

**TABLE 2-2
COMPARISON OF IMPACTS BY ALTERNATIVE¹**

<p align="center">Alternative 1 Continuation of Present Management (No Action)</p>	<p align="center">Alternative 2 Coalbed Methane Infill Development</p>	<p align="center">Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)</p>
<p>General Project Description</p>		
<p><i>Alternative 1 would involve the construction of 269 conventional wells and 81 CBM wells (320-acre spacing with no infill) for a total of 350 wells and associated facilities (33 compressors).</i></p>	<p><i>Alternative 2 would involve the construction of 269 conventional wells and 367 CBM wells (320-acre spacing with infill option) for a total of 636 wells and associated facilities (33 compressors).</i></p>	<p><i>Alternative 3 would involve the construction of 269 conventional wells, 367 CBM wells (320-acre spacing with infill option), and 70 injection wells for a total of 706 wells and associated facilities (41 compressors).</i></p>
<p><i>Estimated overall surface disturbance beyond the existing oil and gas development is 714 acres; this value represents disturbance from well pads and access roads and includes the use of existing well pads where available.</i></p>	<p><i>Estimated overall surface disturbance beyond the existing oil and gas development is 1,306 acres; this value represents disturbance from well pads and access roads and includes the use of existing well pads where available.</i></p>	<p><i>Estimated overall surface disturbance beyond the existing oil and gas development is 1,410 acres; this value represents disturbance from well pads and access roads and includes the use of existing well pads where available.</i></p>
<p>1. Air Quality - Issues include the potential for exceeding applicable National Ambient Air Quality Standards (PM_{2.5}, PM₁₀, Pb, SO₂, CO, O₃, and NO₂) and PSD Increment Ceilings as studied in the Near Field Analysis, and Air Quality Related Values (visibility, acid deposition, water bodies, vegetation) as studied in the Far Field Analysis. Only Alternative 3 was specifically modeled, as impacts under Alternatives 1 and 2 would be less than under Alternative 3 due to the smaller number of new sources which would be constructed under Alternatives 1 and 2 compared to Alternative 3. The area studied for air quality impacts in the Far Field Analysis included two Class 1 areas, Mesa Verde National Park and the Weiminuche Wilderness, which are not in the Study Area but which could potentially be impacted by activity in the Study Area. Assumptions made in the modeling were all “reasonable, but conservative.”</p>		
<p><i>Summary</i> - Significant impacts are not expected. Although not specifically modeled, fewer new sources would be installed under this Alternative than were included in the model, so impacts would be less than modeled.</p>	<p><i>Summary</i> - Significant impacts are not expected. Although not specifically modeled, fewer new sources would be installed under this Alternative than were included in the model, so impacts would be less than modeled.</p>	<p><i>Summary</i> - Significant impacts are not expected. Modeled impacts were all below applicable ambient air quality standards or appropriate significance or increment levels. Cumulative visibility impacts on Class I areas are unlikely to exceed the 1.0 deciview “just noticeable change” threshold.</p>
<p>2. Vegetation and Wetlands - Issues include ground-disturbing activities that would remove or disturb vegetation communities and wetlands, and increase the spread of noxious weeds; alterations of surface water quality and quantity that could affect wetlands. Estimates of acres of disturbance include the use of existing well pads where available.</p>		

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<p>Vegetation types that would sustain greatest percentage losses include Gambel oak (103 acres; 0.95%), low-density piñon-juniper (117 acres; 0.80%), and ponderosa pine forest (162 acres; 0.96%).</p>	<p>Vegetation types that would sustain greatest percentage losses include Gambel oak (273 acres; 2.54%), low-density piñon-juniper (520 acres; 3.56%), and ponderosa pine forest (508 acres; 3.00%).</p>	<p>Vegetation types that would sustain greatest percentage losses include Gambel oak (277 acres; 2.58%), low-density piñon-juniper (527 acres; 2.58%), and ponderosa pine forest (516 acres; 3.05%).</p>
<p>Of wooded riparian vegetation, which is considered a more sensitive vegetation type, 42 acres (0.51%) may be removed, although careful well pad site selection could reduce this value.</p>	<p>Of wooded riparian vegetation, which is considered a more sensitive vegetation type, 164 acres (2.01%) may be removed, although careful well pad site selection could reduce this value.</p>	<p>Of wooded riparian vegetation, which is considered a more sensitive vegetation type, 165 acres (2.02%) may be removed, although careful well pad site selection could reduce this value.</p>
<p><i>Summary</i> - Significant impacts could result from the potential infestations of noxious weeds due to increased surface disturbances (832 acres overall), although appropriate revegetation techniques should minimize the spread of weeds.</p>	<p><i>Summary</i> - Significant impacts could result from the potential infestations of noxious weeds due to increased surface disturbances (1,952 acres overall), although appropriate revegetation techniques should minimize the spread of weeds.</p>	<p><i>Summary</i> - Significant impacts could result from the potential infestations of noxious weeds due to increased surface disturbances (2,136 acres overall), although appropriate revegetation techniques should minimize the spread of weeds.</p>
<p>3. Wildlife and Fisheries - Issues include ground-disturbing activities that would remove vegetation (habitat); disturbance of wildlife from project noise and activities; and potential impacts on local fisheries from increased sedimentation, accidental spills of petroleum products and produced water, or changes in surface water flows. Critical wildlife habitats include deer and elk winter ranges, severe winter ranges, and winter concentration areas.</p>		
<p>Wildlife ranges that would sustain the largest losses of surface disturbances (vegetation removal) on a percentage basis include elk summer range (249 acres, 0.33%) and elk winter concentration areas (86 acres, 0.17%).</p>	<p>Wildlife ranges that would sustain the largest losses of surface disturbances (vegetation removal) on a percentage basis include elk summer range (595 acres, 0.81%) and elk winter concentration areas (247 acres, 0.50%).</p>	<p>Wildlife ranges that would sustain the largest losses of surface disturbances (vegetation removal) on a percentage basis include elk summer range (634 acres, 0.86%) and elk winter concentration areas (260 acres, 0.51%).</p>

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<p>Impacts from surface disturbances on deer severe winter range are 175 acres (0.11%) and to deer winter concentration areas are 97 acres (0.13%). Opportunities to avoid surface impacts within these habitats is minimal due the widespread occurrence of these habitats in the areas of future development.</p>	<p>Impacts from surface disturbances on deer severe winter range are 404 acres (0.24%) and to deer winter concentration areas are 119 acres (0.17%). Opportunities to avoid surface impacts within these habitats is minimal due the widespread occurrence of these habitats in the areas of future development.</p>	<p>Impacts from surface disturbances on deer severe winter range are 435 acres (0.26%) and to deer winter concentration areas are 118 acres (0.16%). Opportunities to avoid surface impacts within these habitats is minimal due the widespread occurrence of these habitats in the areas of future development.</p>
<p>Noise/activity impacts from construction and production combined indicate that elk summer range, 18,018 acres (24.56%), and elk winter concentration areas, 6,757 acres (9.17%), will experience the largest noise/activity disturbances on a percentage basis.</p>	<p>Noise/activity impacts from construction and production combined indicate that elk summer range, 42,243 acres (55.90%), and elk winter concentration areas, 15,766 acres (30.93%), will experience the largest noise/activity disturbances on a percentage basis.</p>	<p>Noise/activity impacts from construction and production combined indicate that elk summer range, 46,997 acres (64.06%), and elk winter concentration areas, 16,697 acres (33.29%), will experience the largest noise/activity disturbances on a percentage basis.</p>
<p>Noise/activity from construction and production would impact 16,517 acres (9.95%) of deer severe winter range and 6,607 acres (9.17%) of deer winter concentration areas.</p>	<p>Noise/activity from construction and production would impact 37,988 acres (22.89%) of deer severe winter range and 7,207 acres (10.00%) of deer winter concentration areas.</p>	<p>Noise/activity from construction and production would impact 40,991 acres (24.70%) of deer severe winter range and 7,357 acres (10.21%) of deer winter concentration areas.</p>

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<p>Potential impact on fisheries include effects to water quantity and quality. Surface waters of the Study Area should not experience an overall reduction in water quantity since the fresh water requirements for well drilling (less than 18acre-feet/year) would be acquired from already appropriated irrigation water sources. Degradation of water quality may occur from erosion and sedimentation from the surface disturbances within the Study Area (714 acres) and accidental spills where roads and pipelines cross rivers. Studies published to date, including results of the 3M Project, have not defined any impacts on fisheries from producing water out of the Fruitland or injecting it into deeper strata.</p>	<p>Potential impacts on fisheries include effects to water quantity and quality. Surface waters of the Study Area should not experience an overall reduction in water quantity since the water requirements for well drilling and completion (approximately 25 acre-feet/year) would be acquired from already appropriated irrigation water sources. Degradation of water quality may occur from erosion and sedimentation from the surface disturbances within the Study Area (1,306 acres) and accidental spills where roads and pipelines cross rivers. Studies published to date, including results of the 3M Project have not defined any impacts on fisheries from producing water out of the Fruitland or injecting it into deeper strata.</p>	<p>Potential impacts on fisheries include effects to water quantity and quality. Surface waters of the Study Area should not experience an overall reduction in water quantity since the water requirements for well drilling and completion (27 acre-feet/year or less) would be acquired from already appropriated irrigation water sources. Degradation of water quality may occur from erosion and sedimentation from the surface disturbances within the Study Area (1,410 acres) and accidental spills where roads and pipelines cross rivers. Studies published to date, including results of the 3M Project, have not defined any impacts on fisheries from producing water out of the Fruitland or injecting it into deeper strata.</p>
<p><i>Summary</i> - No significant impacts are anticipated for wildlife and fisheries resources.</p>	<p><i>Summary</i> - Impacts from noise/activity disturbances could be significant for elk severe winter ranges and winter concentration areas, although impacts could be reduced by minimizing winter construction in sensitive areas.</p>	<p><i>Summary</i> - Impacts from noise/activity disturbances could be significant for elk severe winter ranges and winter concentration areas, although impacts could be reduced by minimizing winter construction in sensitive areas.</p>

