3.0 AFFECTED ENVIRONMENT

The following environmental resources are discussed to the level of detail commensurate with the potential for environmental impact to that resource.

3.1 GEOLOGY AND SOILS

The proposed project site is located with the Animas Valley, which is part of the Animas Basin system. The Animas Basin system is located in the Mexican Highland section of the Basin and Range physiographic province. The Mexican Highlands, part of the Basin and Range province, includes the deserts of southern and western Arizona, southwestern New Mexico, and northern Mexico. The Mexican Highlands consist of broad valleys or basins separated by steeply rising mountain ranges. Each basin is essentially an independent hydrologic system. Some of these basins (including the Animas Basin) have no drainage to the sea and are slowly filling up with sand, gravel, and soil washed down from the mountains.

The Animas Basin system is an interconnected group of four subbasins that cover a watershed area of about 2,448 mi^2 (3,940 km^2) (see Figure 3-1). The four subbasins are the Lower Animas, Upper Animas, Lordsburg, and Cloverdale (San Luis). The proposed project site is located in the southwestern part of the Lower Animas Subbasin. The Lower Animas Subbasin is bounded to the east by the Peloncillo Mountains, which form part of the Continental Divide. The Pyramid Mountains to the east separate parts of the Lordsburg and Lower Animas subbasins, which merge northwest of Lordsburg (NMWRRI 2000).

Sediments eroded from the mountains have formed broad fans filling the valley floor. The most extensive landforms of the Lower Animas Subbasin are broad slopes that fan out from the mountain fronts. The slopes of these fans flatten out away from the mountains to form the basin floor areas. The basin floor areas range from narrow alluvial flats along the north-south drainage ways to broad plains comprising both alluvial flats and playa-lake depressions (NMWRRI 2000).

The Lower Animas Subbasin with an area of about 847 mi^2 (1,360 km^2) is the deepest part of the Animas Basin system in the Cotton City-Alkali Flat area. The fill thickness probably does not exceed 2,000 ft (600 m) as indicated by oil and gas exploration drilling and geophysical (seismic and gravity) surveys done in the area (NMWRRI 2000).

The Lower Animas Subbasin includes an extensive (Middle Pleistocene) basalt flow and broad alluvial flats, with shallow braided channels of the Lower Animas fluvial system in the Animas-Cotton City area. A very large playa-lake complex north of Interstate 10 (I-10) is the ultimate sink for much of the storm runoff in the basin system (NMWRRI 2000).

Soils. Soils in the general vicinity of the AmeriCulture site belong to the Hondale-Playas Association, which are deep, moderately fine textured and fine textured, nearly level to gently sloping soils on alkali flats (USDA 1973). At the AmeriCulture site, soils are of the Hondale series, consisting of very deep, well-drained soils formed in alluvium, derived from mixed sediments. This series is extensively distributed throughout southern New Mexico and southeastern Arizona. Hondale soils are in mixed sediments on old alluvial plains and fans where

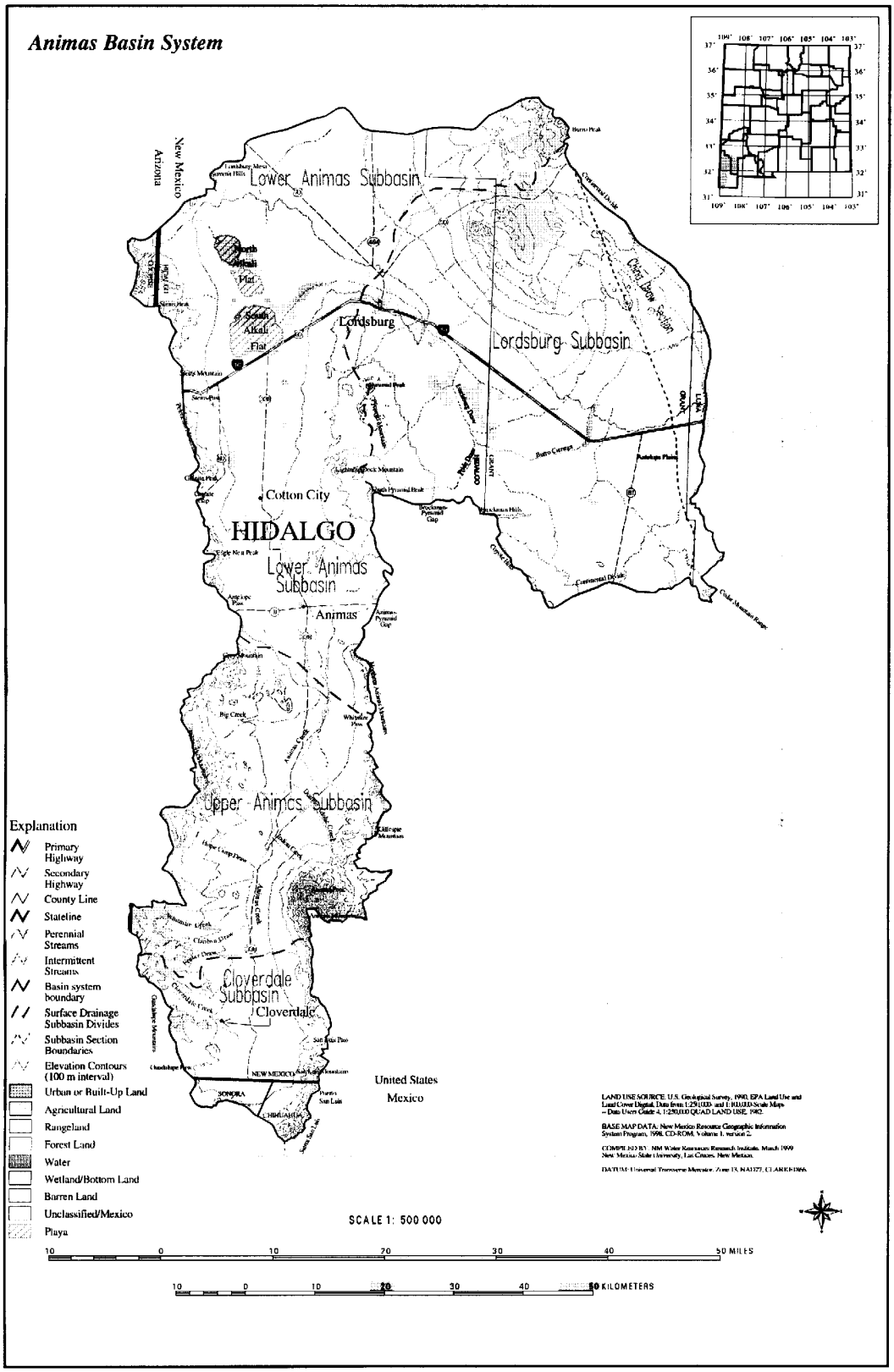

Figure 3-1. Animas Basin.

flooding is rare, and generally occur from 3,500 to 5,000 ft. Slopes range from 0 to 3 percent where Hondale soils are present (USDA 1994). Over the site area, the evaporation rate exceeds the permeability of the local soils.

