

Chapter 4 – Cumulative Effects

4 Cumulative Effects

Chapter 4 describes the cumulative effects analysis conducted and the results of the analysis. Cumulative effects are effects that result from the incremental effect of the SJBEC Project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the actions. Cumulative effects can result from individually minor but collectively significant actions that take place over a period of time (40 CFR §1508.7).

4.1 Methods

The cumulative effects analysis conducted involved a series of steps that are summarized below:

- Issues or resources were identified for cumulative effects analysis.
- The study area and timeframe for analysis were determined for each resource.
- A range of past, present, and reasonably foreseeable future actions were identified that could have an effect on the issues or resources of concern within the study area and timeframe established.

The cumulative effects of the SJBEC Project in conjunction with other actions were then analyzed for each resource. The methods used to assess cumulative effects are resource-dependent, and include:

- Trend analysis was used qualitatively and quantitatively where data allowed.
- GIS overlays and effects analysis were used to understand spatial and temporal relationships of the SJBEC Project with past, present, and reasonably foreseeable future actions.

4.1.1 Study Area

The cumulative effects study area for each issue or resource was established to help bound the description of the affected environment and assess direct and indirect effects. For purposes of cumulative effects analysis, the analysis area for each resource is the same as the area studied for direct and indirect effects and described in Chapter 3, Affected Environment and Environmental Effects.

4.1.2 Timeframe

The timeframe for the cumulative effects analysis extends from the history of effects to each resource through the anticipated life of the project (and beyond, for resources having more permanent effects). The effects of past and present actions and trends over time for each resource are discussed below. The timeline for reasonably foreseeable future actions is defined by the term of the proposed right-of-way grants, which is up to 50 years.

4.1.3 Past and Present Actions

Past and present actions are described in the affected environment sections for each resource in Chapter 3. Past and present actions are generally accounted for in the analysis of direct and indirect effects for each resource and are carried forward to the cumulative effects analysis. The text below for each resource, summarizes trends of how past and present actions have affected each resource over time.

4.1.4 Reasonably Foreseeable Future Actions

For this cumulative effects analysis, reasonably foreseeable actions were defined as:

- Projects where permit applications have been submitted
- Projects or actions where funding has been identified
- Projects or actions that have begun or completed the NEPA process

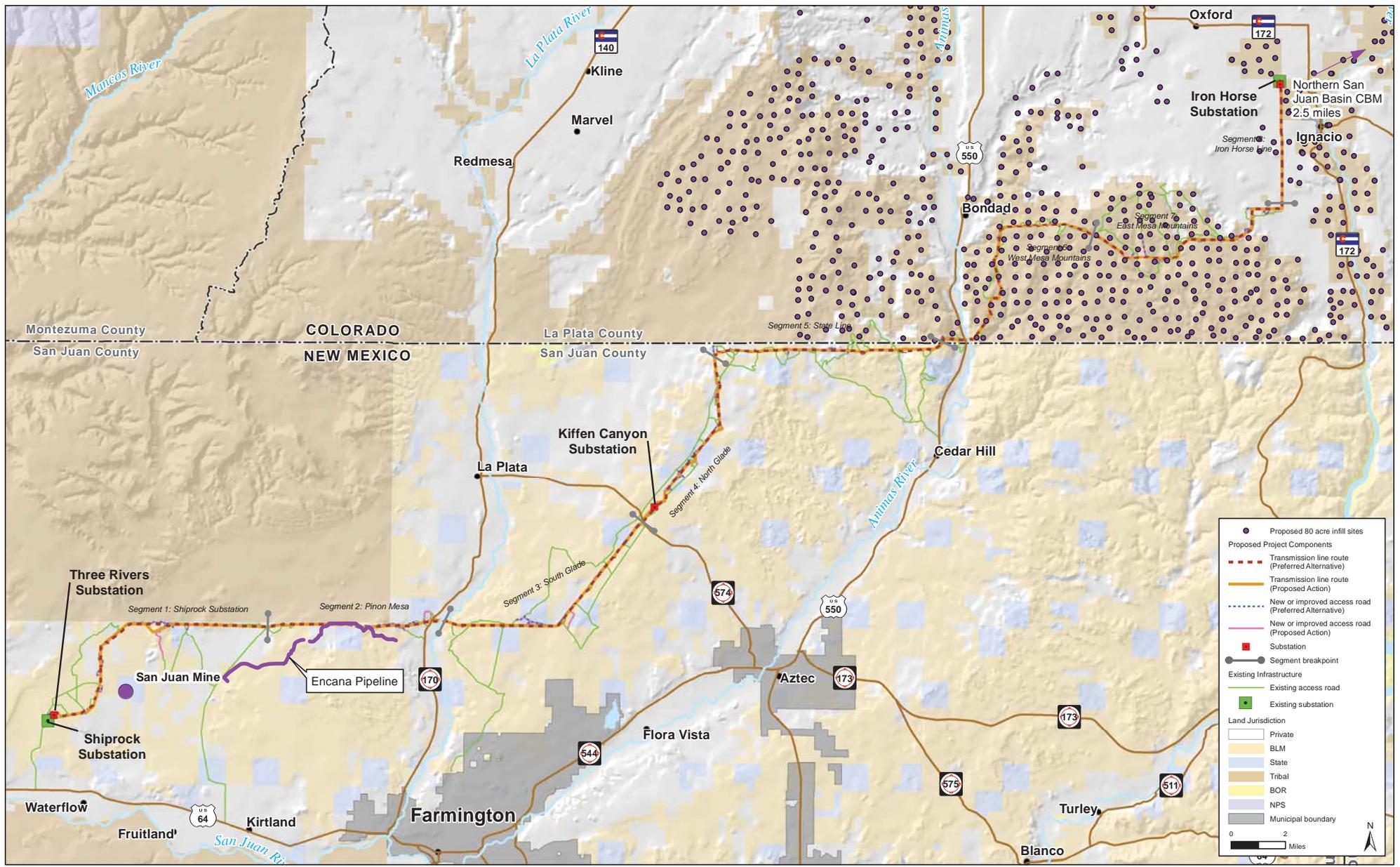
Reasonably foreseeable actions or projects for this cumulative effects analysis were identified through:

- EIS scoping
- Consultation with the BLM FFO and cooperating agencies

Based on this input, the following projects or actions provided in Exhibit 4-1, Reasonably Foreseeable Projects Near the SJBEC Study Area, were identified as reasonably foreseeable. Exhibit 4-2, Map of Reasonably Foreseeable Projects Near the SJBEC Study Area, shows the general location of projects.

Exhibit 4-1
Reasonably Foreseeable Projects Near the SJBEC Study Area

Reasonably Foreseeable Project	Description	Status
Encana Proposed Natural Gas Pipelines	These two connecting proposed natural gas pipelines would be built on lands managed by the BLM FFO along Western's power line near the proposed SJBEC route.	Project not expected until after 2014.
Encana Proposed Natural Gas Wells	Encana has proposed to construct 4 to 5 new wells on lands managed by the BLM FFO near the proposed SJBEC route.	Project not expected until after 2014.
Oil and Gas Well Development on Lands Managed by the BLM FFO	The 2001 RFD for the 2003 Farmington RMP predicted 16,615 subsurface completions in the NM portion of the San Juan Basin over a 20-year period. In the township areas containing the proposed route, the prediction for average well locations per section ranged from 2 to 3 on the western end of the proposed route to >6 in T30N, R12W.	Since the release of the 2003 RMP, 3,351 wells have been drilled.
San Juan Mine Reclamation Project	Reclamation of a closed surface mine involving backfilling, grading, and revegetation. Total mine disturbance covered approximately 5,000 acres. A portion of this mine is located on lands managed by the BLM FFO.	Over 2,000 acres have been reclaimed. Reclamation is ongoing.
Northern San Juan Basin Coalbed Methane Project on USFS Lands in the San Juan National Forest	Six companies proposed to drill 284 coalbed methane wells in Archuleta and La Plata Counties, 185 of which would be on federal mineral estate.	ROD released in 2007; construction is ongoing at a rate of 1–2 wells per year.
Oil and Gas Well Development on USFS and BLM lands in Colorado	San Juan Public Lands Supplemental Draft EIS/Draft LMP Revision (released in August 2011) predicted 2,954 new wells in the San Juan Public Lands Planning Area in southwestern Colorado. Spacing could vary from 40 acres to 320 acres.	Ongoing.
San Juan Public Lands Land Management Plan Revision	Land Management Plan revision for USFS- and BLM-managed lands in Archuleta, Conejos, Dolores, La Plata, Mineral, Montezuma, Rio Grande, and San Juan Counties, Colorado.	Proposed decision date of May 2013.
Oil and Gas Well Development on SUIT lands in Colorado	The 2002 Final EIS analyzed a preferred alternative involving the drilling or recompletion of 636 production wells at 160-acre spacing.	Final EIS released in 2002; construction is ongoing at a rate slower than anticipated by the FEIS. As of December 15, 2007, 86 wells had been drilled.
SUIT Oil and Gas Infill Development	Infill development of 770 coalbed methane wells at 80-acre spacing/density that involves expansion and drilling on existing well pads throughout the Mesa Mountains.	Programmatic EA finalized in August 2009. Construction is ongoing.



Source: GIS BLM 2012, GIS Tri-State 2013, GIS SUIT 2012b

Exhibit 4-2 Map of Reasonably Foreseeable Projects Near the SJBC Study Area

4.2 Land Ownership and Use

4.2.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Existing land use conditions within and directly adjacent to the study area are influenced by decades of oil and gas development, coal mining, and electrical transmission line development. Access roads with associated right-of-way authorizations connect these land uses and traverse many parts of the study area. Land use planning documents continue to support oil and gas development and the addition of new right-of-way for transmission infrastructure.

Urban land uses are present near the study area but are a less-dominant feature. The nearest urban areas are the cities of Farmington and Aztec in New Mexico and the Town of Ignacio in Colorado. These areas have experienced modest population growth over the past several decades.

Due to the arid, desert southwest climate, non-urban residential and agricultural land uses have historically located near perennial water sources. The proposed SJBEC Project would encounter residential and agricultural land uses at the La Plata River, Animas River, and in dispersed areas in Colorado.

4.2.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Lands in the San Juan Basin support a variety of activities including recreation, agriculture, urban development, and grazing. Land use planning policies guide activities related to these uses. Effects of reasonably foreseeable actions without the SJBEC Project are discussed below.

The San Juan Basin contains significant natural gas reserves. Oil and gas exploration and development began in the basin in the 1920s and have since shaped land use patterns. The basin remains one of the nation's most important gas suppliers. The primary market for natural gas from the San Juan Basin is California; San Juan Basin natural gas is California's largest single source. Demand for natural gas is expected to rise in California and nationally, resulting in continued extraction and exploration activities.

