

4.0 CUMULATIVE IMPACTS

This chapter defines cumulative impacts, describes the methodology for assessing these impacts, describes projects and activities considered in this assessment, and presents the results organized by resource topic.

4.1 DEFINITION OF CUMULATIVE IMPACTS

The Council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) define cumulative impacts as

“the impacts on the environment which result from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions and regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (Title 40 Code of Federal Regulations [CFR] Part 1508.7)

4.2 IMPACT ASSESSMENT METHODOLOGY

A cumulative impact analysis is based on a number of assumptions. CEQ guidance limits cumulative impact analysis to “important issues of national, regional, or local significance” (CEQ 1997). Therefore, not all issues identified for direct or indirect impact assessment in this EIS are analyzed for cumulative effects. Potential impacts from the Big Sandy Energy Project (Project) action and alternatives are captured and characterized for each resource topic in Chapter 3.0. Because of the wide geographic scope of a cumulative impact assessment and the variety of activities assessed, cumulative impacts are commonly examined at a more qualitative and less detailed level than are direct and indirect impacts caused by the action alternatives.

Public documents prepared by agencies of Federal, state, and local government are the primary sources of information regarding present and reasonably foreseeable future actions. Actions undertaken by private persons and entities are assumed to be captured in the information provided by such agencies. Cited Records of Conversation document some of the many follow-up phone calls made to verify, update, or expand on information in public documents.

The regions of influence are specific to each resource topic and are the same as presented for each resource topic in Section 3.0. Forty years is the period considered for reasonably foreseeable future actions. Criteria determining the significance of cumulative impacts are the same as presented in Section 3.0. Unless otherwise noted, there is no difference in the intensity or context of potential cumulative impacts between the Proposed Action, Alternative R, or Alternative T, which are described in Section 2.0.

4.3 PROJECTS AND ACTIVITIES CONSIDERED

Following are descriptions of past, present, and reasonably foreseeable future projects and activities that would potentially contribute to cumulative impacts if the Project is implemented. Additional information concerning some projects and activities is included in results presented for some resource topics.

4.3.1 [Griffith Energy Project](#)

This project involves building and operating the Griffith Energy Project (Griffith), a 520-megawatt, natural gas-fired, combined cycle power plant, on private land south of Kingman, Arizona (Western Area Power Administration [Western] 1999). Griffith interconnects with the Western Pacific Northwest-Pacific Southwest Intertie and Parker-Davis transmission systems to supply power to the competitive electric

wholesale market. Construction of this plant is expected to be completed in Summer 2001. The Sacramento Valley Aquifer is the source of water for Griffith.

4.3.2 Mead-Phoenix 500-kV Transmission Line Project

This project is a 500-kilovolt (kV), alternating-current transmission line running north-south through the Project region of influence and between the Westwing (Perkins) Substation north of Phoenix, Arizona and the Mead Substation located in Boulder City, Nevada (Western 1989). The transmission line, built in 1994 and 1995, is approximately 225 miles long with approximately 120-foot steel lattice towers spaced approximately 1,200 feet apart. Right-of-way in this area is 150, 175, or 200 feet depending on whether it is along an existing 500-kV line, a 345-kV line, or standing alone.

4.3.3 Mead-Liberty 345-kV Transmission Line Project

The Mead-Liberty transmission line parallels the Mead-Phoenix project described above. It was constructed in 1966 and 1967 (Swanson 2001).

4.3.4 U.S. Highway 93 Wikieup-Interstate 40 (I-40) Widening

Currently, the Arizona Department of Transportation (ADOT) is finalizing an Environmental Assessment for this highway improvement project. ADOT proposes to widen in phases the existing highway between Wikieup and Interstate 40 (I-40) to four lanes divided by an open median, a concrete median barrier, or a continuous left-turn lane (ADOT 2000). The project would utilize an existing ADOT right-of-way (200 feet wide) and would require 1,263 acres of additional right-of-way from private landowners, the BLM, and the Arizona State Land Department. Currently, only two small segments totaling approximately 7 miles that are located just south of I-40 on U.S. Highway 93 (US 93) are in ADOT's construction plans for funding in 2003 and 2004; additional

construction would occur after 2004 (Ellis 2001).

4.3.5 US 93 Highway Santa Maria-Wikieup Widening

ADOT is currently implementing this highway improvement project for a segment of US 93 from Wikieup south to the Santa Maria River (ADOT 1995). It involves widening the existing two-lane roadway to four lanes divided by an open median, a concrete median barrier, or a continuous left-turn lane. ADOT currently has 200 feet of existing right-of-way along the roadway. An additional 108 feet of right-of-way (256 acres) will be required for the proposed improvements.

