

Cumulative Impacts

Note: The following chapter has been substantially revised based on comments received on the DEIS from EPA (see Volume II).

5.1 Introduction

This section addresses potential cumulative impacts to the environment that could be associated with the implementation of the proposed U.S. 93 Hoover Dam Bypass Project in concert with one or more other past, present, or reasonably foreseeable future actions or projects. Specifically, this section is prepared in accordance with the requirements of NEPA and guidance from the Council on Environmental Quality (CEQ), Considering Cumulative Effects Under the National Environmental Policy Act. The CEQ regulations define a "cumulative impact" for purposes of NEPA as follows:

Cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR §1508.7).

This cumulative impacts section gives emphasis to the actions or projects that are likely to cause the most significant cumulative impacts (i.e., projects that would occur relatively close to the project site). For other transportation projects in the region, this cumulative impacts section focuses primarily on the potential impacts of reasonably foreseeable future actions. The impacts of past and present actions are also discussed, but in less detail and in a more qualitative manner.

5.2 Cumulative Impacts Analysis

5.2.1 Other Actions/Projects Included in the Cumulative Impacts Analysis

The following criteria were considered in identifying those past, present, or reasonably foreseeable projects that could result in cumulative impacts:

- Projects that have an application for construction and/or operation pending before an agency with permit authority
- Projects that are listed on the Arizona Transportation Improvement Program (STIP) or the Nevada STIP
- Projects that have the potential to generate environmental impacts that, when addressed collectively with the proposed project, could result in cumulative impacts to the environment
- Projects that are of a similar character, could affect similar environmental resources, or are located in geographic proximity to the proposed project

5.2.2 Scope of the Cumulative Impacts Analysis

The geographic area addressed in this analysis varies according to the nature and characteristics of each environmental resource. Two geographic areas are defined to categorize this analysis. A description of each follows:

1. The first area is the vicinity of the proposed project and includes the area within the NHL boundary, portions of the HDR boundary, and portions of the LMNRA (see Figure 2-3).
2. A second area encompasses a substantial portion of the surrounding desert region, a geographic area generally corresponding to the Las Vegas and Henderson urban area in Clark County, Nevada, and Mohave County, Arizona. This geographic area is used to include a broader range of other projects and environmental resources well beyond the immediate vicinity of the proposed project.

5.2.3 Timing and Duration of Other Actions/Projects

For each of the projects addressed in this analysis, the time period in which it would be implemented, including construction and operational phasing, is defined. Information on the timing and duration for the other projects was obtained from applicant proposals, when available. When this information was not available and could not otherwise be obtained through reasonable efforts (e.g., direct contact with applicants), professional judgement was used to estimate a reasonable time frame to complete the regulatory review and permit issuance processes needed for implementation of the other projects.

5.2.4 Future Time Horizon of the Proposed Project

A horizon has been selected to discuss potential cumulative impacts of the Hoover Dam Bypass and other past, present, and reasonably foreseeable projects. The time horizon for the Sugarloaf Mountain Alternative, the preferred alternative, is 7 years, the approximate time to complete design and construction.

5.2.5 Cumulative Projects Data and Information

Each of the projects addressed in this cumulative effects analysis is supported by different levels of information, depending upon the current status of the particular project. For future projects, this information ranges from a simple project description, identifying its goals and objectives, to a comprehensive environmental review performed in accordance with NEPA or other state or local environmental regulations. For past projects, relevant agencies or departments were interviewed about documents that might discuss the history of the project, including past project impacts.

This analysis uses the level of information available at the time this EIS document was prepared to describe these other projects and their respective potential impacts on the environment. If sufficient data or information on specific aspects of the proposed project were not available to complete an analysis comparable to the evaluation of other projects, and reasonable efforts to obtain that information were unsuccessful (as in the case of the U.S. 95 widening in Nevada), professional judgement was used to estimate the potential impacts.

5.2.6 Reasonable Forecast Analysis

In accordance with the CEQ guidance, this analysis assesses future cumulative effects for projects that can be reasonably forecast. This includes those projects that are currently funded or for which other NEPA analysis is being prepared, and those that are being considered but have not reached a funding or environmental document stage.

5.3 Methods Used for Identifying Other Past, Present, and Reasonably Foreseeable Actions/Projects

Several methods were used to identify other past, present, and reasonably foreseeable projects that could, in concert with the proposed Hoover Dam Bypass, contribute to cumulative impacts on the environment. For projects occurring on lands administered by federal agencies, the agency with primary land management authority identified projects that could potentially contribute to cumulative environmental effects. These agencies include the following:

- ADEQ
- ADOT
- AGFD
- FHWA
- Los Angeles Department of Water and Power
- NPS
- Nevada Department of Conservation and Natural Resources
- NDOT
- WAPA
- Reclamation
- USFWS

Surveying other land management authorities within the southeast Nevada/western Arizona region identified other projects. These surveys consisted of informal inquiries designed to acquire existing available environmental documentation and project descriptions. Concerning other projects located on private properties in the vicinity of the proposed bypass, the Clark and Mohave County Planning Departments determined that there are no applications or proposals for specific plans.

5.4 List of Past, Present, and Reasonably Foreseeable Actions/Projects and Respective Environmental Impacts

The actions or projects that could result in changes to the local environment (and result in cumulative impacts when combined with the proposed project) would include any actions proposed by NPS and Reclamation, and highway projects proposed by NDOT, ADOT, or local jurisdictions such as Clark and Mohave counties.

NPS and Reclamation administer the land in the immediate vicinity of Hoover Dam. No new actions or projects are proposed within the project area by these two agencies; therefore, no environmental impacts (such as biological, cultural, air quality, noise, recreation, visual, or aesthetic) would result and, consequently, the proposed project would not contribute to significant cumulative impacts. Similarly, no projects are proposed by

Clark and Mohave counties in the immediate project vicinity that would contribute to cumulative environmental impacts with the proposed project.

ADOT and NDOT each have two reasonably foreseeable future projects. NDOT plans to begin improvements (widening the two-lane segments to four-lane, median divided) to U.S. 95 from the California/Nevada state line to the U.S. 93 intersection west of Boulder City. Further, NDOT is currently preparing an environmental document for U.S. 93 improvements from the western terminus of the Hoover Dam Bypass project to U.S. 93 about 1 mile north of Railroad Pass Casino, west of Boulder City. ADOT is currently constructing improvements on Arizona SR 68 from MP 1.2 to MP 14.5. Further, ADOT plans to begin a preliminary study for improvements to U.S. 93 from the LMNRA eastern boundary to the eastern terminus of the Hoover Dam Bypass project.

5.4.1 Past Actions/Projects Near and Within the Project Vicinity

In its natural state, the Colorado River flowed unimpeded some 1,700 miles with a vertical elevation drop of more than 14,000 feet from its beginnings in the southern Rocky Mountains and eastern Great Basin to its terminus at the Gulf of California. The lower portion of the river from the Grand Canyon downstream was typically low gradient and flowed through a rather broad alluvial valley with relatively few confined reaches. At its mouth was an alluvial delta containing vast marshes, riparian forests, and backwaters. Such habitats were present along the entire reach of the lower river. The riparian belt extended away from the river for up to several miles, where the water table was relatively shallow.

