate that six of the 136 mines and prospects in this general area may be affected by proposed CHU boundaries. Three of the six mines have had a limited amount of gold, silver, or tungsten extracted in the past (i.e., less than 10,000 troy ounces). More than 10,000 ounces were extracted from one gold mine, but the last production was over 50 years ago; two are active material sales pits. Over 95% of these mines are excluded from the proposed CHU boundaries.

Two active material sale pits (flagstone, off Mojave Road in Kern County) are above 3,700 feet in elevation. Though there may be few desert tortoises in the immediate vicinity, mineral material sales and/or removal from those sites would be limited to expansion of already disturbed areas (subject to BLM discretion). The U.S. Bureau of Mines (1992) noted that "exceptions would be made to accommodate local emergency situations such as flash floods (but) mineral leasing applications requiring surface occupancy or impacts within the plan area would be rejected." The report further acknowledges that "all mineral related projects would require the BLM to consult with the Service. Full mitigation and/or compensation to threatened species populations and habitat throughout the management area would be required." Designation of critical habitat would thus appear to have no direct impact on mines currently operating on federal lands in California.

Fremont-Kramer CHU also includes the very southwestern corner of the Randsburg KGRA; if competitive lease sales were to be held, a "no surface occupancy" stipulation could govern those three or four sections of land. The heart of the KGRA is not within the proposed CHU, and it could be leased in the future. Given the small CHU area in Kern County's southeast

Table 15. *Earnings in San Bernardino, Riverside, and Imperial Counties, 1991 by sector.*

Industry	San Bernardino (\$000)	Share (%)	Riverside (\$000)	Share (%)	Imperial (\$000)	Share (%)
Agriculture	\$ 196,541	0.8	\$ 194,360	0.9	\$ 271,707	16.8
Mining	27,558	0.1	34,112	0.2	29,267	1.8
Construction	949,495	4.0	1,056,289	4.9	52,375	3.2
Manufacturing	1,716,212	7.2	1,154,585	5.3	39,875	2.5
Transportation	1,035,496	4.4	471,077	2.2	43,167	2.7
Wholesale	659,608	2.8	376,041	1.7	57,471	3.6
Retail	1,708,967	7.2	1,306,484	6.0	122,482	7.6
F.I.R.E.	549,721	2.3	455,220	2.1	24,561	1.5
Services	3,352,267	14.1	2,746,688	12.6	169,959	10.5
Government	3,172,409	13.4	2,134,641	9.8	305,982	19.0
Other	<u>10,366,560</u>	<u>43.7</u>	<u>11,801,454</u>	<u>54.3</u>	<u>497,502</u>	<u>30.8</u>
TOTAL	\$23,734,834	100%	\$21,730,951	100%	\$1,614,348	100%

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (1993).

corner, no significant economic impacts are expected. The BLM confirmed that there are no cattle allotments in this area (U.S. Bureau of Land Management-California, personal communication 1993).

The proposed **Superior-Cronese CHU** encompasses about 766,900 acres in San Bernardino County, about 16% of all proposed California acreage. The CHU is in west-central San Bernardino County, and is adjacent to Fremont-Kramer CHU. About 17% of the acreage within this proposed CHU is administered by the Department of Defense, BLM lands constitute over 52%, private lands total 29%, and 2% are owned by the state of California. The CHU includes about 89,600 acres of the southern end of the China Lake Naval Weapons Center and about 37,400 acres of the extreme southern portion of the Fort Irwin Military Reservation.

The BLM cites high potential for some locatable minerals (e.g., perlite) in a few sections in the western part of Superior-Cronese CHU, although almost no mineral extraction is currently underway (U.S. Bureau of Land Management-California Desert District, personal communication 1993). Some limestone/dolomite mining (Pleuss-Stauffer) has occurred in the past near the Alvord Mountains. Additional surface disturbances would be subject to section 7 consultation. Future surface disturbances, utility corridors, and subsurface mining activities would be subject to section 7 consultations.

The BLM previously has prohibited sheep grazing in most of the proposed CHUs, but there are currently four relatively small cattle allotments. Grazing for all proposed CHUs in California is discussed below. ORVs are restricted to designated and existing routes.

The proposed **Ord-Rodman CHU** includes about 253,700 acres (roughly 5% of all proposed California acreage), entirely within San Bernardino County. This CHU is located southeast of Barstow, and extends about 30 miles east-west and 15 miles north-south. Over two-thirds of the land is managed by the BLM, private lands comprise 29%, and the State of California owns about 2%. The Department of Defense manages about 500 acres in the CHU in the northwest corner of Twentynine Palms Marine Corps Base.

Limited mining for locatable and leasable minerals has occurred in the past, and the current BLM plan has identified the Ord Mountains as having potential for copper and molybdenum (U.S. Bureau of Land Management, California Desert District, personal communication 1993).

Neither is a critical or strategic mineral. There are no KGSs or KGRAs located within the proposed habitat.

One utility corridor runs through the Ord Mountains, and the Mojave Pipeline traverses the northwestern part of the area. Any expansion of these uses would be subject to section 7 consultations. Surface management agencies may incur added costs as a result of being required to sign and post some areas. ORV use is limited to designated and existing routes on all BLM lands in this region.

The proposed Ivanpah CHU lies largely within the East Mojave National Scenic Area, abutting the California-Nevada border and entirely in San Bernardino County. The proposed CHU area totals 632,400 acres, of which 93% is managed by the BLM. The remainder is state (4%) and private (about 3%) land. The unit lies about 20 miles east of Baker and on both sides of Interstate 15. There are no permanent residents within the proposed CHU boundaries.

The majority of the Ivanpah CHU is managed by the BLM as category 1 tortoise habitat. Mining occurs in the mountains outside this unit. The BLM's California Desert District Office noted that "some or all of this will likely be designated wilderness in the near future and an East Mojave National Park could soon overlay much of the area" (personal communication 1993).

Several mines lie near or within Ivanpah CHU. Most mines lie outside CHU boundaries (e.g., Castle Mountain, Colosseum, Rose, Hart, and Huntington mines); others lie within the proposed boundaries (e.g., Morning Star gold mine, Aiken cinder mine). According to the U.S. Bureau of Mines (1990), six mines were producing in the East Mojave National Scenic Area. More recent information shows that four mines remain operational, and only one of those is within the proposed CHU (U.S. Fish and Wildlife Service-Portland, personal communication 1993). Any surface expansion for existing mines would be subject to section 7 consultations, while ongoing subsurface operations within any given CHU would not be adversely affected. Vehicular use has been restricted to designated routes. Expansion of OHV routes will be assessed through section 7 consultation.

The proposed Piute-Eldorado CHU includes approximately 453,800 acres in California, entirely within San Bernardino County. The unit lies north of Interstate 40, and its eastern boundary extends into Nevada to the Arizona border. The CHU is about 23 miles west of Laughlin, Nevada.

There are no permanent residents living within the proposed CHU boundaries. The lands are primarily federal (73%), with the remainder being either private (23%) or State of California (4%) land.

The BLM lands in Piute-Eldorado CHU are managed almost entirely as category 1 habitat, and there are three wilderness study areas in this region. All ORV activity is restricted to designated routes. This CHU contains access routes for power line corridors, and many old mines are located in the unit. Section 7 consultation would be required before any new surface disturbance could be permitted for resuming operations.

The proposed Chemehuevi CHU is the second largest in size (937,400 acres) and is entirely in San Bernardino County. The CHU lies south of Interstate 40 and west of the Colorado River. About 80% the CHU is managed by the BLM, with the remainder in a checkerboard pattern of private (about 17%) and State of California (about 4%) lands.

Chemehuevi CHU includes a 1,000-acre area (about 0.11% of Chemehuevi CHU area) in Ward Valley, San Bernardino County, which is proposed for a 78-acre disposal site for low-level radioactive waste materials.⁷ The California State Lands Commission application for the Ward Valley site was a result of requirements mandated by the Low-level Radioactive Waste Policy Act of 1980 to develop a facility for a 30-year period. California is a member state of the Southwestern Radioactive Waste Disposal Compact Consent Act.

Consistent with section 7 of the Act, a Biological Opinion issued by the Service to the BLM stated that direct impacts from the 78-acre site likely would not jeopardize the continued existence of the desert tortoise, but it further stated that "the Service opposes the siting of this facility in an area that has been identified by Service, Department, and Bureau biologists as important to this species' future management and recovery" (U.S. Fish and Wildlife Service 1990).

On May 7, 1993, the Secretary stipulated that he would rescind several specific actions of his predecessor related to the transfer of the Ward Valley site, which was within the proposed CHU. The U.S. District Court issued a Memorandum and Order (dated July 14, 1993) that, because critical habitat had not yet been finalized, "the court, in its

⁷"Low-level radioactive waste" is a term describing protective clothing, machinery, etc., that has been contaminated by radioactivity. It excludes high level waste such as spent fuel rods and other highly radioactive materials.

discretion, declines to declare whether the Biological Opinion issued by the Service in November 1990 was valid as a matter of law or whether the Service may consider economic developments subsequent to April 2, 1990 as it proceeds to designate critical habitat for the Mojave population of the Desert Tortoise."⁸

Consistent with the Federal District Court decision, the administrative process is ongoing. On August 11, 1993, Interior Secretary Bruce Babbitt rescinded the previous Secretary's decision to transfer the Ward Valley proposed dump site acreage until the State of California conducts studies and formal hearings on the project. This action could result in changes in the road, sump, and pit locations, and may alter surface disturbances in proposed CHUs.