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<p>4. Threatened and Endangered (TES) Species - Federal species of concern include bald eagle, peregrine falcon, southwestern willow flycatcher, Colorado pikeminnow, razorback sucker, and Knowlton’s cactus. Issues include whether or not there would be a “may affect” situation to any Federal- or State-listed threatened and endangered species. While avoidance of specific features such as nest sites will result from mitigation, potential impacts could occur in TES habitat areas. Issues also include a reduced viability for populations of Federal, state, or SUIT sensitive species. “May affect” situations would require consultation with Tribal biologists and the USFWS. The Endangered Species Act provides for the protection of listed species and their habitats, such as nest sites and critical habitats. This assessment also considers the level of impact on habits that are not “critical” but are nevertheless important to these species. For that purpose, comparison of potential impacts to important, but not “critical”, habitats also is provided.</p>		
<p>Within bald eagle winter habitat, a total of 118 acres (0.20%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>	<p>Within bald eagle winter habitat, a total of 334 acres (0.57%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>	<p>Within bald eagle winter habitat, a total of 346 acres (0.59%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>
<p>Within bald eagle winter concentration areas, a total of 25 acres (0.16%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>	<p>Within bald eagle winter concentration areas, a total of 65 acres (0.40%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>	<p>Within bald eagle winter concentration areas, a total of 67 acres (0.42%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>
<p>Within wooded riparian vegetation, which provides general habitat for peregrine falcon and southwestern willow flycatcher, a total of 42 acres (0.51%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>	<p>Within wooded riparian vegetation, which provides general habitat for peregrine falcon and southwestern willow flycatcher, a total of 164 acres (2.01%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>	<p>Within wooded riparian vegetation, which provides general habitat for peregrine falcon and southwestern willow flycatcher, a total of 165 acres (2.02%) are located within development windows where impacts from construction could occur, although careful well pad site selection would avoid impacts or minimize this value.</p>

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<p>Potential impacts on aquatic species (Colorado pikeminnow, razorback sucker, roundtail chub, river otter) include effects on water quantity and quality. Surface waters of the Study Area should not experience an overall reduction in water quantity since the water requirements for well drilling and completion (less than 18 acre-feet/year) would be acquired from already appropriated irrigation water sources. Hydrologic modeling in the 3M Project determined that total discharge from the Fruitland outcrop is less than 1% of base stream flow. Degradation of water quality may occur from erosion and sedimentation from the surface disturbances within the Study Area (714 acres) and accidental spills where roads and pipelines cross rivers.</p>	<p>Potential impacts on aquatic species (Colorado pikeminnow, razorback sucker, roundtail chub, river otter) include effects on water quantity and quality. Surface waters of the Study Area should not experience an overall reduction in water quantity since the water requirements for well drilling and completion (25 acre-feet/year or less) would be acquired from already appropriated irrigation water sources. Hydrologic modeling in the 3M Project determined that total discharge from the Fruitland outcrop is less than 1% of base stream flow. Degradation of water quality may occur from erosion and sedimentation from the surface disturbances within the Study Area (1,306 acres) and accidental spills where roads and pipelines cross rivers.</p>	<p>Potential impacts on aquatic species (Colorado pikeminnow, razorback sucker, roundtail chub, river otter) include effects on water quantity and quality. Surface waters of the Study Area should not experience an overall reduction in water quantity since the water requirements for well drilling (less than 27 acre-feet per year) would be acquired from already appropriated irrigation water sources. Hydrologic modeling in the 3M Project determined that total discharge from the Fruitland outcrop is less than 1% of base stream flow. Degradation of water quality may occur from erosion and sedimentation from the surface disturbances within the Study Area (1,410 acres) and accidental spills where roads and pipelines cross rivers.</p>
<p><i>Summary</i> - Current Tribal, BLM, and BIA procedures provide for the avoidance of impacts on TES species. If a T&E or sensitive species may be affected, then further consultation with the Tribe and the USFWS is required. Therefore, no significant impacts are anticipated.</p>	<p><i>Summary</i> - Current Tribal, BLM, and BIA procedures provide for the avoidance of impacts on TES species. If a T&E or sensitive species may be affected, then further consultation with the Tribe and the USFWS is required. Therefore, no significant impacts are anticipated.</p>	<p><i>Summary</i> - Current Tribal, BLM, and BIA procedures provide for the avoidance of impacts on TES species. If a T&E or sensitive species may be affected, then further consultation with the Tribe and the USFWS is required. Therefore, no significant impacts are anticipated.</p>

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<p>5. Geology and Minerals - Issues for Geology and Minerals Resources include the potential for the project to restrict or prohibit a reasonable opportunity to explore for deposits and to prohibit the economic recovery of resources. Issues also include the increased potential for CBM production in the near outcrop area to create or exacerbate natural gas seeps and coal fires, resulting in loss of resource (natural gas or coal) without corresponding benefits and a danger to human health and safety. Many on-going projects are focused on understanding any potential linkage between CBM production and environmental conditions at the Fruitland outcrop. Reservoir modeling in the 3M project has determined that widespread infill well development will not cause outcrop seepage to increase and may, in the long term, decrease seepage.</p>		
<p>Production of natural gas would not affect the recovery of other resources in other formations, except for cemented well bores being an obstruction for underground coal mining. Cavitated and fraced areas would produce hazard areas for underground coal mining.</p>	<p>Production of natural gas would not affect the recovery of other resources in other formations, except for cemented well bores being an obstruction for underground coal mining. Cavitated and fraced areas would produce hazard areas for underground coal mining.</p>	<p>Production of natural gas would not affect the recovery of other resources in other formations, except for cemented well bores being an obstruction for underground coal mining. Cavitated and fraced areas would produce hazard areas for underground coal mining.</p>
<p>Total anticipated gas production from CBM wells is 920 bcf.</p>	<p>Total anticipated gas production from CBM wells is 1,182 bcf.</p>	<p>Total anticipated gas production from CBM wells is 1,304 bcf.</p>
<p>Potential for CBM production to create or exacerbate natural gas seeps and/or coal fires near the outcrop is not well understood at this time. Impacts may be related to distance from the outcrop. Six wells developed in the near outcrop zone were considered in the RFD for Alternative 1.</p>	<p>Potential for CBM production to create or exacerbate natural gas seeps and/or coal fires near the outcrop is not well understood at this time. Impacts may be related to distance from the outcrop. Twelve wells developed in the near outcrop zone were considered in the RFD for Alternative 2.</p>	<p>Potential for CBM production to create or exacerbate natural gas seeps and/or coal fires near the outcrop is not well understood at this time. Impacts may be related to distance from the outcrop. Twelve wells developed in the near outcrop zone were considered in the RFD for Alternative 3.</p>
<p><i>Summary</i> - No significant impacts are anticipated aside from irretrievable commitment of the oil and gas resources to economic development projects.</p>	<p><i>Summary</i> -No significant impacts are anticipated aside from irretrievable commitment of the oil and gas resources to economic development projects.</p>	<p><i>Summary</i> -No significant impacts are anticipated aside from irretrievable commitment of the oil and gas resources to economic development projects.</p>

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<p>6. Soils - Issues include increased soil erosion, loss of topsoil, loss of prime farmland, mixing of soil horizons, compaction, and contamination of soils from various pollutants. These impacts may result in the loss of soil resources or soil productivity.</p>		
Estimated maximum surface disturbance of soils with high-to-severe erosion potential would be 306 acres (0.36%).	Estimated maximum surface disturbance of soils with high-to-severe erosion potential would be 1,130 acres (1.33%).	Estimated maximum surface disturbance of soils with high-to-severe erosion potential would be 1,164 acres (1.37%).
Estimated maximum surface disturbance of prime farmland would be 37 acres (0.18%).	Estimated maximum surface disturbance of prime farmland would be 83 acres (0.40%).	Estimated maximum surface disturbance of prime farmland would be 86 acres (0.41%).
<i>Summary</i> - No significant impacts are anticipated. Current SUI, BLM, and BIA siting procedures, and standard conditions and mitigation provided in Appendix E will minimize or avoid impacts to sensitive soils.	<i>Summary</i> - No significant impacts are anticipated. Current SUI, BLM, and BIA siting procedures, and standard conditions and mitigation provided in Appendix E will minimize or avoid impacts to sensitive soils.	<i>Summary</i> - No significant impacts are anticipated. Current SUI, BLM, and BIA siting procedures, and standard conditions and mitigation provided in Appendix E will minimize or avoid impacts to sensitive soils.
<p>7. Groundwater - Issues include potential contamination of groundwater resources as a result of drilling activities and from removal of water from the Fruitland Formation and reinjection into other formations. Issues also include the increased potential for vertical migration of methane gas into shallow, higher quality aquifers (see also Geology, Minerals, and Soils).</p>		
Localized water quality degradation may occur during drilling and cementing operations, although impacts would affect only small amounts of groundwater in the immediate vicinity of the well.	Localized water quality degradation may occur during drilling and cementing operations, although impacts would affect only small amounts of groundwater in the immediate vicinity of the well. Due to the larger number of wells to be drilled for Alternative 2, the effects would be greater than Alternative 1 but are difficult to quantify.	Localized water quality degradation may occur during drilling and cementing operations, although impacts would affect only small amounts of groundwater in the immediate vicinity of the well. Due to the larger number of wells to be drilled for Alternative 3, the effects would be slightly greater than Alternative 2 but are difficult to quantify.

