# 5.0 - CUMULATIVE IMPACTS ANALYSIS

Cumulative impacts result from the incremental impacts of an action when added to past, present, and reasonably foreseeable future actions, regardless of who takes the action. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. This chapter discusses cumulative impacts as the incremental effect to specific resources or issues that would occur from Alternatives A, B, and C, in conjunction with other past or reasonably forseeable actions.

## 5.1 REASONABLY FORESEEABLE DEVELOPMENT

In support of the cumulative impact discussion, this chapter provides a discussion of past and present oil and gas activities in the Uinta Basin, both of which serve as introductions to the outlook for reasonably foreseeable development (RFD) in the Project Area and the greater Uinta Basin. The cumulative impact and RFD analysis is based upon the level of activities and actions identified in the VFO Mineral Potential Report (BLM 2002) which projected environmental impacts across a 15-year period. This RFD was reviewed in 2008 for oil and gas development, which would be the most significant development activity expected in the VFO Planning Area, and BLM determined during this review that the RFD only projects environmental impacts for up to five years (BLM 2008a). The BLM has carefully monitored industry trends and surmises that the RFD used as an analytical tool in planning efforts can be considered accurate up to approximately five years from the time that the ROD for the VFO Approved RMP is signed. Within the next five-year timeframe, the BLM will monitor the impacts of continued development to resources in the planning area and ensure that the impacts disclosed in the RMP analysis are not exceeded by the pace of development.

Other significant activities with the potential to contribute to cumulative impacts would be livestock grazing and recreational projects. Spatial boundaries for cumulative impact assessments vary and are larger for resources that are mobile or migrate (i.e., air quality) compared to resources that are stationary or that have defined boundaries. For the analysis purposed of this EA, the Cumulative Impact Analysis Area (CIAA) for most resources is the VFO Planning Area which encompasses approximately 5.5 million acres in Duchesne, Daggett, Uintah, and Grand Counties.

### 5.1.1 OIL AND GAS

The Uinta Basin is a significant source of natural gas and oil, and it is currently one of the most active oil and gas producing areas in the onshore U.S. Oil and gas development is at an all-time high in the Basin, with more rigs operating, and more APDs being processed than ever before. For example, over half of the total oil and gas wells drilled in Utah between 1911 and November 2000 were drilled within the Uinta Basin. APDs and ROW applications processed by the BLM VFO have exhibited a significant upward trend, estimated to be approximately 15 percent annually.

Exploratory drilling is currently proposed in the western and southwestern portions of the Uinta Basin, encompassing BLM, Tribal, and National Forest lands. Production of exploratory wells typically lags discovery by many years. These exploratory wells are typically characterized by larger, deeper, more remote locations requiring greater per-well expenditures, potential delays in infrastructure access and, therefore, greater financial risk.

Future oil and gas development in the Uinta Basin will depend upon the feasibility of exploration, as determined by the underlying geology and further infill development projects within the Basin. Future development will be dependent upon the geologic feasibility of each prospect, the cost to develop the resources, and engineering technological advancements. Development of Tribal lands will continue and

perhaps increase as exploratory wells are drilled in the Hill Creek Extension. Drilling in the Ashley National Forest will likely increase as a result of new leasing and management strategies. However, the level of development on Tribal and National Forest System lands is unknown.

The cumulative scenario for this EA is based on the number of existing wells in the VFO Planning Area, as well as the estimated total number of wells anticipated to be drilled over the coming 5 years in this same area. As of January 2008, according to UDOGM data, approximately 9,171 wells had been drilled in the VFO Planning Area. Of these wells, 77 percent (7,089 wells) are classified as active (i.e., producing; shut-in; drilling commenced; drilling suspended), leaving 23 percent (2,082 wells) that have been plugged, abandoned, and reclaimed. Under the Approved RMP, an estimated 6,530 oil and gas wells are anticipated in the VFO Planning Area. The following surface disturbance assumptions have been applied regarding future construction associated with oil and gas development:

- Surface disturbance for a well pad: 2.4 acres;
- Surface disturbance for an access road, assuming 0.2 mile/well: .73 acre/well; and
- Surface disturbance for pipelines and flowlines: 0.47 acre/well.

Based on these assumptions, the additional surface disturbance associated with past, present, and reasonably foreseeable oil and gas development would be 49,029 acres, or approximately 0.9 percent of the 5.5 million acre VFO Planning Area. The details of the cumulative development scenario are shown in **Table 5-1**.