Seasonal flooding resulted in the creation of several distinct communities of plants and animals. High water occurred around June, with low flows occurring during the winter months. Riparian communities were in a constant state of succession as the river, on a seasonal basis, was constantly depositing new sediment, shifting its channel, and creating and destroying habitat. Floodplain communities developed in areas prone to extended periods of inundation, and the aquatic community evolved consisting of a main channel with separate or connected oxbows and backwaters.

The overall ecosystem of the lower Colorado River today is quite different from that which existed prior to modern day use and development. During historic times, the area surrounding the Hoover Dam was used for a wide variety of purposes. Past activities in the project area and vicinity included cattle grazing, hunting, and mining for turquoise, gold, and silver. Mining occurred in the late 1800s and early 1900s in several areas within about 5 miles of Hoover Dam. Turquoise mining occurred near the location of the Hacienda Hotel; gold and silver mining occurred in locations on the Arizona side of the dam. Cattle grazing and hunting historically occurred in the project vicinity, but were not allowed near Hoover Dam (personal communication, Bill Burke, NPS, 1998).

The project area and vicinity currently consist of a mixture of land uses and facilities. Current uses and facilities include the dam and related hydroelectric facilities, a utility corridor (transmission towers and lines), a transportation corridor (U.S. 93 and access roads to the dam, lake, and river), and developed recreation facilities (visitors' center and parking garage at the dam, boating facilities, rafting and canoeing facilities, hiking trails, hot springs, and scenic lookouts).

These past and present activities, in addition to future planned projects, have and will continue to have a variety of impacts on the environment in the vicinity of Hoover Dam. These projects are described below in chronological order from past to future.

5.4.1.1 Construction of Hoover Dam

In 1928, Congress passed the Boulder Canyon Project Act authorizing construction of Hoover Dam. (Hoover Dam has also been called Boulder Dam; Congress made the name Hoover Dam permanent in 1947 after Herbert Hoover, the 31st President of the United States, who strongly supported construction of a high concrete dam on the Colorado River.) Construction of Hoover Dam began in 1931, and the last concrete was poured in 1935 – exactly 2 years, 1 month, and 28 days ahead of schedule. Hoover Dam's reservoir, Lake Mead, is America's largest man-made reservoir and can store 28.5 million acre-feet (9.2 trillion gallons) of water, or nearly 2 years of the river's average annual flow. (An acre-foot of water could cover a football field to a depth of 1 foot.)

Direct Impacts of Dam Construction

In order to construct Hoover Dam, engineers first drove a diversion tunnel through the wall of the river canyon from a point upstream of the dam site to a point downstream. They then lined the tunnel with concrete and built inlet and outlet sections to minimize flow turbulence. Cofferdams (watertight structures that allow exposure of the riverbed) were placed across the river above and below the dam site to divert the water into the tunnel and prevent it from backing up into the dam site. During construction of Hoover Dam, the Colorado River was diverted into four 56-foot-diameter tunnels averaging more than 4,000 feet in length. These tunnels were drilled and blasted out of the rock walls on either side of the river. Tunneling activity reached its peak in January 1932, with as much as 16,000 cubic yards of rock being hauled away every day by the truck fleet. The construction of the cofferdams required the removal of nearly 213,000 cubic yards of river silt from the bed of the Colorado River, which was replaced by sand and gravel and covered with concrete.

These activities completely altered streamside communities in the construction zone. The river could no longer supply water to flora and fauna along the natural stream course, and organisms that move with the stream flow had no natural bank habitat to supply them with nutrition and cover. After they diverted the river, work crews cleared the vegetation from the dam construction and reservoir areas. Thus, riparian habitat was directly destroyed. Dam construction required excavation of foundation and abutment areas for the dam. First workers dredged the area and removed all earth, sand, gravel, and loose rock, directly destroying riparian vegetation. Digging in the river bottom may have lowered the water table and made water inaccessible to established vegetation root systems. Additional rock was drilled, blasted, excavated, loaded, and removed so that the dam could be constructed on solid bedrock.

Facilities, such as roads, buildings, minor utility pipelines, surfaced areas for parking, and storage areas, were developed to facilitate construction. For the Hoover Dam construction, power lines were also strung across the Mojave Desert from San Bernardino and Victorville, California, to a substation on a rocky promontory near the canyon rim to provide power for all machines and illuminate the entire dam site, including tunnels.

As part of the necessary infrastructure for the construction of the dam, the Boulder Canyon Project Federal Reservation was created. This 144-square-mile area in the Eldorado Valley included the dam site, the lower portion of the future reservoir, the site of Boulder City, and

vast stretches of open territory around the town. This area was under federal control and, unlike the surrounding jurisdictions, gambling, the sale of liquor, and other practices deemed injurious to the workers and the orderly progress of work were strictly prohibited. The town, named Boulder City, included eight 172-man dormitories, one 53-man office dormitory, more than 600 family cottages, a mess hall and recreation hall, an office building, company store, laundry, and a 20-bed hospital. Sewer and water lines were laid out and hooked up, and nearly 20 miles of streets were paved. Reclamation spent well over a million dollars constructing the administration building, government residences, and landscaping for streets and parks. Privately financed structures housing various independent businesses sprung up along Nevada Highway, the main street in town. The key to this transformation of the Eldorado Valley was a network of elaborate, expensive pumps and pipes that carried water from the Colorado River out of Black Canyon to the town (Stevens, 1988).

After the construction of Hoover Dam was completed, a large portion of Boulder City was razed, as required by the government contract. This included hundreds of cottages, half a dozen dormitories, the mess hall, the recreation hall, and many other structures. The southern half of the city was returned to a state closely resembling its predam condition. Two dormitories were set aside to house Civilian Conservation Corps workers working on the Boulder Dam National Recreation Area, and a number of cottages were resold and hauled offsite for other uses. However, the landscaping remained and some of the original buildings are still standing, including the hospital, Grace Community Church, the Boulder Dam Hotel, and a number of enlarged and renovated cottages (Stevens, 1988).

On February 29, 1936, Hoover Dam and its powerhouse were accepted as complete. In addition to the direct, adverse, environmental effects of the dam's construction, there were immediate beneficial effects, which included water and power for the Los Angeles metropolitan area and water and flood protection for the fertile agricultural lands of Southern California and Arizona.

In general, the development of Hoover Dam and its associated facilities involved construction activities that likely resulted in temporary localized impacts on air quality, ambient noise levels, water quality, recreation resources, and aesthetic and visual resources. Impacts on local air quality would have likely occurred from construction equipment and vehicles traveling on dirt roads and during earth-moving activities. The impacts from increases in ambient noise levels would have resulted from the construction equipment, vehicles, and personnel constructing the various projects. Impacts to local water quality and riparian ecosystems could be expected to have occurred where construction activities, including scaling of the cliffs in Black Canyon, were conducted near Lake Mead, the Colorado River, or any of the washes or other water bodies in the project vicinity. The impacts to aesthetic resources would have occurred from the presence of the construction vehicles, equipment, and personnel, the dust and noise generated, and the change to the landscape that resulted. All of these impacts are construction related, specific to the projects' locations, and once the projects were completed, the impacts ceased and natural systems (air, water, vegetation, and wildlife) adapted and stabilized. Furthermore, prior to development of the dam, there were no permanent human receptors or habitations sensitive to noise, air, and aesthetic impacts – only construction workers and visitors to the construction site.