The proposed Ward Valley LLRW site was included in the final boundaries of Chemehuevi CHU. This decision is discussed in the Exclusion Report (Appendix VIII).

Chemehuevi CHU has had little mining in the past, but has some potential for oil and gas development. There are no KGSs or KGRAs in this CHU. Section 7 consultations would be required prior to new surface use and expansion, but this does not imply adverse economic impacts due to final CHU boundaries.

All vehicular use on Chemehuevi CHU is limited to designated routes. There are 10 wilderness study areas, three of which the BLM already has recommended for wilderness designation. Harvest of Mojave yucca stalks for ornamental and cosmetic purposes has occurred legally on private lands and illegally on public lands (U.S. Bureau of Land Management-California, personal communication 1993).

The proposed Pinto Mountains CHU is the smallest of the California units, totaling 171,800 acres. The CHU lies primarily north of the Joshua Tree National Monument, with about 62% of the area in San Bernardino County and 38% in Riverside County. Few people permanently reside within this CHU. The nearest towns are Twentynine Palms and Yucca Valley (with populations of 13,100 and 17,900, respectively, on January 1, 1993).

The proposed Chuckwalla CHU is the largest in size of all units, totaling 1,021,200 acres, and is situated in Riverside (66%) and Imperial

⁸Memorandum and Order, U.S. District Court, Northern District of California, July 14, 1993, re: Desert Tortoise et al. vs. Babbitt, as Secretary of the Interior, et al.

(34%) Counties. Military land (nearly 50,000 acres) includes the Chocolate Mountain Aerial Gunnery Range, a live bombing and target range on the western side of the unit. Chuckwalla CHU lies south of Interstate 10 and directly east of the Salton Sea and Coachella Canal. Very few individuals permanently reside within the proposed CHU.

Several established and maintained trails run throughout the area, and there are several campgrounds. While any trail expansion would require consultation with the Service, there should be no economic impacts attributable to designation of CHUs.

D.1. California livestock grazing

According to the BLM, 13 different allotments would be affected totally or partially by the presently proposed CHU boundaries (U.S. Bureau of Land Management-California Desert District, personal communication 1993). Grazing already has been restricted in terms of allowed AUMs, use, and location in category 1 and 2 habitat. In the hypothetical case where the BLM terminated these allotments, grazing fee collection would be reduced by \$95,210 annually, an insignificant amount to the national economy.

An estimated 100 jobs would be lost in California due to critical habitat designation (see Table 16). This includes 80 direct ranching jobs and 20 indirect jobs in other industries. The maximum total job loss represents an insignificant proportion of the 1,031,900 workers in the four counties in 1990. Normally, over 90% of displaced workers would again find jobs within one year, with most of the remainder finding work during the second year (Mead et al. 1991).

Following the methodology of Rice et al. (1978), the estimated reduced earnings (1993 dollars) of local ranch operations attributable to habitat designation would be \$2.52 million in San Bernardino, Riverside, and Imperial Counties, primarily in the first two; this is the estimated permanent effect of reduced earnings, capitalized at 10% over 50 years. This amount is insignificant to the combined economies of the three counties.⁹

⁹This deliberately omits both Kern and Los Angeles Counties from the estimate of aggregate economic impacts. These counties have less than 2.5% of the proposed CHU acreage, with much of that land having no residents or economic base and under the control of the U.S. military.

Additional incremental costs would result if the BLM is required to provide reimbursement for non-movable range improvement items; such reimbursable improvements may total \$208,500.

E. Summary of Economic Effects

The economic consequences of reduced cattle grazing on federal lands to establish the proposed critical habitat units includes three effects. Ranch profits in the seven counties are estimated to fall by \$4,470,000 [per methodology of Rice et al. (1978)]; this is the estimated permanent effect of reduced earnings, capitalized at 10% over 50 years. The federal government will compensate allottees in the four states with a one-time payment estimated at \$376,000 for the loss of permanent improvements to grazing lands (pending BLM administrative decisions of partially affected allotments). Discontinuing grazing leases will result in a \$170,000 annual reduction in collected grazing fees that are divided among range improvements, the Federal Treasury, and local governments. The \$170,000 is not a "net" reduction in that it does not include the reduced costs of grazing program administration.

Current data indicate there should be no more than 425 total jobs lost in the seven counties due to designation of critical habitat (Table 16). These losses include 340 direct ranching jobs and 85 indirect jobs in other industries, which together represent less than 0.03% of the 1,535,100 employees in the seven-county region in 1990. Employment losses can not be allocated precisely between the counties until the BLM decides on how to handle partially affected grazing permits. The aggregate job loss will be reduced if affected permits are replaced by nonaffected lands (federal or private), or if those laborers transfer to jobs on unaffected ranch lands. These estimated employment losses will not be permanent for most laborers, it is anticipated that over 90% of displaced workers would again find jobs within one year, with most of the remainder finding work during the second year (Mead et al. 1991).

Given present data it is not possible to calculate any precise net gain or loss to the Treasury, since the receipt of grazing fees by the BLM generally is less than the direct cost to administer their grazing program (U.S. Bureau of Land Management 1991). It is possible that there will be a net savings to the U.S. Treasury as a result of limiting the below-cost grazing allotment leases.

Table 16. *Regional employment effects of critical habitat designation.*

State	Direct employment loss	Employment multiplier	Total employment loss	Total employees
Arizona	35 - 60	1.21	40 - 75	36,600
California	40 - 80	1.25	50 - 100	1,031,900
Nevada	45 - 120	1.14	50 - 135	446,800
Utah	<u>40 - 80</u>	1.44	<u>55 - 115</u>	<u>19,800</u>
TOTAL	160 - 340	1.26	195 - 425	1,535,100

Source: Estimated direct losses supplied by BLM offices in affected areas. Employment multipliers estimated by IMPLAN.

The Service has approved a short-term HCP for Clark County, Nevada (RECON 1991). The HCP identifies guidelines for both property development and conservation that allow for urban growth while providing sufficient tortoise preservation measures. The county's plan was developed prior to designation of critical habitat and its effects are therefore attributable to the jeopardy standard (from listing) and not adverse modification which is the topic of this study. Washington County, Utah, also is developing an HCP, although it has yet to be approved by the Service. No other development projects were identified by federal agencies that may be affected by habitat designation. Thus, there are no other known areas within the seven counties where current property development may be affected by critical habitat designation, nor are there other HCPs known to be in process. The identifiable economic effects of habitat designation on property development are insignificant.

V. Payments to Counties

Potential revenue loss to the counties examined in this report as local consequence of earning on existing federal leases and/or permits is

not precisely calculable due to several factors, including (but not limited to):

- The aggregate number of section 15 leases for grazing which have been issued, and from which a 50% revenue-sharing basis exists, as opposed to section 3 permits which carry a basis of 12.5% revenue sharing with the affected county.
- The final administrative decision by the BLM (as the surface management agency) to partly or completely terminate certain permits/leases for grazing (predicated upon their location, existing ingress/egress to other lands, etc).
- The percentage mixture of the above two types of permits issued by the BLM and their attendant fee structure.

While it is known that certain grazing fees in each of the counties will be reduced and/or foregone, it is not possible to accurately estimate the dollar impact on the specific county level until the BLM has concluded their administrative decision process.

VI. Long-term Effects of Critical Habitat Designation

The analysis for this report has been based primarily on data which are both current and calculable. Long-term economic impacts, especially on a county level basis, explicitly have not been addressed. For example, while there may be a very low level of temporary unemployment of those laborers on any given federal allottee's lease/permit, it is normally anticipated that those workers will be reemployed within two years or be shifted to other private ranch lands in the short-term.

A given county's receipt of grazing fees will be based on final administrative decisions by the surface managing agencies on the number of issued/reissued permits, and their percentage revenue sharing base (cited above).

Mining may be impacted over the long term, and only if surface expansion is explicitly limited to avoid adverse modification to critical habitat. If such limitations do occur, they would also be predicated on governmental administrative decision at that time (by the BLM, military,

tribal counsels), but would reasonably be expected to be minimal both in percent and dollar-level impacts.

VII. Benefits of Critical Habitat Designation

Society stands to gain a wide array of benefits from designating critical habitat for the desert tortoise. Biodiversity of the region will be preserved, the value of some recreation opportunities may be increased, and intrinsic benefits from ensuring future environmental quality may be gained. These benefits are not goods exchanged in typical markets; therefore, determining their values and comparing benefits to the costs of preservation present unusual challenges. Any comparison naturally favors the more readily quantified half of the equation: costs of preservation. This disparity is exacerbated with the desert tortoise because data are not available at this time to estimate specifically the dollar value of benefits from preserving its habitat. Examples of works that provide correlative information are provided below.