Land Use Study Area

The proposed study area for Land Ownership and Use is described for the affected environment in Section 3.2, Study Area.

As shown in Exhibit 4-1, oil and gas development is expected to continue, and there are several specific projects identified. Between 2002 and 2022, up to 16,615 new wells are expected on BLM-managed lands.¹ Since the 2003 release of the BLM FFO's Resource Management Plan (RMP), 3,351 of those wells have been drilled. A 2002 Final EIS analyzed a preferred alternative that allows for drilling or recompleting 636 oil and gas wells on SUIT lands in Colorado. A 2011 BLM and US Forest Service (USFS) EIS² predicted an additional 2,954 wells in the San Juan Public Lands Planning Area in southwestern Colorado. In addition, a 2009 Programmatic EA was completed authorizing up to 770 coalbed methane wells on SUIT lands.³ A 2007 ROD authorized 284 coalbed methane wells in Archuleta and La Plata Counties.⁴

In order to accommodate and distribute the projected increase in recovered gas resources, an additional 3,600 miles of pipeline is expected throughout the basin.⁵ As demand for natural gas increases, new pipelines, access roads, and development sites will create disturbances and result in new right-of-way. Due to a long history of gas extraction and the probability that the majority of new wells will be drilled from existing well pads, additional effects to land uses in the region will likely be minimal.

In addition, northwestern New Mexico, specifically the area surrounding the Shiprock Substation near Farmington, contains several major electrical transmission lines with associated right-of-way grants and easements. Additional upgrades of and expansions to the existing network may be considered in the future, though there are no known specific proposals at this time. Proposed infrastructure expansions could provide improved connections to the energy market in Albuquerque, New Mexico.⁶ New solar energy development throughout New Mexico and Arizona may also prompt the need for additional transmission capacity in the

¹ BLM 2001

² BLM 2011

³ SUIT 2009

⁴ BLM 2007

⁵ BLM 2001

⁶ New Mexico Task Force on Statewide Electricity Transmission Planning 2010

San Juan Basin. Due to the variety of existing utility easements, added transmission capacity may be accommodated in proximity to existing utility corridors, thereby minimizing the effects to land uses.

4.2.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative would be consistent with applicable land use planning policies. Lands in northwestern New Mexico and southwestern Colorado are heavily dedicated to and affected by oil and gas development, gas pipelines, electrical transmission lines, and related access road right-of-way. The Preferred Alternative would minimally contribute to the cumulative effects to existing land uses in the region.

4.2.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.2.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.3 Special Designation Lands

4.3.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

There are two specially designated areas in the study area, the Hogback and Cedar Hill Areas of Critical Environmental Concern (ACECs). BLM management prescriptions for the Hogback ACEC are in place to protect sensitive plant species unique to the region. Surface disturbance presents the greatest threat to the plant species; as a result, surface development and off-highway-vehicle use have been historically limited within the ACEC boundary.

Surface disturbances in the Hogback ACEC have mostly been due to the development of electrical transmission lines, access roads, and the Shiprock Substation. Demand for electricity in the Southwest market has resulted in the construction of new transmission infrastructure and expansion of existing electrical transmission infrastructure. The Shiprock Substation, located in the eastern portion of the Hogback ACEC is a major hub for transmission lines in the region.

Special Designation Lands Study Area

The proposed study area for special designation lands is described for the affected environment in Section 3.2, Study Area.

Management prescriptions in the Cedar Hill ACEC are designed to protect sensitive cultural resources. Since the ACEC boundary and management prescriptions did not exist prior to 2003, ground-disturbing activities, mainly oil and gas development, are prevalent in the ACEC.

4.3.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Lands within and surrounding the Hogback and Cedar Hill ACECs would continue to be influenced by oil and gas development. Since the 1920s, the San Juan Basin has been one of the nation's leading suppliers of natural gas. Oil and gas development activities are more prominent in the Cedar Hill ACEC than in the Hogback ACEC. Many of the wells in the Hogback ACEC are temporarily or permanently abandoned.

Oil and gas development in the Cedar Hill ACEC would continue. To minimize new surface disturbance, management prescriptions for the ACEC require access be accommodated on existing roads. Effects from new drilling are likely to be minimal since most new wells are expected to be drilled from existing well pads.⁷

Threats to sensitive plant species in the Hogback ACEC would continue to be largely from soil-disturbing activities such as off-highway-vehicle use and construction. These effects would be considered to be minimal, since as shown in Exhibit 4-1, soil-disturbing activities in the ACEC are not expected.

4.3.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative would minimally contribute to the cumulative effects on the ACECs. Within the Hogback ACEC, there are nearly existing access roads, transmission lines, and 26 acres of surface disturbance associated with the existing Shiprock Substation. Approximately 21.3 acres of new surface disturbance would be necessary as part of the Preferred Alternative. Of the total acres that would be disturbed, 20 acres would be for the new Three Rivers Substation. The site of the proposed substation is directly

⁷ BLM 2001

north of the existing Shiprock Substation and would be accessible via a network of existing access roads. Management prescriptions in the ACEC require that transmission line projects be considered on a case-by-case basis to minimize effects to sensitive plant species. The Preferred Alternative will follow these management prescriptions to minimize any possible direct, indirect, or cumulative effects to the ACEC.

No new surface disturbance is proposed in the Cedar Hill ACEC as part of the Preferred Alternative; therefore, there is no potential for cumulative effects.

4.3.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.3.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative. The only difference is that the Proposed Action would affect 21.6 acres of land in the Hogback ACEC as compared to 21.3 acres with the Preferred Alternative.

4.4 Recreation

4.4.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Existing conditions have been primarily affected by energy infrastructure, including transmission lines, well pads, and associated access roads. Many of these access roads are used for recreational activities, such as off-highway vehicle use; to gain access to smaller trails for mountain biking and other non-motorized uses; and for hunting.

4.4.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

If the reasonably foreseeable actions directly disturbed recreation areas or altered permanent access to recreation areas, they could permanently affect recreation in the study area. In the study area, there are two designated recreation areas on BLM lands: the Pinon Mesa and the Glade Run Recreation Areas. There are no formally designated recreation areas in the rest of the study area.

Recreation Study Area

The proposed study area for recreation is described for the affected environment in Section 3.2, Study Area.

A portion of Encana's proposed pipelines would cross the Pinon Mesa Recreation Area. Specific effects are unknown at this time, but it is expected that recreation activities would continue as they do today in the Pinon Mesa area. Additional oil and gas development in BLM-designated recreation areas could increase the number of access roads in the study area. These roads have generally improved recreational access, allowing users to access more remote destinations and providing multiple access points for trails and other routes. New oil and gas development in these areas would likely increase vehicular traffic and the number of people accessing the area to operate and maintain the wells. Noise and disruption from the presence of workers, equipment, and materials could indirectly affect the recreational setting. These activities, however, are infrequent and localized. Therefore these indirect effects to recreational users are not expected to be substantially different than what recreational users experience today from existing energy development.

4.4.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The cumulative effects of reasonably foreseeable actions with the Preferred Alternative would be similar to the effects described above. Changes in recreational access and activities resulting from the Preferred Alternative would likely be unnoticeable to the average recreational user, because these recreation areas house similar transmission line infrastructure. The Preferred Alternative would add a transmission line within the Pinon Mesa and Glade Run Recreation Areas; however, the addition of the transmission line would not be expected to reduce recreational opportunities or use in the study area. Permanent indirect effects to recreation could involve noise and disruption of the recreation setting from the presence of workers, equipment, and materials during regular line maintenance. The activities would be infrequent and localized and would not be expected to alter the recreational experience for users.

4.4.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.4.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.5 Grazing and Livestock

4.5.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Grazing, which was one of the earliest uses of public lands when the West was settled, continues to be an important use of those same lands today. Livestock grazing now competes with more uses than it did in the past, as other industries and the public look to public lands as sources of both conventional and renewable energy and as places for outdoor recreational opportunities, including off-highway-vehicle use.

Over time there has been a gradual decrease in the amount of grazing that takes place on BLM-managed land, and that trend continues today. Grazing use on public lands has declined from 18.2 million animal unit months (AUMs) in 1954 to 8.3 million AUMs in 2011. In most years, the actual use of these forage areas is less than the amount authorized because forage amounts and demands depend on several factors, such as drought, wildfire, and market conditions.⁸ Grazing trends on SUIT and private lands are unknown.

Existing conditions in the study area have been primarily affected by energy infrastructure, including transmission lines, well pads, and associated access roads as well as recreational uses.

4.5.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Cumulative effects to livestock grazing are those that permanently affect available forage, water, and land suitable for grazing. Reasonably foreseeable future actions and conditions within the planning area that would likely affect livestock grazing include loss

Grazing and Livestock Study Area

The cumulative effects study area for livestock grazing is the same area described for the affected environment in Section 3.2, Study Area.

⁸ BLM 2012

of grazing lands to other resource uses such as oil and gas development. In addition, climate change could cause an increase or decrease in temperatures and precipitation, which would affect soil conditions, vegetative health, and water flows and temperature. Such changes would potentially alter forage available for livestock grazing and the AUMs that public lands could support. Specific effects from reasonably foreseeable local projects include:

- **Encana Proposed Natural Gas Wells and Pipelines** – The Encana-proposed gas wells and pipelines fall within the Shumway Arroyo Allotment Management Plan (AMP) on BLM land. The project would temporarily reduce forage during pipeline and well construction and would permanently reduce forage at well sites and access roads. It is not likely that AUMs would decrease from these actions.
- **Oil and Gas Well Development on Lands Managed by the BLM** – Oil and gas well development locally affects grazing where the oil and gas wells, pads, and access roads are constructed. Wells and associated access roads would be constructed in a different study area and at different times than the SJBEC Project. Close coordination with livestock permittees could reduce any localized effects to AUMs.
- **Northern San Juan Basin Coalbed Methane Project on USFS and BLM Lands in Colorado** – The Northern San Juan Basin Coalbed Methane Project is located 2.5 miles outside of the SJBEC study area. Cumulatively, the coalbed methane project would not directly affect grazing within the study area. The coalbed project could indirectly affect grazing operators that graze inside and outside of the study area. Effects in the coalbed area would be similar to those described for oil and gas development on BLM lands.
- **San Juan Public Lands Land Management Plan Revision** – Management plan revisions could provide updated management of grazing on public lands.
- **Oil and Gas Well Development on SUIT Lands** – Cumulative effects to livestock grazing from oil and gas development on

SUIT lands would be similar to those described for oil and gas development on BLM lands.