Long-term impacts to cultural resources occurred during project construction because of both the disturbance to the cultural resource sites and the imposition of new facilities

changing the setting and accessibility of cultural resource sites. Consultations with Native Americans for the DEIS provided numerous comments from tribal informants that construction of the dam and impounding of the waters of Lake Mead had a serious adverse effect on the traditional cultural landscape.

Substantial long-term visual effects on the environment occurred. After project construction was completed and the construction vehicles and equipment were removed, the change to the landscape from the dam and Lake Mead was dramatic and profound, and it was unlikely to revert to its preproject conditions.

The development of Hoover Dam and its associated facilities also contributed in a beneficial manner to the local and regional economy, local recreation resources, transportation and circulation in the area, and public utilities across the southwestern United States. This project, constructed during the Great Depression, employed a large number of previously unemployed workers. This work and the paycheck it provided enabled employees and their families to move from the tents and shacks north of Las Vegas to Boulder City, and to forego the soup kitchens in Las Vegas. Beneficial economic effects were realized regionally during construction from the purchase of materials, goods, and services in the local area and region. Construction personnel working on these projects contributed to secondary spending by their individual purchases of goods and services. Additionally, some workers made a large impact to the economy of Las Vegas by gambling away the majority of their paychecks during their days off.

Benefits to recreationists occurred by the development of additional recreation facilities and opportunities in the area. Benefits to commuters, tourists, commercial truck traffic, and local and regional consumers accrued by the development of the local roadway and interstate highway system in the area and the creation of HDNHL, a major tourist attraction. The development of U.S. 93 provides a more direct route between Las Vegas and Kingman, improving interstate commerce and numerous recreation facilities and other types of establishments.

Loss of Riparian Vegetation. Filling the reservoir and operation of the dam severely impacts vegetation, both in the immediate area around the dam and downstream. When the reservoir fills, riparian habitat becomes inundated, directly destroying the submerged vegetation. Many of the plant species that are not submerged in the initial filling area are unable to tolerate the subsequent water-level fluctuations typical in reservoirs and die off, reducing habitat for wildlife. Terrestrial habitat shrinks in acreage as a direct result of inundation. The land-water interface in the project area increases, resulting in shifts in flora and fauna as the ecology changes from that of a river to that of a lake-like impoundment.

Because sediment is entrapped in the reservoir upstream of a dam, the downstream system receives essentially clear, "sediment-hungry" water. The clear water derives its equilibrium load by entraining bed sediments and eroding riverbanks. These actions decrease the floodplain width and, therefore, decrease the area available for establishment of riparian habitat.

If the normal pattern of seasonal flooding is altered as a result of dam operation, long-established patterns of soil fertility relationships will change as well. For example, riparian vegetation that depends on spring deposition of silt for seedling establishment will not be generated. Floodplain lakes, marshes, swamps, and ponds may not receive annual or seasonal replenishment of water and nutrients. Use of a dam for hydroelectric

generation can produce fluctuations downstream that shift conditions from those of a large stream to those of a small headwater in a short period of time.

Effect of Dams on Terrestrial Life. Many birds use the shores and banks of streams and rivers for nesting. Although reservoirs can increase the area of land suitable for nests, dam operation often causes unexpected fluctuations in water levels that wash away eggs or inundate nest sites.

Other birds use riparian trees for nesting, roosting, and hunting. Reservoirs often make open-water habitat out of streamside forests, killing the trees. The effect is beneficial for snag-loving birds, so long as the dead trees are left standing, but it is detrimental for birds that use living trees during their various life stages.

Reptiles and amphibians commonly lay their eggs on stream banks or in river shallows. Reservoir fluctuations prematurely end their development, as the eggs are either inundated or desiccated beyond their tolerance.

The development of Hoover Dam facilities resulted in long-term changes to biological resources. Impacts to biological resources typically occurred during the construction phase of a project, but they are considered long-term because of their effects on local habitats and species. Although the dam was constructed prior to the Endangered Species Act, substantial impacts likely occurred to both common and sensitive native plant and animal species.

Effects of Dams on Aquatic Life. Faunal remains in archaeological sites show that Colorado River fishes were caught and eaten by Indians, as well as early canyon explorers. Studies completed during the late 1930s, during and after the construction of Hoover Dam, noted faunal declines when compared to earlier studies. A 1944 survey of the lower Colorado River was the first to provide insight on both native and introduced fishes downstream from the new Hoover and Parker dams. Reductions in native species were attributed to environmental changes associated with damming (Hunt and Huser, 1988).

Impacts have resulted from changes to wetland vegetation along the river. Streamside vegetation is essential in maintaining the aquatic ecosystems that support fisheries. Roots of riparian plants stabilize banks, prevent erosion, and occasionally create overhanging banks that serve as cover for fish. Streamside trees and herbs decrease the amount of sediment passing into the water and keep water temperatures cool enough to support cold-water fisheries. Sedimentation blocks fish gill filaments and results in fish death by anoxemia and carbon dioxide retention. Sedimentation also decreases the oxygen supply to fish eggs, resulting in their death, and alters the habitat of the aquatic invertebrates that form the prey base for many fish.

Riparian vegetation also serves as a source of large organic debris, which distributes sediments in a stream and creates pool and riffle habitat for aquatic organisms. Organic debris is an important source of nutrition for aquatic ecosystems.

Alien fish also attracted early attention in research studies and surveys. Lake Mead changed the Colorado River in ways that enhanced lentic-adapted (i.e., adapted to living in still waters such as lakes, ponds, or swamps), non-native species, and reservoir sport fisheries became important regional resources. A remarkable array of both native and non-native species were used as bait, and bait and forage fishes escaped or were intentionally stocked to join and feed expanding game fish populations. Many alien fish

could not adapt to the environment or competition for resources and disappeared, but others became well established. The original fauna of 30 or so native species in the Colorado basin has increased to 80 or more, including species from as far away as Europe, Asia, and Africa. Few things seem to help native fish survive the presence of alien species, aside from strong evidence that flooding in canyons displaces non-native fish, while native species are unaffected. In fact, native fish are often enhanced by flood removal of predators and competitors. However, the effect is temporary, since alien fish from populations protected in reservoirs and ponds upstream soon reinvade the canyons (Hunt and Huser, 1988).

Establishment of Salt Cedar. Historically, the lower Colorado River ecosystem was a mosaic of different native vegetation communities comprised mainly of Fremont cottonwood, Goodding willow, honey mesquite, screwbean mesquite, quailbush, and arrowweed, as well as many other plant species. This ecosystem was extremely important to many wildlife species, especially neotropical migratory bird species. However, native plant communities began to change soon after the completion of Hoover Dam. The elimination of annual spring floods produced an environment more suitable for the establishment of salt cedar, an exotic plant introduced during the mid-1800s, than for the regeneration of many native species.