4.3.6 US 93 Big Sandy River Bridge Addition

ADOT is proposing to build an additional bridge across the Big Sandy River west of the existing bridge as part of the US 93 widening projects described above. The existing bridge will provide two lanes for north-bound traffic while the new bridge will provide two lanes for southbound traffic. Construction is not slated to begin until 2003, a full year after the Project-related gas pipeline crossing of the Big Sandy River would be completed (Ellis 2001).

4.3.7 Cattle Grazing in Southern Big Sandy Valley

The Greenwood Peak Community, Groom Peak, and Gray Wash allotments are located approximately 3 miles south of Wikieup. There are no division fences or natural boundaries separating the Greenwood Peak Community allotment from the Groom Peak allotment, and livestock readily drift from one to the other. Cattle are grazed yearlong on the Groom Peak and Gray Wash allotments (Bureau of Land Management [BLM] 2000a).

These allotments run north and south along the Big Sandy River south of Wikieup to the middle Signal Road crossing and extend east across US 93 into the Aquarius Mountains and west into the Hualapai Mountains. Cattle graze yearlong

throughout each allotment and there are no pasture fences on the BLM-administered portions of these allotments (BLM 2000b). Grazing also occurs on Banegas Ranch, as described below.

4.3.8 Banegas Ranch

This is an existing ranch located 3 miles south of Wikieup along the Big Sandy River, with existing rights to divert approximately 2,400 acre feet per year from the Big Sandy River. However, historical water use has probably been no greater than 300 acre feet per year. About 50 acres will continue to be irrigated; crops include Bermuda grass, hay, alfalfa forage, and nut trees (Koblitz 2001). Grazing consists of approximately 250 animal unit months (AUMs) (cattle). Caithness purchased the ranch and is in the process of transferring a portion of the property to MCEDA. The ranch will continue to utilize water rights for ranch operations including irrigation of forage crops and water for livestock.

4.3.9 Residential Development in Big Sandy Valley

There are 40-acre plots being sold for ranchettes in the *Windmill Ranches* development located approximately 15 to 20 miles north of Wikieup on both sides of US 93. Using conservative numbers, there is the potential for approximately 250 shallow water wells if all the 250 lots are built on. At this time, less than one-tenth of the parcels are inhabited. Most are being sold to out-of-state owners and are not being developed. Because these parcels are greater than 36 acres, they do not have to go through a development review process by Mohave County Planning. There are several other residential areas north of *Windmill Ranches* and south of the I-40/US 93 intersection on Old Highway 93 for sale; these include *Silverado Acre Estates Tract 3805*, a subdivision with 1-acre lots, and *Silverado Ranches* with 40-acre parcels (Taylor 2001 and Delmar 2001).

4.3.10 Hualapai Lands in Big Sandy Valley

The Hualapai Tribe is considering developing a 60-acre parcel of Trust Land located approximately 18 miles north of the Project plant site. The Hualapai would use the existing 50-gpm well on the property (Bravo 2000) as a source of water for a potential aquaculture or agriculture project. In addition, there are two individually owned tribal parcels (allotted lands) in the vicinity of the 60-acre parcel which have the potential to be developed for agricultural or other purposes in the reasonably foreseeable future.

4.3.11 Arkosic Road

Mohave County has applied for a perpetual right-of-way for an approximately 1.8 mile-long public road (to be called Arkosic Road) and utility corridor across approximately 3.6 acres of public lands administered by BLM near Wikieup. The proposed Arkosic Road is identical to the county road proposed as part of the Project (refer to Section 2.2.4 for a detailed description), and Caithness has agreed to build and pave Arkosic Road. The BLM is currently preparing an Environmental Assessment for Arkosic Road pursuant to NEPA. The purpose of Arkosic Road would be to provide a public road and utility corridor for existing and future property owners in the area. Legal access is needed for current residents and an existing mining operation. The unpaved road used by residents and the mine to access US 93 at milepost 128 has been closed by ADOT for safety reasons. For the purpose of this cumulative assessment the potential effects of Arkosic Road are already covered by the Proposed Action.

4.3.12 Phelps Dodge Bagdad Mine Wellfield

The Phelps Dodge Bagdad Mine is located on Burro Creek, approximately 18 miles east-southeast of the proposed power plant site. The mine produces copper and molybdenum ore through open-pit mining methods. Copper and molybdenum concentrates are produced from the ore using conventional milling and froth flotation methods, and are shipped offsite for

smelting. Cathode copper is produced by leaching low-grade ore and extracting copper from the pregnant leach solution using solvent extraction and electrowinning methods.