Two bodies of research offer evidence of benefits that may apply to the tortoise. Numerous studies have estimated benefits gained from preserving rare or endangered species including: whooping cranes (Stoll and Johnson 1984), bald eagles and striped shiners (Boyle and Bishop 1987), desert bighorn sheep (King et al. 1987), and threatened and endangered species in Colorado (Walsh et al. 1987). Other empirical research offers evidence of nonmarket benefits gained from preserving components of ecological systems, including: preventing forests from being developed (Walsh et al. 1984), preserving air quality in parklands in the Southwest (Schulze et al. 1983), and protecting spotted owls and old-growth forests in the Pacific Northwest (Hagen et al. 1992). Though the latter studies involve several geographic regions, they offer insights on benefits of preserving whole ecosystems. Of particular interest for this report are benefits of preserving unique habitats like the hot desert ecosystem of the American Southwest.

A second challenge in endangered species benefit-cost analysis is the spatial disparity between distribution of benefits and costs. Benefits tend to be small locally but very large on national and global scales. Costs follow an opposite trend; they are most significant locally but they diminish rapidly in significance on a global scale (Wells 1992). In species preservation, the benefits accruing to society may not be

immediately evident. Costs, in contrast, attract notice because they are incurred in a concentrated area through lost employment, foregone development, or other constraints. To properly compare benefits and costs, the full range of each must be considered.

A. Biodiversity Benefits

Designation of critical habitat for the desert tortoise will contribute to the biotic diversity of the Mojave and Colorado Deserts. Tortoise habitat includes components that benefit a variety of other desert species; designation will be beneficial by retaining the original characteristics of their ecosystem. Grazing, mining, and ORV use are of particular concern in land management for desert tortoise recovery and negatively affect the habitat of other desert species.

Reducing or eliminating activities that may adversely modify the natural ecology of the region may benefit the desert tortoise and other native animal and plant species. Management practices that adequately protect the desert ecosystem may reduce threats to other rare, threatened, or declining species. The Mojave Desert region is home to 70 federally and state listed species and candidates for listing (Appendix VII). Reduced development and limited off-road access will lessen negative effects such as trash dumping, vegetation removal, erosion, and soil compaction. Return to predisturbance plant cover will help reduce stream siltation and benefit rare aquatic species of the region. Protection of desert tortoise habitat thereby may reduce the need for future protection of other rare species.

The activities of greatest concern are those causing soil disturbances or compaction. Disturbed desert soils are more susceptible to wind and water erosion, organic matter may deteriorate more rapidly, seed germination is suppressed, and the environment becomes less hospitable for plants and animals (Dregne 1983). Further damage may be caused by plants being crushed by vehicles or riparian habitat being disturbed so it is no longer suitable for native species (Bury 1980; Lathrop 1983; U.S. General Accounting Office 1991). Undisturbed soil surfaces improve native flora, providing benefits of forage and cover for indigenous terrestrial species (Bury 1980). Reduced erosion, runoff, and watercourse travel by ORVs will improve habitat for aquatic species (Bury 1980).

Degradation of riparian areas and desert washes alters the landscape and reduces populations of native plants and animals (Bury and Luckenbach 1986; U.S. General Accounting Office 1991). The Desert Tortoise Recovery Team has proposed reductions in grazing and ORV activity in CHUs in an effort to allow recovery of the fragile desert ecosystem. Future mining activity would be evaluated through section 7 consultations on a case-by-case basis.

The possibility exists that activities now occurring in CHUs that are detrimental to indigenous species may relocate from the proposed CHUs onto other desert lands. This may prove harmful to species outside CHUs and require future restrictions or preservation measures. Establishing a larger area that encompasses a wider range of biotic features as a preserve, park, or monument -- as is currently under consideration in the eastern Mojave Desert in California -- may adequately address this issue.

B. Recreation Use Benefits

Nonconsumptive recreation uses of the desert tortoise, such as viewing and photography, are limited by the species' behavioral tendencies and relatively dispersed population. Recreation uses of CHUs after designation may include increased enjoyment of a more pristine native desert environment and improved opportunities for hiking, photography, birding, and similar nonconsumptive uses. Other recreation uses may include viewing or reading articles about the desert tortoise, other desert species, or the desert ecosystem that benefit from critical habitat designation.

Collection of tortoises for pets and release of former captive tortoises have been banned by the states for several years and are prohibited actions under the Act. These steps were taken to prevent jeopardy to the species through disease transmission and to maintain genetic integrity of wild populations, and they are not relevant in the incremental analysis of critical habitat designation.

Some recreation activities may be relocated or restricted due to habitat designation, particularly ORV use. Most ORV races that occurred on category 1 and 2 desert tortoise habitat in the seven-county region were relocated or discontinued, a decision made by the BLM prior to discussion of critical habitat and therefore not relevant in this analysis. The Desert Tortoise Recovery Plan proposes eliminating

organized ORV events in Piute-Eldorado CHU and restricting travel to designated roadways in all CHUs without present travel constraints. Resolving whether these restrictions will yield a net gain or loss of recreation-use benefits would require additional specific study and is beyond the scope of this analysis.

Empirical studies provide evidence of recreation value from species preservation. Stoll and Johnson (1984) found that survey participants were willing to pay \$4.47 per year for a permit to visit Aransas National Wildlife Refuge, winter home to migratory whooping cranes. Even if no cranes were present, respondents were willing to pay \$3.07 annually for the permit. The authors contend the cranes represent about \$1.40 of the annual permit value, while the remainder of the permit value is attributable to the preserve itself.

The net change in recreation use benefits is of interest in this analysis. That is, what is the change in recreation benefits from decreased ORV use relative to increased benefits in other forms of recreation? The gain or loss of benefits is indeterminable with the information available at this time. Net recreation benefits may or may not increase with the establishment of CHUs.

C. Intrinsic Values

The public places value on knowing that natural environments and wildlife are protected and will exist in the future. Benefits reside in the assured presence (existence value), availability for future use (option value), and ability to preserve the resource for future generations (bequest value). That these values exist and are substantial have been confirmed in numerous studies (Krutilla 1967; Brookshire et al. 1983; Walsh et al. 1987).

Designating critical habitat for the desert tortoise will maximize existence, option, and bequest values. Intrinsic benefits from the preservation of wildlife may represent a substantial portion of total benefits gained. Walsh et al. (1987) studied the benefits of wildlife preservation in Colorado. The authors concluded that recreation uses represented 30% of total benefits of wildlife protection; and 70% of total benefits was due to option, existence, and bequest values. Loomis (1991) found intrinsic values comprised nearly 95% of the public's willingness to

pay to preserve water conditions for wildlife purposes at Mono Lake, California. Recreation uses comprised the remaining 5%.

D. Summary of Benefits

The total benefit to society of desert tortoise preservation includes several components. Biodiversity in the Mojave and Colorado Deserts will be sustained, recreation value may increase, and intrinsic gains will be realized. The total value of social benefits of species preservation has been shown to be substantial in a variety of studies.

Dividing the sum of benefits between the various parts by which gains are generated is a delicate task. If preservation of a species is accomplished wholly through designating critical habitat, then the full value of benefits could be attributed to that action. Typically, however, preservation is attained through a set of interactive management actions, each of which is essential to success and no one of which can be singled out as the sole means by which a species is preserved (Walsh 1992). Given the information at hand, and without better understanding the network of consequences from management alternatives, it is not possible to disaggregate the sum of benefits to identify that portion directly attributable to critical habitat designation.