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<p>With the exception of removal of water from the Fruitland Formation, which is generally considered to be unusable due to high salinity, no impacts are expected for groundwater quantities. Most produced water is reinjected into deeper horizons under EPA UIC permits.</p>	<p>With the exception of removal of water from the Fruitland Formation, which is generally considered to be unusable due to high salinity, no impacts are expected for groundwater quantities. Most produced water is reinjected into deeper horizons under EPA UIC permits. More water would be produced under Alternative 2 than under Alternative 1.</p>	<p>With the exception of removal of water from the Fruitland Formation, which is generally considered to be unusable due to high salinity, no impacts are expected for groundwater quantities. Most produced water is reinjected into deeper horizons under EPA UIC permits. Approximately the same amount of water would be produced under Alternative 3 as under Alternative 2.</p>
<p>Impacts from the vertical migration of methane gas due to old borings/wells should be localized. The BLM and Colorado Oil and Gas Conservation Commission (COGCC) have programs to remediate impact sites that are identified through the San Juan Basin wide Annual Bradenhead Testing Program or any other means. New oil and gas wells are unlikely to contribute to methane migration problems.</p>	<p>Impacts from the vertical migration of methane gas due to old borings/wells should be localized. The BLM and COGCC have programs to remediate impact sites that are identified through the San Juan Basin wide Annual Bradenhead Testing Program or any other means. New oil and gas wells are unlikely to contribute to methane migration problems. Due to the greater number of CBM wells, impacts on groundwater are expected to be greater than Alternative 1, because of the greater probability of being located in proximity to old borings/wells and natural fractures.</p>	<p>Impacts from the vertical migration of methane gas due to old borings/wells should be localized. The BLM and COGCC have programs to remediate impact sites that are identified through the San Juan Basin wide Annual Bradenhead Testing Program or any other means. New oil and gas wells are unlikely to contribute to methane migration problems. Due to the greater number of CBM wells, impacts on groundwater are expected to be greater than Alternative 1 and only slightly greater than Alternative 2, because of the greater probability of being located in proximity to old borings/wells and natural fractures.</p>
<p>No injection of nitrogen or carbon dioxide</p>	<p>No injection of nitrogen or carbon dioxide</p>	<p>Injection of nitrogen or carbon dioxide is not expected to result in additional vertical migration of methane or nitrogen/carbon dioxide.</p>

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<p><i>Summary</i> -Impacts on groundwater quality may occur in localized areas and could be significant to individual water users. Some groundwater is contaminated with methane and, in some cases, the source appears to be leakage from existing wells. Well monitoring programs are in place, and the BLM and COGCC coordinate remediation actions as needed.</p>	<p><i>Summary</i> - Impacts on groundwater quality may occur in localized areas and could be significant to individual water users. Some groundwater is contaminated with methane and, in some cases, the source appears to be leakage from existing wells. Due to the larger number of wells to be drilled for Alternative 2, the effects would be greater than Alternative 1 but are difficult to quantify. Well monitoring programs are in place, and the BLM and COGCC coordinate remediation actions as needed.</p>	<p><i>Summary</i> - Impacts on groundwater quality may occur in localized areas and could be significant to individual water users. Some groundwater is contaminated with methane and, in some cases, the source appears to be leakage from existing wells. Due to the larger number of wells to be drilled for Alternative 3, the effects would be slightly greater than Alternative 2 but are difficult to quantify. Well monitoring programs are in place, and the BLM and COGCC coordinate remediation actions as needed.</p>
<p>8. Surface Water - Issues include potential for exceeding Colorado Department of Public Health and Environment (CDPHE) and SUIT water quality standards due to accidental spills of petroleum products or produced (saline) water as well as from sedimentation from erosion of disturbed surfaces. Issues also include surface water depletions from well drilling and stimulation.</p>		
<p>Fresh water requirements for well drilling and stimulation would be approximately 18 acre-foot/year. Surface waters of the Study Area should not experience an overall reduction in water quantity since the water requirements would be acquired from already appropriated irrigation water sources.</p>	<p>Fresh water required for well drilling and stimulation would be approximately 25 acre-feet/year. Surface waters of the Study Area should not experience an overall reduction in water quantity since the water requirements would be acquired from already appropriated irrigation water sources.</p>	<p>Fresh water requirements for well drilling and stimulation range would be approximately 27acre-feet/year. Surface waters of the Study Area should not experience an overall reduction in water quantity since the water requirements would be acquired from already appropriated irrigation water sources.</p>

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<p>Interaction between Fruitland Formation groundwater and surface streams is expected to be minimal because of the relative depth of the Fruitland Formation and the low permeability of the Kirtland Shale, although borings/wells could provide a conduit to surface water. Hydrologic modeling in the 3M Project determined that total discharge from the Fruitland outcrop is less than 1% of base stream flow. Potential impacts from producing water from the Fruitland and injecting into deeper horizons have not been rigorously studied.</p>	<p>Interaction between Fruitland Formation groundwater and surface streams is expected to be minimal because of the relative depth of the Fruitland Formation and the low permeability of the Kirtland Shale, although borings/wells could provide a conduit to surface water. Hydrologic modeling in the 3M Project determined that total discharge from the Fruitland outcrop is less than 1% of base stream flow. Potential impacts from producing water from the Fruitland and injecting into deeper horizons have not been rigorously studied.</p>	<p>Interaction between Fruitland Formation groundwater and surface streams is expected to be minimal because of the relative depth of the Fruitland Formation and the low permeability of the Kirtland Shale, although borings/wells could provide a conduit to surface water. Hydrologic modeling in the 3M Project determined that total discharge from the Fruitland outcrop is less than 1% of base stream flow. Potential impacts from producing water from the Fruitland and injecting into deeper horizons have not been rigorously studied.</p>
<p>Sedimentation can result from erosion of disturbed surfaces. Estimated overall surface disturbance within the Study Area would be 832 acres.</p>	<p>Sedimentation can result from erosion of disturbed surfaces. Estimated overall surface disturbance within the Study Area would be 1,952 acres.</p>	<p>Sedimentation can result from erosion of disturbed surfaces. Estimated overall surface disturbance within the Study Area would be 2,136 acres.</p>
<p>Significant impacts on water quality could occur if produced water spilled into streams; however, impacts would be localized. Standard pipeline design and operation procedures should minimize likelihood of large spills (over 300 barrels).</p>	<p>Significant impacts on water quality could occur if produced water spilled into streams; however, impacts would be localized. Standard pipeline design and operation procedures should minimize likelihood of large spills (over 300 barrels).</p>	<p>Significant impacts on water quality could occur if produced water spilled into streams; however, impacts would be localized. Standard pipeline design and operation procedures should minimize likelihood of large spills (over 300 barrels).</p>
<p><i>Summary</i> - No significant impacts on surface water are anticipated.</p>	<p><i>Summary</i> - No significant impacts on surface water are anticipated.</p>	<p><i>Summary</i> - No significant impacts on surface water are anticipated.</p>

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COMPARISON OF IMPACTS BY ALTERNATIVE¹**

<p align="center">Alternative 1 Continuation of Present Management (No Action)</p>	<p align="center">Alternative 2 Coalbed Methane Infill Development</p>	<p align="center">Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)</p>
<p>9. Land Use and Ownership - Issues include interference with already established and permitted land uses. Issues include potential conflicts from “split estate” situations whereby the surface is under private/state ownership and the mineral rights are under Tribal ownership. Issues also include unreclaimable losses of irrigated agricultural lands, reduction of AUMs, disruption of timber harvesting, displacement of recreational areas, and displacement or devaluation of residential properties. Land use and value may be impacted by noise and visual resource changes in addition to direct loss of actual surface use.</p>		
<p>Estimated maximum disturbance for “split estate” situations with private/state surface and Tribal/allotted subsurface would be 186 acres (0.6%).</p>	<p>Estimated maximum disturbance for “split estate” situations with private/state surface and Tribal/allotted subsurface would be 531 acres (1.8%).</p>	<p>Estimated maximum disturbance for “split estate” situations with private/state surface and Tribal/allotted subsurface would be 542 acres (1.9%).</p>
<p>Estimated maximum disturbance of prime farmland would be 37 acres (0.18%). This amount could be reduced through careful site selection for the well pad.</p>	<p>Estimated maximum disturbance of prime farmland would be 83 acres (0.40%). This amount could be reduced through careful site selection of the well pad.</p>	<p>Estimated maximum disturbance of prime farm land would be 86 acres (0.41%). This amount could be reduced through careful site selection of the well pad.</p>
<p>Estimated disturbance of county-designated rangeland would be 47 acres (0.18%). Estimated disturbance of SUIT-designated rangeland would be 336 acres (1.4%) and would result in a loss of 24.6 AUMs.</p>	<p>Estimated disturbance of county-designated rangeland would be 98 acres (0.2%). Estimated disturbance of SUIT-designated rangeland would be 771 acres (3.0%) and would result in a loss of 14.5 AUMs.</p>	<p>Estimated maximum disturbance of county-designated rangeland would be 100 acres (0.2%). Estimated maximum disturbance of SUIT-designated rangeland would be 830 acres (3.2%) and would result in a loss of 14.6 AUMs.</p>
<p>No disturbance of recreational areas is anticipated on tribal lands due to the non-availability windows.</p>	<p>Estimated disturbance of recreational areas would be 43 acres (2.4%). This amount could be reduced through careful site selection for the well pad.</p>	<p>Estimated disturbance of recreational areas would be 46 acres (2.5%). This amount could be reduced through careful site selection for the well pad.</p>
<p>Estimated disturbance of residential property would be 25 acres (0.4%). This amount could be reduced through careful site selection for the well pad. By regulation, no facility would be constructed within 300 feet of an existing residence.</p>	<p>Estimated disturbance of residential property would be 99 acres (1.5%). This amount could be reduced through careful site selection for the well pad. By regulation, no facility would be constructed within 300 feet of an existing residence.</p>	<p>Estimated disturbance of residential property would be 99 acres (1.5%). This amount could be reduced through careful site selection for the well pad. By regulation, no facility would be constructed within 300 feet of an existing residence.</p>

**TABLE 2-2
COMPARISON OF IMPACTS BY ALTERNATIVE¹**

Alternative 1 Continuation of Present Management (No Action)	Alternative 2 Coalbed Methane Infill Development	Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)
<i>Summary</i> - No significant impacts are expected from displacement of residential or recreational property or from permanent losses of irrigated agricultural lands due to small areas potentially impacted, expected dispersion of impacts, and SUIT, BLM, and BIA siting procedures, which provide for the avoidance of such features where possible.	<i>Summary</i> -No significant impacts are expected from displacement of residential or recreational property or from permanent losses of irrigated agricultural lands due to small areas potentially impacted, expected dispersion of impacts, and SUIT, BLM, and BIA siting procedures, which provide for the avoidance of such features where possible.	<i>Summary</i> -No significant impacts are expected from displacement of residential or recreational property or from permanent losses of irrigated agricultural lands due to small areas potentially impacted, expected dispersion of impacts, and SUIT, BLM, and BIA siting procedures, which provide for the avoidance of such features where possible.
10. Traffic and Transportation - Issues include public safety on roads within the Reservation due to construction traffic. Issues also include the potential for project-related traffic to exceed the capacity of the roadway.		
<i>Summary</i> - Transportation impacts should be less than initial gas field development because an infrastructure is in place and because future development will be at a lower development rate than previous development. Oil and gas development activities are not expected to create more than a 6% increase over the Year 2017 background traffic volumes.	<i>Summary</i> - Transportation impacts should be less than initial gas field development because an infrastructure is in place and because future development will be at a lower development rate than previous development. Oil and gas development activities are not expected to create more than a 6% increase over the Year 2017 background traffic volumes.	<i>Summary</i> - Transportation impacts should be less than initial gas field development because an infrastructure is in place and because future development will be at a lower development rate than previous development. Oil and gas development activities are not expected to create more than a 6% increase over the Year 2017 background traffic volumes.
11. Cultural - Issues include disturbance of archaeological and historic sites and of traditional cultural places and resources without prior enactment of approved mitigation measures.		
Within high-sensitivity prehistoric and ethnohistoric resource zones, 612 acres (0.54%) would be disturbed.	Within high-sensitivity prehistoric and ethnohistoric resource zones, 1,484 acres (1.3%) would be disturbed.	Within high-sensitivity prehistoric and ethnohistoric resource zones, 1,600 acres (1.4%) would be disturbed. .
Within high-sensitivity historic resource zones, 32 acres (0.10%) would be disturbed.	Within high-sensitivity historic resource zones, 149 acres (0.41%) would be disturbed.	Within high-sensitivity historic resource zones, 157 acres (0.43%) would be disturbed.