- **San Juan Mine Reclamation Project** – The San Juan Mine Reclamation Project, located on BLM lands, would provide an opportunity for grazing operators to resume grazing in specific areas within the mine’s boundary once the surface is re-vegetated. Grazing would only resume based on BLM and mine concurrence in areas safe for grazing.⁹

4.5.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The effect to livestock grazing from the reasonably foreseeable projects and the Preferred Alternative would primarily be the same as identified under the Section 4.5.2, Effects of Reasonably Foreseeable Actions Without the SJBEC Project, above. As discussed in Chapter 3, the forage areas that would be permanently lost as a result of the Preferred Alternative would be small and would have no measurable effects upon grazing capacity (AUMs) or a change in the authorized uses for the allotments.

4.5.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.5.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.6 Visual Resources

4.6.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

The study area contains a variety of landscapes. It includes elongated bluffs with steep cliffs, rolling hills incised by draws, broad valleys, and table mesas. Dark green pinon and juniper and gray-green shrubs (such as sagebrush) and grasses are found throughout the area. Soil color (browns, beiges, oranges, and grays) varies by location. Power lines and oil and gas pads are common in

Visual Resources Study Area

The cumulative effects study area for visual resources is described in Section 3.7.1, Study Area.

⁹ BLM 2009

the area. The low, flat alluvial valleys contain substantial rural residential and commercial development.

Past and present actions within and directly adjacent to the study area that have affected visual resources include oil and gas development, coal mining, and electrical transmission line development located in Segments 1 through 4 and Segment 8 (segments are shown in Exhibit 3-3, Study Area). Access roads with associated right-of-way authorizations connect these land uses and traverse many parts of the study area. These actions occur on lands owned and managed by various entities and, therefore, have varying requirements for managing visual resources. All of these actions involve adding artificial elements to the landscape or altering the condition of major landscape features (land, water, vegetation, and structures). Urban land uses are present near the study area but are a less-dominant feature. The nearest urban areas are Farmington and Aztec, New Mexico, and Ignacio, Colorado.

4.6.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Reasonably foreseeable projects likely to have the greatest future cumulative effect on visual resources in the study area are those associated with oil and gas development and the San Juan Public Lands Land Management Plan Revision. The San Juan Public Lands Land Management Plan Revision influences land management, which, in turn, affects the preservation and alteration of visual resources. These actions would occur on lands owned and managed by various entities that have varying requirements for managing visual resources. The plan would cover a variety of actions that would involve adding artificial elements to the landscape or altering the condition of major landscape features. It is assumed, however, that the San Juan Public Lands Land Management Plan Revision would maintain or improve the condition of visual resources and would not include land management decisions that allow visual resources to degrade.

Planned oil and gas development in the study area would continue the trend of well pad development that is prevalent in the area.

Development that would occur on BLM lands would be subject to BLM's visual resource management classes¹⁰ and visual requirements which would help to minimize effects to the visual landscape. In general, reasonably foreseeable projects planned in the study area would result in similar effects to visual resources that exist today; only the number of oil and gas wells is expected to continue to increase over time. Specific effects to the key observation points considered in Chapter 3 are unknown, since the locations of future oil and gas wells are unknown.

4.6.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative combined with other reasonably foreseeable projects would increase the number, density, and visibility of artificial elements in the study area. The incremental effect of altering the visual setting, when combined with similar effects created by other reasonably foreseeable projects, would increase the total area of land affected by energy development projects in the study area.

4.6.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.6.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.7 Transportation and Access

4.7.1 Existing Conditions and How They Have Been Affected by Past and Present Activities

Existing conditions for the transportation network within and directly adjacent to the study area are influenced by decades of ranching, homesteading, mining, exploration, settlement, and farming. In the twentieth century, oil and gas, coal, and electrical transmission line development has also contributed to the expanding network of highways, county roads, and service roads that crisscross the area. As discussed in the land use section,

Transportation and Access Study Area

The cumulative effects study area for transportation and access is described in Section 3.2, Study Area.

¹⁰ See Section 3.7.3.1, BLM Lands, for more information on visual resource management classes.

planning documents for the greater San Juan region continue to provide for oil and gas development and the addition of new right-of-way for transmission line infrastructure.

As is typical for industry-dominated communities of the intermountain West, the study area for the SJBEC Project has a diversity of federal, state, county, tribal, and private service roads that connect communities. In addition, secondary routes and main arterial service roads are likely co-located in areas of early ranching, mining, and timber harvesting.

One federal, interstate highway is located within the study area: US 550. Expanded to a four-lane road in the 1990s and early 2000s, this highway services commercial and non-commercial traffic throughout northern New Mexico and southwestern Colorado. State highways include NM 170 and NM 574 and connect the urban communities of Farmington and Aztec to smaller towns and villages in the region. County roads in this area also provide important connections between communities, ranches, and tribal lands.

In addition to numbered and regulated roadways, are hundreds of miles of native-surface, unimproved roads used by ranchers, oil and gas providers, recreationalists, and utility companies. Maintenance schedules and management is highly variable for the majority of these roadways. Due to population growth and the expansion of industry throughout the San Juan Basin, over time, the number of surface roads and their use has increased.

4.7.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

As indicated in Exhibit 4-1, most of the reasonably foreseeable development in the study area includes additional oil and gas development. It can be expected that this development would require improvements to existing access roads or construction of new access roads. Within the study area, however, there is a well-developed network of existing roadways. In many cases, oil and gas developers would try to use or modify existing roadways to limit the need for new roadway construction.

Additional effects of increased traffic to existing roads and highways in the region would likely be minimal since roadway congestion is not a substantial issue.

4.7.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

Approximately 86 percent of the access roads needed to support the Preferred Alternative could be fulfilled by existing roads that need little or no improvement. This minimizes the need to disturb undisturbed areas. The 14 percent that would be new roads are mostly short spurs that average 250 to 500 feet in length that would generally dead-end at structure locations. Further, lands in northwestern New Mexico and southwestern Colorado are heavily dedicated to, and affected by, oil and gas development, gas pipelines, electrical transmission lines, and related access road right-of-way. Therefore, the Preferred Alternative would minimally contribute to the cumulative effects to transportation uses in the region.

During operation, maintenance crews and vehicles would conduct periodic inspection and maintenance activities. Detailed ground inspections of the entire transmission line system would take place on a semi-annual or annual basis. A crew with a service vehicle, typically a bucket truck, and four-wheel-drive trucks or all-terrain vehicles would patrol the line and make necessary repairs. In addition, access roads would be used to access the transmission line in instances where emergency repairs are required. These activities would have no measurable effect on long-term traffic volumes in the study area.

4.7.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.7.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.8 Geology and Geologic Hazards

4.8.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

The study area has been heavily influenced by decades of oil and gas development, coal mining, and electrical transmission line development. Energy infrastructure that has had an effect on the study area's geology primarily includes wells and mines. Oil and natural gas wells tend to be very deep and may cross many geologic layers. Underground mining in the San Juan Mine near Segment 1 (segments are shown in Exhibit 3-3, Study Area) has created the potential for subsidence. There are also regions near the project area where surface mining removed portions of the outcropping rock, although much of the land is being reclaimed. There are no indications of large scale disturbance from these activities.

4.8.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

New wells are planned in the study area for the Encana Proposed Natural Gas Wells Project, Northern San Juan Basin Coalbed Methane Project, and oil and gas well development on USFS, BLM, BLM FFO and SUIT lands. Exhibit 4-1 lists the status and number of wells covered in these proposals. The exact locations of these wells are unknown. In addition, as shown in Exhibit 4-2, coalbed methane wells are expected to be drilled in southwestern Colorado on USFS and SUIT lands in southwestern Colorado. Depending on the number of wells and their relationships with nearby landforms, they could destabilize portions of the underlying bedrock. Additionally, new access roads may be required, and maintenance equipment and drill rigs would increase the load on the subsurface. As more projects are sited to avoid geological hazards, suitable siting locations may become increasingly occupied, thereby forcing future projects towards areas of greater geological hazard.

4.8.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative would disturb some portions of the underlying bedrock during construction. The transmission line

Geology and Geologic Hazards Study Area

The study area is the same as described in Section 3.2, Study Area.

structure foundations are expected to extend 20 feet below the ground surface, which is relatively shallow in comparison with the gas and oil wells from the abovementioned projects. The Preferred Alternative would not pose a hazard to the stability of landforms, since the project would be designed and built to minimize potential hazards.

4.8.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.8.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.9 Paleontology

4.9.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Past and present actions have potentially affected paleontological resources in the vicinity of the project study area by disturbing paleontologically sensitive geologic units. Direct effects to paleontological resources can be caused by ground-disturbing activities such as road construction, clearing and leveling well pad or transmission tower sites, pipeline trenching, or mine excavation. These activities can damage paleontological specimens and lead to the loss of associated data. Permanent indirect effects include increased potential for vandalism or unauthorized collection of paleontological resources from increased access.

4.9.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Reasonably foreseeable actions that include ground-disturbing activities on geologic units with moderate to very high sensitivity (PFYC 3, 4, or 5)¹¹ for paleontological resources would occur with or without the SJBEC Project. Reasonably foreseeable actions that could have cumulative effects to paleontological resources include the Encana pipeline, oil and gas well development on lands managed by the BLM FFO, oil and gas well developments on BLM

Paleontology Study Area

The cumulative effects study area for paleontology is the same as described for the affected environment in Section 3.2, Study Area.

¹¹ Please see the Section 3.10, Paleontology, for more information on the Potential Fossil Yield Classification (PYFC) numbers.

lands in Colorado, oil and gas well development on SUIIT lands in Colorado, and SUIIT oil and gas infill development. These projects could have similar effects to paleontological resources as described above in Section 4.9.1, Existing Conditions and How They Have Been Affected by Past and Present Actions.

4.9.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The effects to paleontological resources from the reasonably foreseeable projects and the Preferred Alternative would be similar to those identified above in Section 4.9.2, Effects of Reasonably Foreseeable Actions Without the SJBEC Project. Environmental Protection Measures (EPMs) will be implemented to avoid or minimize possible effects to paleontological resources, which will reduce the potential for cumulative effects to paleontological resources.

4.9.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.9.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.10 Minerals

4.10.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

As described in detail in Section 3.11, Minerals, mineral resources have long been important to the economic and employment base of the Four Corners area and San Juan Basin. More than 30,000 oil and gas wells have been drilled, millions of tons of coal extracted, and hundreds of thousands of cubic yards of aggregate and construction materials (rock, gravel, sand) extracted. In addition, more than 300 miles of high-voltage electric transmission lines have been constructed to export generated electric power out of the region. Many of these and past and present actions or activities have occurred near, but not within, the SJBEC Project right-of-way. Mineral rights along much of the SJBEC Project right-of-way have been leased to mining companies (in Segment 1) or to oil and gas operators (Segments 2 through 7), and much of the proposed

Minerals Study Area

The study area for cumulative effects is the same as described in Section 3.2 Study Area.

transmission line route follows existing access roads built and maintained to support oil and gas operations. Approximately half of the proposed transmission route parallels existing 345 kV and 115 kV transmission lines, each of which has accommodated mineral and mining industry use of access roads.