VIII. Acknowledgments

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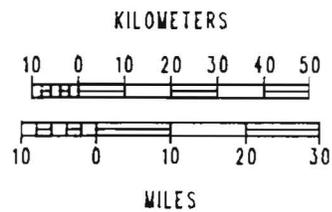
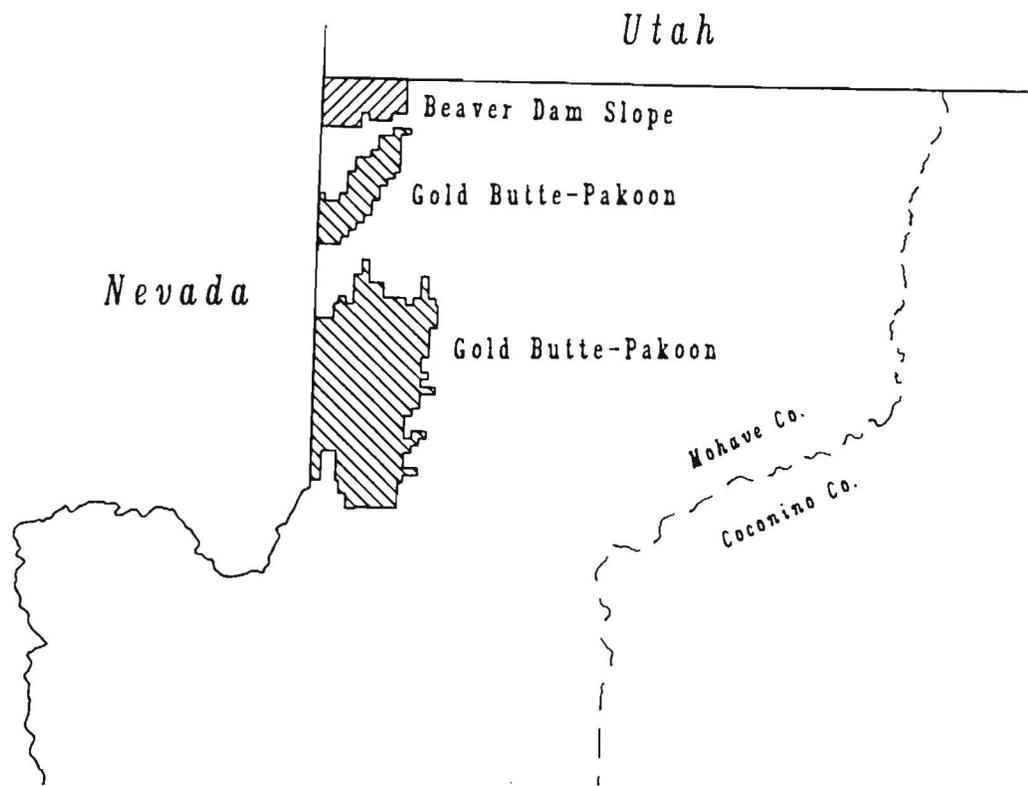
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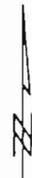
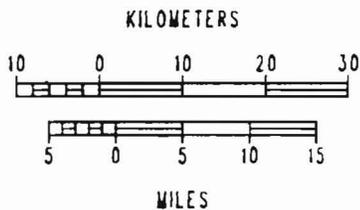
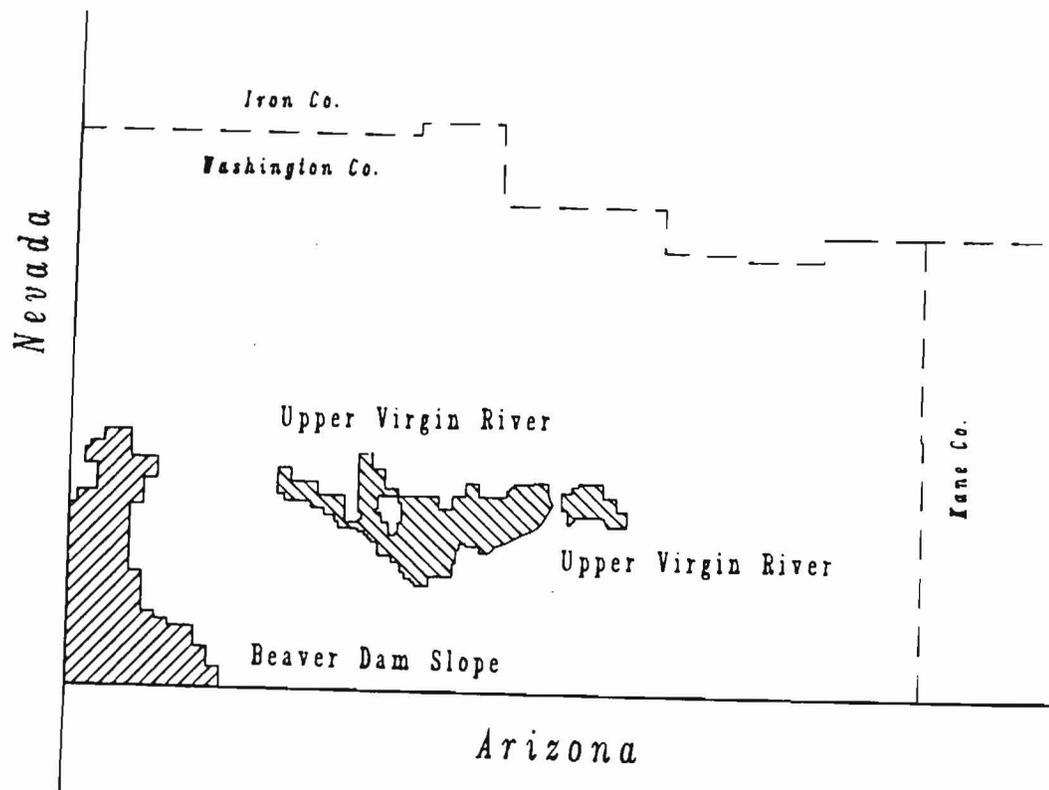
Appendix I. Surface acreage ownership of critical habitat units (1993 data).

State	Critical habitat unit	Federal					Tribal	State	Private	Total
		BLM	Military	National Park Service	Fish and Wildlife Service					
California	Chemehuevi	746,708	0	0	0	0	34,016	156,641	937,365	
	Chuckwalla	662,471	49,552	652	0	0	32,631	275,940	1,021,247	
	Fremont-Kramer	259,455	65,437	0	0	0	435	192,678	518,005	
	Ivanpah	591,089	0	0	0	0	22,379	18,911	632,379	
	Pinto Mountains	159,391	0	137	0	0	8,977	3,322	171,827	
	Ord-Rodman	175,713	515	0	0	0	3,885	73,613	253,726	
	Piute-Eldorado	329,937	0	0	0	0	18,238	105,628	453,803	
	Superior-Cronese	<u>402,605</u>	<u>127,210</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>12,340</u>	<u>224,777</u>	<u>766,932</u>	
Subtotal		3,327,369	242,714	789	0	0	132,900	1,051,510	4,755,284	
Nevada	Beaver Dam Slope	87,003	0	0	0	0	0	429	87,432	
	Gold Butte-Pakoon	189,473	0	2,017	0	0	0	805	192,322	
	Mormon Mesa	396,984	0	0	2	0	0	30,908	427,894	
	Piute-Eldorado	<u>411,549</u>	<u>0</u>	<u>101,609</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3,620</u>	<u>516,858</u>	
Subtotal		1,085,009	0	103,626	2	0	0	35,762	1,224,506	
Utah	Beaver Dam Slope	63,641	0	0	0	0	8,695	2,120	74,456	
	Upper Virgin River	<u>25,728</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1,629</u>	<u>18,858</u>	<u>8,388</u>	<u>54,603</u>	
Subtotal		89,369	0	0	0	1,629	27,553	10,508	129,059	
Arizona	Beaver Dam Slope	39,147	0	0	0	0	3,420	158	42,725	
	Gold Butte-Pakoon	<u>249,801</u>	<u>0</u>	<u>43,589</u>	<u>0</u>	<u>0</u>	<u>2,254</u>	<u>478</u>	<u>296,122</u>	
Subtotal		<u>288,948</u>	<u>0</u>	<u>43,589</u>	<u>0</u>	<u>0</u>	<u>5,674</u>	<u>636</u>	<u>338,847</u>	
TOTAL		4,790,695	242,714	148,004	2	1,629	166,129	1,098,417	6,447,697	

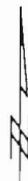
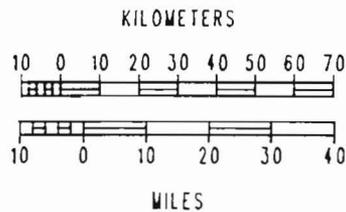
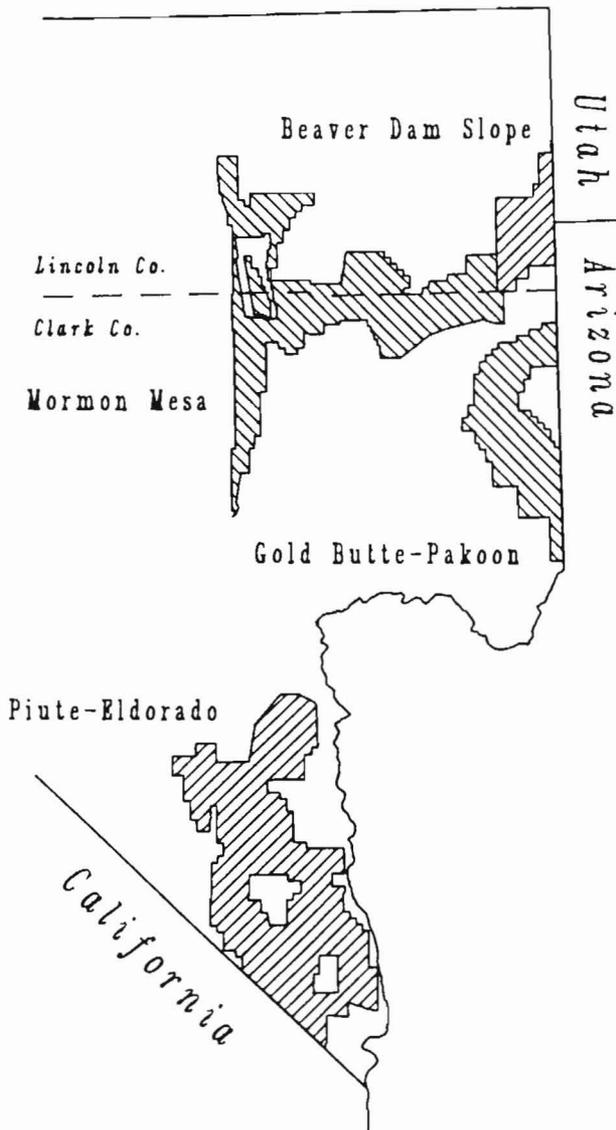
General Configuration of Critical Habitat Units (CHU's) in Arizona