**TABLE 2-2
COMPARISON OF IMPACTS BY ALTERNATIVE¹**

<p align="center">Alternative 1 Continuation of Present Management (No Action)</p>	<p align="center">Alternative 2 Coalbed Methane Infill Development</p>	<p align="center">Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)</p>
<p>Within the disturbance areas, it is estimated that 40 archaeological and historic sites may be present. Individual sites would be avoided or mitigated.</p>	<p>Within the disturbance areas, it is estimated that 114 archaeological and historic sites may be present. Individual sites would be avoided or mitigated.</p>	<p>Within the disturbance areas, it is estimated that 118 archaeological and historic sites may be present. Individual sites would be avoided or mitigated.</p>
<p><i>Summary</i> - No significant impacts are anticipated. Current SUI, BLM, BIA procedures provide for the avoidance or mitigation of impacts on cultural resources.</p>	<p><i>Summary</i> - No significant impacts are anticipated. Current SUI, BLM, BIA procedures provide for the avoidance or mitigation of impacts on cultural resources.</p>	<p><i>Summary</i> - No significant impacts are anticipated. Current SUI, BLM, BIA procedures provide for the avoidance or mitigation of impacts on cultural resources.</p>
<p>12. Visual - Issues include visual contrast that would occur from construction disturbances and the presence of project facilities that would alter the scenic values of the landscape, and would dominate views from residences, recreation areas, and highway. Impacts would result from the introduction of form, line, color, and textures not found in the existing landscape.</p>		
<p>Within immediate foreground views from residences, approximately 15 wells may be constructed and would result in high visual impacts on 1.3% (46.35 acres) of immediate foreground viewing areas.</p>	<p>Within immediate foreground views from residences, approximately 41 wells may be constructed and would result in high visual impacts on 10.6% (126.7 acres) of immediate foreground viewing areas.</p>	<p>Within immediate foreground views from residences, approximately 52 wells may be constructed and would result in high visual impacts on 13.4% (159 acres) of immediate foreground viewing areas.</p>
<p>No wells are anticipated to be constructed within immediate foreground views from recreation areas.</p>	<p>Within immediate foreground views from recreation areas, approximately 2 wells may be constructed and would result in high visual impacts on 7.4% (6.12 acres) of immediate foreground viewing areas. Since no well pads currently exist in recreation areas, there is no opportunity to mitigate through use of existing well pads.</p>	<p>Within immediate foreground views from recreation areas, approximately 2 wells may be constructed and would result in high visual impacts on 7.4% (6.12 acres) of immediate foreground viewing areas. Since no well pads currently exist in recreation areas, there is no opportunity to mitigate through use of existing well pads.</p>

**TABLE 2-2
COMPARISON OF IMPACTS BY ALTERNATIVE¹**

<p align="center">Alternative 1 Continuation of Present Management (No Action)</p>	<p align="center">Alternative 2 Coalbed Methane Infill Development</p>	<p align="center">Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)</p>
<p>Within immediate foreground views from key travel routes, approximately 15 wells may be constructed and would result in high visual impacts on 1.85% (45.9 acres) of immediate foreground viewing areas.</p>	<p>Within immediate foreground views from key travel routes, approximately 50 wells may be constructed and would result in high visual impacts on 6.2% (153 acres) of immediate foreground viewing areas.</p>	<p>Within immediate foreground views from key travel routes, approximately 50 wells may be constructed and would result in high visual impacts on 6.2% (153 acres) of immediate foreground viewing areas.</p>
<p><i>Summary</i> - While there is a potential for significant impacts to occur, many of these impacts can be mitigated through appropriate siting, although other resources (TES species, cultural, irrigated farmland) have priority and well pads may need to be in the vicinity of residences.</p>	<p><i>Summary</i> - While there is a potential for significant impacts to occur, many of these impacts can be mitigated through appropriate siting, although other resources (TES species, cultural, irrigated farmland) have priority, and well pads may need to be in the vicinity of residences.</p>	<p><i>Summary</i> - While there is a potential for significant impacts to occur, many of these impacts can be mitigated through appropriate siting, although other resources (TES species, cultural, irrigated farmland) have priority, and well pads may need to be in the vicinity of residences.</p>
<p>13. Socioeconomics - Issues include effects on Tribal, state, and local government revenues; direct and indirect employment, especially for Tribal members; effects on community cohesion and rural character of the area; and contribution to boom-bust economic cycles.</p>		
<p>Alternative 1 would contribute \$124 million to the local economy over 20 years.</p>	<p>Alternative 2 would contribute \$185 million to the local economy over 20 years.</p>	<p>Alternative 3 would contribute \$204 million to the local economy over 20 years.</p>
<p>Reduction in Tribal revenues could adversely affect programs that support social and cultural bonds within SUIT community.</p>	<p>Less severe reduction in Tribal revenues is likely to result in fewer adverse effects on programs supporting social and cultural bonds within SUIT community than under Alternative 1.</p>	<p>Less severe reduction in Tribal revenues is likely to result in fewer adverse effects on programs supporting social and cultural bonds than under Alternatives 1 or 2.</p>
<p>State severance tax revenues will fall to 0 under all alternatives.</p>	<p>State severance tax revenues will fall to 0 under all alternatives.</p>	<p>State severance tax revenues will fall to 0 under all alternatives.</p>
<p>Alternative 1 would result in a 10 to 20% loss in COGCC conservation levy revenues.</p>	<p>Alternative 2 would result in \$700K in additional COGCC conservation levy revenues compared to Alternative 1.</p>	<p>Alternative 3 would result in \$1,100K in additional COGCC conservation levy revenues compared to Alternative 1.</p>

**TABLE 2-2
COMPARISON OF IMPACTS BY ALTERNATIVE¹**

<p align="center">Alternative 1 Continuation of Present Management (No Action)</p>	<p align="center">Alternative 2 Coalbed Methane Infill Development</p>	<p align="center">Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)</p>
<p>Alternative 1 would result in a loss in County property tax collections of more than \$1 million/year for first five years.</p>	<p>Alternative 2 would result in \$16 million in additional property tax collections over 20 years, compared to Alternative 1.</p>	<p>Alternative 3 would result in \$23 million in additional property tax collections over 20 years compared to Alternative 1.</p>
<p>Tribal revenues from severance tax and royalties on Tribal acreage would decline 15 to 20% per year over the life of the project.</p>	<p>Alternative 2 would result in \$83 million in addition SUI royalties and production payments on Tribal acreage over 20 years compared to Alternative 1.</p>	<p>Alternative 3 would result in \$181 million in additional SUI royalties and production payments Tribal acreage over 20 years compared to Alternative 1.</p>
<p>Alternative 1 would result in direct employment of 30 employees/year (construction, operation and maintenance) initially, increasing to 82 employees by the end of the project.</p>	<p>Alternative 2 would result in direct employment of 34 employees/year (construction, operation and maintenance) initially, increasing to 191 employees by the end of the project.</p>	<p>Alternative 3 would result in direct employment of 35 employees/year (construction, operation and maintenance) initially, increasing to 213 employees/year by the end of the project.</p>
<p>Indirect employment loss as a result of reduced Tribal revenues would result in substantial reduction in Tribal employment, especially for Tribal members.</p>	<p>Indirect employment losses would be less severe than under Alternative 1.</p>	<p>Indirect employment losses would be less severe than either Alternatives 1 or 2.</p>
<p>The rural lifestyle that characterizes most of the Reservation would be least affected by drilling and related activities. However, Alternative 1 would have the most dramatic decline of the “boom-bust” cycle of the oil and gas economy.</p>	<p>The rural lifestyle of the Reservation would be affected more by drilling and associated activities than Alternative 1. With respect to the “boom-bust cycle”, the decline in the oil and gas economy would be less severe than Alternative 1.</p>	<p>The rural lifestyle of the Reservation would be affected most by Alternative 3 since it represents the highest level of industrial activity. With respect to the “boom-bust” cycle, Alternative 3 features the most gradual decline of the oil and gas economy.</p>