While many native species are very susceptible to elimination by fire, salt cedar thrives on it. Salt cedar drops its needles each year during the winter, producing a thick carpet of highly flammable duff within a short amount of time. Once a fire begins, it spreads rapidly through the salt cedar. After burning, salt cedar sprouts new shoots from roots, while many native species do not. Salt cedar also produces seed throughout almost the entire year, so it is ready to take advantage of any disturbance that occurs, including fire. Through these two mechanisms, salt cedar is able to outcompete native plants and has become the dominant plant species along many riparian areas in the Southwest, including the lower Colorado River. Many areas have become pure stands of salt cedar after wildfires have swept through. Unfortunately, salt cedar has limited value as wildlife habitat. Additionally, as the predominance of salt cedar increases along the Colorado River, so does the frequency of wildfires, thereby spreading salt cedar even more.

Potential Cumulative Impacts

The construction of Hoover Dam has resulted in long-term impacts to the immediate vicinity and surrounding region. The U.S. 93 Hoover Dam Bypass Project will have localized, long-term impacts to terrestrial wildlife, desert washes, and aesthetics of Black Canyon; therefore, the bypass will contribute to cumulative impacts in the project area. These impacts are discussed in more detail in Section 5.5.2.

May and June 1998 site visits and field interviews with Native American tribal elders, conducted for FHWA by the University of Arizona, resulted in completion of an ethnographic study report for the Hoover Dam Bypass project in December 1998. That report included preliminary findings, summarized in the DEIS, indicating the presence of potentially significant traditional cultural properties in the vicinity of the bypass project. Additional site visits and interviews were conducted during May 2000. The resulting report (FHWA, October 2000a), provided documentation supporting a determination by FHWA and the SHPOs that the Gold Strike Canyon and Sugarloaf Mountain TCP is eligible for the National Register of Historic Places. In the interviews with the tribal elders, there was a clear feeling expressed that the construction of Hoover Dam had a substantial adverse impact on traditional cultural values, including: inundating the Colorado River from which

traditional songs and power were derived; flooding Native American village sites, a salt trail, and salt mines; destroying ancient fishing places; bringing pollution, public access, and vandalism to traditional lands; impacting the land with numerous power transmission towers; and overdeveloping the area for recreation. The Hoover Dam Bypass will have an adverse effect on the TCP and is discussed in Section 5.5.1.

5.4.1.2 Hoover Dam Visitor Center and Parking Facilities

The new visitor center and parking garage was opened at Hoover Dam in 1997. The Finding of No Significant Impact (FONSI) for the Visitor Center and Parking Facilities (September 20, 1979) concluded that there would be slight social and economic impacts. Reclamation, in consultation with the Nevada and Arizona SHPOs, determined that the project would have an adverse effect on the HDNHL. That effect was addressed through design review stipulations in an MOA signed by the federal ACHP on April 9, 1991.

Impacts on wildlife and vegetation were determined to be extremely small, almost nonexistent, and only temporary in nature because they would cease at the end of construction. Impacts to natural vegetation and archaeological sites that may have been present in the project area were minimized or avoided because they were destroyed or covered with concrete when the dam was initially constructed. The remaining natural vegetation is located on the canyon walls, and very little of the project occurred in that area.

The project was found to have beneficial effects by improving safety, relieving congestion, and providing a more efficient means of operation, particularly of the visitor services. Visitors would no longer have to wait for long periods in extreme heat and would be able to take the tour in a much more enjoyable and efficient manner. The project was determined to be in harmony with the designs, aesthetics, and the operation of the dam, and would provide for a continuity of design and purpose. The project features were designed so that they would blend with the existing dam and facilities.

Potential Cumulative Impacts

According to the FONSI, construction did not result in impacts that were more than minimal. As a result, this project, in combination with the proposed Hoover Dam Bypass, would not result in any cumulative impacts.

5.4.2 Present Actions/Projects Near and Within the Project Vicinity

This section focuses on federal, state, and local agency management plans and programs affecting the environmental resources in the project area. Detailed references for these plans and programs can be found in EIS Chapter 9.

5.4.2.1 Lake Mead General Management Plan

NPS's Lake Mead General Management Plan, approved in 1986 for a 25-year or longer period, follows a strategy that centers on accommodating increasing visitor use while protecting the area's most outstanding natural and cultural resources. It also addresses visitor use and flash flood safety problems that face most developed areas.

Solving existing crowding/congestion problems and accommodating projected increases in visitation would require expansion and improvement of existing developed areas, circulation improvements, improvement of existing shoreline access points, and establishment of new developed areas. The Management Plan establishes maximum levels

of development that could accommodate increasing use in the future, while not exceeding reasonable capacity limits. These are maximum levels, not goals; development within the maximum levels would occur only when demand and economic feasibility justify the expansion (NPS, 1986).

The Management Plan has resulted in and will continue to result in the following primary impacts during the 25-year projected life of the plan:

- Improvements in water quality in beach areas
- Destruction of or severe damage to soils, causing minor disruptions in drainage patterns that would temporarily increase erosion potential
- Seismic exploration for oil and gas leases would have the potential to cause adverse impacts to bighorn sheep herds, although proposed mitigation measures and the assumption that activity would remain sporadic, as in the past, reduces these impacts to a less than significant level

Potential Cumulative Impacts

Management Plan impacts, when considered in conjunction with those from the Hoover Dam Bypass Project, may result in cumulative impacts to the bighorn sheep population. The plan will result in beneficial impacts to water quality, so the bypass would not contribute to cumulative water quality impacts. Similarly, the Hoover Dam Bypass Project is not expected to impact soils, so cumulative soil impacts are not expected. Cumulative impacts to the bighorn sheep population are discussed in more detail in Section 5.5.2.

5.4.2.2 Reclamation Endangered Species Conservation

As part of Reclamation's ongoing operations and maintenance activities, the agency has an ongoing program of endangered species conservation. These programs are defined in the Description and Assessment of Operations, Maintenance, and Sensitive Species of the Lower Colorado River (Reclamation, 1996). The activities range from very specific to broad multispecies conservation programs, and they occur within the immediate Hoover Dam Bypass Project area as well as in the surrounding region. Reclamation's endangered species conservation activities include the following programs.

Endangered Razorback Sucker and Bonytail Conservation. Reclamation has an active program for the conservation and recovery of endangered razorback suckers and bonytail. These activities are part of the current routine operation of the Lower Colorado River system. As part of the Lower Colorado River Multi-Species Conservation Program (MSCP) interim conservation effort, federal and state biologists met in July 1995 to prioritize and quantify recovery and conservation program needs for endangered fish and other species during the 1995 to 2005 period. The following programs represent some of the ways this is currently being achieved.

- **Native Fish Work Group.** The purpose of this program is to replace the aging population of adult razorback suckers resident to Lake Mohave with immature fish spawned by wild populations to maintain the population's genetic diversity and viability.
- **Willow Beach National Fish Hatchery.** Reclamation has been working with the USFWS at the Willow Beach National Fish Hatchery to retrofit portions of a cold water fish hatchery facility to rear native warm-water fishes. Heating systems have been designed and installed for the hatch house for initial rearing of eggs and larvae. Since the

initiation of this program, approximately 8,000 young razorback suckers have been reared for stocking into rearing ponds at Lake Havasu (Reclamation, 1996).