In the area of the Proposed Action, there are areas that have been disturbed by past actions. The area immediately surrounding the AmeriCulture hatchery, the local roads, and the parking area to the southeast of the hatchery have all been previously disturbed. The area around the existing freshwater well was disturbed when the well was drilled. A water tank or stock tank exists just to the east of the freshwater well (see Figure 2-4). The pipeline that carries the water from the well to the AmeriCulture hatchery runs east paralleling the local road for most of the way then angles to the northeast to the hatchery.

Structural Geology. The structural history of southwestern New Mexico is dominated by three major tectonic episodes. The following paragraphs discuss these episodes, beginning with the oldest and ending with the most recent.
The Laramide Orogeny was a series of mountain-building events that affected much of western North America 35 to 75 million years ago. The deformation in the region included several north to northwest trending uplifts of 0.5 to 3 miles (0.8 to 5 km).

During the mid-Tertiary (approximately 20 to 40 million years ago), a large part of the area was covered with volcanic ash and sediments and minor volcanic flows. These flows were centered near volcanic centers. Some of these volcanic centers formed cauldron complexes where intense extension occurred along systems of faults.

In the late Tertiary (approximately 6 to 12 million years ago), basins and ranges were formed along widely spaced faults. The valleys or basins of the Mexican highlands were formed this way. These valleys and ranges are mostly horst and graben structures. The blocks that have been broken and slowly pushed up above the surrounding land to form steeply rising mountain ranges are called horsts. The blocks that are depressed relative to the mountain blocks (the valleys or basins) are called grabens. These structures are formed when blocks separated by faults have been lifted or depressed relative to each other.

Mineral Resources. There are extensive mineral resources to the north of the Animas Basin. In the Animas Basin area, Phelps-Dodge recently closed a copper smelter in Playas. There are old inactive mines in the area for gold, silver and copper ores. A small shallow gravel pit is present 2.5 mi (4 km) to the northwest.

Geothermal Resources. Many of the geothermal systems in New Mexico occur where the late Tertiary horsts intersect, older cauldron complexes, and Laramide uplifts. The Lightning Dock KGRA in the Animas Valley (Figure 1-2) occurs in an area where these three geologic features intersect (Witcher 1995). A KGRA is a region identified by the U.S. Geological Survey as containing geothermal resources.

In the region of the Lightning Dock KGRA, a major west-northwest trending structure is thought to exist. The fracture zone associated with a large mid-Tertiary caldera/cauldron is immediately

adjacent to or transverses the Lightning Dock Area. The Basin and Range faulting that created the Animas Basin system also runs through the Lightning Dock area (Witcher 2001).

The proposed power plant is located adjacent to Burgett Floral Greenhouses, the Nation's largest geothermally-heated greenhouse operation, in the northeast part of the Lightning Dock KGRA. In addition to the geologic features discussed above, a north-trending, late Pleistocene fault scarp, the southern end of which is in the Lightning Dock KGRA, which may provide a zone of open shallow fracture permeability in the KGRA local to the project area (Witcher 2001).

The source of water and heat found in the KGRA is likely background regional heat flow in deep bedrock, through which water flows on a regional scale and discharges upward in the Lightning Dock KGRA. Some regional aquitards (formations that impede or block water flow) that would prevent water from flowing upward are absent, possibly resulting from Cretaceous and Tertiary uplift. The intersection of the four tectonic elements discussed above provides the vertical fracture permeability that allows water to flow up in the Lightning Dock area (Witcher 2001). The capacity of the Lighting Dock KGRA to produce energy has not been fully characterized.

The direct-use geothermal plant at Burgett Floral Greenhouses, whose wells were included in aquifer testing at AmeriCulture, water at approximately 244°F (118°C) from three wells in the Lightning Dock KGRA. The capacity of the plant is approximately 32.8 megawatts thermal (MWt) (OIT 2001), from which approximately 1 MW of power is being generated.

The Lightning Dock KGRA is essentially elliptical in shape, with the long axis oriented north-south. It is approximately 1 mile wide and 2.5 miles long, and produces 95 to 250° F water from wells less than 500 feet deep (Fisher et al. 1990).

The characteristics of the Lightning Dock KGRA have been extensively described using a variety of methods, as reported in Callender 1985. A conservative estimate of the volume of the Lightning Dock KGRA is approximately 0.75 km^3. Porosity is estimated at 20 to 25 percent, and specific heat is assumed to range from 0.65 to 0.70 $cal/cm^{3o}C$. Temperature of the reservoir is estimated at 100° C, and mean annual temperature for the area is estimated at 17o C. The total heat content of the KGRA is estimated at approximately 2.1×10^{17} joules (Callender, 1985).

The capability of a geothermal resource area to produce sufficient energy on a sustainable basis is dependent on its hydrogeologic properties, which control the ability of subsurface materials to transmit the heated water contained within them to one or more wells. To assess the potential for sustainable energy production, a 48-hour pump test was conducted using an existing well (AmeriCulture State 1) at the proposed project location. This well is 399 ft (122 m) deep, producing from a fractured rhyolite reservoir in an open hole from a 282 to 399 ft (86 to 122 m) depth. The static water level is approximately 75 ft (23 m) below land surface. Water temperature during the last 40 hours of the test remained at 232° F (111°C), or slightly higher. A sample of the geothermal water was collected for analysis and found to be of good quality, with TDSs of 1,071 milligrams per liter (mg/L) and pH of 8.1.

Drawdown was measured at the AmeriCulture State 1 well. Drawdown was measured in the AmeriCulture Federal 1 monitoring well, located 1,170 ft (357 m) northeast of the AmeriCulture

State 1 well. This well is completed in Tertiary to Quaternary deposits from 60 to 223 ft (approximately 20 to 68 m) depth. A third well (Burgett "A" State well), associated with a neighboring greenhouse operation, was also involved in the test and monitored. This well, completed in the fractured rhyolite to a depth of 440 ft (approximately 130 m), is located 825 ft (251 m) to the north-northeast of the AmeriCulture State 1 well (Witcher 2001).

During the first 24 hours, only the AmeriCulture State 1 well was pumped at a rate of 1,050 gpm (approximately 4,000 lpm). During the second 24 hours, two other wells in the vicinity were pumped. The Burgett "C" State well, located 255 ft (77.7 m) southwest of Burgett "A" State well and 645 ft (197 m) north of the AmeriCulture State 1 well, was turned on first at a rate of 650 gpm (2,500 lpm). The Burgett "B" State well, located 345 ft (105 m) southwest of the Burgett "A" State well and 600 ft (approximately 200 m) north of the AmeriCulture State 1 well, was turned on second at a rate of 1,200 gpm (4,500 lpm). Both of these wells are similar in construction to the Burgett "A" State well. Pumping the wells simultaneously provided an opportunity to observe the impact of realistic operating scenarios.

An anomalously low drawdown in the AmeriCulture Federal 1 monitoring well appeared to indicate that there is a hydrogeologic boundary between the AmeriCulture State 1 well and the AmeriCulture Federal 1 well. Because the location and nature of this boundary is not well known, the data from the AmeriCulture Federal 1 well could not be used to calculate the hydrogeologic characteristics of the system. Data from the AmeriCulture State 1 and Burgett "A" State well were used to characterize the aquifer properties. Maximum drawdowns for the wells during the various pumping stages are summarized in Table 3-1.