**TABLE 2-2
COMPARISON OF IMPACTS BY ALTERNATIVE¹**

<p align="center">Alternative 1 Continuation of Present Management (No Action)</p>	<p align="center">Alternative 2 Coalbed Methane Infill Development</p>	<p align="center">Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)</p>
<p><i>Summary</i> - Significant impacts include a significant loss of employment for local workers, especially Tribal members, and significant loss in local government and Tribal revenues, which would in turn result in a loss of services, especially for Tribal members.</p>	<p><i>Summary</i> - Alternative 2 would benefit the local economy (\$185 million over 20 years), both maintain and increase employment, and contribute to the budgets of local and Tribal government, which would in turn help to maintain service levels.</p>	<p><i>Summary</i> - Alternative 3 would benefit the local economy (\$204 million over 20 years), both maintain and increase employment, and contribute to the budgets of both local and Tribal government, which would in turn help to maintain service levels.</p>
<p>14. Noise - Construction-related noise sources include construction of roads and well pads, drilling and completion, and installation of compressor equipment. Production-related noise sources include compressor engine operation, well workers, and maintenance activities.</p>		
<p>This Alternative would result in the smallest number of new wells and therefore in the lowest potential for a sensitive receptor, such as a residence, to be in close proximity to construction and production activities.</p>	<p>Due to increased well development and additional compressors, there would be an increased potential under Alternative 2 compared to Alternative 1 for a sensitive receptor (e.g., residence) to be in closer proximity to construction and production activities.</p>	<p>Due to increased well development, including injection wells, and additional compressors, there is an increased potential under Alternative 3 compared to Alternatives 1 and 2 for a sensitive receptor (e.g., residence) to be in close proximity to construction and production activities.</p>
<p>No ECBM activities.</p>	<p>No ECBM activities.</p>	<p>Additional noise impacts would result from extraction, transportation, and injection of compressed nitrogen.</p>
<p><i>Summary</i> - Noise impacts from CBM facilities have been identified and mitigation efforts have been recommended and implemented. Noise impacts from individual wells would be localized but may be significant to individuals.</p>	<p><i>Summary</i> - Noise impacts from CBM facilities have been identified and mitigation efforts have been recommended and implemented. Noise impacts from individual wells would be localized but may be significant to individuals.</p>	<p><i>Summary</i> - Noise impacts from CBM facilities have been identified and mitigation efforts have been recommended and implemented. Noise impacts from individual wells would be localized but may be significant to individuals.</p>

**TABLE 2-2
COMPARISON OF IMPACTS BY ALTERNATIVE¹**

<p align="center">Alternative 1 Continuation of Present Management (No Action)</p>	<p align="center">Alternative 2 Coalbed Methane Infill Development</p>	<p align="center">Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)</p>
<p>15. Health and Safety - Issues include the potential for health risks for project workers and general public. Specifically, health risks include wildfires; natural gas flow line leakage, rupture, and possible fire and/or explosion; spills of condensate or produced water; air emission exposure; and injuries associated with well field construction and operation, as well as methane and hydrogen sulfide contamination of aquifers and escaping gas at surface areas (see also Geology, Minerals, and Soils for discussion on methane gas issues).</p> <p>Each operator must have a Spill Contingency Plan that includes information and procedures for both produced water and chemical spills, and will include location and authorization of isolation block valves.</p>		
<p>Alternative 1 has the potential for a ruptured pipeline to cause fire/explosion. However, since most of the larger pipelines are already in place and construction is less than under the other alternatives, the potential for larger fires/explosions is minimal provided construction crews practice normal diligence around buried pipelines.</p>	<p>Alternative 2 has the increased potential for a ruptured pipeline to cause fire/explosion. However, since most of the larger pipelines are already in place, the potential for larger fires/explosions is minimal provided construction crews practice normal diligence around buried pipelines. Greater construction than under Alternative 1 would lead to slightly greater chance of an accident occurring.</p>	<p>Alternative 3 has the potential for a ruptured pipeline to cause fire/explosion. However, since most of the larger pipelines are already in place, the potential for larger fires/explosions is minimal provided construction crews practice normal diligence around buried pipelines. Greater construction than under Alternatives 1 or 2 would lead to slightly greater chance of an accident occurring.</p>
<p>CBM development has the potential to cause an increase in methane seepage and coal fires near the Fruitland outcrop. Potential health and safety impacts could be avoided on the Reservation by controlling access and activities near the outcrop.</p>	<p>CBM development has the potential to cause an increase in methane seepage and coal fires near the Fruitland outcrop. Reservoir modeling in the 3M project has determined that widespread infill well development will not cause outcrop seepage to increase and may, in the long term, decrease seepage. Project Potential health and safety impacts could be avoided on the Reservation by controlling access and activities near the outcrop.</p>	<p>CBM development has the potential to cause an increase in methane seepage and coal fires near the Fruitland outcrop. Potential health and safety impacts could be avoided on the Reservation by controlling access and activities near the outcrop. Reservoir modeling in the 3M project has determined that widespread infill well development will not cause outcrop seepage to increase and may, in the long term, decrease seepage. ECBM has not yet been included in 3M modeling.</p>
	<p>Due to the larger number of wells to be constructed, the aggregate probability of a health and safety incident increases during construction.</p>	<p>Due to the larger number of wells to be constructed, the aggregate probability of a health and safety incident increases during construction.</p>

**TABLE 2-2
COMPARISON OF IMPACTS BY ALTERNATIVE¹**

<p align="center">Alternative 1 Continuation of Present Management (No Action)</p>	<p align="center">Alternative 2 Coalbed Methane Infill Development</p>	<p align="center">Alternative 3 Enhanced Coalbed Methane Recovery (Agency and Tribal Preferred Alternative)</p>
		<p>Since nitrogen is non-flammable, no explosion or fire would occur following a rupture of a nitrogen pipeline, although injury could occur from flying debris.</p>
		<p>Health concerns regarding nitrogen include low levels of oxygen within the immediate area (10 to 15 feet) of the rupture and would be present for approximately six minutes after the leak is stopped.</p>
<p><i>Summary</i> - No significant impacts are anticipated from project construction provided that workers use appropriate health and safety practices.</p>	<p><i>Summary</i> - No significant impacts are anticipated from project construction provided that workers use appropriate health and safety practices, nor is outcrop seepage expected to increase due to widespread infill development.</p>	<p><i>Summary</i> - No significant impacts are anticipated from project construction provided that workers use appropriate health and safety practices.</p>
<p>¹ The percent of areas affected shown on this table represent the area of each individual resource in the study area for each alternative (e.g., Gambel oak (1.07% for Alternative 1). Values for acres disturbed represent the use of existing well pads where available. Values for acres disturbed represents 100% of the potential development area and, in actuality, only 80% of the area will be developed.</p>		

TABLE 4-5
Anticipated Surface Disturbance Impacts on Vegetation Resources
from Alternative 1 - Continuation of Present Management (No Action)

	Grassland/ Shrubland	Gambel Oak	Low-Density Piñon-Juniper	Medium- to High- Density Piñon- Juniper	Ponderosa Pine	Wooded Riparian
Resource Acreage Within Study Area	168,018	10,751	14,617	136,483	16,904	8,156
Resource Area as a Percent of Study Area	39.88%	2.55%	3.47%	32.40%	4.01%	1.94%
Total Number of Wells Potentially Impacting the Resource	168	37	44	191	60	15
Construction - Maximum Acres Disturbed (Percentage of Resource)	514 (0.31%)	113 (1.05%)	135 (0.92%)	585 (0.43%)	184 (1.09%)	46 (0.56%)
Total Number of Existing Pads in Resource	79	5	9	67	11	2
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	351.3 (0.21%)	103 (0.96%)	116.1 (0.79%)	446.4 (0.33%)	160.9 (0.95%)	42 (0.51%)
Production - Maximum Acres Disturbed (Percentage of Resource)	346 (0.21%)	76 (0.71%)	91 (0.62%)	393 (0.29%)	124 (0.73%)	31 (0.38%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	262.3 (0.16%)	71 (0.66%)	81.1 (0.55%)	322.4 (0.24%)	111.9 (0.66%)	29 (0.36%)

**TABLE 4-6
Anticipated Surface Disturbance Impacts on Vegetation Resources
from Alternative 2 - Coalbed Methane Infill Development**

	Grassland/ Shrubland	Gambel Oak	Low- Density Piñon- Juniper	Medium- to High-Density Piñon-Juniper	Ponderosa Pine	Wooded Riparian
Resource Acreage Within Study Area (Acres)	168,018	10,751	14,617	136,483	16,904	8,156
Resource Area as a Percent of Study Area	39.88%	2.55%	3.47%	32.40%	4.01%	1.94%
Total Number of Wells Potentially Impacting the Resource	467	93	187	481	175	55
Construction - Maximum Acres Disturbed (Percentage of Resource)	1,429 (0.85%)	285 (2.65%)	572 (3.91%)	1,472 (1.08%)	535 (3.16%)	168 (2.06%)
Total Number of Existing Pads in Resource	149	6	26	104	13	2
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	1,122.1 (0.67%)	272.2 (2.53%)	518.7 (3.55%)	1,257.6 (0.92%)	508.7 (3.01%)	164 (2.01%)
Production - Maximum Acres Disturbed (Percentage of Resource)	962 (0.57%)	192 (1.79%)	385 (2.63%)	991 (0.73%)	361 (2.14%)	113 (1.39%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	804.1 (0.48%)	185.2 (1.72%)	357.7 (2.45%)	880.6 (0.65%)	347 (2.05%)	111 (1.36%)

TABLE 4-7
Anticipated Surface Disturbance Impacts on Vegetation Resources
from Alternative 3 - Enhanced Coalbed Methane Recovery (Proposed Action)

	Grassland/ Shrubland	Gambel Oak	Low- Density Piñon- Juniper	Medium- to High- Density Piñon- Juniper	Ponderosa Pine	Wooded Riparian
Resource Acreage Within Study Area	168,018	10,751	14,617	136,483	16,904	8,156
Resource Area as a Percent of Study Area	39.88%	2.55%	3.47%	32.40%	4.01%	1.94%
Total Number of Wells Potentially Impacting the Resource	490	95	191	513	179	56
Construction - Maximum Acres Disturbed (Percentage of Resource)	1,499 (0.89%)	291 (2.71%)	585 (4.00%)	1,570 (1.15%)	548 (3.24%)	171 (2.10%)
Total Number of Existing Pads in Resource	168	7	29	126	16	3
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	1,153.3 (0.69%)	276.3 (2.57%)	524.7 (3.59%)	1,310.2 (0.96%)	514.8 (3.05%)	165 (2.02%)
Production - Maximum Acres Disturbed (Percentage of Resource)	1,009 (0.60%)	196 (1.82%)	393 (2.69%)	1,057 (0.77%)	369 (2.18%)	115 (1.41%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	831.3 (0.49%)	188.3 (1.75%)	362.7 (2.48%)	932.2 (0.68%)	351.8 (2.08%)	112 (1.37%)

TABLE 4-8
Anticipated Impacts from Surface Disturbance (Vegetation Removal) on Wildlife Resources
from Alternative 1 - Continuation of Present Management (No Action)