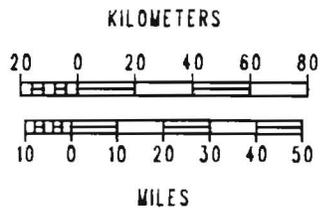
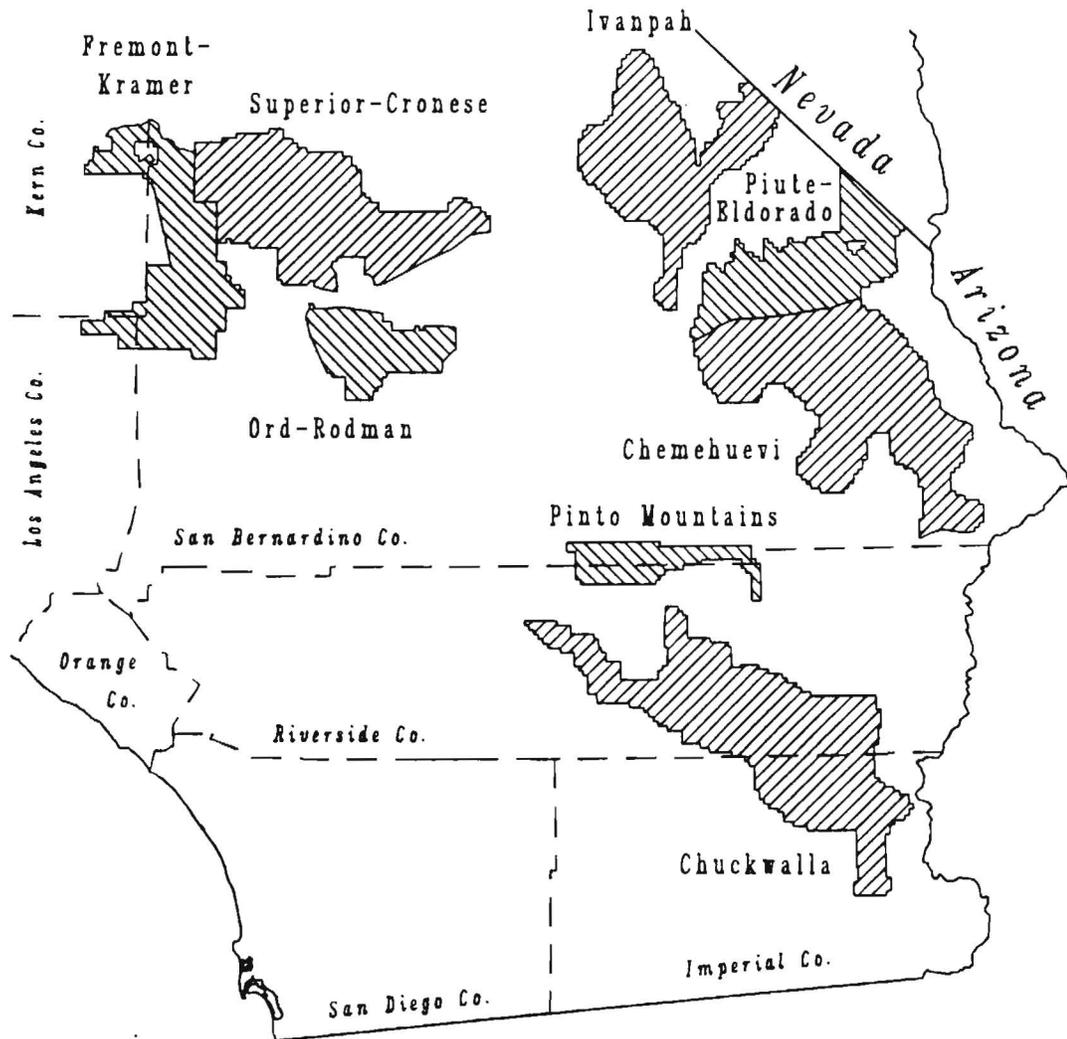
General Configuration of Critical Habitat Units (CHU's) in Utah



General Configuration of Critical Habitat Units (CHU's) in Nevada



General Configuration of Critical Habitat Units (CHU's) in California



Appendix II. *Areas affected by proposed critical habitat units.
Counties included in proposed critical habitat designation*

<u>Arizona</u>	<u>California</u>
Mohave	Imperial
	Kern
<u>Nevada</u>	Los Angeles
Clark	Riverside
Lincoln	San Bernardino
	<u>Utah</u>
	Washington

*Department of Defense installations affected by
critical habitat designation*

Installation	State	Critical habitat unit
China Lake Naval Weapons Center	California	Superior-Cronese
Chocolate Mountains Gunnery Range	California	Chuckwalla
Edwards Air Force Base	California	Fremont-Kramer
Fort Irwin	California	Superior-Cronese
Twentynine Palms Marine Corps Base	California	Ord-Rodman

Appendix III. *Agencies contacted regarding estimating economic impacts of critical habitat designation.*

Department of Defense

Army Corps of Engineers

Los Angeles, California

Sacramento, California

Bolling Air Force Base, Washington, D.C.

China Lake Naval Air Weapons Station, California

Edwards Air Force Base, California

Fort Irwin, California

Naval Facilities Engineering Command, San Diego, California

Nellis Air Force Base, Nevada

Twentynine Palms Marine Corps Combat Center, California

Department of Energy

Environmental Protection Division, Las Vegas, Nevada

Department of the Interior

Bureau of Land Management

Phoenix, Arizona

Riverside, California

Sacramento, California

Reno, Nevada

Cedar City, Utah

Las Vegas, Nevada

St. George, Utah

Salt Lake City, Utah

Bureau of Reclamation, Boulder City, Nevada

National Park Service

Joshua Tree National Monument

Lake Mead National Recreation Area

Regional Supervisor, San Francisco, California

Zion National Park

Department of Transportation

Federal Highway Administration

Phoenix, Arizona

Carson City, Nevada

Appendix IV. *Section 7 consultations currently in progress.*

California

Ongoing Section 7 consultations within proposed critical habitat

1-8-93-F-19	Marine Corps logistics base operations and maintenance, Barstow
1-8-93-F-13	Cajon pipeline construction and maintenance
1-8-93-F-23	Edwards Air Force Base installation and restoration program OU-4
1-8-93-F-17	Fort Irwin expansion
1-8-93-F-11	Pilot Knob cattle grazing allotment

Completed biological opinions for projects in proposed critical habitat

1-8-93-F-12	AT&T fiber optic line
1-8-92-F-60	Naval air warfare station management plan
1-8-92-F-58	Oil and gas leases in Ivanpah Valley
1-6-92-F-28	Small mining programmatic
1-6-92-F-19	Cattle grazing on 24 allotments
1-6-91-F-41	Fort Irwin programmatic
1-6-91-F-17	Rainbow Basin natural area management plan
1-6-90-F-54R	Rand Mountains/Fremont Valley management plan
1-6-90-F-46	Mead-McCullough transmission line
1-6-90-F-41	U.S. Ecology - Ward Valley
1-6-90-F-10	Land tenure adjustment program

Arizona

Completed biological opinions for projects within proposed critical habitat

2-21-91-F-337	Grazing on the Arizona strip
2-21-90-F-178	Mead to Phoenix transmission line
2-21-89-F-170	Hoover Dam bridge

Appendix IV. *Concluded.*

Utah

Ongoing Section 7 consultations within proposed critical habitat:

6-UT-90-F-002	Nine cattle grazing allotments in Washington County
6-UT-90-F-004	Castle Cliffs allotment grazing management plan
6-UT-92-F-006	Green Spring housing development, Washington City

Nevada

Ongoing Section 7 consultations within proposed critical habitat:

1-5-93-F-148	Nevada Department of Transportation material pit
1-5-93-F-209	Loran Station Road, searchlight
No number	Stateline resource management plan
No number	Eldorado Land Act sale

Completed biological opinions within proposed critical habitat:

1-5-93-F-85	Wyle laboratories facilities
1-5-93-F-91	Southwest intertie project
1-5-92-F-309	Programmatic Section 9 for races in Eldorado TMA
1-5-91-F-34	Brookline mine (NV-54-900-319; N54-90-13P)

Appendix V. *Economic sector descriptions.*

Agriculture includes traditional crop and livestock operations as well as horticulture and greenhouse businesses. The region includes 24 industries in the sector, the most important of which are dairies, landscape/horticulture, and agricultural services.

Mining includes metals, fluids, and natural gas extraction industries. Mining also includes raw materials for construction, such as sand, gravel, and stone. Of the 16 industries in this sector, the most significant are natural gas/crude petroleum, gold, and sand and gravel.

Construction includes residential, commercial, and infrastructure building, and three construction maintenance industries. The sector includes 10 industries, the most important of which are new residential construction, new industrial construction, and maintenance-other facilities.

Manufacturing includes the largest number and broadest spectrum of industries, ranging from food processing to fabric mills and from wood products to munitions manufacturing. The region contains 307 manufacturing industries. Defense, printing/publishing, and building materials are the sector's most important manufacturing industries.

Transportation, Utilities, Communication are referred to as an abbreviated "Transportation." Of the 14 industries in this sector, Motor Freight Transportation and Communications are the region's most significant.

Wholesale trade is a single-industry sector.