Table 3-1. Drawdown Results of Pump Tests

Drawdown Measurement Point	First 24 Hours	Second 24 Hours
	Wells Pumped AmeriCulture State 1 Pumped at 1,000 gpm (approximately 4,000 lpm)	Wells Pumped AmeriCulture State 1 Pumped at 1,000 gpm (approximately 4,000 lpm) Burgett "B" State Pumped at 1,200 gpm (approximately 4,500 lpm) Burgett "C" State Pumped at 650 gpm (approximately 2,500 lpm)
AmeriCulture State 1	30 ft (9.1 meters)	32.29 ft (9.84 m)
Burgett "A" State Well	11.6 ft (3.54 meters)	23.4 ft (7.13 meters)

Using the 24-hour pump test data, transmissivity and storativity were calculated according to the Cooper and Jacob method to be 62,393 gpd/ft (775,310 lpd/m) and 1.17 x 10^{-4} (dimensionless), respectively. These values were used to project the long-term drawdown effects of pumping the well, which are discussed later in Section 4.1.1.

Drilling has commenced for the investigation and feasibility study phase for another potential use of the geothermal resource in the area of the Proposed Action. This potential use would

involve drilling wells into the deep part of the geothermal resource where limited fluid is present. Water would be injected in one well and geothermal fluid would be collected at the nearby well. If this project proved successful, a power plant would be constructed to generate electricity from the resulting geothermal fluid.

Table 3-2 presents an analysis of the geothermal fluid present within the AmeriCulture State 1 Well. Overall the water quality is good (Witcher 2001).

Table 3-2. Geothermal Water Analysis

Constituent/Characteristic	Measurement
pH of water	8.11
Total Dissolved Solids	1071 mg/L
Bicarbonate	2.27 meq/L
Sodium by ICP	319 mg/L
Calcium by ICP	22.7 mg/L
Magnesium by ICP	0.1 mg/L
Potassium by ICP	14.7 mg/L
Chloride by Autoanalyzer	80 mg/L
Sulfate	462 mg/L
Fluoride by electrode	- - -
Bromide by Ion Chrom	not detected
Arsenic by ICP	not detected
Silica by ICP	42.0 mg/L
Strontium by ICP	0.45 mg/L
Lithium by ICP	- - -
Boron by ICP	0.37 mg/L
Iron by ICP	1.14 mg/L
pH of water LCS	8.25
pH of water duplicate	8.11
pH of water RPD	0.000

*Data from sample collected on 10/30/00

3.2 WATER RESOURCES

Surface Hydrology. The Lordsburg Subbasin to the northeast contributes flood runoff via Lordsburg Draw to the Lower Animas Subbasin (Figure 3-1). The Upper Animas Subbasin contributes surface runoff to the Lower Animas Subbasin via a north-flowing Animas Creek (Figure 3-1). The transitional boundary between the Upper and Lower Animas subbasins is located about 6 mi (approximately 10 km) south of Animas near the end of the entrenched Animas Creek (NMWRRI 2000).

There are no major perennial streams in the Animas Basin system with the exception of short perennial to intermittent reaches of Animas Creek and a few of its major headwater tributaries, all of which are located to the south of the project site. Upper Animas Creek occupies a well-defined valley to a point about 5 mi (8 km) south of Animas, and it contributes runoff and aquifer recharge to downstream areas in the Lower Animas Subbasin. The stream-channel system rapidly loses its identity in the Animas area. Some parts of the basin floor are occupied by a prominent (partly relict) pattern of shallow distributary channels, while other basin-floor

surfaces appear to be mainly sites of sheet flooding during very high storm-runoff events. This ill-defined surface drainage pattern ultimately grades north to the (South Alkali Flat) playa-lake plain near and north of I-10 (NMWRRI 2000).

In the immediate vicinity of the project site the land has a gentle slope that grades to almost flat just to the northwest. Over the length of the site there is a slope of approximately 1.5 percent from the east to the west-northwest. Just to the west and northwest of the site the slope is less than 0.2 percent. The project sits between two very shallow dry washes. One wash approximately 1,550 ft (472 m) to the north of the site, trends northwest and becomes indistinguishable from sheetflow features about 3,960 ft (1,210 m) northwest of the site. The other wash, approximately 1,500 ft (approximately 460 m) to the south of the site, becomes indistinguishable from sheetflow features just south of the site and seems to flow into the drainage ditch cut along the north-south trending powerline and access road. This drainage ditch runs under the access road to the site and flows into the flat area 2,640 ft (805 m) west of the site.

The most prominent hydrologic feature on the site is a small marshy area of 0.5 to 1 acre (0.2 to 0.4 hectares) that lies just west of the greenhouses. This feature is formed by the discharge of water from the fish tanks at AmeriCulture.

Groundwater Hydrology. The primary aquifer system is formed by unconsolidated to partly indurated basin fill, which includes surficial deposits of ancestral Animas Creek, and basin-floor facies of Upper and Middle Gila Hydrostratigraphic Units. The aquifer system has unconfined, semiconfined and confined components. It is laterally extensive but quite variable in thickness (NMWRRI 2000).

Underlying basin fill comprises well-consolidated and partly indurated Middle and Lower Gila Hydrostratigraphic Units that have very low hydraulic conductivities. Storage coefficients reflect semiconfined and confined aquifer conditions. A very liberal estimate of available groundwater of good quality that is stored in the Animas Basin aquifer system is about 1.2×10^{10} m^3 (12 km^3, 9.5×10^6 ac-ft) (NMWRRI 2000).

Reported groundwater pumped for irrigation in 1995 was 2.5 x 106 m3 (2,040 ac-ft) and 17.9 x 106 m3 (14,542 ac-ft) for the Lordsburg and Animas areas, respectively. The Animas Valley underground basin was used to a greater extent in the 1940s when cotton farming occurred in the area and required significant amounts of groundwater. At the time, the water rights were adjudicated at a level that officials believed could be sustained with minimal impact. No new water rights have been added since the 1940s. Since then, agriculture in the area has declined. Some of the water rights associated with the declining agricultural activities have been sold to other operations. However, most are unused. As a result, the total water use in the area Animas Valley is below the level thought be sustained with minimal impact. The water use by AmeriCulture is provided in Section 3.6 (Infrastructure).

3.3 CLIMATE/AIR RESOURCES

Climate of the Animas Basin system is arid to semiarid except in the highest parts of the San Luis, Animas, Guadalupe, Peloncillo and Big Burro ranges. In the town of Animas, at an

elevation of 4,415 ft (1,346 m), the average annual precipitation is 11.03 in (28.02 cm). The average total precipitation ranges from 0.20 in (0.5 cm) in April to 2.33 in (5.92 cm) in August. The average maximum temperature is 77.3°F (25.2°C). The average maximum temperature in summer is 93.6°F (34.2°C), with the hottest month being June (95.4°F [35.2°C]). The average minimum temperature in winter of 27.2°F (-2.67°C) with the coldest month being January with 26.2°F (-3.22°C) (WRCC 2000). Evaporation exceeds precipitation in the Animas Basin. Evaporation records at Animas indicate an annual evaporative rate of 99.7 in (253 cm). The prevailing wind direction at the site is to the east-northeast (Exergy 2001).