**Table 5-1. Cumulative Oil and Gas Development Surface Disturbance (Excluding Proposed Action and Alternatives) in the VFO Planning Area**

| Planning Area | Existing Active Wells | RFD # Wells | Total # Wells | Well Pads (acres)[1] | Access Roads (acres) | Total Pipelines (acres) | Total Surface Disturbance (acres) in the CIAA |
|---|---|---|---|---|---|---|---|
| VFO | 7,089 | 6,530 | 13,619 | 32,686 | 9,942 | 6,401 | 49,029 |

[1]Well pad disturbance is overestimated, since it assumes one well per pad. In some cases, two or more wells may be drilled from a single well pad.

**Table 5-2** shows the total disturbance of past, present, and reasonably foreseeable development (from **Table 5-1**) with the addition of surface disturbances associated with the Proposed Action and alternatives.

**Table 5-2. Cumulative Oil and Gas Development Surface Disturbance in the VFO CIAA, Including the Proposed Action and Alternatives**

| Alternative | Existing Wells | RFD Wells | Alt Wells | Total # Wells | Well Pads (acres)[1] | Access Roads (acres) | Total Pipelines (acres) | Total Disturbance (acres) |
|---|---|---|---|---|---|---|---|---|
| A | 7,089 | 6,530 | 664 | 14,283 | 34,279 | 10,427 | 6,713 | 51,419 |
| B | 7,089 | 6,530 | 112 | 13,731 | 32,954 | 10,024 | 6,454 | 49,432 |
| C | 7,089 | 6,530 | 664 | 14,283 | 34,279 | 10,427 | 6,713 | 51,419 |

[1]Well pad disturbance is overestimated, since it assumes one well per pad. In some cases, two or more wells may be drilled from a single well pad.

### 5.1.2 LIVESTOCK GRAZING

Livestock grazing is currently a permitted use of public lands within the VFO Planning Area. Although some minor changes may be expected over the next few years, it is reasonable to expect that livestock

grazing would continue. Allocated AUMs would remain essentially unchanged; however, based on use trends over the past seven years, actual use may decline based on individual grazing permittee's operations and market conditions. The VFO currently administers grazing on 147 allotments. The 147 allotments within the VFO boundary designated for livestock grazing encompass approximately 2,268,120 acres (1,696,416 acres of BLM land; 571,704 acres of private, State, and Tribal lands). Within the grazing allotments managed by the VFO, 153,370 AUMs are allocated for livestock.

### 5.1.3 RECREATION

Reasonable foreseeable recreation decisions potentially affecting cumulative impacts in the VFO RMP area could include designation of Areas of Critical Environmental Concerns (ACECs), Wild and Scenic Rivers (WSRs), and Special Recreation Management Areas (SRMAs), as well as trail, campground, and cabin development. These designations and developments would have beneficial impacts on recreation, but would also affect the management of other resources in the Cumulative Impact Analysis Area (CIAA).

## 5.2 CUMULATIVE IMPACTS

### 5.2.1 INTRODUCTION

This section discloses the impacts expected when the Proposed Action or alternatives are added to the past and reasonably foreseeable actions. **Table 5-3** presents a comparison of expected surface disturbance under each alternative. Although the CIAAs vary per resource, the table below describes surface disturbance within the VFO Planning Area.

**Table 5-3 Comparison of Surface Disturbances Associated with the Proposed Action (Alternative A) and Alternatives (B and C) to the CIAA**

| Alternative | Total Surface Disturbance Proposed in the BPPA by Alternative (acres) | Total Surface Disturbance in the CIAA (acres)[1] | Percentage of Surface Disturbance in the CIAA Caused by Alternatives in the BPPA |
|---|---|---|---|
| A | 1,620 | 51,419 | 3.2 |
| B | 319 | 49,810 | 0.6 |
| C | 1,515 | 51,419 | 2.9 |

[1] Acreage determined using per well assumptions listed above in Section 5.1.1

### 5.2.2 GEOLOGY AND MINERALS

The cumulative impact area for geology and minerals is the Uinta Basin. The Proposed Action and alternatives, combined with other existing and proposed oil and gas developments in the CIAA, would hasten the rate at which reserves of natural gas are extracted from the Wasatch Formation and Mesaverde Group in the Uinta Basin. This irreversible commitment of resources would be economically beneficial to the general public during the life of the project. Gas resources within the deeper Dakota Sandstone, Cedar Mountain Formation, Mancos Shale, Morrison Formation, Entrada Formation, and Wingate Sandstone would not be affected by the Proposed Action.