Water is supplied to the Bagdad Mine by as many as 14 shallow groundwater production wells located along the Big Sandy River, between 5 and 13 miles north-northwest of the proposed power plant and production wellfield. The Bagdad production wells range in depth from about 100 to 140 feet, and are all completed in the upper aquifer. Water from the Bagdad wellfield is delivered to the mine through a pipeline. Power is delivered to the wellfield by an H-frame, wood pole transmission line that is located between the existing Mead-Liberty and Mead-Phoenix Project transmission lines, north of the wellfield.

The total amount of groundwater withdrawn by Phelps Dodge to supply the Bagdad Mine is unknown, but has been estimated by the U.S. Geological Survey to be approximately 2,005 acre-feet per year (refer to Section 3.4).

4.3.13 Cell Tower Sites in Big Sandy Valley

Mohave County has approved the installation of seven cell tower sites in the Big Sandy Valley from I-40 south to the county line. These towers will be located adjacent to US 93 in elevated areas approximately 7 to 10 miles apart. The towers will be approximately 190 feet high, will be constructed as steel lattice structures, and will have no lighting requirements. The nearest location to the power plant site is in the southeast quarter of Section 1, T15N, R13W. An additional repeater tower will be located on Aubrey Peak, approximately 10 miles east of the valley (Delmar 2001).

4.4 IMPACTS AND MITIGATION BY RESOURCE

This section, organized by resource topic, presents the results of analyses of potential cumulative impacts attributable to implementation of the Big Sandy Energy Project action alternatives. When applicable mitigation measures which could reduce or avoid impacts

are discussed. Impacts are analyzed with an amount of detail commensurate with their importance. Each resource was evaluated using the same significance criteria defined in Section 3.0.

4.4.1 Air Resources

Negligible emissions of regulated air pollutants are expected associated with the existing Mead-Phoenix Project 500-kV and Mead-Liberty 345-kV transmission lines, existing cattle grazing in the Southern Big Sandy Valley, residential development, and future development of Hualapai lands in the Big Sandy Valley. Therefore, it is not anticipated that these activities or structures would contribute significantly to cumulative impacts to air resources in combination with the Proposed Action.

Griffith is located about 70 kilometers (km) (43 miles) from the proposed power plant site. Evaluation of cumulative air quality impacts resulting from existing and permitted sources is a requirement of New Source Review permitting. For such evaluations, Arizona regulations require that sources within 50 km (31 miles) of a Proposed Action must be considered in the ambient air impact analysis. Beyond that range, it has been found that gas-fired utility plants usually result in negligible impacts relative to the significance criteria thresholds. Therefore, it is not likely that Griffith will contribute to an exceedance of significance criteria within the region of influence of the project when combined with the Proposed Action.

Construction projects have only a short-term effect on air quality. Emissions of gaseous pollutants from construction vehicles, and particulate emissions from earth moving and other activities tend to have very localized effects. The cumulative effect of the US 93 highway and bridge improvements projects and other projects involving construction in combination with construction of the Project would be negligible, since there is almost no overlap in the time frame for the construction activities. Construction phase and operational

impacts of the Proposed Action have been evaluated by refined dispersion modeling, and indicate that these impacts do not exceed significance criteria. Adding the short-term construction effects of other projects in the vicinity of the Proposed Action is not anticipated to cause exceedances of the significance criteria.

If future land development within the Project region of influence is residential, then there would be relatively little contribution to air quality impacts from the development itself. A potential increase in vehicle traffic in the vicinity may have a minor, localized effect on air quality. Future land development when combined with the Proposed Action would not adversely contribute to the air quality parameters (e.g., NAAQS and increments) used as the significance criteria for the Project.

The Proposed Action, when added to identified past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not expected to cause exceedances of significance criteria thresholds for air resources; therefore, there would be no significant cumulative impacts.

4.4.2 Geology/Paleontology

There are no known areas of regional geological or potential mineral resource development of economic importance in the region of influence. Therefore, the cumulative actions when added to the Proposed Action would not have significant impacts. The Project and cumulative actions would not impact any existing mining operations. The Project and cumulative actions may remove a small portion of the Valley's sand and gravel resources from potential development, ; however, this impact would not be significant because of the extent of these resources in the Big Sandy Valley and northwestern Arizona.

Significant portions of vertebrate fossils have been found within portions of the Big Sandy formation in the southern end of the Big Sandy Basin. However, most of the past, present, and reasonably foreseeable future actions in the region of influence would not have the potential to adversely affect any undiscovered fossil

resources, or would be required to survey and recover these resources before construction (e.g., US 93 projects). Therefore, any impacts on paleontological resources would be less than significant.