The eastern border of the Animas Basin system follows the Continental Divide. Crest elevations of the Continental Divide commonly exceed 6,600 ft (2,000 m) in the Sierra San Luis-Southern Animas Mountain area. This range is the northern extension of the Sierra Madre Occidental of northwestern Mexico, and the Guadalupe/Peloncillo range to the west. It is the first major highland area to intercept masses of moist air that seasonally move inland from the Gulf of Mexico and the eastern Pacific Ocean. Most of the large precipitation events are in the summer and early fall, but lower magnitude (but very effective) precipitation pulses occur during the winter and early spring in some years (NMWRRI 2000). Higher parts of the Cloverdale and Upper Animas subbasins are significantly cooler and wetter than the Animas-Cotton City, Lordsburg area. During the summer, precipitation occurs primarily as thundershowers, with the amount of rainfall from these storms being quite variable. Snowfall is the main precipitation during winter (NMWRRI 2000).

Except for the Southern Animas-San Luis range and the Guadalupe Mountains, the climate is arid with mostly clear skies and limited rainfall and low humidity. The air quality for southern rural New Mexico is normally very good. Gaseous emissions are limited. Ambient concentrations of pollutants have traditionally been within state and Federal standards, although during periods of dry weather, particulate levels noticeably increase. No known quantitative data exist on the air quality of the area (NMWRRI 2000). The air emissions at the project site consist of vehicle exhaust, exhaust from the emergency generators, and from the propane heaters in the trailer used as living quarters at the site.

3.4 BIOLOGICAL RESOURCES

The AmeriCulture site is about 16 mi (approximately 26 km) southwest of Lordsburg, NM, at an elevation of approximately 4,200 ft (approximately 1,300 m). The project site is an area that has been previously disturbed by grazing, construction of roads and structures, and other activities. A diurnal and nocturnal pedestrian survey was performed at the AmeriCulture site in August 2001, with some supplemental information collected in January 2002. The following subsections address vegetation, wetlands, wildlife, and protected or sensitive species at or adjacent to this facility.

Vegetation. The Animas Basin system represents a moderate array of land cover ranging from Ponderosa Pine Forest in the higher parts of the Burro Mountains in the north and in the southern Animas, Peloncillo, and Guadalupe mountains adjacent to the Cloverdale and Upper Animas subbasins. Mixed Piñon-Juniper woodlands and grasslands on lower mountain slopes grade rapidly into semidesert-grass and desert-scrub vegetative cover in the rangelands on lower

piedmont slopes and basin floors (McCraw 1985). A large playa-lake plain (Figure 3-1) including North and South Alkali Flats, dominates the floor of the Lower Animas Subbasin, and large areas are sparsely vegetated cover. Rangeland accounts for the majority of the land cover in the area.

The surveyed area consisted primarily of scrub vegetation characteristic of the Chihuahuan Desert scrub (Brown 1982). Some grassy areas at the site appear to be diminishing due to drought, historic heavy grazing and other land disturbances. Some of the more common plant species observed included creosotebush (*Larrea tridentata*), fourwing saltbush (*Atriplex canescens*), honey mesquite (*Prosopis glandulosa*), and purple prickly pear (*Opuntia violacea* var. *macrocentra*). One population of a nonnative and invasive plant species, Yellow starthistle (*Centaurea solstitialis*) or a related species, Malta starthistle (*C. melitensis*), was discovered in the disturbed area by the parking lot near the waste fish water containment pond.

Wetlands. An area where water has been discharged from the fish containment ponds was surveyed to determine if there were marshy areas present that are protected and regulated under the *Clean Water Act*. An artificially created marshy area less than one acre in size has been created on the edge of a containment pond by waste fish water discharges over a number of years. This area supports a small population of wetland vegetation that includes cattail (*Typha* sp.), willow (*Salix* sp.), and sedge (*Carex* sp). According to the owner, the cattail currently present represents growth from several years ago, because the pond no longer reaches the level required for their survival.

Wildlife. Only wildlife species representative and common to the area were sighted during the biological survey. During the August 2001 nocturnal survey, up to 100 individuals of a species of *Bufo* consistent with the Great Plains toad (*Bufo cognatus*), were observed along a section of the paved road paralleling the fresh (non-geothermal) water pipeline. Power lines run parallel to the primary access road to the AmeriCulture site. These lines, and the transmission towers supporting the lines, were surveyed for the presence of raptors or other birds; however, none were observed.

Protected and Sensitive Species. The principal purpose of the biological survey was to characterize the habitat to determine the suitability for species that are federally-listed as endangered, threatened, or candidates for listing. Species listed by the State of New Mexico as endangered or threatened were also considered in this survey (NMDGF 2000). The New Mexico BISON-M database (http://www.fw.vt.edu/fishex/states/nm.htm) and the New Mexico Rare Plant Technical Council database (http://nmrareplants.unm.edu) were accessed to determine species of interest that may be present in Hidalgo County, NM, as was the U.S. Fish and Wildlife Service (USFWS) endangered species list (http://ifw2es.fws.gov/EndangeredSpecies/Lists/ListSpecies.cfm).

Available records indicate that 6 federally-listed endangered species, 7 federally-listed (or proposed) threatened species, 2 Federal candidate, 20 state-listed endangered species, and 32 state-listed threatened species have been reported in Hidalgo County where the project site is located (see Table 3-3). No federally- or state-listed plant or animal species were observed at the AmeriCulture site, and no suitable habitat is present for any federally-listed species. However,

suitable habitat is present for certain state-listed species including the Common Ground Dove *(Columbina passerina pallescens*), Mexican Garter Snake (*Thamnophis eques megalops*), Colorado River Toad *(Bufo alvarius)*, Costa's Hummingbird *(Calypte costae*), Arizona Grasshopper Sparrow *(Ammodramus savannarum ammolegus)*, and Night Blooming Cereus *(Peniocereus greggii)*. Additionally, no critical habitat for federally protected species occurs on the project site. Critical habitat is habitat that has been recognized by the USFWS as essential to the conservation and viability of the federally protected species.

Letters have been sent to the USFWS, the New Mexico Department of Game and Fish, and the New Mexico Department of Energy, Minerals, and Natural Resources, Forestry Division requesting a list of species those agencies are aware of in the project area.

On April 9, 2002, The USFWS responded to the faxed request with a list of federally-listed species including all endangered, threatened, proposed threatened, and candidate species for Hidalgo County, New Mexico. All of the species on the USFWS list have been included in the biological survey and analysis. All USFWS recommendations that pertain to the Proposed Action have been addressed and a copy of the letter can be referenced in Appendix B.

3.5 CULTURAL RESOURCES

Cultural resources are those aspects of the physical environment that are the product of human or societal use, and those institutions that hold communities together and link them to their surroundings. Cultural resources include expressions of human society and history in the physical environment such as prehistoric or historic archaeological sites, buildings, structures, objects, districts, or other places including natural features and biota that are considered to be important to a culture, subculture, or community. Cultural resources also include traditional lifeways and practices, and community values and institutions.

The principal Federal law addressing cultural resources is the *National Historic Preservation Act* (NHPA) of 1966, as amended (16 *United States Code* [USC] Section 470), and implementing regulations (36 *Code of Federal Regulations* [CFR] 800), that describe the process for identification and evaluation of historic properties; assessment of the effects of Federal actions on historic properties; and consultation to avoid, reduce, or minimize adverse effects. The term "historic properties" refers to cultural resources that meet specific criteria for eligibility for listing on the National Register of Historic Places (NRHP). This Section 106 process does not require preservation of historic properties, but does ensure that the decisions of Federal agencies concerning the treatment of these places result from meaningful considerations of cultural and historic values and of the options available to protect the properties. The Proposed Action is an undertaking as defined by 36 CFR 800.3 and subject to the Section 106 process and other Federal requirements.