The cumulative impacts to geologic and mineral resources would include changes to the local topography including cuts and fills in the sandstone and sandy shale bedrock underlying the Project Area. These changes to the topographic character of the area would add to other residual changes created by additional

oil and gas projects and other surface disturbing activities (e.g. range facility construction, recreation facility construction, etc.) in the CIAA.

The Proposed Action and alternatives would add to the area in the CIAA that would not be available for development of oil-shale resources. Surface disturbance for the well pads, access roads, compressor station and pipelines would comprise about 4.7 percent of the land surface within the Project Area. At least this much of the area would be unavailable for oil shale development. However, other areas of the Uinta Basin, and the Piceance Basin in Colorado, are considered to contain oil shale resources of higher quality, and these areas would likely be developed first. A small amount of the area set aside for tar sand development may also be closed to development.

The Proposed Action and alternatives would have no cumulative impact on other mineral resources in the CIAA, including Gilsonite, sand and gravel, and building stone.

### 5.2.3 AIR QUALITY

The CIAA for air quality is defined as the Uinta Basin and northwestern Colorado. Cumulative air quality impacts are defined as the combination of emissions resulting from the Proposed Action or alternatives, existing nearby permitted sources, and RFD within the region. Areas of concern include the Uinta Basin, the High Uintah Wilderness Area, as well as nearby mandatory Federal PSD Class I areas such as Arches and Canyonlands National Parks and Flat Tops Wilderness. Potential Air Quality Related Value (AQRV) impacts to sensitive areas include regional impacts on visibility, total nitrogen and sulfur deposition, and Acid Neutralization Capacity (ANC).

It is anticipated that the pace and level of natural gas development within this region of the State will continue over the next few years. This will add incrementally to air quality impacts from emissions sources. The Draft EIS and RMP for the VFO (BLM 2005a) has recently addressed the impacts to air quality in the Uinta Basin and surrounding areas of special concern, considering both existing permitted sources and an extended look at development over a fifteen year timeframe. The development alternatives were based on BLM's proposed plans for resource development, which included estimates for the number of wells drilled for oil and gas, compressor stations, and pipelines, along with other foreseeable development activities by non-BLM entities. In general, results from this analysis indicate that existing air quality in the region is good, and based on reasonable development scenarios in conjunction with existing sources, is not of great concern.

The cumulative air quality analysis conducted by BLM for the VFO RMP evaluated a 15-year development of over 6,000 wells and associated ancillary facilities such as well pads, compressor stations, three-phase separators, condensate tanks, and dehydration units. The methodology, emissions inventory, and results are well documented in the Air Quality Assessment Report for the Vernal and Glenwood Springs Resource Management Plans, Vernal Resource Management Area and Glenwood Springs Resource Management Area, Colorado, August 2004. No significant near- or far-field impacts were predicted in association with the operation of 6,000+ wells. Therefore, effects from the Big Pack project would be similarly insignificant because development of 664 wells on 292 well pads is well within the umbrella of the Air Quality Assessment.

In particular, cumulative well development activities in the Uinta Basin are not expected to affect attainment of NAAQS standards or regional PSD increments. Existing and RFD stationary sources including compressor engines and turbines, while of greater concern, are anticipated to be adequately spaced to allow for favorable dispersion conditions. A cumulative effects analysis on visibility impairment within nearby Class I and selected Class II areas found that potential changes in visibility and acid deposition were within acceptable guidelines.

In general, the increase in emissions associated with development would be localized, in some cases temporary (well development phase), and on a limited scale in comparison with regional emissions. Therefore, it is unlikely that the project, under any alternative, would substantially impact the cumulative air quality of the region.

### 5.2.4 PALEONTOLOGY

As potential impacts to paleontological resources across a geographic landscape are not additive, the CIAA for paleontological resources is defined as the existing BPPA. Cumulative impacts to the paleontological resources in the CIAA would primarily result from activities associated with surface and subsurface disturbance. Previous oil and gas activities in the CIAA have disturbed approximately 90 acres. Future impacts to the paleontological resources in the CIAA would primarily result from additional oil and gas development projects and increased visitation to the BPPA. Additional surface disturbance associated with oil and gas development would occur based upon the alternative selected (Alternative A: 1,620 acres; Alternative B: 319 acres; Alternative C: 1,515 acres) for this EA. These activities could have short- and long-term cumulative effects on paleontological resources in the CIAA. Surface-disturbing activities could affect paleontological resources by damaging or destroying fossils. Adverse effects include physical damage to or destruction of fossils, as well as increased vandalism and theft that result from improved access to fossil localities. However, as site-specific paleontological surveys would be conducted prior to surface-disturbing activities in the BPPA, and as all identified paleontological resources would be avoided or impacts mitigated, cumulative impacts associated with the Proposed Action or alternatives are expected to be minimal.