The Proposed Action, with mitigation, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not expected to cause exceedances of significance criteria thresholds for geological and paleontological resources; therefore, there would be no significant cumulative impacts.

4.4.3 Soils

The development projects included in Section 4.3 have potential to impact soils in the region of influence. However, since these projects fall under Federal, state, tribal, and local jurisdiction, it is expected that best management practices to reduce soil erosion would be implemented. The Project, with mitigation, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not expected to exceed significance criteria thresholds for soils. Therefore, there would be no significant cumulative impacts.

4.4.4 Groundwater

The past, present, and reasonably foreseeable actions are not expected to impact springs and seeps. However, since the Project would impact Cofer Hot Spring, there would be significant cumulative impacts.

Negligible impacts on groundwater resources are expected associated with the existing transmission lines and the US 93 road-widening and bridge projects. Therefore, it is not anticipated that these activities would contribute to cumulative impacts on groundwater resources in combination with the Project.

Griffith is located in the Sacramento Valley groundwater basin. Water for Griffith will be supplied by groundwater pumped from the Project property. Because Griffith is located in a separate groundwater basin approximately 40

miles from the Project, there are no potential cumulative impacts to the groundwater resources of the Big Sandy groundwater basin attributed to the two projects.

The total amount of groundwater consumed to support grazing is believed to be on the order of 80 acre-feet per year (refer to Table 3.4-1). This amount of groundwater consumption was analyzed as part of the affected environment in Section 3.4 and, therefore, there would be no cumulative effects beyond the Project.

The source of water for land being developed for residential use will likely be groundwater pumped from the upper alluvial aquifer. Based on the planned development of the *Windmill Ranches* development located approximately 15 miles north of Wikieup, there is the potential for approximately 250 lots supplied by 250 shallow water supply wells at buildout. Assuming each well will supply one single-family residence with an average occupancy of 3.5, and an average water use of 120 gallons per capita per day, the total annual water use of the development at buildout is estimated to be 105,000 gallons per day, or about 117 acre-feet per year. It is assumed that nearly half of this water will be recharged to the upper aquifer through septic systems. The net consumption of groundwater would be about equal to the exiting consumption of groundwater for domestic uses, or 0.25 percent of total groundwater outflow.

There are three existing parcels belonging to the Hualapai Tribe in the Big Sandy Valley. One well, placed in the upper aquifer, is located on tribal land. This well has not been used for the past 30 years, but according to tribal members, may potentially be used in the future for aquaculture or agricultural purposes. Because this well would be pumping a relatively small volume of water from the upper aquifer (about 80 ac-ft/yr), the impacts on the groundwater resources of the Big Sandy basin would be minor.

The groundwater production wells that would be used to supply the power plant would be completed solely in the lower aquifer. The Bagdad Mine groundwater production wells are

completed in the upper aquifer, and are located north of the predicted area of potential impact to the upper aquifer from the Proposed Action (refer to Section 3.4, Groundwater). Because of this, there would be no potential cumulative impact to the lower aquifer.

The potential cumulative impact to the upper aquifer from groundwater pumping to supply the power plant and the Bagdad Mine can be expressed as the total amount of groundwater withdrawn from the two aquifers. The results of groundwater modeling indicate that groundwater flow from the middle aquifer to the upper aquifer may be reduced by as much as 564 ac-ft/yr as a result of pumping to supply the power plant (refer to Section 3.4, Groundwater). The cumulative impact to the upper aquifer, based on the predicted flow reductions to the upper aquifer (564 ac-ft/yr) and pumping to supply the Bagdad Mine (2,005 ac-ft/yr), is therefore estimated to be 2,569 ac-ft/yr, most of which is attributed to mine pumping.

The potential cumulative impact to the groundwater resources of the Big Sandy Basin from the Proposed Action (4,850 ac-ft/yr) and the Bagdad Mine (2,005 ac-ft/yr) can be expressed as the total amount of groundwater withdrawn (approximately 6,855 ac-ft/yr).

Because only minor changes to the amounts of water used by these past, present, and reasonably foreseeable future actions in the Big Sandy Valley and because the water system is currently balanced (i.e., average use equals average water recharge), cumulative impacts to groundwater resources are not expected to be significant.

4.4.5 Surface Water

The only past, present, or reasonably foreseeable actions in the Big Sandy Valley that consume surface water resources are cattle grazing and the agricultural operations including the Banegas Ranch and evapotranspiration from vegetation including the increasing populations of tamarisk. These are existing and were considered as part of the affected environment in Section 3.5. Temporary impacts on surface water quality would occur during construction of the proposed

gas pipeline across washes and at crossings of the Big Sandy River. Similar impacts likely would occur resulting from the construction of the US 93 bridge addition and road expansion. However, these impacts would be short-lived and would not occur at the same time, and thus would not be considered significant when added to the effects of the Proposed Action.