4.10.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

There are many proposals and plans for additional development of mineral resources within the San Juan Basin, including some located near the study area. The following proposed projects could potentially add to cumulative effects of past and present actions as identified in Exhibit 4-1.

- Encana Proposed Natural Gas Wells and Pipelines
- Oil and Gas Well Development on Lands Managed by the BLM FFO
- San Juan Mine Reclamation Project
- Northern San Juan Basin Coalbed Methane Project on USFS Lands in the San Juan National Forest
- Oil and Gas Well Development on USFS and BLM Lands in Colorado
- Oil and Gas Well Development on SUIT Lands in Colorado
- SUIT Oil and Gas Infill Development

The cumulative result of these proposed projects would involve greater extraction of mineral resources (especially coal, oil, and natural gas) from the San Juan Basin, along with the added economic stimulus to local, regional, and state economies. These projects would also further deplete existing reserves of mineral resources, since all are finite, and once extracted cannot be replaced.

4.10.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

As described in detail in Section 3.11, Minerals, construction of the Preferred Alternative would involve temporary disturbance or occupancy of approximately 800 acres along the proposed right-of-way for construction of the transmission line, substations,

and access roads, making this area briefly unavailable for mineral resource development. Permanent displacement or disruption and use of potential mineral resource surface area resulting from the Preferred Alternative would total approximately 182 acres. The Preferred Alternative would not directly or indirectly encourage expansion of mineral resources, increase mineral or mining use or extraction, or significantly reduce use of these resources.

Compared with the hundreds of thousands of acres currently used and millions of acres potentially available for future mineral resource development within the San Juan Basin, the Preferred Alternative would minimally contribute to cumulative effects of past, existing, and foreseeable future resource use within the San Juan Basin.

4.10.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.10.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative. The only difference is that Proposed Action would temporarily affect 827 acres during construction and 183 acres permanently. As described in Section 4.10.3, this would minimally contribute to cumulative effects to minerals.

4.11 Soils

4.11.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

The study area has been heavily influenced by decades of oil and gas development, coal mining and electrical transmission line development. Energy development is primarily composed of pipelines and well heads. Pipelines are typically buried at a shallow depth and only require excavation that is slightly wider than the pipe diameter. Wells extend to great depths, but the surface footprints are relatively small with limited soil disturbance. Along with the existing transmission lines in the area, the wells and pipelines require access roads for construction and maintenance, which also disturb area soils.

Effects to soils from these actions include soil loss and erosion. The underlying soil has been compacted, and drainage routes and runoff rates may have been altered over time.

Soils Study Area

The study area is the same as described for the affected environment in Section 3.2, Study Area.

4.11.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

New wells are planned in the study area for the Encana Proposed Natural Gas Wells Project, Northern San Juan Basin Coalbed Methane Project, and oil and gas well development on USFS, BLM, BLM FFO and SUIT lands. Exhibit 4-1 lists the status and number of wells covered in these proposals. The exact locations of these wells are unknown. In addition, as shown in Exhibit 4-2 coalbed methane wells are expected to be drilled in on USFS and SUIT lands in southwestern Colorado. Depending on the number of wells and their locations, their construction could disturb soil in the study area. In addition, new access roads may be required and would result in soil disturbance.

A portion of the Encana Proposed Natural Gas Pipelines is planned to be constructed in the study area. This would disturb soil and require excavation for the pipe. Over time, the natural conditions are expected to be restored, but the pipeline could be unearthed for maintenance. Effects could include erosion and soil compaction from construction vehicles on access roads; however, since the surface footprint is relatively small, no long-term effects to the soil environment are expected.

The San Juan Mine Reclamation Project is being developed in the study area and includes backfilling, grading, and revegetating approximately 5,000 acres of surface mines. This will help restore the land to its original condition.

4.11.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative is not expected to have an adverse cumulative effect to soils. The Preferred Alternative proposes to share existing access roads where feasible to minimize development and soil disturbance. In addition, EPMS listed in Exhibit 2-23, Environmental Protection Measures, will be employed during project design and construction to minimize possible soil effects related to erosion and ground disturbance.

4.11.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.11.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.12 Farmlands

4.12.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Existing conditions in the study area have been primarily affected by energy development infrastructure including well pads, transmission lines, and access roads. These activities have affected farmlands through farmland fragmentation, permanent farmland loss through conversion into non-farmland uses, restriction of farmland access or operation, and farmland soil degradation from erosion or compaction.

4.12.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Oil and gas well development on SUIT lands may affect area farmlands, depending on where the development is located. Potential effects include removing farmland from production, fragmenting farmland parcels, restricting access to or farmland activities on farmland parcels, and erosion or compaction of farmland soils. In addition to oil and gas well development, associated access roads, well pads, and other infrastructure could affect farmland.

As more projects are developed in the area, siting to avoid farmland could become increasingly difficult, and suitable siting locations may become increasingly occupied, thereby limiting future siting location options.

4.12.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The effect on farmland from the reasonably foreseeable projects and the Preferred Alternative would primarily be the same as identified above under Section 4.12.2, Effects of Reasonably Foreseeable Actions Without the SJBEC Project. The Preferred Alternative

Farmlands Study Area

The cumulative effects study area for farmlands is the same as described for the affected environment in Section 3.2, Study Area.

would not affect a large area of productive farmland, nor would it preclude agricultural operations in the area; so the potential for cumulative effects is minimal.

4.12.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.12.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.13 Water Resources and Wetlands

4.13.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

The effects of past and present activities in the study area to surface waters include reduced water quality likely as a result of irrigation runoff from agricultural activities, inadequate septic systems located near the rivers, organic wastes from ranching activities, roads, residential areas, and oil and gas and energy development located close or adjacent to the rivers. Sedimentation and siltation in the La Plata, Animas, and San Juan Rivers come from a combination of natural erosion processes and soils disturbed by developments in the region. Section 3.14.3.5, Water Quality, describes impaired surface waters in the study area.

Access roads to existing gas well pads, electrical transmission lines, substations, power generation facilities and other infrastructure in the San Juan River Basin frequently pass through the floodplains of the numerous arroyos located in Segments 1 through 4 of the study area (segments are shown in Exhibit 3-3, Study Area). These access roads are designed in such a manner as to allow flood events to occur naturally without causing noticeable effects.

Wetlands located in Segments 7 and 8 have been somewhat fragmented by roads and ditches. These wetlands appear to be healthy and functional and to have experienced little degradation from past and present actions in and around the study area.

Water Resources and Wetlands Study Area

The proposed study area for Water Resources and Wetlands is described in Section 3.14.1, Study Area.

4.13.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Future gas well development on BLM and SUIT lands and the ground disturbance associated with their construction and operation are the predominant reasonably foreseeable activities in the region that might contribute effects to surface waters and wetlands. The potential effects to surface waters would be increased sedimentation and siltation from soil disturbance and an increased potential for contamination by chemicals, such as fuel and lubricants, used by equipment and vehicles during construction and operation. The effects of these projects would be reduced by siting roads and well pads to avoid waterbodies and wetlands. Access roads would be designed to maintain natural drainage patterns in the area to allow flood events to occur without causing noticeable effects. These activities are not expected to affect groundwater or floodplains.

The regulatory requirements in place for these future developments have a demonstrated record of success in reducing these effects to negligible in nearby perennial waters, when compared to the effects of natural processes and sampling data in the La Plata, Animas, and San Juan Rivers (see Section 3.14.3.5, Water Quality, for a description of water quality.)

4.13.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The potential effects to water resources in the region from other reasonably foreseeable actions, when combined with the Preferred Alternative, may have some potential to contribute to the impairment of surface water resources. With the high degree of erosion protection measures that are applied to projects as a standard practice in the region, the effects of the Preferred Alternative, when combined with these other future projects in the region, would not be expected to contribute noticeably to the impairment of area surface waters. Contamination of water resources by accidental spills of hazardous fluids would not be expected to result in measurable adverse effects. Possible cumulative effects to groundwater would not occur, since the project would not permanently affect groundwater.

Floodplains would not be noticeably affected by the project and therefore would have no cumulative effect when combined with other reasonably foreseeable actions in the study area.

The Preferred Alternative would not result in any loss of wetlands and therefore would have no cumulative effect when combined with other reasonably foreseeable actions in the study area.

4.13.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.13.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.14 Vegetation

4.14.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Oil and gas development, coal mining, and electric power transmission are the past and present actions that have had the greatest effect on vegetation. Critically, this has included clearing vegetation for roads, wells, mines, and other infrastructure, resulting in habitat loss and fragmentation, along with the spread of noxious weeds along access roads and in disturbed areas. The San Juan Coal Mine alone occupies approximately 5,000 acres, much of which has been cleared of vegetation. Several special status plants such as the Mesa Verde cactus, Aztec gilia, and Brack's hardwall cactus may have been affected by these past actions. Human-caused fires can lead to habitat loss and consequent increases in invasive species. Grazing, farming, and increased use of previously remote areas due to access roads have also caused direct loss of habitat and habitat fragmentation. In general, however, a large majority of the study area and region remains relatively undisturbed with native vegetation.

4.14.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Future oil and gas well development—along with the accompanying loss of native plants, potential habitat fragmentation, and the potential for increasing the distribution of noxious weeds—is the

Vegetation Study Area

The proposed study area for Vegetation is described in Section 3.2, Study Area.

primary reasonable foreseeable activity in the region that would affect vegetation. These effects would be similar to those described above in Section 4.14.1, Existing Conditions and How They Have Been Affected by Past and Present Actions. Known populations of Mesa Verde cactus and its habitat in the general area would continue to be protected from development by the BLM's Hogback ACEC located just west of Segment 1 (segment locations are shown in Exhibit 3-3, Study Area). Reclamation of the San Juan Mine, however, would ultimately reestablish native vegetation across nearly 5,000 acres that are presently disturbed or void of plants.

4.14.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The cumulative effects of the Preferred Alternative combined with other past, present, and reasonably foreseeable actions within the study area would be similar to those discussed above in Section 4.14.1, Existing Conditions and How They Have Been Affected by Past and Present Action. The Preferred Alternative would incrementally reduce and fragment vegetation in the study area. These reductions would permanently affect approximately 182 acres and temporarily affect approximately 800 acres, which would not be expected to lead to substantial loss of plant communities. Further, the plant communities that would be affected in the study area are common across the region. A major factor offsetting these effects is siting the transmission line adjacent to previously disturbed areas, including other transmission lines, oil and gas facilities, and existing access roads, for example. Locating the Preferred Alternative near existing infrastructure would limit effects to special status plant species and those that may result from the spread of noxious weeds.