The human use of lands now encompassing Hidalgo County and the Animas Valley is believed to date back several thousand years. The prehistoric resources of the region are among the least surveyed and studied in New Mexico despite the presence of cave sites in the mountains with good preservation of artifacts and its designation in the archaeological literature as the focus of the Animas occupation. A universally accepted cultural chronology for the area has not been

Table 3-3. Federal and State Listed Species for Hidalgo County, New Mexico

Common Name	Scientific Name	Federal	State	Habitat	Site Findings
PLANTS					
Night Blooming Cereus	*Peniocereus greggii*		E	Mostly sandy to silty gravelly soils. Typically growing up through and supported by shrubs especially *Prosopis glandulosa*	Habitat present, Species not observed
Orcutt Pincushion Cactus	*Escobaria orcuttii*		E	Rocky soils of broken mountainous terrain	Habitat not present, Species not observed
Parish's Alkali Grass	*Puccinellia parishii*		E	Alkaline spring seeps, seasonally wet areas. Can persist at springs highly impacted by grazing or trampling	Habitat present, Species not observed
MOLLUSCA					
Hacheta Grande Woodland Snail	*Ashmunella hebardi*		T	Under loose stones under unusually large pinyon pine	Habitat not present, Species not observed
Shortneck Snaggletooth Snail	*Gastrocopta dalliana dalliana*		E	Only known NM pop. In Indian Creek Canyon	Habitat not present, Species not observed
FISH					
Loach Minnow	*Rhinichthys cobitis*	T	T	Streams	Habitat not present, Species not observed
Roundtail Chub	*Gila robusta*		E	Mid elevation streams and rivers	Habitat not present, Species not observed
Spikedace	*Meda fulgida*	T	T	Riparian areas following fish maturation	Habitat not present, Species not observed
AMPHIBIA					
Chiricahua Leopard Frog	*Rana chiricahuensis*	PT		Aquatic areas	Habitat not present, Species not observed
Colorado River Toad	*Bufo alvarius*		T	Typically found around 1500 m in Creosotebush and Mesquite vegetation	Habitat present, Species not observed
Lowland Leopard Frog	*Rana yavapaiensis*		E	Aquatic, deep pools below 1500 m	Habitat not present, Species not observed
REPTILES					
Gray-checkered Whiptail	*Cnemidophorus dixoni*		E	Predominantly desert grassland and its derivatives	Habitat not present, Species not observed
Mexican Garter Snake	*Thamnophis eques megalops*		E	In NM, riparian areas 1300-1800 meters	Habitat present, Species not observed
NM Ridgenose Rattlesnake	*Crotalus wouldardi obscurus*	T	E	mountainous terrain	Habitat not present, Species not observed

Table 3-3. Federal and State Listed Species for Hidalgo County, New Mexico (continued)

Common Name	Scientific Name	Federal	State	Habitat	Site Findings
REPTILES (continued)					
Reticulate Gila Monster	*Heloderma suspectum suspectum*		E	Lower slopes in mountainous and outwash plains, especially in arroyos or canyons	Habitat not present, Species not observed
Bunch Grass Lizard	*Sceloporus scalaris slevini*		T	Montane grassland areas	Habitat not present, Species not observed
Giant Spotted Whiptail	*Cnemidophorus burti*		T	Canyon bottom areas in NM	Habitat not present, Species not observed
Mountain Skink	*Eumeces tetragrammus callicephalus*		T	Montane areas of Guadalupe Canyon	Habitat not present, Species not observed
Green Rat Snake	*Senticolus triaspis intermedia*		T	Montane and/or riparian areas	Habitat not present, Species not observed
Narrowhead Garter Snake	*Thamnophis rufipunctatus rufipunctatus*		T	Montane and adjacent areas	Habitat not present, Species not observed
BIRDS					
American Peregrine Falcon	*Falco peregrinus anatum*		T	Cliffy, wooded, forested slopes	Habitat not present, Species not observed
Bald Eagle	*Haliaeetus leucocephalus*	T	T	Riparian areas	Habitat not present, Species not observed
Common Black-Hawk	*Buteogallus anthracinus anthracunus*		T	Cottonwood stands near perennial streams	Habitat not present, Species not observed
Mexican Spotted Owl	*Strix occidentalis lucida*	T		Wooded, multicanopy areas	Habitat not present, Species not observed
Northern Aplomado Falcon	*Falco femoralis septentrionalis*	E	E	Yucca Grassland and adjacent shrubbery	Habitat not present, Species not observed
Whiskered Screech Owl	*Otus trichopsis asperus*		T	Montane woodlands dominated by at least some Cottonwoods	Habitat not present, Species not observed
Common Ground Dove	*Columbina passerina pallescens*		E	Undeveloped areas below 1650 m	Habitat present, Species not observed
Buff-collared Nightjar	*Caprimulgus ridgwayi ridgwayi*		E	Arid shrublands and woodlands - generally in canyons and washes	Habitat not present, Species not observed

Table 3-3. Federal and State Listed Species for Hidalgo County, New Mexico (continued)

Common Name	Scientific Name	Federal	State	Habitat	Site Findings
BIRDS (continued)					
Elegant Trogon	*Trogon elegans canescens*		E	Pine-Oak and Pinyon-Juniper vegetation	Habitat not present, Species not observed
N. Beardless Tyrannulet	*Camptostoma imberbe ridgwayi*		E	Lower elevations in dense stands of mesquite along stream courses	Habitat not present, Species not observed
SW Wouldow Flycatcher	*Empidonax traillii extimus*	E	E	Riparian areas consisting of upper story cottonwoods and lower story wouldows	Habitat not present, Species not observed
Thick-billed Kingbird	*Tyrannus crassirostris*		E	In NM, confined to riparian habitats	Habitat not present, Species not observed
Mountain Plover	*Charadrius montanus*	PT		Shortgrass prairies and dry playas	Habitat not present, Species not observed
Neotropic Cormorant	*Phalacrocorax brasilianus*		T	Large bodies of water	Habitat not present, Species not observed
Gould's Wild Turkey	*Meleagrus gallopavo mexicana*		T	Mountainous areas with live oaks	Habitat not present, Species not observed
Broad-billed Hummingbird	*Cynanthus latirostris magicus*		T	Riparian Woodlands	Habitat not present, Species not observed
White-eared Hummingbird	*Hylocharis leucotis borealis*		T	Montane areas	Habitat not present, Species not observed
Violet-crowned Hummingbird	*Amazilia violiceps ellioti*		T	Riparian Woodlands	Habitat not present, Species not observed
Lucifer Hummingbird	*Calothorax lucifer*		T	Slopes and adjacent canyons in montane areas	Habitat not present, Species not observed
Costa's Hummingbird	*Calypte costae*		T	Found in arid scrub terrain	Habitat present, Species not observed
Gila Woodpecker	*Melanerpes uropygialis uropygialis*		T	Lower elevation woodlands	Habitat not present, Species not observed
Bell's Vireo	*Vireo bellii*		T	Dense shrubland or woodland in riparian areas	Habitat not present, Species not observed
Gray Vireo	*Vireo vicinior*		T	Open woodlands and shrublands featuring evergreens	Habitat not present, Species not observed
Abert's Towhee	*Pipilo aberti aberti*		T	Thickets of seepwouldow in riparian areas	Habitat not present, Species not observed