- **HAVFISH Project.** Reclamation is an active partner of the multi-agency, Lake Havasu Fishery Improvement Project, HAVFISH. One of the objectives of this program is to release 25,000 razorback suckers and 25,000 bonytail into Lake Havasu over the next 10 years.
- **Boulder City Golf Course Native Fish Rearing Project.** Reclamation and NDOW signed an interagency agreement with the City of Boulder City to use the ponds at the Boulder City Golf Course for rearing native fish. During 1994, the first lake on the course was drained, and a new liner and aeration system were installed. Approximately 1,400 juvenile razorback suckers were stocked in the ponds, and over 400 of these were stocked into Lake Havasu in 1995. This program has since expanded with the development of three more ponds on the golf course.
- **Hualapai Native Fish Rearing Facility.** Reclamation is providing technical and financial support to the Hualapai Tribe in northern Arizona for the development of a native fish rearing facility. This facility may raise razorback suckers, bonytail, humpback chubs, and other native fishes for reintroduction into the Colorado River and its tributaries within the Grand Canyon and on tribal lands.

Native Riparian Plant Restoration. Reclamation is maintaining and expanding the cooperative native riparian plant restoration programs initiated along the Lower Colorado River. These partnership activities include the establishment of native plant nurseries, demonstration plantings, enhancement projects, and research. Reclamation has committed at least \$100,000 per year for 5 years, beginning in 1996, for native riparian plant restoration.

Three-Finger Lake Project. In 1993, Reclamation and USFWS began a cooperative project to restore Three-Finger Lake, which is located on the California side of the lower Colorado River within the Cibola Division, south of Blythe. Approximately 120 acres of channels and shallow backwater areas, plus one 20-acre native fish rearing pond, were dredged. This project included the construction of the water intake system, protective levees and bankline structures, and the planting of native riparian vegetation.

Boulder City Wetland Project. The primary objective of the Boulder City Wetland Project is to demonstrate using reclaimed municipal wastewater to restore habitat for threatened and endangered species, and species of concern. Secondary objectives include public education and research on improving water quality and restoring habitat for sensitive species. The wetland receives Colorado River water blended with treated wastewater from Boulder City's wastewater treatment plant. The blended wastewater flows through a wetland system consisting of a stream containing shallow marshes and pools, then through four deep-water ponds. The stream and ponds contain a variety of native wetland plants and are bordered by native riparian plantings. Water from this wetland is used to irrigate turf at an adjacent Veterans Cemetery.

Lower Imperial Division Wetland Enhancement. This proposed cost-share project will restore and maintain streamflow of sufficient quality and quantity to enhance and assist in recovering and protecting riparian/wetland and aquatic fish and wildlife habitat. The proposed project extends from Imperial Dam upstream to Martinez Lake and encompasses a 9.5-mile reach of the lower Colorado River, including about 3,000 acres of riparian habitat

and wetlands and 22 backwater lakes. The area is used extensively by waterfowl, neotropical birds, sport fish, amphibians, mammals, songbirds, and other wildlife. Project objectives for the California and Arizona sides of the river include: restore the historical California channel, creating habitat for the endangered Yuma clapper rail and razorback sucker and for other species of concern; restore inflow and outflow to approximately 20 isolated backwater lakes adjacent to the river that have been partially or totally plugged by silt and vegetation; protect existing riparian stands of native cottonwood, willow, and mesquite; and restore and enhance wetlands.

Las Vegas Wash Wetland Restoration. Reclamation and NPS have entered into an agreement to construct two new wetlands totaling approximately 20 acres on the lower end of the Las Vegas Wash near its discharge to Lake Mead. These two multipurpose wetlands are designed to enhance marsh and riparian habitat within the eroded channel of the wash and also to provide for the polishing of perennial effluent flows. The purpose of this effort is to enhance habitat for the benefit of aquatic and riparian-dependent species.

MSCP Development. The Lower Colorado River MSCP is a cooperative federal/lower basin states/tribal/ private effort to conserve Endangered Species Act-listed and sensitive species dependent on the river. This program has the goal of benefitting more than 100 federal-, or state-listed, candidate and sensitive species and their habitats, ranging from aquatic, wetland and riparian, to upland.

As part of the development of this MSCP, Reclamation is generating a BA and requested formal Section 7 consultation on its present discretionary routine operations and maintenance. Reclamation has discretion in the following areas:

- Managing target elevations of Lake Mohave, Lake Havasu, and Senator Wash Reservoir
- Making determinations of surplus, normal, and shortage conditions
- Implementing Endangered Species Act Section 7 endangered species conservation measures, such as cooperative efforts to preserve the endangered razorback sucker and bonytail populations in Lake Mohave and elsewhere on the Lower Colorado River
- Making management decisions on actions that affect recreation, the natural environment, and private development (along with the activities), limited by the fact that such decisions do not result in a new or additional consumptive use of Colorado River water or violate other mandates as specified in the "Law of the River"

Potential Cumulative Impacts

The Endangered Species Conversation Program has been designed to result in a beneficial impact to the region's biological resources. These plans are resulting in the recovery of native fish populations in the Lower Colorado River, enhancement and restoration of wetlands, restoration of native riparian plant habitat, and the conservation of federal- and state-listed threatened endangered species and species of concern. As a result, the beneficial project impacts of the Species Conservation Program, when considered in conjunction with the project impacts of the Hoover Dam Bypass Project, do not contribute to cumulative impacts.

5.4.2.3 Clark County Desert Conservation Program

The desert tortoise was emergency listed as endangered in 1989 and was later changed to threatened status in 1990. Historically, when development occurred that required the taking of a special-status species, a Habitat Conservation Plan was necessary in order to obtain an incidental take permit. Because of the length of time between species listings and completion of Habitat Conservation Plans, and because of the rapid growth and development occurring in the Las Vegas Valley CCDCP, the program was to provide a mechanism to allow development to occur on tortoise habitat within Clark County in exchange for the conservation of publicly owned desert tortoise habitat outside the urban area. The intent was to achieve a balance between economic stability and long-term environmental preservation.

The program called for the preparation of a Short-Term Habitat Conservation Plan in 1990 and a Long-Term Desert Conservation Plan, which became effective in 1995. In 1995, USFWS approved the Long-Term Plan and granted a 30-year incidental take permit to Clark County. The plan is based on the funding of certain measures identified in the USFWS Recovery Plan for the Desert Tortoise. The source of funding is a \$550-per-acre mitigation fee on development. The permit area includes all private land within Clark County and all land that becomes private through any means.

Potential Cumulative Impacts

The proposed project would be constructed on federal lands and is not directly affected by the CCDCP. However, implementation of the preferred alternative would result in a loss of 120 acres of marginal habitat and, as indicated in Section 3.3.3 of the EIS, mitigation would be implemented to minimize impacts on the desert tortoise. Mitigation will include contributing project funds to the desert tortoise habitat conservation program, conducting preconstruction surveys, relocation of affected tortoises, and construction worker education regarding tortoises. With implementation of this mitigation, development of the proposed project would not contribute to cumulative impacts on the desert tortoise, nor would it conflict with the goals and objectives of the CCDCP.

5.4.3 Reasonably Foreseeable Future Projects

This section focuses on the reasonably foreseeable actions that are proposed or are in the planning stage that would occur near the project area. The actions evaluated are roadway improvement programs proposed for Nevada and Arizona. Provided below is a brief description of each of these highway projects and their anticipated short-term and long-term adverse impacts on the environment.