	Elk Summer Range	Elk Winter Range	Elk Severe Winter Range	Elk Winter Concentra- tion Area	Deer Summer Range	Deer Winter Range	Deer Severe Winter Range	Deer Winter Concent- ration Area
Resource Acreage Within Study Area (Acres)	73,363	391,309	158,365	50,974	416,495	391,250	165,949	72,046
Resource Area as a Percent of Study Area	17.41%	92.88%	37.59%	12.10%	98.86%	92.87%	39.39%	17.10%
Total Number of Wells Potentially Impacting the Resource	120	302	102	45	347	300	110	44
Construction - Maximum Acres Disturbed (Percentage of Resource)	367 (0.50%)	924 (0.23%)	312 (0.19%)	138 (0.27%)	1,062 (0.25%)	918 (0.23%)	337 (0.20%)	135 (0.19%)
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	246 (0.34%)	592 (0.15%)	199 (0.13%)	84 (0.17%)	703 (0.17%)	588 (0.15%)	170 (0.10%)	96 (0.13%)
Production - Maximum Acres Disturbed (Percentage of Resource)	247 (0.33%)	622 (0.15%)	210 (0.13%)	93 (0.18%)	715 (0.17%)	618 (0.15%)	227 (0.14%)	91 (0.12%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	185 (0.25%)	451 (0.12%)	152 (0.10%)	65 (0.13%)	530 (0.13%)	448 (0.11%)	141 (0.08%)	71 (0.10%)
Resource Acreage Within Region	NA	1,224,320	516,480	112,640	NA	1,090,690	507,520	139,520
Percentage of Regional Range Disturbed	NA	0.07%	0.06%	0.27%	NA	0.08%	0.06%	0.10%
NA = Not Available								

TABLE 4-9
Anticipated Disturbance Impacts from Construction and Operation Activities on Wildlife Resources
from Alternative 1 - Continuation of Present Management (No Action)

	Elk Summer Range	Elk Winter Range	Elk Severe Winter Range	Elk Winter Concentra- tion Area	Deer Summer Range	Deer Winter Range	Deer Severe Winter Range	Deer Winter Concent- ration Area
Resource Acreage Within Study Area	73,363	391,309	158,365	50,974	416,495	391,250	165,949	72,046
Resource Area as a Percent of Study Area	17.41%	92.88%	37.59%	12.10%	98.86%	92.87%	39.39%	17.10%
Total Number of Wells Potentially Impacting the Resource	120	302	102	45	347	300	110	44
Amount of Habitat Impacted by Noise/Activity Disturbances During Construction and Drilling (Assuming 0.5-mile radius from well pad) (Percentage of Habitat)	3,018 (4.11%)	7,595 (1.94%)	2,565 (1.62%)	1,132 (2.22%)	8,727 (2.10%)	7,545 (1.93%)	2,767 (1.67%)	1,107 (1.54%)
Amount of Habitat Impacted by Noise/Activity Disturbances During Production and Maintenance (Assuming 0.25-mile radius from well pad) (Percentage of Disturbance)	15,000 (20.45%)	37,750 (9.65%)	12,750 (8.05%)	5,625 (11.04%)	43,375 (10.41%)	37,500 (9.58%)	13,750 (8.29%)	5,500 (7.63%)
Combined Maximum Disturbance from Construction and Production (Percentage of Resource)	18,018 (24.56%)	45,345 (11.59%)	15,315 (9.67%)	6,575 (12.90%)	52,102 (12.51%)	45,045 (11.51%)	16,517 (9.95%)	6,607 (9.17%)
Resource Acreage Within Region	NA	1,224,320	516,480	112,640	NA	1,040,640	507,520	139,520
Percentage of Regional Range Disturbed	NA	3.70%	2.97%	5.84%	NA	4.33%	3.25%	4.74%
NA = N ot Available								

TABLE 4-10
Anticipated Impacts from Surface Disturbance (Vegetation Removal) on Wildlife Resources from
Alternative 2 - Coalbed Methane Infill Development

	Elk Summer Range	Elk Winter Range	Elk Severe Winter Range	Elk Winter Concentra- tion Area	Deer Summer Range	Deer Winter Range	Deer Severe Winter Range	Deer Winter Concent- ration Area
Resource Acreage Within Study Area	73,363	391,309	158,365	50,974	416,495	391,250	165,949	72,046
Resource Area as a Percent of Study Area	17.41%	92.88%	37.59%	12.10%	98.86%	92.87%	39.39%	17.10%
Total Number of Wells Potentially Impacting the Resource	288	601	248	105	634	601	253	48
Construction - Maximum Acres Disturbed (Percentage of Resource)	881 (1.2%)	1,839 (0.47%)	759 (0.48%)	321 (0.63%)	1,940 (0.47%)	1,839 (0.47%)	774 (0.47%)	147 (0.20%)
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	590 (0.80%)	1,250 (0.32%)	563 (0.36%)	245 (0.48%)	1,287 (0.31%)	1,250 (0.32%)	393 (0.24%)	118 (0.16%)
Production - Maximum Acres Disturbed (Percentage of Resource)	593 (0.80%)	1,238 (0.32%)	511 (0.32%)	216 (0.42%)	1,306 (0.31%)	1,238 (0.49%)	521 (0.31%)	99 (0.14%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	442 (0.60%)	941 (0.24%)	410 (0.26%)	177 (0.35%)	970 (0.23%)	935 (0.24%)	325 (0.20%)	84 (0.12%)
Resource Acreage Within Region	NA	1,224,320	516,480	112,640	NA	1,040,640	507,520	139,520
Percentage of Regional Range Disturbed	NA	0.47%	0.14%	0.63%	NA	0.18%	0.15%	0.11%

NA = Not Available

**TABLE 4-11
Anticipated Noise/Human Activity Disturbance Impacts from Construction and Operation Activities
on Wildlife Resources from Alternative 2 - Coalbed Methane Infill Development**

	Elk Summer Range	Elk Winter Range	Elk Severe Winter Range	Elk Winter Concentra- tion Area	Deer Summer Range	Deer Winter Range	Deer Severe Winter Range	Deer Winter Concent- ration Area
Resource Acreage Within Study Area (Acres)	73,363	391,309	158,365	50,974	416,495	391,250	165,949	72,046
Resource Area as a Percent of Study Area	17.41%	92.88%	37.59%	12.10%	98.86%	92.87%	39.39%	17.10%
Total Number of Wells Potentially Impacting the Resource	288	601	248	105	634	601	253	48
Amount of Habitat Impacted by Noise/Activity Disturbances During Construction and Drilling (Assuming 0.5-mile radius from well pad) (Percentage of Habitat)	7,243 (9.87%)	15,115 (3.86%)	6,237 (3.94%)	2,641 (5.18%)	15,945 (3.83%)	15,115 (3.86%)	6,363 (3.83%)	1,207 (1.68%)
Amount of Habitat Impacted by Noise/Activity Disturbances During Production and Maintenance (Assuming 0.25-mile radius from well pad) (Percentage of Disturbance)	36,000 (49.07%)	75,125 (19.20%)	31,000 (19.58%)	13,125 (25.75%)	79,250 (19.03%)	75,125 (19.20%)	31,625 (19.05%)	6,000 (8.33%)
Combined Maximum Disturbance from Construction and Production (Percentage of Resource)	43,243 (58.94%)	90,240 (23.06%)	37,237 (23.51%)	15,766 (30.93%)	95,195 (22.86%)	90,240 (23.06%)	37,988 (22.89%)	7,207 (10.00%)
Resource Acreage Within Region	NA	1,224,320	516,480	112,640	NA	1,040,640	507,520	139,520
Percentage of Regional Range Disturbed	NA	7.37%	7.21%	14.00%	NA	8.67%	7.49%	5.17%
NA = Not Available								

TABLE 4-12
Anticipated Impacts from Surface Disturbance (Vegetation Removal) on Wildlife Resources from
Alternative 3 - Enhanced Coalbed Methane Recovery (Proposed Action)

	Elk Summer Range	Elk Winter Range	Elk Severe Winter Range	Elk Winter Concentra- tion Area	Deer Summer Range	Deer Winter Range	Deer Severe Winter Range	Deer Winter Concent- ration Area
Resource Acreage Within Study Area (Acres)	73,363	391,309	158,365	50,974	416,495	391,250	165,949	72,046
Resource Area as a Percent of Study Area	17.41%	92.88%	37.59%	12.10%	98.86%	92.87%	39.39%	17.10%
Total Number of Wells Potentially Impacting the Resource	313	659	269	113	704	659	273	49
Construction - Maximum Acres Disturbed (Percentage of Resource)	958 (1.3%)	2,017 (0.52%)	823 (0.52%)	346 (0.68%)	2,154 (0.52%)	2,017 (0.52%)	835 (0.50%)	150 (0.21%)
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	624 (0.85%)	1,331 (0.34%)	590 (0.37%)	257 (0.50%)	1,388 (0.33%)	1,331 (0.34%)	423 (0.26%)	117 (0.16%)
Production - Maximum Acres Disturbed (Percentage of Resource)	645 (0.87%)	1,358 (0.34%)	554 (0.34%)	233 (0.46%)	1,450 (0.35%)	1,358 (0.35%)	562 (0.33%)	101 (0.14%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	473 (0.66%)	1,005 (0.26%)	434 (0.27%)	187 (0.37%)	1,056 (0.25%)	1,005 (0.26%)	350 (0.21%)	85 (0.12%)
Resource Acreage Within Region	NA	1,224,320	516,480	112,640	NA	1,040,640	507,520	139,520
Percentage of Regional Range Disturbed	NA	0.16%	0.52%	0.31%	NA	0.19%	0.16%	0.11%

NA = Not Available

TABLE 4-13

Anticipated Noise/Human Activity Disturbance Impacts from Construction and Operation Activities on Wildlife Resources From Alternative 3 - Enhanced Coalbed Methane Recovery (Proposed Action)