4.14.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.14.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative. The only difference is that the Proposed Action would permanently affect approximately 183 acres (as compared to 182 for the Preferred Alternative) and temporarily affect 827 acres (as compared to 800 for the Preferred Alternative).

These differences are minor, and the potential for cumulative effects would be similar for the two alternatives.

4.15 Fish and Wildlife

4.15.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Fish species and fish habitats would not be permanently affected by the SJBEC Project and are, therefore, not described in detail below. Wildlife and special species habitat in the study area consists of large expanses of scrub-shrub habitat, pinon and juniper woodlands, wetlands and riparian areas, rivers, and agricultural areas.

Wildlife, including special species, found in the study area is currently subject to the effects of existing transmission lines and considerable development related to oil, gas, and mining. Infrastructure development includes both linear features such as power lines, access roads, and oil and gas pipelines, and nonlinear features such as fossil fuel exploration and extraction. Linear features have resulted in irretrievable losses of habitat, habitat fragmentation, and the spread of invasive species along access roads and disturbed areas. Transmission lines increase risks to bird species from electrocution and collisions. Power line structures also provide perches and nesting substrates for avian species, which can benefit raptors and ravens, and facilitate predation of other species such as prairie dogs. The presence of access roads is associated with increased risk of mortality from collisions with vehicles, which can lead to the loss of habitat and introduction of invasive species. Changes in habitat and other environmental variables, such as noise resulting from human disturbance and presence, may also influence wildlife behavior during key periods such as breeding, rearing, and overwintering.

Nonlinear features can disrupt wildlife behavior due to associated disturbance from human activities and direct loss of habitat. Finally, grazing, farming, and residential development, though limited in the study area, have caused direct loss of habitat and habitat fragmentation.

Fish and Wildlife Study Area

The proposed study area for cumulative effects for fish and wildlife is described in Section 3.16.1, Study Area.

4.15.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Future gas well development on BLM and SUIT lands and the ground disturbance associated with construction and operation are the predominant reasonably foreseeable activities in the region that would contribute effects to wildlife and habitat. Considerable oil and gas development is planned for the coming years. The effects to wildlife and habitat from future linear and nonlinear infrastructure would be similar to the effects described in 5.15.1, Existing Conditions and How They Have Been Affected by Past and Present Actions. While most of these reasonably foreseeable actions would likely lead to a reduction in wildlife and wildlife habitat, the planned closure and restoration of the San Juan Mine would reestablish approximately 5,000 acres of previously disturbed habitat, which would likely draw wildlife to the area.

4.15.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative would contribute effects to wildlife and habitat in similar ways for linear features as described above in Section 4.15.1. When combined with other reasonably foreseeable projects, the Preferred Alternative would contribute to continued loss of wildlife and habitat in the region. In relation to past development and future proposed development, the footprint of the proposed project is relatively small; it is estimated that 800 acres would be temporarily disturbed, and 182 acres would be permanently disturbed. The disturbance and habitat loss is offset somewhat by siting a large portion of the proposed transmission line immediately adjacent to existing transmission lines and existing oil and gas development to minimize the need to construct new roads. The transmission line will be co-located near other transmission line features in Segments 1 through 4, and it will be built on existing poles in Segment 8 (segments are shown on Exhibit 3-3, Study Area). Co-located transmission lines may also have lower collision rates for birds than isolated transmission lines, as the overall visibility of multiple lines in proximity aids visual

detection and avoidance of the lines by birds.^{12, 13} The Preferred Alternative is not expected to present a detriment to any species at the population level.

4.15.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.15.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.16 Cultural Resources

4.16.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Much of the study area has been heavily developed by industry. This means the study area already contains well pads, pipelines, access roads, and transmission lines which may have affected the cultural resources within it. The past actions that have had the most effect on cultural resources are likely the development of access roads needed to support existing industrial development including well pads, pipelines, and transmission lines. In some cases, access roads have been constructed within archaeological sites. Although the major prehistoric features and structures have rarely been affected, some roads cross areas containing cultural materials, resulting in diminished historic integrity. These past actions—particularly road construction—may have also resulted in increased traffic and visitation to archaeological sites, some of which exhibit evidence of vandalism or inappropriate collection and excavation.

4.16.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

A number of ongoing and future projects have the potential to affect cultural resources in the study area even if the SJBEC Project is not completed (see Exhibit 4-1). These projects are related to natural gas exploration and expansion, construction of new gas infrastructure, and mine reclamation. While agencies and project proponents will, in most cases, have to consider the effects of these

Cultural Resources Study Area

The study area for cumulative effects on cultural resources is the same as described in Section 3.17.1, Study Area.

¹² PSC 2011

¹³ RUS 2013

projects on cultural resources under federal and state statutes, these projects serve to illustrate the degree to which the study area is, and will continue to be, affected by the expansion of industry infrastructure. Most importantly, access roads that cross archaeological sites are used by a wide variety of users including the public and various entities associated with electrical transmission, mining, and oil and gas development. As a result, many of these access roads will require ongoing upgrades or maintenance associated with other users and undertakings. In addition, new oil and gas development related to well pads or new pipelines proposed in the area would require additional ground disturbance and additional roads to access the sites. Given the number of potential cultural sites in the study area, it is likely that reasonably foreseeable projects could affect cultural resources in the area. These effects could include direct effects, such as construction within the boundaries of a cultural site. Most of the proposed development, however, is expected on federal lands managed by the BLM or the SUIT, and would be subject to requirements of the National Historic Preservation Act, which would likely serve to avoid, minimize, or reduce potential effects to cultural resources.

4.16.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The construction of new roads and possibly transmission structures may affect a number of cultural resources in the area. These effects would be mitigated as discussed in Section 3.17, Cultural Resources, and include a variety of monitoring and avoidance measures to be determined on a site-by-site basis, as well as testing or data recovery along access roads. In general, the Preferred Alternative would continue the trend that energy development has had on cultural sites as described above in Section 4.16.1, Existing Conditions and How They Have Been Affected by Past and Present Actions.

4.16.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have similar effects as described in Section 4.16.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative. The only difference is that the Proposed Action would affect 48 cultural sites as compared to 36 for the

Preferred Alternative, so the Proposed Action would have a greater effect to the cultural landscape than then Preferred Alternative.

4.17 Air Quality, Climate Change, and Greenhouse Gases

4.17.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Air quality in the region remains in attainment with federal ambient air quality standards for all regulated criteria pollutants. The region has seen increases, however, in ozone, nitrogen oxides, and particulate matter over the past decade. These increases are attributed to oil and gas operations, power plants, and general growth in the region. According to a programmatic environmental assessment for an oil and gas project on SUIT lands, over 30,000 natural gas and oil wells have been drilled in the San Juan Basin in Colorado and New Mexico.¹⁴ The area contains natural gas processing, refining and treatment plants; several large coal-fired generating stations and other non-coal-fired power plants. These sources all contribute criteria pollutant and greenhouse gas emissions to the region. The Four Corners Air Quality Task Force, which was formed in 2005 to address air quality issues in the study area, identified rapid industrialization from increased development of oil, gas, and coal resources as a major cause of rising levels of these pollutants, including ozone concentrations that are approaching the national ambient air quality standard. Additional concerns include visibility impairment in Class I¹⁵ areas and mercury emissions from coal-fired power plants.¹⁶ While no correlation between specific greenhouse gas-producing actions and climate change effects can be made, sources such as these have contributed to increasing global levels of greenhouse gases and global climate change.

Air Quality, Climate Change, and Greenhouse Gases Study Area

The cumulative effects study area for air quality and climate change is the same as described in Section 3.18.1, Study Area, and includes air pollution sources that affect air quality within the study area: primarily oil and gas activities and power generation.

¹⁴ SUIT 2009

¹⁵ See Section 3.18, Air Quality, Climate Change, and Greenhouse Gases, for more information on Class I areas.

¹⁶ Four Corners Air Quality Task Force 2007

4.17.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

The reasonably foreseeable actions in the region, listed in Exhibit 4-1, would result in a cumulative increase in fugitive dust from surface disturbances and criteria pollutants from vehicle and equipment emissions associated with construction and operation. These activities would produce temporary, localized, and intermittent effects. These actions would occur over a wide area at varying times and are unlikely to produce cumulatively localized fugitive dust emissions. The large number of oil, natural gas, and coalbed methane wells proposed or under development would contribute to the ongoing air quality trends described above under existing conditions. These actions would have the potential to cumulatively increase ambient air concentrations of regulated pollutants.

In addition to the reasonably foreseeable actions described in Exhibit 4-1, a number of actions are being proposed in the region to reduce air pollutant emissions from oil and gas production and power plants and reverse air quality trends described above. The BLM has placed emission limits on new and replacement internal combustion gas field engines for oil and gas development on lands within its jurisdiction. Colorado has implemented regulations requiring retrofitted controls on oil and gas emission sources and stringent emissions standards for new and relocated reciprocating internal combustion engines. In addition, the Arizona Public Services Company is proposing to shut down three units at the Four Corners Coal-Fired Power Plant, one of the largest power plants in the US, by 2014 and install pollution control upgrades on two other units.¹⁷ Similarly, the Public Service Company of New Mexico plans to shut down two units at the San Juan Generating Station by the end of 2017 and install nitrogen-oxide reducing technology on the remaining two units by 2016.¹⁸ Actions such as these would help reduce emissions and visibility impairment at Class I areas in the study area.

While it is not possible to directly correlate emissions of greenhouse gases to specific local or regional impacts on climate change, energy

¹⁷ Federal Register 2012.

¹⁸ PNM 2013

generation has been identified as one of the major contributors of greenhouse gas emissions in Colorado and New Mexico and in the US. Reasonably foreseeable actions that contribute toward Colorado or New Mexico greenhouse gas reduction goals may have a beneficial climate change effect while cumulative actions that increase greenhouse gas emission levels may have a negative effect on climate change.

4.17.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative would not have an appreciable long-term direct or indirect cumulative effect to air quality in the study area. Construction and maintenance activities associated with the Preferred Alternative would introduce short-term temporary sources of fugitive dust and equipment emissions. The long-term emissions would have a negligible incremental effect to air quality in relation to ongoing and proposed oil and gas development and power plant operations in the region. The transmission line and substations associated with the Preferred Alternative would not produce emissions because the Preferred Alternative does not include new generation.

The Preferred Alternative would not have an appreciable long-term direct or indirect cumulative effect on climate change.

4.17.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.17.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.18 Noise and Vibration

4.18.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Current sources of noise and vibration within and directly adjacent to the study area include:

- Oil and gas development
- Electrical transmission lines and substations

Noise and Vibration Study Area

The cumulative effects study area for noise and vibration is described in Section 3.19.1, Study Area.