Surface-disturbing activities could also have a beneficial effect on paleontological resources by drawing the attention of a qualified paleontologist to areas that are not currently being researched, resulting in the collection of specimens and data that would not otherwise be recovered.

### 5.2.5 CULTURAL RESOURCES

Impacts to the cultural resources in the CIAA would primarily result from activities associated with surface and subsurface disturbance. Previous oil and gas activities in the CIAA have disturbed approximately 90 acres. Due to the large amount of existing natural gas development in the BPPA, recreational use in the area is low and fire management activities are not conducted. As such, surface disturbance from these activities in the BPPA is rare. Future impacts to the cultural resources in the CIAA would primarily result from surface disturbance associated with additional oil and gas development projects and increased visitation to the BPPA. Additional surface disturbance associated with oil and gas development in the CIAA would occur based upon the alternative selected (Alternative A = 1,620 acres; Alternative B = 319 acres; Alternative C = 1,515 acres) for this EA. Impacts may also result from specific cultural resource management decisions and from non-surface-disturbing activities that create atmospheric, visual, and/or auditory effects. These latter impacts would apply to sites or locations that together comprise the overall cultural experience for all visitors to the area, and especially to those deemed sacred or traditionally important by Native American Tribes and used by these groups in such a manner that atmospheric changes, visual obstructions, and/or noise levels impinge upon that use. These types of impacts cumulatively affect not only the historic setting, feeling, and view shed of cultural properties, but also their eligibility potential for nomination to the NRHP.

### 5.2.6 SOILS

The CIAA for soil resources is the VFO Planning Area. Past, present, and future surface disturbance in the CIAA is estimated at 49,029 acres . Any land-disturbing activity that removes native vegetation and topsoil can result in an increase in erosion rates and sediment yield. Authorized actions that could result in increased erosion and sediment yield within the CIAA include oil and gas development, livestock grazing, recreation, mining activities (Gilsonite, sand and gravel, and, potentially oil shale), and county and private road construction. Of these potential soil-disturbing activities, existing and proposed roads are the features of highest concern. Unlike surface and buried pipelines, active roadways and well pads would not reclaimed, thus sediment yield from roads could continue at rates two to three times above background rates into the indefinite future.

Compaction due to construction activities at well pads, along access roads, and in other disturbed areas would result in a small increase in surface runoff from the area. This increased runoff could in turn cause increased sheet, rill, and gully erosion. The construction and operation of each well would incrementally increase the chance that leaks or spills of saline water, hydro-fracturing chemicals, fuels, and lubricants would occur within the CIAA. Spills of this nature could increase the loss of soil productivity within the area.

As shown in **Table 5-3** above, surface disturbance associated with the Proposed Action and alternatives when added to past, present, and reasonably foreseeable actions would have minimal impacts on soil resources across the CIAA. In addition, design features including berms, sediment control structures, and proper grading of well pads and access roads, would reduce the impacts of the Proposed Action and Alternatives on soil resources by minimizing soil erosion, and by reducing the potential for soil contamination. Under the No Action Alternative, site-specific mitigation measures for soil resources would be implemented on a well by well basis as part of the APD approval process.

### 5.2.7 WATER RESOURCES

The CIAA for water resources (including floodplains) is the BLM VFO Planning Area. The Proposed Action and alternatives would result in a slight increase in erosion rates and sediment yield. If reclamation and mitigation measures are not successful, additional sedimentation and turbidity of surface water, including that in the Green River, could result. The increased erosion, combined with increases associated with other oil and gas development, recreational activities including OHV use, livestock grazing, and mining, could have cumulative negative impacts on aquatic habitat within affected drainages.

Rapid and successful reclamation/re-vegetation of temporarily disturbed areas, use of erosion control devices, and implementation of BMPs are particularly important in minimizing water quality impacts and in assuring maintenance of long-term stream health. Design features of the Proposed Action and alternatives, including berms, sediment control structures, and proper grading of well pads and access roads, would minimize additional erosion and delivery of sediment from the proposed project facilities.