	Elk Summer Range	Elk Winter Range	Elk Severe Winter Range	Elk Winter Concentration Area	Deer Summer Range	Deer Winter Range	Deer Severe Winter Range	Deer Winter Concentration Area
Resource Acreage Within Study Area (Acres)	73,363	391,309	158,365	50,974	416,495	391,250	165,949	72,046
Resource Area as a Percent of Study Area	17.41%	92.88%	37.59%	12.10%	98.86%	92.87%	39.39%	17.10%
Total Number of Wells Potentially Impacting the Resource	313	659	269	113	704	704	659	49
Amount of Habitat Impacted by Noise/Activity Disturbances During Construction and Drilling (Assuming 0.5-mile radius from well pad) (Percentage of Habitat)	7,872 (10.73%)	16,574 (4.24%)	6,765 (4.27%)	2,842 (5.58%)	17,706 (4.25%)	16,574 (4.24%)	6,866 (4.14%)	1,232 (1.71%)
Amount of Habitat Impacted by Noise/Activity Disturbances During Production and Maintenance (Assuming 0.25-mile radius from well pad) (Percentage of Disturbance)	39,125 (53.33%)	82,375 (21.05%)	33,625 (21.23%)	14,125 (27.70%)	88,000 (21.13%)	82,375 (21.05%)	34,125 (20.56%)	6,125 (8.50%)
Combined Maximum Disturbance from Construction and Production (Percent of Resource)	46,997 (64.06%)	98,949 (25.29%)	40,390 (25.50%)	16,967 (33.29%)	105,706 (25.38%)	98,949 (25.29%)	40,991 (24.70%)	7,357 (10.21%)
Resource Acreage Within Region	NA	1,224,320	516,480	112,640	NA	1,040,640	507,520	139,520
Percentage of Regional Range Disturbed	NA	8.08%	7.8%	15.06%	NA	9.51%	8.08%	5.27%
NA = Not Available								

TABLE 4-14				
Anticipated Surface Disturbance Impacts on Threatened, Endangered, and Sensitive Species Habitats from Alternative 1 - Continuation of Present Management (No Action)				
	Bald Eagle Winter Range	Bald Eagle Winter Concentration Areas	Wooded Riparian Habitat*	Medium- to High-Density Piñon-Juniper**
Resource Acreage Within Study Area	58,640	16,129	8,156	136,483
Resource Area as a Percent of Study Area	13.92%	3.83%	1.94%	32.40%
Total Number of Wells Potentially Impacting the Resource	51	10	15	191
Construction - Maximum Acres Disturbed (Percentage of Resource)	156 (0.26%)	31 (0.19%)	46 (0.56%)	585 (0.43%)
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	117 (0.20%)	24 (0.15%)	42 (0.51%)	446 (0.33%)
Production - Maximum Acres Disturbed (Percentage of Resource)	105 (0.17%)	21 (0.13%)	31 (0.38%)	393 (0.29%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	85 (0.14%)	17 (0.11%)	29 (0.36%)	322 (0.24%)
* Species that utilize this habitat include peregrine falcon and southwestern willow flycatcher				
** Species that utilize this habitat include the Knowlton's cactus				

TABLE 4-15
Anticipated Surface Disturbance Impacts on Threatened, Endangered, and Sensitive Species Habitats from Alternative 2 - Coalbed Methane Infill Development

	Bald Eagle Winter Range	Bald Eagle Winter Concentration Areas	Wooded Riparian Habitat*	Medium- to High-Density Piñon-Juniper**
Resource Acreage Within Study Area	58,640	16,129	8,156	136,483
Resource Area as a Percent of Study Area	13.92%	3.83%	1.94%	32.40%
Total Number of Wells Potentially Impacting the Resource	130	24	55	481
Construction - Maximum Acres Disturbed (Percentage of Resource)	398 (0.68%)	73 (0.45%)	168 (2.06%)	1,472 (1.08%)
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	332 (0.57%)	65 (0.40%)	164 (2.01%)	1,258 (0.92%)
Production - Maximum Acres Disturbed (Percentage of Resource)	268 (0.46%)	49 (0.30%)	113 (1.39%)	991 (0.73%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	234 (0.40%)	45 (0.01%)	111 (1.36%)	881 (0.65%)
* Species that utilize this habitat include peregrine falcon and southwestern willow flycatcher				
** Species that utilize this habitat include the Knowlton's cactus				

**TABLE 4-16
Anticipated Surface Disturbance Impacts on Threatened, Endangered, and Sensitive Species
Habitats from Alternative 3 - Enhanced Coalbed Methane Recovery (Proposed Action)**

	Bald Eagle Winter Range	Bald Eagle Winter Concentration Areas	Wooded Riparian Habitat*	Medium- to High- Density Piñon- Juniper**
Resource Acreage Within Study Area	58,640	16,129	8,156	136,483
Resource Area as a Percent of Study Area	13.92%	3.83%	1.94%	32.40%
Total Number of Wells Potentially Impacting the Resource	138	25	56	513
Construction - Maximum Acres Disturbed (Percentage of Resource)	422 (0.72%)	77 (0.48%)	171 (2.10%)	1,570 (1.15%)
Construction - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	344 (0.59%)	66 (0.41%)	165 (2.02%)	1,310 (0.96%)
Production - Maximum Acres Disturbed (Percentage of Resource)	284 (0.48%)	52 (0.32%)	115 (1.41%)	1,057 (0.77%)
Production - Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	244 (0.42%)	46 (0.29%)	112 (1.37%)	923 (0.68%)
* Species that utilize this habitat include peregrine falcon and southwestern willow flycatcher				
** Species that utilize this habitat include the Knowlton's cactus				

**TABLE 4-23
Fresh Water Use by Alternative During the 20-year Project Life**

	Conventional	CBM	Injection	
Fresh water/well for drilling in barrels (bbls)	5,450	450	450	
Fresh water/well for completion (bbls)	3,550	3,500	3,500	
Total fresh water/well (bbls)	9,000	3,950	3,950	
				TOTAL
Alternative 1				
Number of wells	269	81	0	350
Fresh water for drilling (bbls)	1,466,050	36,450	0	1,502,500
Fresh water for completion (bbls)	954,950	283,500	0	1,238,450
Total fresh water (bbls)	2,421,000	319,950	0	2,740,950
Total fresh water (acre-feet)				
Fresh water per year (acre-feet)	312	41	0	353
Alternative 2				
Number of wells	269	367	0	636
Fresh water for drilling (bbls)	1,466,050	165,150	0	1,631,200
Fresh water for completion (bbls)	954,950	1,284,500	0	2,239,450
Total fresh water (bbls)	2,421,000	1,449,650	0	3,870,650
Total fresh water (acre-feet)	312	187	0	499
Fresh water per year (acre-feet)	16	9	0	25
Alternative 3				
Number of wells	269	367	70	706
Fresh water for drilling (bbls)	1,466,050	165,150	31,500	1,662,700
Fresh water for completion (bbls)	954,950	1,284,500	245,000	2,484,450
Total fresh water (bbls)	2,421,000	1,449,650	276,500	4,147,150
Total fresh water (acre-feet)	312	187	36	535
Fresh water per year (acre-feet)	16	9	2	27

**TABLE 4-26
Anticipated Surface Disturbance Impacts on Land Use Types from Alternative 1**

Land Use Types	Resource Acreage Within Study Area (Acres)	Resource Area as a Percent of Study Area	Total Number of Wells Potentially Impacting the Resource	Construction-Maximum Acres Disturbed (Percentage of Resource)	Construction-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	Production-Maximum Acres Disturbed (Percentage of Resource)	Production-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)
			Tribal	Tribal		Tribal	
Agriculture	39,874	9.5	31	95 (0.2%)	80 (0.2%)	64 (0.2%)	56 (0.1%)
Prime Farmland	20,768	4.9	14	43 (0.2%)	37 (0.2%)	29 (0.1%)	26 (0.1%)
County Designated Grazing	42,502	10.0	24	73 (0.2%)	47 (0.1%)	49 (<0.1%)	36 (0.1%)
Picnic Flats Grazing Unit	54,658	12.9	71	217 (0.4%)	145 (0.3%)	146 (0.3%)	109 (0.2%)
Mesa Mountains Grazing Unit	38,310	9.1	70	214 (0.6%)	128 (0.3%)	144 (0.4%)	100 (0.3%)
Sambritos Grazing Unit	7,839	1.9	24	73 (0.9%)	59 (0.8%)	49 (0.6%)	42 (0.5%)
Forest Resources - Woodland	136,483	32.4	191	584 (0.4%)	446 (0.3%)	393 (0.3%)	322 (0.4%)
- Timber	16,904	4.0	60	184 (1.1%)	161 (1.0%)	124 (0.7%)	112 (0.7%)

**TABLE 4-26
Anticipated Surface Disturbance Impacts on Land Use Types from Alternative 1**

Land Use Types	Resource Acreage Within Study Area (Acres)	Resource Area as a Percent of Study Area	Total Number of Wells Potentially Impacting the Resource	Construction-Maximum Acres Disturbed (Percentage of Resource)	Construction-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	Production-Maximum Acres Disturbed (Percentage of Resource)	Production-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)
			Tribal	Tribal		Tribal	
Designated Recreation	800	0.2	0	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Residential	6,472	1.5	9	27 (0.4%)	25 (0.4%)	18 (0.3%)	18 (0.3%)
Commercial	351	0.1	5	15 (4.3%)	15 (4.3%)	10 (2.8%)	10 (2.8%)

TABLE 4-27
Impact Analysis Summary of Alternative 1 on SUIT-Designated Grazing Areas

Grazing Units	Average Acres/AUM	Total AUMs	Construction-Maximum Acres Disturbed	Construction-Loss of AUMs Using New Wells	Production-Maximum Acres Disturbed	Production-Loss of AUMs Using New Wells	Construction-Acres Disturbed using Existing Well Pads	Construction -Loss of AUMs Using Existing Wells	Production-Acres Disturbed Using Existing Wells	Production-Loss of AUMs Using Existing Wells
Picnic Flats 54,658 acres	23.2	2,356	217	9	146	6.3	145	6.3	109	4.7
Mesa Mountains 38,310 acres	6.2	6,179	214	34.5	144	23.2	128	20.6	100	16.1
Sambrito 7,839 acres	74.5	110	73	1	49	0.7	59	0.8	42	0.6
Totals	—	8,645	504	44.5	339	30.2	332	27.7	251	21.4