The Proposed Action, with mitigation, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not expected to cause exceedances of significance criteria thresholds for surface water; therefore, there would be no significant cumulative impacts.

4.4.6 Floodplains

Federal and/or county regulations require projects to mitigate potential adverse impacts to affected floodplains. Such mitigation measures are the responsibility of those constructing or operating the projects and activities. Given these requirements, the Proposed Action, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley would not result in significant cumulative impacts on floodplains.

4.4.7 Land Use and Access

None of the past, present, and reasonably foreseeable future actions in the region of influence are anticipated to result in any substantive inconsistency with land use laws, ordinances, or regulations (BLM, state, or county). The US 93 widening and bridge additions would provide minor positive effects on area access. Thus, the Proposed Action when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not anticipated to exceed significance criteria as a result of the Proposed Action. Therefore, there would be no significant cumulative impacts.

4.4.8 Grazing Management

Cumulative impacts on grazing management are expected to be minor for all of the projects and

activities considered for analyzing Project cumulative impacts. Impacts on grazing allotments from the projects and activities described above would remove small portions of the land available for grazing within the region of influence.

The Proposed Action, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not expected to cause significant impacts on grazing management.

4.4.9 Recreation, Wilderness, and Visual Resources

Some additional temporary demand for recreation facilities, developed and undeveloped, and wilderness would result from large construction projects such as Griffith and US 93 road and bridge improvement projects. Smaller increases in permanent recreation and wilderness demand may occur from the additional population in Windmill Ranches. Because of the wide range of recreation and wilderness opportunities in the area and the small increases in demand, the cumulative impacts would be less than significant.

The US 93 bridge and widening, and cell towers could result in substantial impacts on the scenic quality or landscape characteristics of the area. Visual impacts related to the cell towers would depend on tower location. The Griffith project is outside the region of influence for visual analysis. The transmission projects represent minor to substantial impacts on the visual quality of the valley, since they can be a noticeable to dominant feature in the area depending on distance and viewpoint. None of the remaining projects or actions (grazing, Banegas Ranch, residential development, Hualapai lands, Phelps Dodge Bagdad Mine wellfield) substantially alter the visual quality of the valley. The visual impacts related to US 93 actions, cell towers, and transmission lines could be considered adverse in a predominantly rural/residential area. The proposed Project would contribute to the cumulative impact, but would provide a different visual effect than the cell towers and transmission line structures.

The Proposed Action, when added to any other past, present, and reasonably foreseeable actions in the Big Sandy Valley, is not expected to cause exceedances of the significance criteria thresholds for recreation, wilderness, and visual resources. There would be no significant cumulative impacts on recreation or wilderness. However, there would be cumulative adverse impacts on visual resources.

4.4.10 Areas of Critical Environmental Concern

The widening of US 93 through the Carrow-Stephens Ranches ACEC would have adverse impacts, since any construction would result in removal of vegetation within the ACEC. The ranch has been affected by the initial construction of US 93 past the historic ranch buildings. Widening of this area would include relocation of US 93 to avoid historic areas and some regrading of areas to reduce visual impacts, resulting in a positive impact. Cumulatively, these actions would require removal of native vegetation, which violates BLM Management Prescription 10 for the ACEC and triggers the significance criterion of inconsistency with the BLM Management Prescriptions. No cumulative impacts would be anticipated on the Three Rivers Riparian ACEC from any of the past, present, or reasonably foreseeable actions.

The Proposed Action, with mitigation, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, would likely cause an exceedance of a significance criteria threshold for the Carrow-Stephens Ranches Area of Critical Environmental Concern (ACEC) unless mitigation would be implemented. Therefore, there would be a potential for significant cumulative impacts on the Carrow-Stephens Ranches ACEC.

4.4.11 Vegetation

All of the past, present, and reasonably foreseeable future actions in the Big Sandy Valley would result in some disturbance to vegetation. Any projects occurring in the Big

Sandy Valley that result in the clearing of xeroriparian communities would require proper mitigation and/or compensation in order not to exceed significance thresholds.