Soils compacted on existing roads, new access roads, and well pads contribute slightly greater runoff than undisturbed sites. The increased runoff could lead to slightly higher peak flows in the Green River, potentially increasing erosion of the channel banks. The increased erosion would also potentially increase turbidity in the river during storm events.

The Proposed Action and alternatives, combined with other oil and gas development and increased recreational activities, would slightly increase the chance that accidental spills of fuels, lubricants, petroleum products, or fracing chemicals would occur and contaminate surface water within the CIAA.

Spills of fuels or produced fluids from well pads, pipelines, and compressor stations also have the potential to contaminate the shallow alluvial groundwater along BPPA drainages.

As shown in **Table 5-3** above, surface disturbance associated with the Proposed Action and alternatives when added to past, present, and reasonably foreseeable actions would have minimal impacts on soil resources across the CIAA.

## 5.2.8 VEGETATION

### 5.2.8.1 General Vegetation Including Invasive Species

The CIAA for vegetation and invasive species is the BLM VFO Planning Area. Existing and RFD oil and gas projects in the CIAA have or would disturb approximately 49,408 acres of existing vegetation. In addition, existing and reasonably foreseeable forage use by livestock grazing, wild horses, and wildlife, additional recreational use of habitats, mining activities, and prescribed burns would also potentially disturb existing vegetation throughout the CIAA. Specific negative effects associated with the proposed development in the CIAA could include 1) reduction in the overall visual character of an area; 2) reduction or fragmentation of wildlife habitats; 3) increased soil erosion; and 4) increased potential for weed invasion.

Invasive weed species are a major concern in the Uinta Basin. Weed Management Areas have been established through interagency planning and coordination and treatment to find and destroy stands of invasive and noxious species. As previously stated, past, present, and reasonably foreseeable oil and gas projects in the CIAA would potentially include the construction of approximately 2,724 miles of road, and disturbance of approximately 49,029 acres of existing vegetation. In addition, to vegetation lost from oil and gas developments, past, present, and reasonably foreseeable forage use by livestock grazing, wild horses, and wildlife, additional recreational use, mining activities, and prescribed burns would also potentially increase noxious and invasive weeds throughout the CIAA. Specific negative effects of invasive plants and noxious weeds associated with proposed development in the CIAA could include (1) reduction in the overall visual character of the area; (2) competition with, or elimination of native plants; (3) reduction or fragmentation of wildlife habitats; and (4) increased soil erosion.

**Table 5-3** shows that the Proposed Action and alternatives would incrementally contribute to cumulative impacts associated with other activities in the CIAA.

### 5.2.8.2 Special Status Plant Species

The CIAA for special status plant species is the BLM VFO Planning Area. However, as the habitats have not been fully mapped and the population estimates are unknown, disturbance in the CIAA cannot be quantified.

The Proposed Action and alternatives could impact the Graham's beardtongue and its suitable habitat, which would incrementally contribute to cumulative impacts affecting habitats and populations of this special status plant species. Existing and reasonably foreseeable oil and gas projects have and would continue to contribute to incremental loss and fragmentation of suitable plant habitat within the BPPA and surrounding areas for this species. These activities could also have indirect effects, such as sedimentation and weed invasion, which would cumulatively decrease the plants' recovery potential. In addition, forage use by livestock grazing, wild horses, wildlife, and additional recreational use could also disturb plant habitat in and near the BPPA. These reductions of habitat could be compounded by other losses resulting from non-human induced conditions such as a prolonged drought.

Lands involving special status plant species within the CIAA have generally been leased with terms and conditions to protect these species and their habitat. Adherence to conservation measures/practices to moderate development in these areas and afford protective distances from proposed development to plants and/or their occupied habitats, and minimization of disturbance in suitable habitat, could collectively reduce cumulative impacts.

Assuming adherence to the above mentioned mitigation measures, activities related to the Proposed Action, Alternatives B and C, and other activities in the CIAA would not lead to the need for Federal listing of the Graham's beardtongue.

#### 5.2.8.3 Wetlands/Riparian Zones

The CIAA for wetlands and riparian habitats is what occurs in the BPPA along Bitter Creek. Under the Proposed Action and alternatives, a pipeline is proposed along BLM designated wetlands/riparian zones. However, this pipeline would be collocated with an existing road, and therefore would have few additional impacts on this resource. Design features of the Proposed Action and alternatives, including berms and sediment control structures, would minimize indirect impacts to wetlands and riparian zones. As such, impacts of the Proposed Action and alternatives, combined with other oil and gas development, recreational activities including OHV use, livestock grazing, and mining, would have minimal cumulative impacts on wetlands and riparian zones in the CIAA.