Retail trade combines nine retail industries, the largest of which are automotive sales, food stores, and restaurants.

F.I.R.E. is an acronym for Finance, Insurance, Real Estate. Real estate includes only property sales, not construction. Real estate and owner-occupied dwellings are the most important of the six industries in the region.

Services includes personal and business services, health care (four industries), and education (four non-government industries), among others. The most important of the sector's 47 industries are related to tourism/entertainment and health care.

Government and Specialized Services is a sector segmented into federal (military and non-military), state/local (education and non-education), and "Specialized Services," which refers to industries which do not fit other categories.

Appendix VI. *Recreational uses of BLM-managed lands. Recreation use (000 visitor hours), fiscal year 1990 data.*

State	Land Based Activities						Water Based Activities			Snow/ice Based Activities		Total
	Motor travel		Site based				Fishing	Boating	Other	Winter sports	Snow-mobiling	
	ORV	Other	Non-motor travel	Camping	Hunting	Other						
Arizona	662	107	2,570	48,282	2,306	9,883	938	5,553	2,175	300	--	72,77
California	45,308	47,965	23,604	59,216	10,682	31,941	5,158	3,785	3,034	2,927	84	233,70
Nevada	3,454	1,940	1,364	5,502	2,748	868	1,695	214	154	50	51	18,04
Utah	<u>4,060</u>	<u>13,349</u>	<u>5,247</u>	<u>13,145</u>	<u>4,773</u>	<u>2,965</u>	<u>3,061</u>	<u>2,261</u>	<u>76</u>	<u>48</u>	<u>46</u>	<u>49.03</u>
TOTAL	53,484	63,361	32,785	126,145	20,509	45,657	10,852	11,813	5,439	3,325	181	373,55
U.S. TOTAL	63,016	83,445	41,316	165,366	47,053	57,958	28,664	20,806	8,313	6,631	1,185	523,75

Source: U.S. Bureau of Land Management (1991).

Appendix VII. *Endangered and candidate species that may occur in the area of the proposed critical habitat units for the desert tortoise.*

Category/Common name	Scientific name
Arizona	
Listed:	
E Peregrine falcon	<i>Falco peregrinus anatum</i>
E Bald eagle	<i>Haliaeetus leucocephalus</i>
E Woundfin minnow ^a	<i>Plagopterus argentissimus</i>
E Virgin River roundtail chub ^a	<i>Gila robusta seminuda</i>
PE Southwestern willow flycatcher	<i>Empidonax trailii extimus</i>
Candidate:	
<u>Vertebrates</u>	
2 Merriam's kangaroo rat	<i>Dipodomys merriami frenatus</i>
2 Spotted bat	<i>Euderma maculata</i>
2 California leaf-nosed bat	<i>Macrotus californicus</i>
2 Ferruginous hawk	<i>Buteo regalis</i>
2 Lowland leopard frog	<i>Rana yavapaiensis</i>
2 Arizona southwestern toad	<i>Bufo microscaphus microscaphus</i>
2 Chuckwalla	<i>Sauromalus obesus</i>
2 Virgin spinedace ^a	<i>Lepidomeda mollispinis mollispinis</i>
<u>Invertebrates</u>	
2 Grand Wash springsnail	<i>Pyrgulopsis bacchus</i>
<u>Plants</u>	
2 Atwood wild buckwheat	<i>Eriogonum thompsonae var. atwoodii</i>
2 Paradox milk-vetch	<i>Astragalus holmgreniorum</i>
2 Desert rose	<i>Rosa stellata</i>
2 Roaring Spring prickly poppy	<i>Argemone arizonica</i>

Appendix VII. *Continued.*

Category/Common name	Scientific name
California	
Listed:	
E Desert pupfish ^a	<i>Cyprinodon macularius</i>
PE Coolgardie milk-vetch	<i>Astragalus jaegaranus</i>
PE Sodaville milk-vetch	<i>Astragalus lentiginosus</i> <i>var. sesquimetralis</i>
PE Triple-ribbed milk-vetch	<i>Astragalus tricarinatus</i>
Candidate:	
<u>Vertebrates</u>	
1 Flat-tailed horned lizard	<i>Phrynosoma mcallii</i>
2 Yuma puma	<i>Felis concolor brownii</i>
2 Mojave ground squirrel	<i>Spermophilus mohavensis</i>
2 California leaf-nosed bat	<i>Macrotus californicus</i>
2 Spotted bat	<i>Euderma maculatum</i>
2 Southwestern cave myotis (bat)	<i>Myotis velifer brevis</i>
2 Greater western mastiff bat	<i>Eumops perotis californicus</i>
2 Occult little brown bat	<i>Myotis lucifugus occultus</i>
2 Pacific western big-eared bat	<i>Plecotus townsendii townsendii</i>
2 Loggerhead shrike	<i>Lanius ludovicianus</i>
2 Chuckwalla	<i>Sauromalus obesus</i>
2 Barefoot gecko	<i>Coleonyx switaki</i> (= <i>Anarbylus s.</i>)
<u>Invertebrates</u>	
2 Cheese-weed moth lacewing	<i>Oliarces clara</i>
2 Eunus' skipper	<i>Pseudocopaeodes eunus eunus</i>
2 Mojave Desert blister beetle	<i>Lytta inseparata</i>

Appendix VII. *Continued.*

Category/Common name	Scientific name
<u>Plants</u>	
2 Orocopia sage	<i>Salvia penstemonoides</i>
2 Alverson's foxtail cactus	<i>Coryphantha vivipara</i> var. <i>alversonii</i>
2 Wiggin's cholla	<i>Opuntia wigginsii</i>
2 Mojave milk-vetch	<i>Astragalus mohavensis</i> var. <i>hemigyris</i>
2 Alkali mariposa	<i>Calochortus striatus</i>
2 No common name	<i>Escobaria vivipara</i> var. <i>alversonii</i>
2 Desert cymopterus	<i>Cymopterus deserticola</i>
2 Howe's hedgehog cactus	<i>Echinocereus engelmannii</i> var. <i>howeii</i>
2 Munz's hedgehog cactus	<i>Echinocereus engelmannii</i> var. <i>munzii</i>
2 Barstow woolly-sunflower	<i>Eriophyllum mohavense</i>
2 Little San Bernardino Mountains gilia	<i>Gilia maculata</i>
2 Mojave monkeyflower	<i>Mimulus mohavensis</i>
2 Robison's monardella	<i>Monardella robisonii</i>
2 Short-jointed beavertail cactus	<i>Opuntia basilaris</i> var. <i>brachyclada</i>
2 California ditaxis	<i>Ditaxis californica</i>
2 Hoffman's cactus	<i>Opuntia bigelovii</i> var. <i>hofmannii</i>

Nevada

Listed:

Vertebrates

E American peregrine falcon	<i>Falco peregrinus anatum</i>
E Bald eagle	<i>Haliaeetus leucocephalus</i>
E Bonytail chub ^a	<i>Gila elegans</i>
E Virgin River roundtail chub ^a	<i>Gila robusta seminuda</i>
E Moapa dace ^a	<i>Moapa coriacea</i>

Appendix VII. *Continued.*

Category/Common name	Scientific name
E Woundfin minnow ^a	<i>Plagopterus argentissimus</i>
E Razorback sucker ^a	<i>Xyrauchen texanus</i>
PE Southwestern willow flycatcher	<i>Empidonax trailii extimus</i>
<u>Candidate:</u>	
<u>Vertebrates</u>	
2 Spotted bat	<i>Euderma maculatum</i>
2 Black tern ^a	<i>Chlidonias niger</i>
2 Loggerhead shrike	<i>Lanius ludovicianus</i>
2 White-faced ibis ^a	<i>Plegadis chihi</i>
2 Western least bittern ^a	<i>Ixobrychus exilis herperis</i>
2 Chuckwalla	<i>Sauromalus obesus</i>
2 Meadow Valley Wash speckled dace ^a	<i>Rhinichthys osculus ssp.</i>
2 Moapa speckled dace ^a	<i>Rhinichthys osculus</i>
2 Virgin spinedace ^a	<i>Lepidomeda mollispinis mollispinis</i>
2 Moapa roundtail chub ^a	<i>Gila robusta ssp.</i>
2 Moapa White River springfish ^a	<i>Crenichthys baileyi moapa</i>
<u>Invertebrates</u>	
2 Moapa pebblesnail ^a	<i>Fluminicola avernalis</i>
2 MacNeil sooty wing skipper	<i>Hesperopsis graciaelae</i>
2 Moapa warm spring riffle beetle ^a	<i>Stenelmis calida moapa</i>
2 Grated tryonia	<i>Tryonia clathrata</i>