The Griffith and US 93 road and bridge projects likely would result in permanent clearing of native plant communities. However, Griffith is located approximately 40 miles from the Proposed Action and impacts on vegetation associated with each project are expected to be local and isolated. The two US 93 road-widening projects would overlap in part with the proposed pipeline. Impacts on vegetation along this corridor can be lessened by minimizing the areas of disturbance, reseeding, and fencing revegetation areas to avoid disturbance by livestock and off-road vehicles. Because the US 93 River Bridge Addition Project is scheduled to occur approximately two years after the construction phase of the Project is completed, impacts on vegetation associated with each project are expected to be isolated and minor as long as planned revegetation efforts are successful. However, an unmitigated loss of xeroriparian habitat would be a significant cumulative impact.

The existing transmission lines have caused both temporary and permanent disturbance to vegetation communities. Both routes have been revegetated and the impacts associated with these lines when added to the Proposed Action would not be cumulatively significant.

Changes to native plant communities have resulted from current and historic cattle grazing in the southern Big Sandy Valley, including Banegas Ranch. Continued grazing at Banegas Ranch may limit revegetation of native plant communities. Adverse impacts can be minimized by fencing revegetation areas to allow native plant communities to reestablish.

Future residential development on private lands as well as residential and/or agricultural development on Hualapai lands in the Big Sandy Valley would result in both temporary and permanent disturbance to vegetation communities. The nature and severity of the impact would depend on the size of area

disturbed, as well as the nature and success of any revegetation efforts made, but significance criteria are not expected to be exceeded.

The Proposed Action, with mitigation, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is expected to cause exceedances of significance criteria thresholds for vegetation. Therefore, there is a potential for significant cumulative impacts.

4.4.12 Wetlands, Riparian Areas, and Waters of the United States

The Griffith project has impacted waters of the United States as a result of disturbances occurring during construction activities. Because the Griffith project is located 40 miles from the Proposed Action, it would not contribute to cumulative effects in the Big Sandy Valley.

Several washes classified as waters of the United States cross the existing transmission lines in the Big Sandy Valley. Impacts would be minimal and cumulative since existing access roads would be used.

The US 93 road-widening and Big Sandy River Bridge addition projects would result in impacts on wetlands and riparian areas where the highway crosses the Big Sandy River. These three projects would involve the placement of permanent surface structures. Depending on the nature of mitigation measures taken, impacts to wetlands and riparian areas due to these projects could be significant. However, it is expected that ADOT requirements for mitigation would reduce impacts to a less than significant level. Therefore, the Proposed Action, when added to other past, present, and reasonably foreseeable future actions, would not result in significant cumulative impacts on wetland and riparian areas at the Big Sandy River. A decline in flows at Cofer Hot Spring from the Proposed Action would be a significant impact. No other effects on flows are expected from past, present, or reasonably foreseeable future actions.

Existing cattle grazing in the southern Big Sandy Valley, including Banegas Ranch, is causing

adverse effects to wetlands and riparian areas adjacent to the Big Sandy River. Future residential development on private lands as well as residential and/or agricultural development on Hualapai lands in the Big Sandy Valley may result in either temporary or permanent disturbance to waters of the United States. The severity of the impact on waters of the United States would depend on the size of area disturbed, as well as nature and the success of mitigation efforts. Since such developments would be under the jurisdiction of the U.S. Army Corps of Engineers, adequate mitigation would be required in residential developments, and cumulative impacts on waters of the United States would be mitigated. However, long-term cumulative impacts in areas of future development are not expected to exceed significance criteria.

Based on the significance criteria for this Project, and the impact that would occur on the wetland resulting from a decline in flows at Cofer Hot Spring, the cumulative impacts resulting from the Proposed Action, alone or when added to other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, would be considered significant.

4.4.13 Fisheries and Wildlife

Some bird mortality may occur from bird collisions with the existing Mead-Phoenix 500-kV and Mead-Liberty 345-kV transmission lines. Also, construction of these lines may have resulted in loss of nests or nesting habitat. Nesting habitat also likely would be lost as a result of ADOT's road widening projects, residential development, and the Griffith project. The loss of nesting habitat would be an adverse cumulative impact, but would not be significant since there would not be a reduction in bird breeding opportunities.

The addition of a bridge on US 93 over the Big Sandy River may have an adverse effect on night-roosting bats that use the existing US 93 bridge structure. If construction occurs during daylight hours, this should not impact night-roosting bats. The Big Sandy River Bridge addition would cause short-term impacts to

fisheries and wildlife due to habitat disturbance associated with construction activities, and adverse cumulative impacts would likely occur.

Cumulative impacts to fisheries and wildlife are expected to be minor as a result of the US 93 road improvements projects, existing cattle grazing, and potential land development in the Big Sandy Valley.