Table 3-3. Federal and State Listed Species for Hidalgo County, New Mexico (continued)

Common Name	Scientific Name	Federal	State	Habitat	Site Findings
BIRDS (continued)					
Baird's Sparrow	*Ammodramus bairdii*		T	Grasslands	Habitat not present, Species not observed
AZ Grasshopper Sparrow	*Ammodramus savannarum ammolegus*		T	Open stand of creosote bush and succulents	Habitat present, Species not observed
Yellow-eyed Junco	*Junco phaeonotus palliatus*		T	Forested and riparian areas	Habitat not present, Species not observed
Varied Bunting	*Passerina versicolor*		T	Dense stands of Mesquite and associated growth in canyon bottoms	Habitat not present, Species not observed
Yellow-billed Cuckoo	Coccyzus americanus	C		Lowland deciduous thickets	Habitat not present, Species not observed
MAMMALS					
Arizona Shrew	*Sorex arizonae*		E	Higher elevation mesic forests	Habitat not present, Species not observed
Mexican Long-nosed Bat	*Leptonycteris nivalis*	E	E	In NM, upper desert scrub-pine/oak woodlands	Habitat not present, Species not observed
Desert Bighorn Sheep	*Ovis canadensis mexicana*		E	Arid, mountainous, rocky terrain	Habitat not present, Species not observed
Lesser Long-nosed Bat	*Leptonycteris curasoae yerbabuenae*	E	T	Desert scrub areas with little to no disturbance. Usually roost in caves	Habitat not present, Species not observed
Western Yellow Bat	*Lasiurus xanthinus*		T	Woodlands	Habitat not present, Species not observed
MAMMALS (continued)					
White-sided Jack Rabbit	*Lepus callotis gaillardi*		T	Grasslands	Habitat not present, Species not observed
Southern Pocket Gopher	*Thomomys umbrinus emotus*		T	Higher elevation riparian areas	Habitat not present, Species not observed
Jaguar	*Panthera onca arizonensis*	E		Lowland riparian terrain	Habitat not present, Species not observed
Mexican Gray Wolf	*Canis lupus baileyi*	E		Shortgrass plains, grassland, savanna, and montane areas	Habitat not present, Species not observed
Black-tailed Prairie Dog	Cynomys ludovicianus	C		Shortgrass plains	Habitat not present, Species not observed

Legend: C = Candidate for Protection; **E** = Endangered; **PT** = Proposed Threatened; **T** = Threatened

established, but some general trends have been noted. The Animas Phase (roughly AD 1150 to 1400) represents a distinct break in pottery style, site location, and architecture from the Classic Mimbres Phase, which preceded it. Around AD 1130, throughout the southwest, there appears to have been environmental instability and drought. Increased mortality, scrounging for foodstuffs, and social instability followed with a presumed outmigration from larger sites to smaller settlements at lower elevations near agricultural lands. Other researchers connect the Animas Phase as an outlier of the Casas Grandes culture of Northern Mexico. Environmental conditions in the lowlands prior to the extensive grazing of the more recent past would have provided broader range of food resources for prehistoric inhabitants than is apparent today (Stuart and Gauthier 1981). The region was not a major focus for Spanish occupation due to limited natural resources and Apache raiding, although it did provide a travel and trade corridor to what is now Mexico. Animas, south of the project area, was established in 1843 by Spanish settlers. The county seat and most important town, Lordsburg, was established in 1880 as a railroad stop. Silver and copper mining attracted other settlers around this time. Cotton City, the geographic place name nearest the project area was established later, centered around a cotton gin supported by local cotton farming (Julylan 1998).

A record search was conducted to determine whether any cultural resources have been recorded at or in the vicinity of the Proposed Action. The closest recorded archaeological site is LA 88047, which is located 1.5 mi (2.4 km) west of the AmeriCulture facility. It is southwest of the existing fresh water supply well across the paved road. LA 88047 is an artifact scatter containing lithics, ceramics, ground stone and six fire-affected rock concentrations. It has been attributed to the Mogollon Culture, San Luis Phase, dating to as early as AD 700, based on brownware sherds, although a similar pottery was in use up to AD 1400. There are no historic buildings and no known Native American or other cultural sites near any of the project areas (Ackerly 1992).
The Area of Potential Effect for cultural resources would be limited to those within the AmeriCulture project areas that could be physically disturbed by the construction of the proposed power plant, injection well, pipelines and related facilities. Cultural resource surveys were conducted for the proposed facilities in August 2001 and January 2002 by Ms. Katherine Roxlau and Mr. Kevin Doyle of Tetra Tech (Roxlau 2002). Much of the project area had been previously disturbed by prior activities. One isolated find was recorded in the area of potential effect, but no significant cultural resources exist within the entire development area. Consultation on this undertaking with the New Mexico State Historic Preservation Office (SHPO) is in progress.

3.6 INFRASTRUCTURE

Fresh water for the hatchery is supplied by an existing well located approximately 8,500 ft (2,600 m) to the west (Figure 2-2). The amount of water used at AmeriCulture is 50 gpm (190 lpm). Water used at the hatchery is filtered and recycled as much as possible. Discharge from the hatchery is pumped through a pipe to a containment pond just west of the greenhouses for evaporation. The land and water rights where the freshwater well is located are owned by the AmeriCulture owner's family. The water rights are leased to AmeriCulture. The pipeline to AmeriCulture from the freshwater well runs through an easement on private land.

Electrical power at AmeriCulture is currently supplied by power lines that connect to the site from the south. Power lines run parallel to the primary access road to the AmeriCulture site and enter the proposed project area from the south.

The local electric provider is Columbus Electric Cooperative, Inc., of Deming, NM. Columbus Electric serves approximately 2,500 members in Luna, Grant and Hidalgo Counties in New Mexico and Cochise County in Arizona. On June 30, 2000, the merger between Tri-State and Plains Electric Generating and Transmission of Albuquerque, NM was finalized. As a result, 12 New Mexico cooperatives including Columbia Electric became members of Tri-State.

Tri-State is owned by its 44-member rural electric systems (18 in Colorado, 12 in New Mexico, 8 in Wyoming and 6 in western Nebraska). The hub of the association's four-state network of transmission lines, substations and power plants is in Westminster, Colorado.

Tri-State's owned and contracted mix of electric energy is derived from coal, natural gas and oil-fired generation facilities located throughout its four-state member service territory. In addition, the association purchases Federal hydropower from the Western Area Power Administration, accounting for a substantial portion of the energy Tri-State sells to its 44-member systems. The association has exclusive wholesale power contracts with all of its members whereby each member is obligated to purchase all of its power requirements from Tri-State. Tri-State has contracted with several other utilities in the region to sell power that is not currently needed by its members.

Tri-State's 44 distribution systems directly supply electricity to rural residences, farms and ranches, cities, towns and suburban communities, as well as large and small commercial businesses and industries. Combined, they serve nearly 500,000 customers (based on electrical metering devices) in a 250,000 mi^2 (650,000 km^2) area. Tri-State owns (wholly or jointly) or has maintenance responsibilities for over 5,300 mi (approximately 8,500 km) of transmission line ranging from 69 kV to 345 kV.