Appendix VII. *Continued.*

Category/Common name	Scientific name
<u>Plants</u>	
2 Desert poppy	<i>Arctomecon californica</i>
2 White bear desert poppy	<i>Arctomecon merriamii</i>
2 Spring Mountain milk-vetch	<i>Astragalus remotus</i>
2 Geyer milk-vetch	<i>Astragalus triquetrus</i> (= <i>A. geyeri</i> var. <i>triquetrus</i>)
2 Sticky buckwheat	<i>Eriogonum viscidulum</i>
2 Smooth pungent forsellesia	<i>Forsellesia pungens</i> var. <i>glabra</i>
2 No common name	<i>Penstemon bicolor</i> ssp. <i>bicolor</i>
2 No common name	<i>Penstemon bicolor</i> ssp. <i>roseus</i>
2 No common name	<i>Astragalus eurylobus</i> (= <i>A. tephrodes</i> var. <i>eurylobus</i>)
Utah	
Listed:	
E American peregrine falcon	<i>Falco peregrinus anatum</i>
E Virgin River chub ^a	<i>Gila robusta seminuda</i>
E Woundfin minnow ^a	<i>Plagopterus argentissimus</i>
PE Southwestern willow flycatcher	<i>Empidonax trailii extimus</i>
Candidate:	
<u>Vertebrates</u>	
2 Virgin River montane vole	<i>Microtus montanus rivularis</i>
2 Chuckwalla	<i>Sauromalus obesus</i>
2 Arizona southwestern toad	<i>Bufo microscaphus microscaphus</i>
2 Lowland leopard frog	<i>Rana yavapaiensis</i>
2 Flannelmouth sucker ^a	<i>Catostomus latipinnis</i>
2 Virgin spinedace	<i>Lepidomeda mollispinis mollispinis</i>

Appendix VII. *Concluded.*

Category/Common name	Scientific name
<u>Plants</u>	
2 Virgin River thistle	<i>Cirsium virginensis</i>
2 Shem milk-vetch	<i>Astragalus eremeticus</i>
P2 No common name	<i>Camissonia gouldii</i>

^aOccurs within the same watershed.

E = Taxa listed as endangered.

PE = Taxa proposed to be listed as endangered.

1 = Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

2 = Category 2: Taxa for which existing information may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

P2 = Taxa proposed as a Category 2.

APPENDIX VIII. *Exclusions from critical habitat designation.*

Section 4(b)(2) of the Endangered Species Act (Act) requires the designation of critical habitat for threatened and endangered species based on the best scientific data available. The Act requires analysis of economic and other relevant impacts of this designation, and consideration of the benefits and costs of critical habitat designation. The Act allows the Secretary of the Interior to exclude areas from critical habitat if the costs of designation outweigh the benefits, unless the exclusion would result in extinction of the species.

The U.S. Fish and Wildlife Service (Service) has proposed critical habitat for the desert tortoise; the economic effects of this proposal are examined in the main text of this report. The Service has considered requests for exclusions received during the public comment period; the decisions on those requests are summarized below.

Ranching and Grazing

The Service received requests for exclusion of federal grazing lands based on local economic effects. These federal grazing lands comprise a substantial portion of proposed critical habitat units (CHUs).

Biological Factors

The majority of proposed critical habitat considered necessary for recovery of the desert tortoise is currently grazed by livestock. Deleting such large blocks of habitat from critical habitat would increase fragmentation, reduce the potential for populations to reach and maintain viability, and eliminate the additional habitat protection provided by designation of critical habitat.

Economic Factors

Livestock grazing, while important to some rural areas, is not a significant economic activity when considered at the county, regional (seven counties), or national levels. The direct employment loss in the beef cattle industry due to the designation of critical habitat is estimated to be 160 to 340 jobs; total job losses (after applying the beef

Appendix VIII. *Continued.*

cattle employment multiplier) may range from 200 to 425 jobs (see Table 17). The estimated total employment loss is not a significant proportion of the region's 1,535,000 workers in 1990. Impacts to the beef cattle industry from designation of critical habitat are not significant to the economy of the seven-county region, or to the national economy.

Service Decision

Exclusion of federally owned land used for livestock grazing would remove millions of acres of designated critical habitat. The Service did not recommend exclusion of areas based on economic factors related to the livestock grazing industry. In addition, exclusion of these lands from designated critical habitat likely would result in the extinction of the desert tortoise.

Mining and Mineral Extraction

The Service received requests for exclusions of numerous active mines and mining claims. Most of the requests pertained either to active sites that are very small, or to claims that are not being developed currently.

Biological Factors

The Service acknowledges that active or previously disturbed mine sites typically do not provide suitable habitat for desert tortoises. Excluding every active mine site from critical habitat is impractical, however, in defining CHUs. Designation of critical habitat will not affect ongoing mining operations, though expansion of mining sites would require section 7 consultation to determine whether the expansion would destroy or adversely modify critical habitat. Those areas that do not contain primary constituent elements, such as currently operating mine sites, are not considered critical habitat.

Economic Factors

The Service does not anticipate disruption to current mining operations from designation of critical habitat. Mining claims provide rights to explore and develop mineral deposits, but do not, in and of themselves, ensure that deposits can be developed economically. Claims may never be developed if market conditions do not warrant, or if reserves do not prove economically profitable. The uncertainty involved in determining whether mining claims and their mineral reserves will actually reach the extraction phase precludes their exclusion from critical habitat for economic reasons.

Service Decision

Four areas containing active mines were removed from critical habitat for biological reasons. Three sections of land on the western border of Chuckwalla CHU that contained an active mine site were removed; this area was sufficiently large and located on the CHU border for easy exclusion. Two mines located in the eastern arm of Ord-Rodman CHU were excluded when the eastern boundary of the CHU was redefined. Approximately 13,000 acres in the Newberry Mountains in Paiute-Eldorado CHU containing an active mine site was removed based on lack of suitable tortoise habitat.

Recreation

The primary recreational activities thought to be affected by designation of critical habitat are organized off-road vehicle (ORV) events and use of ORVs in undisturbed areas.

Biological Factors

ORV activities result in direct effects to desert tortoises (mortality from crushing, collection, and vandalism), and indirect effects that can be either immediate (disruption of soil integrity; degradation of annual plants, grasses, and perennial plants; and/or destruction of desert

Appendix VIII. *Continued.*

tortoise shelter sites), delayed, and/or cumulative (soil loss due to erosion, soil compaction and its effects on annual and perennial plants, water pollution, and litter and refuse. These effects have contributed to the tortoise's decline and to the loss and degradation of its habitat.

The only major competitive ORV events still occurring within critical habitat are in the Piute-Eldorado CHU. The Service will assess these events through section 7 consultation to determine if they destroy or adversely modify critical habitat. The majority of critical habitat areas are currently used for casual ORV activities. Deleting casual use areas from critical habitat would increase fragmentation, reduce the potential for populations to reach and maintain viability, and eliminate the additional habitat protection provided by designation of critical habitat.

While designation of critical habitat in these areas will not exclude use of the areas, the Service anticipates that it may result in designation of roads and trails by the land management agency.

Economic Factors

Nearly all competitive ORV events were removed from CHUs after listing, an action attributable to the jeopardy standard. ORV use by individuals will be allowed in CHUs on designated roads. During the public comment period no additional data were provided to justify exclusion of lands based on the economic effects to recreational activities.

Service Decision

The Service did not recommend exclusion of areas based on factors related to recreational activities. Exclusion of these areas from designated critical habitat likely would result in the extinction of the desert tortoise.

Ward Valley

Ward Valley is a 1,000-acre site in San Bernardino County, California that is included in Chemehuevi CHU. The Ward Valley site is on the CHU's

Appendix VIII. *Continued.*

northern boundary, and adjacent to Interstate 40. The site is being developed by U.S. Ecology, Inc. for the State of California as a regional low-level radioactive waste (LLRW) disposal facility. The Service received requests both for inclusion and exclusion of Ward Valley from designated critical habitat.

Biological Factors

The Service issued a nonjeopardy opinion on November 21, 1990, with respect to the proposed facility, but opposed its being located "in an area that has been identified...as important to this species' future management and recovery" (U.S. Fish and Wildlife Service 1990).

Economic Factors

Locating and licensing the Ward Valley LLRW facility, according to the State of California, has required eight years and cost nearly \$48 million to the State and its licensee, U.S. Ecology, Inc.; over \$20 million of this amount was spent before the tortoise was listed in 1990. Ward Valley was selected from among several candidate locations, following a rigorous and costly process. Inclusion of the site in designated critical habitat may force resumption of the facility location process (Douglas P. Wheeler, State of California, The Resources Agency, personal communication 1993). (The Service considers complete loss or complete duplication of the investment highly unlikely; for example, the State may be able to locate the facility on the second-best site and avoid repeating the entire search process.)

According to an analysis of potential liability conducted by the State's Office of the Controller "significant liability can befall the State if no regional LLRW facility is built" by January 1, 1996. Further, failure to build the facility "could possibly trigger breach of contract damages" (D. Robert Shuman, State of California, Office of the Controller, personal communication 1993).

Service Decision

The Secretary of the Interior is aware that including the Ward Valley site may threaten a portion of the investment made in siting the LLRW facility, and may result in potentially significant costs for the State of California. However, after considering these potential economic impacts, the Secretary has determined the area should not be excluded from Chemehuevi CHU.

Military Reservations

Military commanders of each base affected by the designation of critical habitat requested exclusion of military land. Estimates of economic impacts due to critical habitat designation were provided with some of the requests.

Biological Factors

Approximately 4,500 acres of the Marine Corps Air Ground Combat Center at Twentynine Palms, California in Ord-Rodman CHU were removed for biological reasons. Much of the area consists of lava beds, typically not suitable for tortoise habitat. Further, the Center's lands were heavily impacted by previous bombing and other training uses. After considering these factors, the Service redesigned the eastern border of the CHU for biological reasons.