**TABLE 4-30
Anticipated Surface Disturbance Impacts on Land Use Types From Alternative 2**

Land Use Types	Resource Acreage Within Study Area (Acres)	Resource Area as a Percent of Study Area	Total Number of Wells Potentially Impacting the Resource)	Construction-Maximum Acres Disturbed (Percentage of Resource)	Construction-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	Production-Maximum Acres Disturbed (Percentage of Resource)	Production-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)
Agriculture	39,874	9.5	93	285 (0.7%)	264 (0.7%)	192 (0.5%)	182 (0.5%)
Prime Farmland	20,768	4.9	29	89 (0.4%)	83 (0.4%)	50 (0.3%)	57 (0.3%)
County Designated Grazing	42,502	10.0	51	156 (0.4%)	96 (0.2%)	105 (0.2%)	74 (0.2%)
Picnic Flats Grazing Unit	54,658	12.9	178	545 (1.0%)	396 (0.7%)	367 (0.7%)	290 (0.5%)
Mesa Mountain Grazing Unit	38,310	9.1	163	499 (1.3%)	231 (0.6%)	336 (0.9%)	198 (0.5%)
Sambritos Grazing Unit	7,839	1.9	48	147 (1.9%)	130 (1.7%)	99 (1.3%)	90 (1.2%)
Forest Resources - Woodland	136,483	32.4	481	1,472 (1.1%)	1,258 (0.9%)	991 (0.7%)	881 (0.6%)
- Timber	16,904	4.0	175	535 (3.1%)	509 (3.0%)	360 (2.1%)	347 (2.1%)
Designated Recreation	800	0.2	0	0 (0%)	0 (0%)	0 (0%)	0 (0%)

**TABLE 4-30
Anticipated Surface Disturbance Impacts on Land Use Types From Alternative 2**

Land Use Types	Resource Acreage Within Study Area (Acres)	Resource Area as a Percent of Study Area	Total Number of Wells Potentially Impacting the Resource)	Construction-Maximum Acres Disturbed (Percentage of Resource)	Construction-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	Production-Maximum Acres Disturbed (Percentage of Resource)	Production-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)
Residential	6,472	1.5	33	101 (1.6%)	99 (1.5%)	68 (1.0%)	67 (1.0%)
Commercial	351	0.1	5	15 (4.2%)	15 (4.3%)	10 (2.8%)	10 (2.8%)

**TABLE 4-31
Impact Analysis Summary of Alternative 2 on SUIT-Designated Grazing Areas**

Grazing Units	Average Acres/AUM	Total AUMs	Construction-Maximum Acres Disturbed	Construction-Loss of AUMs Using New Wells	Production-Maximum Acres Disturbed	Production-Loss of AUMs Using New Wells	Construction-Acres Disturbed Using Existing Well Pads	Construction-Loss of AUMs Using Existing Wells	Production-Acres Disturbed Using Existing Wells	Production-Loss of AUMs Using Existing Wells
Picnic Flats 54,658 acres	23.2	2,356	545	23.5	367	15.8	396	17.1	290	12.5
Mesa Mountains 38,310 acres	6.2	6,179	499	80	336	54.2	231	37.3	198	32
Sambrito 7,839 acres	74.5	110	147	2.0	99	1.3	130	1.7	90	1.2
Totals	—	8,645	1,191	105.5	802	71.3	757	56.1	578	45.7

**TABLE 4-34
Anticipated Surface Disturbance Impacts on Land Use Types From Alternative 3**

Land Use Types	Resource Acreage Within Study Area (Acres)	Resource Area as a Percent of Study Area	Total Number of Wells Potentially Impacting the Resource	Construction-Maximum Acres Disturbed (Percentage of Resource)	Construction-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	Production-Maximum Acres Disturbed (Percentage of Resource)	Production-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)
Agriculture	39,874	9.5	96	294 (0.7%)	296 (0.7%)	198 (0.5%)	185 (0.5%)
Prime Farmland	20,768	4.9	30	92 (0.5%)	86 (0.4%)	62 (0.3%)	59 (0.3%)
County Designated Grazing	42,502	10.1	53	162 (0.3%)	98 (0.2%)	109 (0.3%)	76 (0.2%)
Picnic Flats Grazing Unit	54,658	12.9	195	597 (1.1%)	422 (0.8%)	402 (0.7%)	312 (0.6%)
Mesa Mountain Grazing Unit	38,310	9.1	181	554 (1.5%)	257 (0.7%)	373 (1.0%)	220 (0.6%)
Sambritos Grazing Unit	7,839	1.9	52	159 (2.0%)	137 (1.7%)	107 (1.4%)	96 (1.2%)
Forest Resources - Woodland	136,483	32.4	513	1,570 (1.2%)	1,310 (1.0%)	1,057 (0.8%)	933 (0.7%)
- Timber	16,904	4.0	179	548 (3.2%)	515 (3.1%)	369 (2.2%)	352 (2.1%)

**TABLE 4-34
Anticipated Surface Disturbance Impacts on Land Use Types From Alternative 3**

Land Use Types	Resource Acreage Within Study Area (Acres)	Resource Area as a Percent of Study Area	Total Number of Wells Potentially Impacting the Resource	Construction-Maximum Acres Disturbed (Percentage of Resource)	Construction-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)	Production-Maximum Acres Disturbed (Percentage of Resource)	Production-Acres Disturbed if All Available Existing Well Pads are Used (Percentage of Resource)
Designated Recreation	800	0.2	0	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Residential	6,472	1.5	33	101 (1.6%)	99 (1.5%)	68 (1.0%)	67 (1.0%)
Commercial	351	0.1	5	15 (4.2%)	15 (4.3%)	10 (2.8%)	10 (2.8%)

**TABLE 4-35
Impact Analysis Summary of Alternative 3 on SUIT-Designated Grazing Areas**

Grazing Units	Average Acres/AUM	Total AUMs	Construction-Maximum Acres Disturbed (% of Resource)	Construction-Loss of AUMs Using New Wells	Production-Maximum Acres Disturbed	Production-Loss of AUMs Using New Wells	Construction-Acres Disturbed Using Existing Well Pads	Construction-Loss of AUMs Using Existing Wells	Production-Acres Disturbed Using Existing Wells	Production-Loss of AUMs Using Existing Wells
Picnic Flats 54,658 acres	23.2	2,356	597	25.7	402	17.3	422	18.2	312	13.4
Mesa Mountains 38,310 acres	6.2	6,179	553	89.2	373	60.2	257	41.5	220	35.5
Sambrito 7,839 acres	74.5	110	159	2.1	107	1.4	136	1.8	96	1.3
Totals	—	8,645	1,309	117	882	78.9	815	61.5	628	50.2

**Table 4-55
Cumulative Visual Impacts on Tribal and Non-Tribal Acreage within the Study Area**

	Views From Residences						Views From Roads						Views From Recreation								
	Immediate Foreground - High (0 - 300 feet)	Foreground - High (300 feet - .25 mile)	Foreground - Moderate (300 feet - .25 mile)	Midleground - Moderate (.25 - 1 mile)	Midleground - Low (.25 - 1 mile)	Background - Low (1 - 5 miles)	Seldom Seen - Low (> 5 miles)	Immediate Foreground - High (0 - 300 feet)	Foreground - High (300 feet - .25 mile)	Foreground - Moderate (300 feet - .25 mile)	Midleground - Moderate (.25 - 1 mile)	Midleground - Low (.25 - 1 mile)	Background - Low (1 - 5 miles)	Seldom Seen - Low (> 5 miles)	Immediate Foreground - High (0 - 300 feet)	Foreground - High (300 feet - .25 mile)	Foreground - Moderate (300 feet - .25 mile)	Midleground - Moderate (.25 - 1 mile)	Midleground - Low (.25 - 1 mile)	Background - Low (1 - 5 miles)	Seldom Seen - Low (> 5 miles)
Acres of Resource	11046.66	8975.61	42568.54	27520.99	68763.87	115493.1	146550.8	7754.3	4446.16	16225.93	13952.92	36817.06	106228.7	238910.3	845.57	345.91	1163.75	416.46	2261.05	6192.48	408794.6
Total Current Disturbance	705	244	1841	654	2603	3226	6574	411	144	738	456	1696	4040	9164	41	15	49	15	142	986	15997
Current Disturbance %	6.4	2.7	4.3	2.4	3.8	2.8	4.5	5.3	3.2	4.5	3.3	4.6	3.8	3.8	4.8	4.3	4.2	3.6	6.3	15.9	3.9

REASONABLE FORESEEABLE DEVELOPMENT WITHIN THE STUDY AREA:

New Disturbance Acres Using All New Well Pads	798.66	504.9	887.4	875.16	1288.26	1627.92	1808.46	318.24	284.58	416.16	618.12	963.9	2083.86	2867.22	39.78	24.48	58.14	30.6	64.26	122.4	3304.8
New Disturbance % Using All New Well Pads	7.2	5.6	2.1	3.2	1.9	1.4	1.2	4.1	6.4	2.6	4.4	2.6	2	1.2	4.7	7.1	5	7.3	2.8	2	0.8
New Disturbance Acres Using a Combination of Existing and New Well Pads	782.12	496.66	784.4	846.32	1090.5	1505.28	1671.12	310.94	276.34	362.6	599.58	844.42	1923.5	2107.08	39.78	24.48	56.08	30.6	53.96	105.92	2132.66
New Disturbance % Using a Combination of Existing and New Well Pads	7.1	5.5	1.8	3.1	1.6	1.3	1.1	4	6.2	2.2	4.3	2.3	1.8	0.9	4.7	7.1	4.8	7.3	2.4	1.7	0.5
Cumulative Disturbance Acres (Current + Alternative 3 New Well Pads)	1503.66	748.9	2728.4	1529.16	3891.26	4853.92	8382.46	729.24	428.58	1154.16	1074.12	2659.9	6123.86	12031.22	80.78	39.48	107.14	45.6	206.26	1108.4	19301.8
Cumulative Disturbance % (Current + Alternative 3 New Well Pads)	13.6	8.3	6.4	5.6	5.7	4.2	5.7	9.4	9.6	7.1	7.7	7.2	5.8	5	9.6	11.4	9.2	10.9	9.1	17.9	4.7
Cumulative Disturbance Acres (Current + Alternative 3 Existing and New Well Pads)	1487.12	740.66	2625.4	1500.32	3693.5	4731.28	8245.12	721.94	420.34	1100.6	1055.58	2540.42	5963.5	11271.08	80.78	39.48	105.08	45.6	195.96	1091.92	18129.66
Cumulative Disturbance % (Current + Alternative 3 Existing and New Well Pads)	13.5	8.3	6.2	5.5	5.4	4.1	5.6	9.3	9.5	6.8	7.6	6.9	5.6	4.7	9.6	11.4	9	10.9	8.7	17.6	4.4