The Tri-State generating facility closest to the project site is the 250-MW Plains Escalante Generating Station, known as PEGS, located near Prewitt, NM, approximately, 220 mi (350 km) to the north.

There are no natural gas utilities at the proposed project site. Heating for the greenhouses and the office is provided by geothermal heat. The trailers at the site that provide temporary quarters for some employees use propane for heating and cooking. Sanitary wastes are discharged to a septic system.

Roads. The project site is accessed by a paved road running approximately 2.5 mi (4 km) east from New Mexico State Road 338 (NM 338). NM 338 provides north-south access to the area. United States Highway 80 (US 80) also provides north-south access to the area approximately 6.5 mi (approximately 11 km) west of the project site. I-10, the major east-west artery for southwestern New Mexico passes the project site approximately 10 mi (16 km) to the north. Other east-west access is provided by NM 9 approximately 15 mi (24 km) to the south.

3.7 ACOUSTIC NOISE

Acoustic noise is defined as sound that is undesirable because it interferes with speech, communication, or hearing; is intense enough to damage hearing; or is otherwise annoying. The physical unit most commonly used to establish a unit of measure that accurately compares sound levels is the decibel (dB). The decibel represents a relative measure or ratio to a reference pressure. The reference pressure is a sound approximating the weakest sound that a person with very good hearing can hear in an extremely quiet room. The reference pressure is 20 micropascals, which is equal to 0 (zero) dB.

A-weighted sound levels (dBA) are typically used to account for the response of the human ear. A-weighted sound levels represent adjusted sound levels that are made according to the frequency content of the sound. Therefore, the dBA is a good correlation to a human's subjective reaction to noise. Table 3-4 presents typical environmental noise on a scale from 0 to 110 dBA.

While the overall project region has the typical low noise level of many rural areas (around 30 to 40 dBA), the area immediately around the proposed project area has a higher level of noise. In the region, the background noise is primarily due to natural sources like wind, thunder, and animals. In the vicinity of the proposed project area, the man-made sources of noise in the area include the operational activity at the AmeriCulture fish hatchery and the Burgett's greenhouse (see Figure 2-2). These noise sources consist of the pumps and fans at the existing AmeriCulture operations, vehicles, and the Burgett turbine power generator. Workers at AmeriCulture experience an estimated noise level equivalent to a commercial/light industrial area, around 60 dBA.

There are two nearby residences. One is the residence of the owner of AmeriCulture. The closest noise receptor not associated with these operations is the residence located about 375 ft (114 m) southwest of the proposed power plant site. With these sources of noise, the maximum background noise level experienced by the nearby receptor is estimated to be around 50 dBA.

3.8 VISUAL RESOURCES

Visibility in the area is generally high. High dust levels, which are typical of the Basin and Range Province, also reduce visibility when strong winds occur during dry weather. Occasionally there is blowing snow in the winter.

The visual foreground in the area of the proposed project is of flat scrubland where there are no structures. The structures in the area include the AmeriCulture greenhouses and office, the Burgett greenhouses to the southeast, a residence to the southwest, and a pipe structure to the northeast that could be the exposed framework for a greenhouse or storage structure. There are also various pieces of old equipment, small tanks, pipelines, power poles and power lines in the foreground. Between the project site and the neighboring residence, a few old school buses are stored on the neighbor's land. The land is very flat so the foreground blends into the mid-ground views. In winter, steam plumes from the greenhouses to the south can be seen. The background view is of the mountains that border the basin to the east and west.

Table 3-4. Comparative A-Weighted Sound Levels

Common Outdoor Sound Levels	Sound Level (dBA)	Common Indoor Sound Levels
	110	
Jet flyover at 1000 ft (300 m)		Rock band
	100	
Gas lawnmower at 3 ft (0.9 m)		Inside subway train
	90	
Diesel truck at 50 ft (approximately 15 m)		Food blender at 3 ft (0.9 m) Garbage disposal at 3 ft (0.9 m)
Noisy urban daytime	80	
		Shouting at 3 ft (0.9 m)
Gas lawnmower at 100 ft (30 m)	70	Vacuum cleaner at 10 ft (3 m)
Commercial area	60	
Heavy traffic at 300 ft (91 m)		Normal speech at 3 ft (0.9 m)
		Large business office
		Dishwasher in next room
	50	
		Small theater, Large conference room (background)
Quiet urban nighttime	45	
		Library (background)
Quiet suburban nighttime	40	
		Bedroom at night Concert hall (background)
Quiet rural nighttime	30	
		Broadcast and recording studio (background)
	10	
	0	Threshold of hearing

The primary viewpoints in the area are from the neighboring residence and NM 338. The view of the AmeriCulture facilities from the neighboring residence is obscured in the foreground by brush, fences, and the old school buses. In the midground, the tops of the AmeriCulture facilities can be seen. The residence also looks over the Burgett greenhouse operations. The largest number of viewers would be traveling along NM 338. From NM 338, both the AmeriCulture facilities and the larger Burgett facilities can be seen in the mid-ground. In winter, the steam plumes from the Burgett facilities are noticeable. The background views of the mountains are unimpeded along this stretch of NM 338.

3.9 LAND USE

A wide variety of land use/landcover categories are present in the Animas Basin system. Rangeland is the major land use category with forest areas exclusively located in the highest

parts of the mountain ranges. Basin floors at the system's northern end include a mix of rangeland, sparsely vegetated to barren playas and dune lands, and the area's only sites of urbanization and irrigation agriculture. Lordsburg is the major urban center with the smaller communities of Animas and Cotton City located in the Lower Animas valley agricultural area. Irrigated crop acreages in 1995 were reported at 1,015 acres (411 ha) in the Lordsburg "Valley" and 7,322 acres (2,963 ha) in the Animas valley (NMWRRI 2000).

The area in the vicinity of the project site is primarily used for grazing. The grazing is not very intensive, as the suitable vegetation is sparse. There are two light "industrial" operations in the immediate area. These are the AmeriCulture fish hatchery and the Burgett greenhouses. Both of these operations lease geothermal resources. There are two nearby residences; one, approximately 1,500 ft (460 m) to the west of the AmeriCulture facilities is the residence of the owner of AmeriCulture. The other residence is closer, approximately 300 ft (90 m) to the southwest of the AmeriCulture facilities.

3.10 SOCIOECONOMIC RESOURCES

This section provides an overview of social and economic conditions present in Hidalgo County, NM. Hidalgo County is an appropriate socioeconomic region of influence (ROI) because any potential socioeconomic effects of the Proposed Action would likely occur within this geographic area and the current data is available for this area. Social and economic conditions include a baseline description of affected communities, population, ethnicity, social groups, economic indicators, and community services and facilities.

Hidalgo County shares borders with Arizona on the west, Mexico on the south and the east, and Grant and Luna Counties on the north and east. Hidalgo County includes 3,447 mi^2 (8,930 km^2) of land with 86 linear miles (140 linear km) on the international border. Lordsburg is the county seat and the most populous city with 2,921 residents (Census 2001). The project area is located approximately 16 mi (26 km) southwest of Lordsburg. All project activities would be sited on lands in unincorporated parts of the county.