5.4.3.1 Boulder City/U.S. 93 Corridor Study

NDOT is conducting a Boulder City/U.S. 93 Corridor Study, the primary objectives of which are:

- Resolving traffic problems in the vicinity of Boulder City
- Extending freeway status to the U.S. 93/U.S. 95 interchange
- Improving operations at the junction of U.S. 93/U.S. 95
- Creating a safer transportation corridor
- Accommodating future transportation demand
- Improving system linkage on U.S. 93 and maintaining route continuity

In November 1999, NDOT began an environmental study of the segment of U.S. 93 between the Wagonwheel Interchange and the Hacienda Hotel. This project is in the environmental study stage, and no project alternatives or alignments have been selected; however, if there is a project as an outcome of the study, construction could begin as early as 2005. The eastern terminus of the project is coincident with the western terminus of the U.S. 93 Hoover Dam Bypass alignment. However, the Boulder City Corridor and the Hoover Dam Bypass are separate projects with independent utility, conceived to meet separate needs; each could be constructed without the other, and each would still fulfill its own objectives.

Traffic analysis conducted for the Hoover Dam Bypass indicates that, if constructed on the proposed timeline, the new bridge crossing does not generate additional traffic west of the dam. This is because there is not currently a noteworthy volume of traffic utilizing an alternate route.

If, however, the Hoover Dam Bypass were not constructed until 2027, the project would result in a 24 percent increase in traffic west of the dam and in Boulder City. This is because the gridlock at the dam would be so severe that a substantial percentage of traffic would seek an alternate route simply due to the extensive delays at the dam. Thus, if construction of the bypass occurs in 2027, vehicles using an alternate route would return to the bypass, resulting an increase in traffic of approximately 24 percent (see Appendix B).

Potential Cumulative Impacts

Depending on the timing of project development, construction activities associated with the Boulder City/U.S. 93 Corridor project could overlap with those of the Hoover Dam Bypass Project, resulting in temporary localized air quality, traffic, noise, visual, or water quality impacts.

Depending on site-specific conditions, a southerly bypass alternative around Boulder City would likely have long-term adverse impacts on desert tortoise and bighorn sheep, which are species also impacted by the dam bypass. The Boulder City/U.S. 93 Corridor bypass alternative would also have potential cultural resource and visual impacts on the undeveloped desert landscape to the north, south, and east of the city. However, the extent or location of potential environmental impacts and required mitigation measures are unknown at this time. Identification of impacts and potential mitigation measures will not be possible until project alternatives have been fully analyzed for the Boulder City/U.S. 93 Corridor. Despite this lack of early engineering information, the potential for cumulative impacts does exist for biological, cultural, Section 4(f), and visual resources. These are discussed in more detail in Section 5.5.2.

5.4.3.2 U.S. 93 Widening in Arizona

The ASTIP (December 1994) has identified the Phoenix to Nevada U.S. 93 corridor as one of the top priority corridors within Arizona. ADOT is programming and constructing various improvements along U.S. 93 in Arizona, from south of Wickenburg to Hoover Dam. Improvements will be phased consistent with funding levels and highway safety and capacity priorities. Ultimately, U.S. 93 will be widened to a continuous four-lane divided highway from Wickenburg to Hoover Dam.

ADOT will widen U.S. 93 to 4 lanes south from the new Hoover Dam Bypass interchange to the improved four-lane divided section 13 miles to the south at the LMNRA boundary. This segment of roadway is the final link between I-40 near Kingman and the Arizona terminus of the Hoover Dam Bypass Project. This widening could be done either

concurrently with construction of the Hoover Dam Bypass or soon after its completion. However, if the dam bypass is not constructed, the U.S. 93 widening will still proceed when ADOT determines traffic congestion in this restricted capacity two-lane section reaches unacceptable levels. If this widening is not completed, the 13-mile segment will create a regional traffic bottleneck between the proposed four-lane Hoover Dam Bypass and I-40, as well as south of I-40 to Phoenix (once the widening of U.S. 93 between Wickenburg and Kingman occurs).

Potential Cumulative Impacts

This work may occur either concurrently with or soon after construction of the Hoover Dam Bypass Project, potentially resulting in cumulative short-term impacts on air quality, traffic, noise, visual, and water quality. In addition, long-term impacts to biological, cultural, and parkland resources may occur, depending on site-specific conditions. However, the impacts could be reduced by reuse of some of the old highway alignment, which is already disturbed (see Section 5.5.2.2); there are several sections where this is a possibility. Nonetheless, the ADOT U.S. 93 widening project has the potential for cumulative impacts to biological, cultural, and Section 4(f) resources. These impacts are discussed in more detail in Section 5.5.2.

5.4.3.3 U.S. 95 Widening in Nevada

NDOT has a project listed in the long-range element of the Transportation System Projects list to widen the two-lane segment of U.S. 95 from the California/Nevada state line west of Laughlin to U.S. 93 west of Boulder City. This segment of U.S. 95 will be widened to a four-lane divided highway based on funding availability and traffic demand. Improvements to U.S. 95 will be a three-stage project. The first third to be designed and bid will be from Searchlight to a point approximately 18 miles north; \$18 million is funded and construction is targeted for fall 2001. The second third of the highway to be improved would be the southern 20-mile section; the anticipated cost is about \$19 million, and it would be constructed about 1 year later if funding is available. The final stage is the northern third of U.S. 95; it is approximately 18 miles long, would cost about \$18 million, and would be constructed as soon as funding became available.

Potential Cumulative Impacts

This program of improvements to U.S. 95 is in the very early planning stages, and few details about the project or potential environmental impacts are currently available from NDOT. Since the project is being funded and designed in three stages starting far south of Hoover Dam, there is no potential for cumulative short-term impacts from construction because the final stage will not likely be built until after completion of the Hoover Dam Bypass. Furthermore, no cumulative traffic operational impacts are foreseen because the highway users are different; most of the traffic on U.S. 95 is traveling to and from Las Vegas with no intention or need to go through Boulder City and/or Hoover Dam. Long-term impacts to biological and cultural resources may occur, depending on site-specific conditions; however, impacts will be very small because all of the work will be within previously disturbed right-of-way. Therefore, the NDOT U.S. 95 widening project has the potential for cumulative impacts to biological and cultural resources, but no engineering or environmental details are available at this time. NDOT is currently preparing an Environmental Assessment (EA) for the entire route (about 60 miles).

5.4.3.4 SR 68, Bullhead City - East, Widening in Arizona

From its junction with SR 95 in Bullhead City, Arizona, 14.6 miles of SR 68 is being widened (from MP 1.2 to MP 14.5) so that the roadway will have four travel lanes all the way to its terminus at U.S. 93. SR 68 is currently a four-lane roadway from MP 14.5 to U.S. 93, and it provides the only east-west roadway linking U.S. 93 near Kingman with Laughlin, Nevada, across the Colorado River from Bullhead City. ADOT traffic studies determined that a minimum of two eastbound and two westbound travel lanes were required to provide adequate operational characteristics and driver safety. This project is currently under construction. An environmental assessment (EA) was completed for this project in June 1999 (ADOT, 1999).