Existing cattle grazing in the southern Big Sandy Valley is causing adverse effects to the Big Sandy River water quality, as well as to fisheries and wildlife inhabiting the Big Sandy River and adjacent riparian areas. Potential land development in the Big Sandy River Valley also may adversely impact fisheries and wildlife by degrading or destroying their habitats. Mitigation for residential development would reduce adverse impacts. However, due to the small-scale nature of development in the valley and the limited impacts of grazing, impacts to fisheries and wildlife are not expected to be significant. The Proposed Action, with mitigation, when added to other past, present, and reasonably foreseeable actions, is not expected to cause an exceedance of the significance criteria threshold for fisheries and wildlife. However, any migratory bird losses due to the Proposed Action or past, present, and reasonably foreseeable future actions would result in a violation of the Migratory Bird Treaty Act, and result in significant cumulative impacts.

4.4.14 Threatened, Endangered, Proposed, and Other Special Status Species

There is a potential for adverse cumulative impacts on threatened, endangered, and proposed, species; however, the determination on the significance of cumulative impacts on these species is deferred until consultation with USFWS is completed.

There is a potential for cumulative impacts on the southwestern willow flycatcher from the Proposed Action and the US 93 Big Sandy River bridge addition. Any crossing of the perennial reach of the Big Sandy River and removing riparian vegetation could decrease habitat

available to the flycatcher. Even if these areas are revegetated, cattle grazing in the Big Sandy Valley, including Banegas Ranch, would have an additive negative effect if cattle are not fenced out of the riparian areas until vegetation is well established. Any impacts on riparian areas along the Big Sandy River may also decrease breeding habitat for the Yuma clapper rail and western yellow-billed cuckoo and foraging habitat for the bald eagle. Any impacts on areas of Tertiary limestone lakebed deposits would adversely affect habitat for the Arizona cliffrose. The final determination of the significance of these impacts would come from Section 7 consultation with USFWS.

Sensitive species of bats may be temporarily displaced by actions in the Big Sandy Valley including the Proposed Action and other past, present, and reasonably foreseeable future actions. The bats may use the bridge crossing over the Big Sandy River for a roosting site; therefore, the bridge addition project could negatively impact sensitive bats. In addition, culverts under US 93 may be used for roosting sites, and highway construction could cause the bats to leave.

Ground-clearing disturbances also have the potential to impact sensitive species of reptiles. Proposed projects such as the residential land development, and the Griffith project, would permanently alter habitat and make it unavailable to reptiles. Mitigation measures taken to minimize habitat destruction and direct mortality of these animals during construction would reduce impacts. All habitat loss for the desert tortoise must be mitigated in order to reduce further impacts on this species.

The proposed US 93 bridge addition project over the Big Sandy River may impact sensitive amphibian and fish species within the river and surrounding riparian areas. Mitigation measures required for road construction would limit the extent and intensity of impacts.

The Proposed Action, when added to other past, present, and reasonably foreseeable future actions, has the potential to have cumulative impacts on sensitive plant species' habitat.

Projects on private land would need to comply with the Arizona Native Plant Law administered by the Arizona Department of Agriculture. Projects under Federal jurisdiction would include measures to minimize impacts on sensitive plants. Thus, no significant cumulative impacts on sensitive plant species are anticipated.

4.4.15 Cultural Resources

Although available information is not precise, it indicates that, on average, various types of projects and activities are disturbing or destroying only a few significant cultural resources each year from an inventory of a few thousand significant resources within the Big Sandy River Basin. Impacts from regulated projects and activities within this area are being mitigated.

Recent projects in the Big Sandy River Basin include the Mead-Phoenix 500-kV Transmission Project and US 93 upgrades between the Santa Maria River and Wikieup. Cultural resource surveys for these projects resulted in the discovery and recording of about 50 archeological and historical sites. Adverse effects to most of the significant sites in this inventory have been avoided and mitigation studies have been conducted at fewer than ten significant sites that were adversely affected. Although these sites have been lost from the regional inventory of cultural resources, important archaeological and historical information was recovered and preserved.

A survey of cultural resources was completed for the improvements project for US 93 from Wikieup north to I-40. It identified almost 60 additional archaeological and historical sites, and slightly more than half of these are considered significant. Analysis of how many of these sites will be affected by the planned upgrades, which are scheduled to occur over the next two decades, is ongoing. Surveys also would be required for other projects requiring Federal permits, such as Griffith and cell tower sites.

Cultural resource surveys were not conducted for projects undertaken prior to regulatory requirements for environmental review, such as the Mead-Liberty 345-kV Transmission Line Project. Also, surveys are not required for private land developments, such as the ongoing residential developments in the northern portion of the Big Sandy River Basin. Impacts from these unregulated activities also are not mitigated, and therefore probably represent the most substantial increment to cumulative impacts on cultural resources within the region.