- Highway traffic and heavy vehicle traffic on the network of access roads providing access to well pads, transmission line tower structures, and substations

These noise and vibration sources have existed for several decades. Accordingly, noise effects from each of these sources are long established and would likely continue to affect the noise and vibration environment within the study area well into the future.

4.18.1.1 Oil and Gas Development

Oil and gas exploration and development in the San Juan Basin began in the 1920s and affected the ambient noise conditions throughout northern New Mexico and southern Colorado since then. Permanent noise produced from oil and gas development includes noise from operating compressors and from vehicle traffic traveling to and from the well pad sites. Demand for natural gas is expected to rise nationally, resulting in continued extraction and exploration activities.

4.18.1.2 Existing Transmission Lines

Northwestern New Mexico, specifically the area surrounding the Shiprock Substation near Farmington, contains several major electrical transmission lines. High voltage transmission lines produce corona noise, which is a crackling sound emanating from the line. Corona noise levels are greater for higher voltage lines, in wet conditions, and at higher elevations. Noise effects to sensitive noise receptors adjacent to large lines are most prominent during rain events and during nighttime hours when ambient noise levels are lower. In this area, there are, on average, 56 days per year with measureable precipitation.¹⁹ Assuming 50 percent are nighttime rain events, corona noise from the 345 kV line could exceed existing background noise levels 28 nights per year on average, equivalent to less than 8 percent of all nighttime hours in a given year. An existing 345 kV line that originates at the Shiprock Substation and travels northeast before crossing into Colorado is capable of producing audible noise from corona. Two residences are in proximity to the line where it crosses NM 170 and may experience corona noise effects from the transmission line, especially during precipitation events.

¹⁹ Western Regional Climate Center 2012

Transmission lines also produce Aeolian noise when wind blows through structures. Receptors that could experience Aeolian noise effects are located where an existing 345 kV line crosses NM 170 and along the existing Iron Horse Line in La Plata County, Colorado. Cumulative effects from Aeolian noise on sensitive receptors are more infrequent and generally fewer than effects from corona noise.

4.18.1.3 Transportation and Access Routes

Highway traffic is a significant noise source, especially when a route is heavily used by trucks. Three major highways are present in the study area: NM 170, NM 574, and US 550. Sensitive noise receptors located adjacent to these routes experience higher average ambient noise levels than do receptors located further away from the routes.

County, local, tribal, and various access roads also contribute to area noise, and to a lesser extent, vibration levels. Heavy vehicle travel to oil and gas wells and industrial land uses are prominent noise sources.

4.18.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

For the foreseeable future, cumulative noise effects have and will result mainly from the construction, operation, and maintenance of oil and gas wells, transmission line infrastructure, and transportation routes. Cumulative vibration effects are more limited to the construction of oil and gas wells and heavy vehicle traffic on uneven roads during construction and maintenance activities.

As shown in Exhibit 4-1, new oil and gas development and extraction activities are planned in the San Juan Basin area, so noise effects from compressors and vehicle traffic would continue and likely increase in number in the future.

Vibration effects from oil and gas development are expected to be minimal, since vibration effects above the threshold of human perception are generally temporary and confined to construction activities such as drilling and blasting. Heavy vehicles travelling on rough roads can produce vibration levels above 65 VdB if access roads are not properly maintained. Because of this, possible

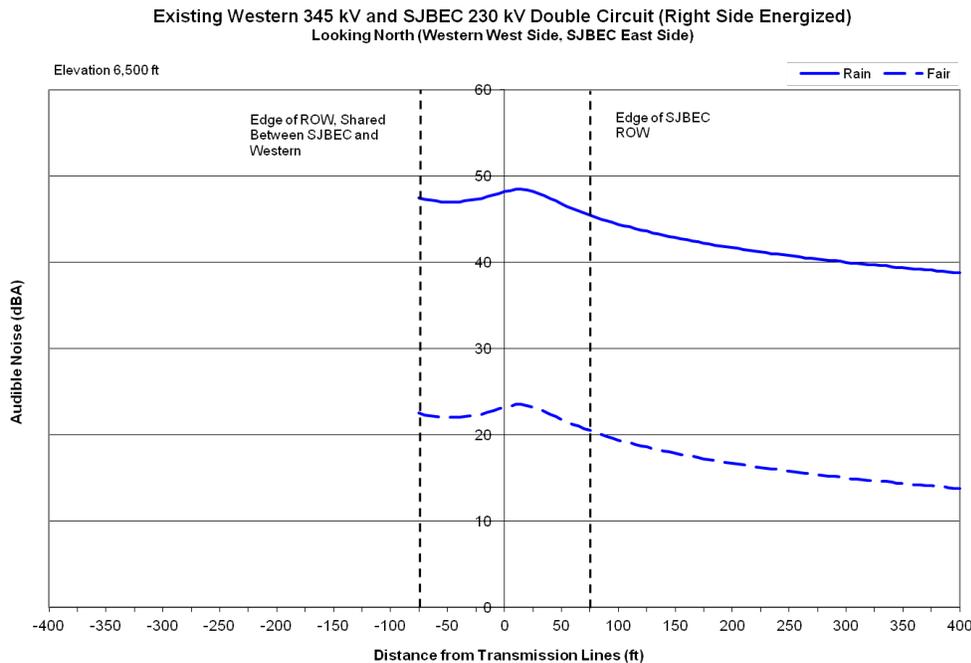
cumulative effects from vibration are expected to be minimal and similar to current conditions.

4.18.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative would minimally contribute to the existing noise and vibration environment.

During operation, the Preferred Alternative would generate corona noise. Cumulative effects from corona noise would be negligible in most portions of the study area because of existing higher voltage lines and other noise sources. For Segments 1 through 3 (segments are shown in Exhibit 3-3, Study Area), the line would parallel Western’s existing 345 kV line; any corona noise from the proposed 230 kV line would be less than corona noise from the existing 345 kV line, as shown in Exhibit 4-3, Corona Audible Noise for Segments 1 through 3 with Western 345 kV Line and Proposed 230 kV Lines for the Preferred Alternative.

**Exhibit 4-3
Corona Audible Noise for Segments 1 through 3 with Western’s 345 kV and Proposed 230 kV Lines for the Preferred Alternative**

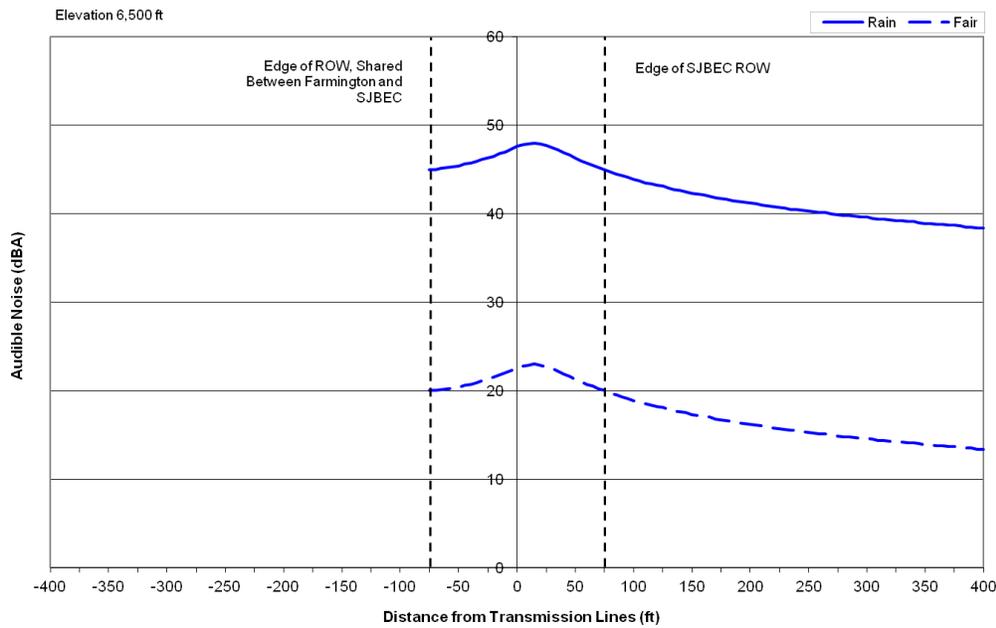


For Segment 4, the line would also parallel an existing City of Farmington 115 kV line as well as Western’s 345 kV line. The

proposed 230 kV transmission line for the Preferred Alternative would be located adjacent to the City of Farmington’s 115 kV line. The corona noise from Western’s existing 345 kV line would be greater than the corona noise from the proposed 230 kV line. The expected noise level at the edge of the shared right-of-way is shown in Exhibit 4-4, Corona Audible Noise for Segment 4 and Western’s 345 kV, City of Farmington’s 115 kV, and Proposed 230 kV Lines for the Preferred Alternative.

**Exhibit 4-4
Corona Audible Noise for Segment 4 and Western’s 345 kV, City of Farmington’s 115 kV, and Proposed 230 kV Lines for the Preferred Alternative**

Existing Western 345 kV, Existing Farmington 115 kV, and SJBEC 230 kV Double Circuit Looking North (SJBEC Right Side Energized)



Corona noise along Segment 8, where the 230 kV line would share the same poles as the existing 115 kV line, is evaluated and discussed in Section 3.19, Noise and Vibration.

Noise sources from maintenance activities could include truck traffic, repair activities on the line, and helicopter operation. Maintenance activities associated with the Preferred Alternative could contribute to temporary cumulative noise effects to sensitive receptors. The combination of maintenance traffic for expanding oil and gas well operations and the numerous existing and proposed

transmission lines could result in higher and more sustained noise levels along key access roads. Because maintenance-related noise-generating activities associated with the Preferred Alternative overlap with comparable activities already taking place in the area, cumulative effects would likely be minimal.

Maintenance activities associated with the Preferred Alternative could also produce cumulative vibration effects on sensitive receptors. Heavy vehicle traffic on an uneven road has a vibration level of 72 VdB, which is above the threshold of human perception. On a paved road, vibration from a moving truck is below the typical level of human perception.²⁰ The combination of equipment needed to construct and maintain expanding oil and gas well operations and the numerous existing and proposed transmission lines could cause more frequent vibration effects along key access roads. Vibration effects would likely be greater along access roads that are not properly maintained.

4.18.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.18.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.19 Electric and Magnetic Fields

4.19.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Existing substations and transmission and distribution power lines are existing sources of electric and magnetic fields in the study area. These sources were described in Section 3.20, Electric and Magnetic Fields, and create localized electric and magnetic fields. The levels of the electric and magnetic fields decrease dramatically with distance beyond the right-of-way for transmission or distribution lines and beyond the fence line of substations.