Potential Cumulative Impacts

Construction on this project was started in September 2000 and is scheduled to be completed in the fall 2001. Approximately 127 acres will be disturbed by project construction. The Draft and Final EAs for this project evaluate the potential for cumulative impacts to biological, Section 4(f), and visual resources. These impacts are discussed in more detail in Section 5.5.2.

5.5 Cumulative Environmental Impacts

Certain impacts associated with the proposed U.S. 93 Hoover Dam Bypass Project could arise which, in conjunction with impacts attributable to other projects (either in the immediate vicinity or with similar characteristics), could have the potential to result in collectively adverse effects to the environment that are of greater significance than those generated individually by the proposed project. Cumulative impacts could include those effects considered to be less than significant individually, but which could become significant when evaluated in relation to impacts from other projects.

5.5.1 Potential Cumulative Impacts

This section describes the cumulative impacts to environmental resources that could potentially arise with implementation of the proposed Hoover Dam Bypass Project in association with the other projects and programs described in this chapter. This discussion is presented by environmental resource areas. Because NPS, Reclamation, or Clark or Mohave counties do not propose development in or near the project area, no impacts on the environment would be expected, and the proposed project would not contribute to cumulative impacts. Therefore, the cumulative effect analysis focuses on the major roadway improvements that are planned to occur in the immediate vicinity of the proposed project and could result in environmental impacts that, when combined with those of the proposed project, have the potential to result in cumulative impacts.

5.5.1.1 Biological Resources

On June 3, 1999, USFWS issued its Biological Opinion for the Hoover Dam Bypass Project. This document represents the opinion of USFWS on the potential effects of the proposed bypass project on federally listed species under the Endangered Species Act of 1973. The Biological Opinion concluded that the project will not likely affect the following endangered species: bald eagle, American peregrine falcon, razorback sucker, southwestern willow flycatcher, bonytail chub, and Devil's Hole pupfish. For the Mojave desert tortoise, a federally listed threatened species, USFWS found that the project is not likely to

jeopardize its continued existence or adversely impact designated critical habitat. USFWS stipulated "reasonable and prudent" measures to minimize project effects on the desert tortoise, including payment of \$46,960 to Clark County for offsite mitigation for the loss of 80 acres of desert tortoise habitat. This EIS also concluded that the Hoover Dam Bypass preferred alternative will impact 20 acres of known habitat of desert bighorn sheep, which is a USFWS species of concern, as well as a State of Nevada protected and State of Arizona threatened species.

There is insufficient environmental and engineering information available for the future U.S. 93 and U.S. 95 highway improvement projects to identify potential cumulative impacts on endangered, threatened, or protected species also affected by the Hoover Dam Bypass. However, since these two future projects will primarily involve widening of existing highways, it is assumed that additional adverse impacts can usually be avoided with environmentally sensitive design, including continued use of protected game crossing structures, right-of-way fencing to minimize animal mortality, and other measures, including roadside signing for wildlife areas. Lands immediately adjacent to major highways are generally low-value biological habitats because of their highly disturbed nature. Hence, no cumulative biological impacts are anticipated from these future projects.

In contrast, the Boulder City/U.S. 93 Corridor alternatives have the potential for cumulative impacts on biological resources also impacted by the Hoover Dam Bypass. A new highway around Boulder City would fragment the existing habitat and essentially isolate most biota now occupying the area between the existing U.S. 93 corridor and any bypass route. As a result of any new highway, human development of the affected area may be accelerated, eventually causing its entire loss as wildlife habitat. The worst-case alternative for biological resources would be a southern bypass similar to that defined in NDOT's 1994 U.S. 93 Colorado River Crossing Corridor Study. The primary difference between the potential project alternatives is the greater habitat loss associated with the approximately 14-mile southern corridor. Considerably more impact to the desert tortoise can be anticipated with a southern alternative, because this corridor cuts through almost continuous tortoise habitat from the point it departs the U.S. 93/U.S. 95 interchange to the point at which it exits the Eldorado Valley and enters the Eldorado Mountains east of Boulder City. The new alignment alternatives for the Boulder City/U.S. 93 Corridor project also have the potential to impact local populations of desert bighorn sheep, which range throughout the River Mountains, often entering the lower slopes and even occasionally crossing U.S. 93. Therefore, although NDOT has not completed environmental and engineering studies for the Boulder City/U.S. 93 Corridor, it is likely that a bypass alternative on new (undisturbed) alignment will impact two special-status wildlife species also impacted by the Hoover Dam Bypass – the desert tortoise and desert bighorn sheep – and thus collectively cause a cumulative impact on these resources. The cumulative acreage of impacted habitats will not be known until NDOT completes preliminary design for the Boulder City/U.S. 93 Corridor.

The SR 68 project has the potential for cumulative impacts to desert bighorn sheep. This project traverses important desert bighorn sheep habitat in the Black Mountains of northwestern Arizona. This habitat was already fragmented by the existing highway, which has effectively split the population for 40 or more years. The construction of two wildlife crossings designed and situated primarily for use by bighorn sheep is part of the proposed mitigation for the project. If successful (i.e., desert bighorn sheep use the crossings), this project could result in a net beneficial impact to desert bighorn sheep.

However, this roadway improvement would result in a disturbance of approximately 90 acres of desert bighorn sheep habitat. Therefore, the Hoover Dam Bypass and the SR 68 widening projects would cumulatively impact 110 acres of bighorn sheep habitat; however, both projects include game crossings to minimize the effect on sheep movement.

USFWS considered cumulative effects in their June 1999 Biological Opinion for the Hoover Dam Bypass and concluded that future federal actions unrelated to the proposed project will require separate consultation pursuant to Section 7 of the Endangered Species Act. Since the majority of the land surrounding the proposed project is administered by Reclamation, NPS, or BLM, any action on those lands will be subject to consultation under Section 7. USFWS further concluded that actions on private lands within Clark County are expected to increase as the human population increases. The rapid growth of the human population, as well as tourism, has resulted in loss and degradation of desert tortoise habitat and loss of individual tortoises. These impacts are expected to continue according to USFWS. However, the CCDCP and associated incidental take permit addresses take of desert tortoises and destruction of their habitat from future development projects on nonfederal lands within Clark County. USFWS anticipates that measures in the CCDCP will continue to mitigate and minimize such effects.

5.5.1.2 Archaeological/Historical (Section 106) Resources

The U.S. 93 Hoover Dam Bypass will not impact significant prehistoric archaeological resources. However, it will have an adverse effect on the HDNHL, some contributing features, and the Gold Strike Canyon and Sugarloaf Mountain Traditional Cultural Property (TCP) within the area of potential effects of the preferred alternative.