The Proposed Action and other past, present, and reasonably foreseeable future actions are within an area that the Hualapai Tribes traditional cultural landscape. The Tribe concludes that any intrusion into the Big Sandy Valley would adversely affect the traditional cultural landscape and would therefore have significant cumulative impacts.

The Proposed Action, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, would cause an exceedance of significance criteria thresholds for traditional cultural resources. Therefore, significant cumulative impacts would occur.

4.4.16 Socioeconomics and Environmental Justice

Because the Griffith project would be completed near the time construction starts on the Big Sandy Energy Project, there would be little overlap of construction craft workers. As the Griffith project is completed, many workers are expected to remain in the Kingman area and would then be hired to work on the Project. This represents a positive cumulative effect, because workers could continue to live in the Kingman area without having to relocate.

Road construction along US 93 from Santa Maria to Wikieup is currently ongoing. Construction of two small segments along US 93 from Wikieup to I-40, located just south of the Interstate, would occur during construction of the Proposed Action. They should not significantly hamper the commuting workforce

from Kingman as the new roadway will parallel the existing two-lane highway.

Development of the Hualapai land project would provide positive benefits related to environmental justice; however, none of these positive impacts would be considered significant.

The Proposed Action, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not expected to cause exceedances of significance criteria thresholds for socioeconomic and environmental justice. Therefore, significant cumulative impacts would not occur.

4.4.17 Public Safety and Services

EMF levels were modeled in the 1986 *Mead-Phoenix ±500-kV DC Transmission Line Project Environmental Impact Statement*. Those levels were previously found to not pose a risk to human health and safety. In general, road-widening projects along US 93 would not cause traffic congestion. This is because new lanes would be constructed parallel to the existing route without road closure.

The cumulative possibility of catastrophic accidents at the Griffith project or during ADOT bridge construction is considered remote. In the unlikely event of disasters, applicable Federal, state and county emergency preparedness procedures, described in Section 3.17, would be followed. ADOT emergency procedures would apply in the event of construction or traffic accidents that could occur during road and bridge construction.

Applicable procedures for human health and safety would likely be strictly enforced for any project or action involving hazardous materials or wastes or safety concerns, such as road or cell tower construction. This would include the proper handling and storage of all hazardous materials, as well as procedures for waste disposal, and implementation of worker health and safety procedures.

The Proposed Action, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not expected to cause exceedances of significance criteria thresholds for public safety and services if the procedures above are implemented. Therefore, significant cumulative impacts are not likely to occur.

4.4.18 Noise

Increases in ambient noise levels resulting from construction activities (e.g., US 93 project, residential or road construction) would be short term and temporary, and likely would be limited to daylight hours. These impacts would not be considered significant.

The Proposed Action, when added to any other past, present, and reasonably foreseeable future actions in the Big Sandy Valley, is not expected to cause exceedances of significance criteria thresholds for noise. Therefore, significant cumulative impacts would not occur.

4.5 SUMMARY OF CUMULATIVE IMPACTS

Significant adverse cumulative impacts would not occur on air, geology/paleontology, soils, surface water, floodplains, land use, grazing management, recreation, wilderness, waters of the United States, fisheries, wildlife (with the exception of migratory bird losses), socioeconomic, environmental justice, public safety and services, and noise. For most resource areas, the degree of cumulative adverse impacts would depend on the extent of mitigation employed to reduce adverse impacts. Positive cumulative economic and public service impacts would occur as a result of the Proposed Action and past, present, and reasonably foreseeable future actions.

Use of mitigation specified in this Draft EIS would reduce many impacts of the Proposed Action to less than significant. However, potentially significant cumulative impacts may occur to migratory birds, due to nest losses and collisions.

Existing roads, buildings, and transmission structures already provide visual impacts in the Big Sandy Valley. Proposed cell towers would contribute to this impact. The proposed Project would add less than significant impacts to the cumulative impacts.

Based on the significance criteria for this Project, the impacts on Cofer Hot Spring would be significant since the groundwater withdrawal would affect a spring and a wetland. The cumulative effects of all of past, present, and foreseeable future actions would be a significant impact on Hualapai traditional cultural resources. Impacts on the Carrow-Stephens Ranches ACEC would be both positive and significantly adverse, due to the nature of the significance criteria and BLM Management Prescriptions for these areas.

A determination on the significance or cumulative impacts on threatened and endangered proposed and listed species will be made after the completion of consultation with USFWS and is anticipated to be reflected in the Final EIS.