As additional sources of electric and magnetic fields have been developed over the years in the study area, electric and magnetic

Electric and Magnetic Fields Study Area

The study area for cumulative effects is the same as described for electric and magnetic fields in Section 3.2, Study Area.

²⁰ FTA 2006

interactions may have occurred between new and existing power lines and substations. When conductors of like phase are close together, the interaction between the conductors can be additive producing higher levels of electric and magnetic fields. Where the conductors are of different phases, the interaction could be subtractive due to the phase cancellation between the lines. Phase cancellation results in lower levels of electric and magnetic fields. Since power lines typically have three different phase conductors, the interactions between two power lines can be complex.

Where two power lines cross at about a right angle, there would be little potential for interaction of electric and magnetic fields between the two power lines since the conductors are close together for only a short distance. Where two power lines run parallel and are close together, the electric and magnetic fields produced from one power line could interact with the electric and magnetic fields produced from the other power line. Depending on the physical arrangement of the two lines (e.g., separation distance and phase conductor arrangements) and the operating conditions (e.g., the level of power flowing in each line), the cumulative effects may be either an increase or a decrease in the electric and magnetic fields that would be produced by each line operating separately. Existing transmission lines in the study area, such as the Western Area Power Administration's (Western) 345 kV line or the City of Farmington's 115 kV line, are separated by distance due to their respective right-of-ways. Since the levels of the electric and magnetic fields decrease dramatically with distance beyond the right-of-way for transmission lines, it is unlikely that the electric and magnetic field levels would exceed established guidelines for electric or magnetic fields.

4.19.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

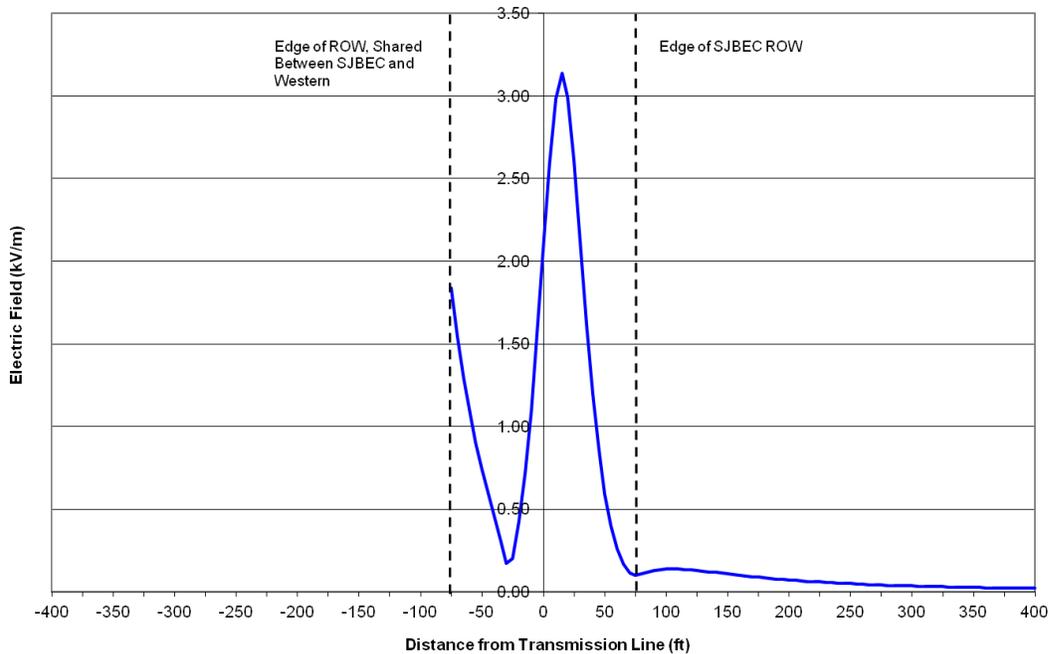
Cumulative effects to electric and magnetic fields from other reasonably foreseeable actions are not expected, since there are no substations or transmission lines proposed.

4.19.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The transmission line for the Preferred Alternative would parallel Western’s 345 kV transmission line and the City of Farmington’s 115 kV line in some areas. The proposed transmission line for the Preferred Alternative would parallel Western’s 345 kV transmission line in Segments 1 through 3. In these segments, the two lines would share a right-of-way edge. The estimated electric fields for shared right-of-way edge for Segments 1 through 3 are shown in Exhibit 4-5, Electric Field for Segments 1 through 3 with Western’s 345 kV and Proposed 230 kV Lines for the Preferred Alternative. The calculated electric field is 0.1 kV/m at the right edge of the right-of-way and 1.78 kV/m at the left edge of the shared right-of-way. These values are well below established exposure limits of the ICNIRP general public exposure limit of 4.2 kV/m, the IEEE general public limit of 5 kV/m, and various established limits for occupational exposure.

**Exhibit 4-5
Electric Field for Segments 1 through 3 with Western’s 345 kV and Proposed 230 kV Lines for the Preferred Alternative**

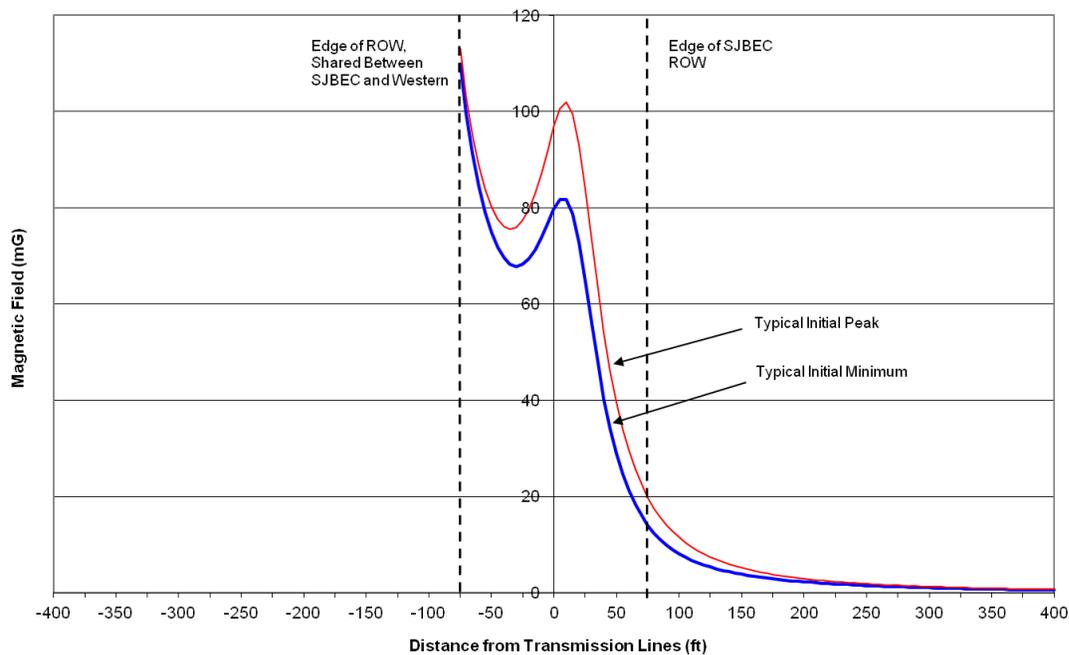
Existing Western 345 kV and SJBEC 230 kV Double Circuit (Right Side Energized)
Looking North (Western West Side, SJBEC East Side)



The values of the magnetic field in Segments 1 through 3, where the new 230 kV line would parallel Western’s 345 kV transmission line, are shown in Exhibit 4-6, Magnetic Field for Segments 1 through 3 with Western’s 345 kV and Proposed 230 kV Lines for the Preferred Alternative. At the right-of-way edges under these initial peak conditions, the calculated magnetic field is approximately 101 mG on the left, shared Western and SJBEC right-of-way edge and 20 mG on the right, SJBEC right-of-way edge. The actual level of magnetic field would vary with current loading, conductor temperature, and ground clearance. These values are below the ICNIRP general public exposure limit of 833 mG, the IEEE general public limit of 9,040 mG, and the ACGIH occupational exposure of 10,000 mG.

**Exhibit 4-6
Magnetic Field for Segments 1 through 3 with Western’s 345 kV and Proposed 230 kV Lines for the Preferred Alternative**

Existing Western 345 kV and SJBEC 230 kV Double Circuit (Right Side Energized)
Looking North (Western West Side, SJBEC East Side)

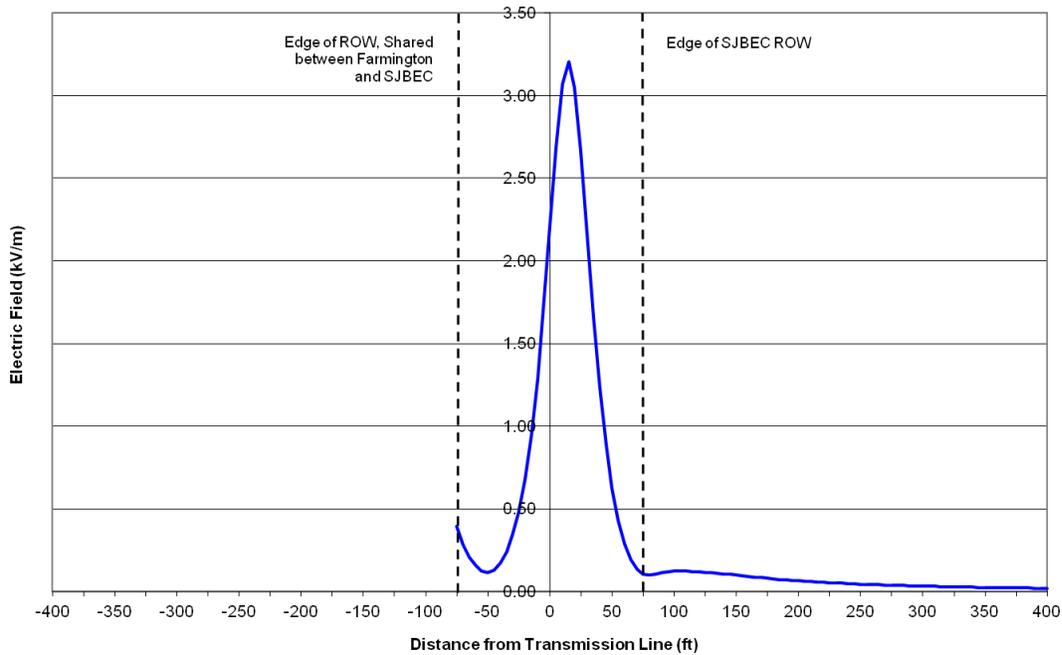


In Segment 4, the proposed transmission line for the Preferred Alternative would parallel the City of Farmington’s 115 kV transmission line that is located adjacent to Western’s 345 kV line.