Population and Demographic Characteristics. Population and demographic information is presented for comparison purposes in Table 3-5. In the population category, Hidalgo County ranks 27 out of 33 counties in New Mexico with a population in 2000 of 5,932. It has declined in population since the 1990 census. Much of this decrease can be attributed to the closure in 1999 of the Phelps-Dodge copper smelter in Playas. The ethnicity and racial breakdown of the county population is more homogenous than the state overall with significantly lower percentages of Native Americans. A higher percentage of the county population reports as Hispanic/Latino origin than in the state or Nation (ADE 2001, Census 2001). While there has been an outmigration of both Hispanic/Latino and Anglos (non-Hispanic whites) from the county from 1980 to 2000, the percentage of persons reporting Hispanic/Latino origin has increased by 4 percent in the last 20 years (BBER 2000a, Census 2001). Over 90 percent of the Hispanic population of New Mexico is native-born; but there is some immigration, primarily from Mexico. Although Hidalgo County is on the border, the estimated net international migration (the difference between immigration and emigration) to Hidalgo County from 1990 to 1999 was only 155 persons (BBER 2000b). Given that annual Border Patrol apprehensions in the county numbered over 5,500 in 1999, Hidalgo County is not generally the final destination of choice for

legal or undocumented immigration (UA 2001). Prior to the recent economic downturn, the population of the county was expected to increase to 6,823 by 2010 and 7,282 by 2030 (BBER 1997).

Economic Characteristics. In 2000, Hidalgo County had an average labor force of approximately 1,974 workers (BBER 2001). Prior to 1999, the largest industries were durable goods manufacturing; state and local government; retail trade and services (BEA 2000c). Economic statistics, which include the full impact of the subsequent closure of the Phelps-Dodge copper smelter in 1999, have not been compiled but the loss of this employer is reflected in outmigration and the high unemployment rate. Phelps-Dodge and its employees also accounted for 40 percent of the tax base of Hidalgo County. In 2000, an average of 209 workers (10.6 percent of the workforce) were listed as unemployed; this number is over twice the national and state average (BBER 2001). The most recent monthly data from December 2001, however, shows an improvement to 7 percent (NMDL 2002). The current top three employers are the city of Lordsburg, Hidalgo County and the U.S. Border Patrol. Other major employers include various motels, service stations and restaurants on I-10, Hamilton James Construction, Burgett Geothermal Greenhouses, Saucedo's Supermarket, Phelps-Dodge, Western Bank and the two school districts (NMDL 2001, UA 2001). Table 3-5 compares the estimated median household incomes, personal income per capita, poverty rates, and unemployment rates for the Hidalgo County with the state and Federal government (Census 2001).

Table 3-5. Population, Demographics, Economic Characteristics, and Poverty Status [1]

POPULATION GROUP	HIDALGO COUNTY 2000	NEW MEXICO 2000	UNITED STATES 2000
Total Population	5,932	1,819,046	281,421,906
White	83.8%	66.8%	75.1%
Black	0.4%	1.9%	12.3%
American Indian, Eskimo, or Aleut	0.8%	9.5%	0.9%
Asian	0.3%	1.1%	3.6%
Native Hawaiian or Other Pacific Islander	0.0%	0.1%	0.1%
Other Race	11.9%	17%	5.5%
Two or More Races	2.9%	3.6%	2.4%
Hispanic/Latino Origin (any race)	56.0%	42.1%	12.5%
White, Non-Hispanic/Latino Origin	42.7%	44.7%	69.1%
Unemployment Rate	10.6%	4.9%	4.0%
Personal Income per Capita	$17,015 (1997)	$19,298 (1997)	$25,288 (1997)
Median Household Income	$28,400 (1997)	$30,836 (1997)	$38,885 (1997)
Living in Poverty	22.6% (1997)	19.3% (1997)	13.3% (1997)

[1]Original data is gathered from a variety of sources and may have been derived using different methodologies. Race and ethnic categories are based on self-reporting during the decennial census.
Source: Census 2001.

In 1996, approximately 396 people in Hidalgo County had wage or salary jobs in agriculture (NMDA 1996). Although relatively few people are employed in agriculture or raising livestock,

the actual importance of ranching and agriculture to the economy of Hidalgo County is much larger because many self-employed proprietors depend on agriculture for their income, which does not show up in employment statistics (ADE 2001). Hidalgo County ranks number 18 among the 33 counties in New Mexico in agricultural sales. The cash receipts for the agricultural sector in 2000 totaled over $27 million (NMDA 2001). Principal crops are chile, cotton, feed corn, hay, wheat and cut flowers. The sale of cattle has declined in importance since 1993 and 1998, as it has in most of the counties of southwest New Mexico. The dollar value of livestock declined during that period from $29.5 million to $10.6 million (ADE 2001).

Community Resources and Social Services. This section describes community resources such as housing, schools, health services, public safety, and fire protection. According to 2000 census figures, there were 2,848 occupied housing units in Hidalgo County, an increase of 18 percent from 1990. Homeownership rates are 67.9 percent, slightly less than the state average (Census 2001).

There are two school districts in Hidalgo County, the Lordsburg Municipal Schools and the Animas Public Schools. Public educational institutions in Lordsburg, NM include 3 elementary schools, 1 middle school and 1 high school with 874 students enrolled. Animas Public Schools, near the project area operate 1 elementary, 1 middle and 1 high school with a total enrollment of 457 students (NCES 2002). There is one private primary school in Lordsburg, but no public or private colleges or universities (NMDE 2002).

There are no hospitals in Hidalgo County. Hidalgo Medical Services in Lordsburg provides primary care and a variety of medical, mental health and dental services. The center employs a staff of 42 with 3 full time primary care providers and dentists. Those requiring extensive treatment or major emergency care must be transported to hospitals in Arizona, Deming or Silver City, depending on the location and treatment needs. The county operates its own ambulance service, which is based in Lordsburg, NM (NMBJ 2002). Fire protection in Hidalgo County is provided by volunteer fire departments. The Hidalgo County Sheriff's Department consists of an elected sheriff and undersheriff, 10 patrol deputies, and detention personnel. The sheriff's department also oversees the central dispatch for the county, which averages 600 calls per month for police, fire, medical and animal control. Because of the large unpopulated border area, the costs of law enforcement, criminal justice, emergency and indigent health services to address illegal immigration and smuggling is a major burden to the limited public resources of Hidalgo County (UA 2001).

3.11 ENVIRONMENTAL JUSTICE

On February 11, 1994, President Clinton issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.* This Executive Order requires Federal agencies to identify and address disproportionately high or adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income populations. Consideration of environmental justice concerns includes race and ethnicity data and the poverty status of populations within the ROI (defined as Hidalgo County, see Section 3.10 above), as shown in Table 3-5.

Environmental justice impacts occur if there are any disproportionately high and adverse human health or environmental effects on minority or low-income populations. The 1997 median household income in Hidalgo County was $28,400 and 22.6 percent of the residents were classified by the U.S. Census Bureau as living in poverty, a higher percentage than in New Mexico or in the United States (Census 2001). There are no updated income and poverty data available, which would include the probable changes in these economic indicators due to the closure of the Phelps-Dodge smelter. Minority populations as defined by the U.S. Census Bureau are present in the ROI.