Considering the nearby foreseeable future highway projects described in Section 5.4.3, on the Nevada side there are no recorded prehistoric sites of known significance within the potential alignments for development of the U.S. 93 Boulder City Corridor. The only reported prehistoric sites are isolated lithic flake scatters, ceramics, and milling stone stations located on the broad alluvial fan east of the Boulder City Airport. However, larger prehistoric archaeological sites, such as rockshelters, campsites, and rock alignments are situated in the River Mountains north of Boulder City, and the Eldorado Mountains to the east contain similar prehistoric resources including prehistoric turquoise mines. Historic sites in the Boulder City area include the Sullivan Turquoise Mines near Hacienda Hotel and in Hemenway Valley; potential remains from the Alunite Mining District and Boulder Annex Townsite near Railroad Pass; historic power transmission lines emanating from the Hoover Dam generating stations to locations in California, Arizona, and Nevada; a Union Pacific Railroad Line from Boulder City to the dam for which berms, bridges, and other features can still be found; and the Boulder City National Register Historic District, which could be affected by improvements to existing U.S. 93 through town. Considering the adverse effect of the preferred alternative on HDNHL and related features, there is a potential for consequential cumulative impacts on this resource due to the possibility of impacts from a Boulder City Corridor alternative on the power transmission lines emanating from the dam, which were found eligible for the National Register as contributing elements to the HDNHL. Furthermore, a Boulder City/ U.S. 93 Corridor Alternative could have a cumulative impact on the Goldstrike Canyon and Sugarloaf Mountain TCP, which is adversely affected by the Hoover Dam Bypass and is located approximately 0.75 mile east of the Hacienda Hotel and south of existing U.S. 93. However, the exact nature and limits of any significant cultural resources potentially affected by the Boulder City Corridor will not be known until detailed studies are completed by NDOT.

On the Arizona side, the abandoned former roadway of U.S. 93 was evaluated within the area of potential effects of the Hoover Dam Bypass. It was found eligible for the National Register for its association with the construction of Hoover Dam. The roadway recorded here is a fill or grade extending from the current highway on the north and running southward roughly parallel to the current highway route. The surface retains some gravel and small pieces of asphalt. This fill-and-cut segment is a portion of the original route of U.S. 93, as it was built in the late 1930s. The contract for construction of Hoover Dam included provisions for completing approaches to the dam for the highway to Las Vegas, Nevada, and a road to Kingman, Arizona. The approaches to Hoover Dam on both sides of the canyon were widened in 1957, and it is possible the recorded segment was abandoned at that time. However, there is certainly the potential for other historic resources, as well as prehistoric archaeological sites along the U.S. 93 corridor in Arizona that might be impacted by widening the highway, especially if it were done on a new alignment. More specific information on potential cultural resources that could be affected by the widening of U.S. 93 in Arizona will not be available until environmental studies are completed for this project, but no National Register resources are presently known that may be affected and that would result in a cumulative impact when considered collectively with the dam bypass effects.

5.5.1.3 Section 4(f) Resources

The preferred alternative for the Hoover Dam Bypass permanently uses approximately 92 acres of Section 4(f) lands from the LMNRA, the HDNHL, and the National Register eligible TCP. It was determined that there are no feasible and prudent alternatives to the use of Section 4(f) land and that the proposed action includes all possible planning to minimize harm to the Section 4(f) lands resulting from their use.

NDOT's Boulder City/U.S. 93 Corridor Study alternatives may impact land within the LMNRA located northeast of Boulder City, between the eastern limit of the project and the recreation area boundary. Using an assumed general highway right-of-way section of 300 feet, as was done for the U.S. 93 Hoover Dam Bypass, the Boulder City Corridor could result in permanent use of over 50 acres of Section 4(f) land from the LMNRA if a southern bypass alternative were selected. Other potential alternative corridors have not been studied fully by NDOT, and the extent of their potential Section 4(f) impact cannot be estimated at this time.

Widening of the 13-mile two-lane segment of U.S. 93 in Arizona, from the future Hoover Dam Bypass interchange to the boundary of the LMNRA, would use Section 4(f) recreation land administered by NPS. In some areas, ADOT has 400 feet of existing highway right-of-way; however, at this predesign stage it is unknown what portions of the widening would be on LMNRA or ADOT land. If ADOT did the widening on the existing alignment of U.S. 93, it is estimated that an additional 50 feet of right-of-way would be required. Assuming all the new highway right-of-way would be on LMNRA land, this ADOT project could result in the permanent use of approximately 80 acres of Section 4(f) land.

Based on the location of existing U.S. 93 through the LMNRA, there is no feasible and prudent alternative to the use of Section 4(f)-protected land for either the proposed Boulder City/U.S. 93 Corridor or the U.S. 93 widening in Arizona. Thus, these two reasonably foreseeable future projects in the immediate vicinity of the Hoover Dam Bypass would have the potential to generate Section 4(f) impacts that, when addressed collectively with the proposed project, could result in a considerable cumulative impact to public recreation and

historic lands. Impacts to Section 4(f) resources from improvements to SR 68 through the LMNRA were evaluated for the project and appended to the Final EA (ADOT, 1999). The evaluation concluded that expanding the roadway through the LMNRA will not substantially impair the activities, features, or attributes of the Section 4(f) resource, either by direct impacts (land takings for easements) from MP 1.6 to MP 2.0 or by constructive use/proximity impacts from MP 1.23 to MP 1.6. The total area of LMNRA required is 1.92 acres.

The four highway projects together could permanently use approximately 224 acres of land from the LMNRA, the HDNHL, and TCP. However, this potential cumulative impact to Section 4(f) land from the four highway projects would still be substantially less than five of the alternative alignments considered for the Hoover Dam Bypass: Willow Beach North, Willow Beach South, Nelson, Cottonwood, and Temple Bar (see Table 2-1).

5.5.1.4 Visual Resources

The preferred Sugarloaf Mountain alignment for the Hoover Dam Bypass will be located approximately 1,500 feet downstream from Hoover Dam and about 254 feet higher than the crest of the dam (see Figure 2-9). This new bridge crossing over Black Canyon will be in full view from the dam (see Figure 3-10). Consequently, it was found to have an adverse effect on the historic landmark owing to the introduction of visual elements that diminish the integrity of the property's significant historic features (36 CFR 800.5). This EIS determined that other visual effects of the Hoover Dam Bypass on the surrounding environment could be mitigated (see Section 3.7).

NDOT's planned Boulder City and U.S. 95 highway improvements and ADOT's planned U.S. 93 widening will likely have both short-term and long-term visual impacts on the surrounding desert environment. However, the planned U.S. 93 and U.S. 95 improvements will be all within existing highway corridors, which have been a part of the desert landscape for many decades and, therefore, may not have adverse visual impacts. Of these three foreseeable future projects, only the Boulder City Corridor alternatives have the potential for substantial visual impacts on presently undeveloped desert landscape, which is located in the Eldorado Valley to the south and the Colorado River and Eldorado Mountains to the north and east. As discussed under Archaeological and Historic Resources (Section 5.5.2.2), the Boulder City Corridor southern bypass alternative could contribute to a cumulative impact on historic features related to Hoover Dam (i.e., the power transmission lines). However, even if a southern bypass were the selected alternative, these transmission lines are not part of the historic viewshed of Hoover Dam; therefore, it does not appear that development of the Boulder City Corridor would contribute to a cumulative visual impact on the HDNHL.

Improvements underway on SR 68 will result in some long-term impacts to visual resources. These impacts result from the loss of some rock spires and other visual features, increased rock cuts, and a change in the overall character in some areas of the project. However, due to its location, SR 68 will have no cumulative impacts to HDNHL visual resources.

This page intentionally left blank.