The three lines share right-of-way edges. The values of the electric field where these three lines would be co-located are shown in Exhibit 4-7, Electric Field for Segment 4 with Western’s 345 kV, City of Farmington’s 115 kV, and Proposed 230 kV Lines for the Preferred Alternative. The calculated electric field is 0.1 kV/m at the right edge of the right-of-way (looking north, the SJBEC right-of-way edge) and 1.79 kV/m at the left edge of the right-of-way. These values are well below established exposure limits of the ICNIRP general public exposure limit of 4.2 kV/m, the IEEE general public limit of 5 kV/m, and various established limits for occupational exposure.

**Exhibit 4-7
Electric Field for Segment 4 with Western’s 345 kV, City of Farmington’s 115 kV,
and Proposed 230 kV Lines for the Preferred Alternative**

Existing Western 345 kV, Existing Farmington 115 kV, and SJBEC 230 kV Double Circuit
Looking North (SJBEC Right Side Energized)

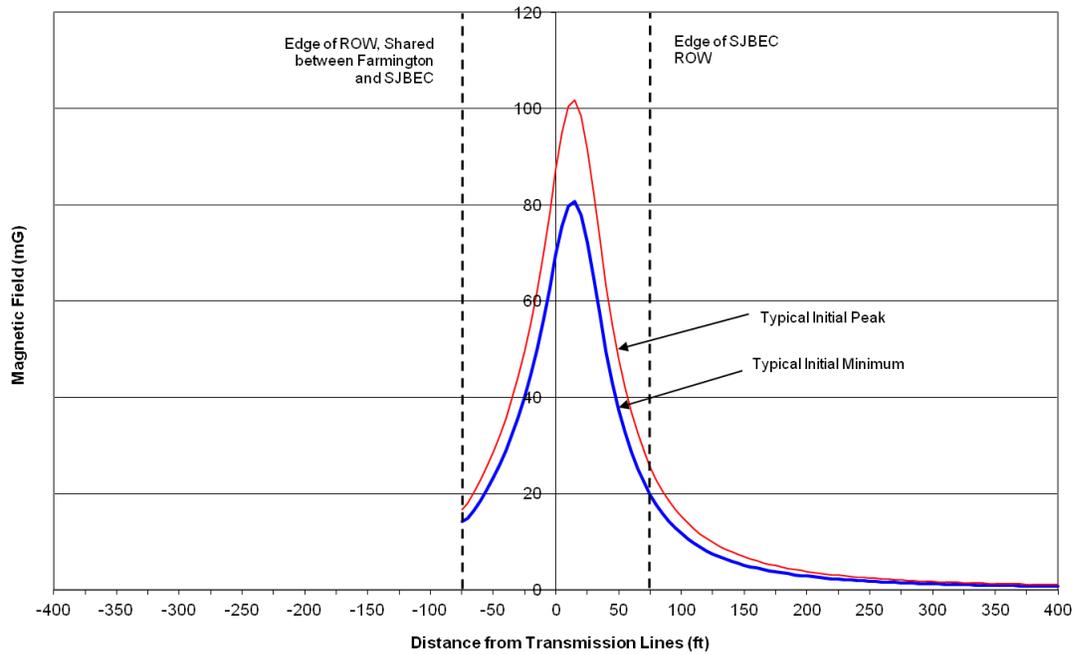


The values of the magnetic field for the lattice steel configuration of Segment 4 are shown in Exhibit 4-8, Magnetic Field for Segment 4 with Western 345 kV, City of Farmington 115 kV, and Proposed 230 kV Lines for the Preferred Alternative. At the right-of-way edges under initial peak conditions the calculated magnetic field is approximately 99 mG on the left and 26 mG on the right. The actual

level of magnetic field would vary with current loading, conductor temperature, and ground clearance. These values are below the ICNIRP general public exposure limit of 833 mG, the IEEE general public limit of 9,040 mG, and the ACGIH occupational exposure of 10,000 mG.

**Exhibit 4-8
Magnetic Field for Segment 4 with Western’s 345 kV, City of Farmington’s 115 kV, and Proposed 230 kV Lines for the Preferred Alternative**

Existing Western 345 kV, Existing Farmington 115 kV, and SJBEC 230 kV Double Circuit
Looking North (SJBEC Right Side Energized)



In addition, the proposed Three Rivers Substation would be located near the existing Shiprock Substation; and the proposed Kiffen Canyon substation would be located near the existing City of Farmington Substation. Tri-State’s new 230 kV line and substations would produce low levels of electric and magnetic fields. As described above, these new sources of low-level electric and magnetic fields can have a cumulative effect when combined with other existing sources of electric and magnetic fields. The proposed substations and transmission line, however, would be located in their own right-of-way, and the levels of electric and magnetic fields at the edge of the right-of-way are expected to be very low.

Because of this, the potential for a cumulative effect with existing transmission and substation facilities in the study area is expected to be low, and it is unlikely that the electric and magnetic field levels would exceed established guidelines.

4.19.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.19.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.20 Hazardous Materials

4.20.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Much of the study area supports industrial uses, like oil and gas development, that have the potential for releases of hazardous materials. One site was found during the database search for historical and current environmental effects.^{21,22} The listing was a former leaking underground storage tank site located adjacent to an access road in Segment 1 (segments are shown in Exhibit 3-3, Study Area). The site currently has a no further action status, so no additional remedial action or assessment is required at this time. The site still has two existing storage tanks; however, it is not known if the existing tanks are affecting the subsurface.

4.20.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

There are currently numerous proposals and plans for future actions in the study area as identified in Exhibit 4-1.

The construction and operation of these projects could increase the potential for hazardous waste spills in the study area. It is unlikely, however, that the proposed projects would affect the existing hazardous material site discussed above in Section 4.20.1, Existing

Hazardous Materials Study Area

The cumulative effects study area for hazardous materials is the same study area as described for the affected environment in Section 3.21.1, Study Area.

²¹ During the database search, two sites were found to be listed at the same location (76 County Road 6500 in Kirtland, New Mexico). It is assumed that these are the same site, but have different titles in two different databases.

²² EDR 2012

Conditions and How They Have Been Affected by Past and Present Actions. The underground storage tank site has two existing storage tanks; however the tanks are not known to be affecting the surrounding area. In the future, these tanks could leak into surrounding soils and tank product could possibly migrate into the ground underneath the access road.

Potential temporary and permanent direct effects from the projects listed in Exhibit 4-1 could involve spills or minor releases of hazardous, non-hazardous, or potentially hazardous materials that may be used as part of the construction (gasoline, diesel, etc.). Another possible temporary direct effect is the discovery of potentially hazardous materials that could be found during construction.

With proper pollution prevention measures and hazardous waste disposal practices, effects in the vicinity of the study area would likely be prevented or mitigated, so the potential for cumulative effects would be low.

4.20.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The Preferred Alternative would have similar effects as described above in Section 4.20.2, Effects of Reasonably Foreseeable Actions Without the SJBEC Project. The risk of encountering hazardous materials during construction or the risk of potential spills during construction or operation is low, and potential cumulative effects are not expected.

4.20.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.20.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.21 Socioeconomics

4.21.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

The effects from past and present activities in the study area are generally accounted for in the baseline socioeconomic environment characterized in Section 3.22, Socioeconomics. Population growth in the area has followed trends seen in the respective states, and unemployment rates increased between 2000 and 2011, similar to state and national trends. In addition to traditional industries (ranching and farming), the economic base of the area includes operation of existing transmission lines and other linear projects, development and operation of energy generation projects, past and present oil and gas operations, other residential and commercial development, as well as retail businesses and tourism. Mining and energy development, specifically oil and gas development, represents a substantial source of employment.

Socioeconomics Study Area

The proposed study area for Socioeconomics is described in Section 3.22.1, Study Area.

4.21.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Section 4.1.4, Reasonably Foreseeable Future Actions, identifies reasonably foreseeable projects proposed within the study area, including other transmission lines, oil and gas development, natural gas pipelines, and coalbed methane development.

As a result of reasonably foreseeable projects, there would be an increase in the projected influx of temporary and permanent workers into the area and an associated increased demand for housing resources and other goods and services. The degree of effect would depend on multiple factors including the percentage of workers relocating to the area from outside the region and the number of workers required by projects at a given time.

Reasonably foreseeable projects may also result in an increase in direct and indirect spending in the region as well as short-term increases in tax revenues in the counties in which projects are located, with the amount contributed varying depending on the size and nature of the project. In general, reasonably foreseeable projects in the study area would continue the long-term trend in the

region of a high percentage of employment coming from oil and gas and related support industries.

4.21.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

Local project-related expenditures, employment, and construction-related earnings from the Preferred Alternative and other reasonably foreseeable projects would have a minor effect on the local economy and employment.

Operation of the Preferred Alternative would not require any additional permanent staff. As a result, the Preferred Alternative would not result in any permanent changes in population and would have no effect on short- or long-term population trends.

Long-term economic impacts from the proposed project would be primarily associated with operation and maintenance-related expenditures on materials and supplies. These impacts would be small, and the incremental addition of these impacts to other ongoing and reasonably foreseeable projects would be relatively minor.

4.21.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.21.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.

4.22 Environmental Justice

4.22.1 Existing Conditions and How They Have Been Affected by Past and Present Actions

Data compiled by the US Census at the block group level indicate the potential presence of minority and low-income communities in the vicinity of the study area as described in Section 3.23, Environmental Justice.

Environmental Justice Study Area

The proposed study area for Environmental Justice is described in Section 3.22.1, Study Area.

4.22.2 Effects of Reasonably Foreseeable Actions Without the SJBEC Project

Development in the planning area is expected to continue as described in Section 4.21, Socioeconomics. Conflict between extractive operations and other land uses, such as residential, has the potential to occur throughout the planning area. These incompatibilities could occur widely and affect residents in the planning area, including low-income and minority groups. Development on non-federal land would need to comply with requirements of local jurisdictions or tribes. Where local controls are minimal, there would be an increased possibility for incompatible development.

4.22.3 Effects of Reasonably Foreseeable Actions With the Preferred Alternative

The proposed project is not expected to generate high or adverse human health or environmental effects on nearby communities. The Preferred Alternative does not appear to exhibit systematic bias toward placing the project in minority or low-income communities (see Section 3.23, Environmental Justice). As a result, the proposed project is not anticipated to add to cumulative impacts on minority or low-income populations.

4.22.4 Effects of Reasonably Foreseeable Actions With the Proposed Action

The Proposed Action would have the same effects as described in Section 4.22.3, Effects of Reasonably Foreseeable Actions With the Preferred Alternative.