Economic Factors

The Navy requested exclusion of the Naval Air Weapons Station at China Lake, California in Superior-Cronese CHU. The economic impact cited in the request was the loss of use of the Superior Valley bombing range, where improvements valued by the Navy at more than \$20 million are located. The Service maintains the Navy's use of existing China Lake facilities do not constitute adverse modification, and current practices at China Lake will not be affected significantly by critical habitat designation.

Appendix VIII. *Continued.*

The Marine Corps requested exclusion of Chocolate Mountain Aerial Gunnery Range from Chuckwalla CHU for several reasons, including what the Corps considered insufficient analysis of economic impacts of relocating and realigning target areas in the Range. The Corps, however, did not provide additional data during the public comment period with which to evaluate these impacts. The Service's Ventura and Carlsbad Field Offices will review additional information provided about the Range to evaluate boundary adjustments based on habitat suitability and habitat degradation due to high levels of impacts near bombing targets. The Service anticipates the Corps will be allowed continued use of the Range without significant impact.

The Army requested exclusion of Fort Irwin, California from Superior-Cronese CHU. The Army cited biological, geographic, and other reasons why the Fort should be excluded, but did not provide an economic basis for removal. The Service contends that current management agreements with the Fort allow continued use without causing adverse modification or significantly impacting current use of the facility.

The Air Force requested exclusion of Edwards Air Force Base (Base) from Fremont-Kramer CHU for several reasons, the combination of which the Air Force is concerned would render the Base unusable. The Air Force estimated that closing or relocating the Base would cost several billion dollars and result in the loss of 30,000 jobs in the region. The Service has reviewed carefully the Air Force's concerns, and reached these decisions:

1. The Service maintains that the supersonic flight corridors on the Base used for aerial testing do not involve modification of habitat and are not affected by designation of critical habitat.
2. The proposed NEXRAD (Next Generation Radar) site requires so few acres that the Service does not foresee problems with its location in the CHU. Ongoing maintenance and operations of NEXRAD should not conflict with critical habitat management.

Appendix VIII. *Continued.*

3. The Air Force estimated an impact of millions of dollars to existing utility corridors on the eastern boundary of the Base. The Service anticipates no impact to existing utility lines and facilities, and has not required mitigation or other development of existing utility corridors. Proposed utility lines, to which the Air Force alluded, but did not estimate economic impacts, would require section 7 consultation to determine whether critical habitat would be destroyed or adversely modified.
4. The military expressed concern that added funding requirements for compliance with designation of critical habitat may preclude their continued funding of the Land Tenure Adjustment (LTA) program in which private inholdings are purchased or traded, to be consolidated under federal ownership. Consultations are already required to evaluate jeopardy standard as a result of listing. The incremental increase in consultation due to designation of critical habitat is not expected to be so substantial as to jeopardize the Air Force's continued participation in the LTA program.
5. The Air Force expressed concern over impaired use of its Precision Impact Range Area (PIRA) on the Base. The Service is not requiring closure of existing bombing ranges, only that consultation for adverse modification occur before existing ranges are expanded or new bombing ranges are established. The Service recognizes that areas not containing primary constituent elements, such as heavily used bombing ranges, are not critical habitat.
6. The Air Force expressed concern that the operations of Phillips Jet Propulsion Laboratory (Laboratory), a tenant on the Base, would be seriously impacted by designation of critical habitat. Impacts to the tortoise from Laboratory propulsion exhaust would involve the jeopardy standard rather than adverse modification. The Service is not proposing curtailment of current Laboratory operations, nor curtailed use of current test areas.

Appendix VIII. *Continued.*

The Service maintains that most training conducted at the Base can be compatible with proper tortoise management, and concluded that the Air Force's concerns about the Base being rendered unusable due to designation of critical habitat are overstated.

Service Decision

After careful consideration of military activities in the affected areas, the Service has determined that in most cases military uses, with some minor modifications, are compatible with desert tortoise management. The Service did not exclude land based on factors related to military ownership or operations, but will continue to review activities and review adverse modification impacts of military uses during consultations. The remainder of the military lands contain significant biological habitat and are considered necessary for the recovery of the species.

Tribal Lands

The Paiute Indian Tribe of Utah - Shivwits Band (Tribe) requested exclusion of the 1,600 acres of tribal land included in Upper Virgin River CHU. The Tribe's request is based on constrained future economic development.

Biological Factors

This recovery unit is unique in that it contains some of the highest densities of desert tortoises known throughout the species' range, and is the smallest recovery unit, requiring more intensive management to ensure long-term survivability and ultimate recovery of the unit. Desert tortoise habitat necessary for recovery within the Upper Virgin River Recovery Unit are not distinguished by landownership boundaries, and it includes Federal, State, private, and Tribal lands.

Economic Factors

The Service is not aware of specific economic activities or development projects slated to occur on Tribal lands that would be adversely affected by the designation of critical habitat. During the public comment period no economic data were presented, nor were development projects identified, to justify exclusion of the Tribe's lands for economic reasons.

Service Decision

The lack of evidence of economic impacts to the Tribe from critical habitat designation, precluded the exclusion of Tribal lands. The Service will consider development proposals through section 7 consultations, and revisit the Tribe's exclusion request when Washington County's Habitat Conservation Plan is approved to provide sufficient tortoise protection measures. The final rule will stress that areas lacking constituent elements, as in developed areas, are not critical habitat.

Private Lands

Every CHU includes some private lands, often in a checkerboard pattern of ownership. Privately owned land totals about 17% of all CHU acreage. The Service received requests for exclusion of private lands based on various reasons including economic effects, cultural reasons, and legal issues. Officials from the City of St. George and Washington County requested the exclusion of approximately 50 square miles from critical habitat to allow economic development and community growth.

Biological Factors

In California, most of the private lands within the CHUs are intertwined with federal lands in a checkerboard pattern. These lands are necessary to allow large, contiguous blocks of habitat to be managed for recovery of the desert tortoise. The BLM in California is currently in the process of acquiring many of the private parcels from willing sellers

Appendix VIII. *Continued.*

to consolidate its holdings. In Utah, the private lands within the Upper Virgin River CHU are also considered necessary for recovery of the desert tortoise. This CHU is the smallest recovery unit outlined in the Draft Recovery Plan; it will therefore require intensive management actions to ensure that federal actions do not destroy or adversely modify the critical habitat on the private lands encompassed by, and along the perimeter of, the critical habitat. Deleting large blocks of private lands containing desert tortoise habitat would increase fragmentation, reduce the potential for populations to reach and maintain population viability, and eliminate the additional habitat protection provided by designation of critical habitat with regard to federal actions on these lands.

Economic Factors

Private lands in CHUs are used for a variety of activities, including ranching (often reliant on adjacent federal grazing permits), mining, and other commercial or industrial uses. Economic effects on private property are difficult to measure because the designation of critical habitat does not affect directly activities on private lands. Impacts may be realized when an activity is funded, authorized, or carried out by a federal agency. This federal "nexus" (the connection from funding, authorization, or enactment) constitutes the legal basis by which private land may be affected. During the public comment period, no additional data were received that identified effects on private lands from the federal nexus.

Mining, livestock grazing, and other practices are reviewed in other sections of this report. The Service is not aware of economic activities occurring on private lands that constitutes regional or national economic significance. No data were provided during the public comment period that identified areas that warranted exclusion for economic reasons.

Service Decision

The Service did not recommend private property exclusions. Exclusion of these areas from designated critical habitat likely would result in the extinction of the desert tortoise.

Utilities

The Service received requests for exclusion of utility corridors or transmission lines that cross CHUs. Several of these requests also sought clarification of the ability of the utility managers to access the lines for routine and emergency servicing.

Biological Factors

Utility and transmission corridors do not normally contain primary constituent elements and, therefore, would not be affected by designation of critical habitat. Routine maintenance operations on existing pipelines, buried fiber-optic lines, and electrical transmission line rights-of-way are generally covered under existing section 7 consultations and are not likely to constitute adverse modification of critical habitat. Any expansion, addition, or modification within the rights-of-way or fee property will be subject to section 7 consultation if authorized, funded, or carried out by a federal agency. Through such consultation, the Service will determine if the proposed action is likely to jeopardize the continued existence of the desert tortoise or destroy or adversely modify its critical habitat. Because these existing corridors traverse critical habitat, they can cause significant fragmentation and provide for increased human access into desert tortoise habitat. Both of these actions adversely affect desert tortoises and their habitat. Therefore, inclusion of these areas within designated critical habitat is necessary to allow the Service to fully assess the effects of proposed federal actions for future activities, including expansion, addition, or modification of existing uses within the corridors.

Economic Factors

Maintenance of existing utility lines and related facilities should not be affected by critical habitat designation. The Service's primary concern is the impact to tortoises from uncontrolled construction of new utility lines on CHUs. Future requests for construction of power lines,

Appendix VIII. *Concluded.*

utility corridors, or rights-of-way will be addressed through section 7 consultations.

Service Decision

The Service did not recommend exclusions related to utility corridors or rights-of-way.