### 5.2.9 WILDLIFE AND FISHERIES

The CIAA for wildlife (including special status wildlife and fishery species) is the VFO Planning Area. Past and present actions in the CIAA (including minerals development, road construction, and livestock improvements among others) have caused direct habitat loss and/or degradation of habitat, contributed to habitat fragmentation, displaced individual wildlife species, increased collisions between wildlife and vehicles, and potentially contributed to the poaching and general harassment of wildlife. Recreation and livestock grazing within the CIAA has also contributed to cumulative impacts to wildlife; however, the incremental contributions of these activities are not quantifiable. Total cumulative surface disturbance from existing active wells and estimated RFD of oil and gas activities in the CIAA is estimated to be approximately 49,029 acres. **Table 5-3** shows that the Proposed Action and alternatives would incrementally contribute to cumulative impacts associated with other activities in the CIAA.

While surface disturbance somewhat corresponds to associated wildlife habitat loss, more accurate calculations of total cumulative wildlife habitat loss are not determinable because impacts are species-specific and dependent upon the following: (1) the status and condition of the population(s) or individual animals being affected; (2) seasonal timing of the disturbance; (3) value and quality of the Project Area as well as adjacent habitats; (4) physical parameters of the affected and nearby habitats (e.g., the extent of topographical relief and vegetative cover); and (5) the type of surface disturbance. However, surface disturbance calculations are considered a useful indicator of habitat loss because as habitats are removed to support oil and gas development, mining, and other development activities, wildlife carrying capacities of an area would be reduced.

In the context of cumulative impact analysis, each acre of vegetative disturbance in the BPPA would be additive to other losses of habitat, foraging areas, breeding areas, ground cover, and increased habitat fragmentation within the CIAA. Additional development activities could temporarily displace wildlife or preclude wildlife species from using areas of more intense human activity. Other impacts could increase disruption of migratory routes and seasonal ranges, increase general distress, or result in deteriorated physical condition, decreased reproductive success, and nutritional condition due to increased energy expenditure.

It should also be noted that this analysis assumes cumulative impacts to special status wildlife species would be similar in nature to those discussed above for wildlife. However, given their ongoing habitat losses, sensitivity to disturbances, and declining population numbers, special status wildlife species would be expected to be more sensitive to impacts related to development within the CIAA than other, more common wildlife species. Based on these sensitivities, existing and RFD land uses have reduced and would likely continue to reduce the quality and quantity of habitats in the CIAA for special status wildlife species. If field inventories for special status wildlife species are conducted prior to construction and seasonal and/or spatial buffers (or avoidance) are implemented, or surface density is reduced in sensitive areas, project-related impacts to special status wildlife species could be reduced. As such, the additive impacts of the Proposed Action and alternatives with other existing and RFD activities could affect but would not likely cause a trend towards Federal listing of the WTPD, spotted bat, bald eagle, golden eagle, ferruginous hawk, greater sage-grouse, short-eared owl, burrowing owl, sage sparrow, or Utah milk snake. However, if these mitigation measures are not implemented under Alternatives A and C, as recommended, localized extirpation of sage-grouse populations could occur and may decrease the overall viability of sage-grouse populations in the CIAA.

Similar to special status wildlife discussed above, existing and RFD land uses (including livestock grazing, mineral development, and recreation) have reduced and will likely continue to reduce population sizes and habitat quality in the CIAA for special status fish species. Water depletions associated with the Proposed Action and alternatives, in combination with depletions from other existing and RFD activities in the CIAA, would reduce the ability of the Upper Colorado River Basin to create and maintain the physical habitat and biological environment for the endangered Colorado River fish. As such, these water depletions to the Upper Colorado River Basin ***"may affect, are likely to adversely affect"*** the Colorado River fish USFWS-designated critical habitats.

The additive impacts of the Proposed Action and alternatives on special status fish species for effects other than depletion depend upon the alternative. If an accidental spill were to enter Bitter Creek, the additive impacts of the Proposed Action and Alternative B with other existing and RFD activities would degrade habitat quality for the endangered and sensitive Colorado River fish. However, specific actions under Alternative C to utilize closed-loop drilling in 100-year floodplains, berm well pads, and line tank battery berms would minimize the potential for contaminants to reach the White River. Therefore, the additive impacts of Alternative C with other existing and RFD activities would not likely degrade habitat quality for the endangered and sensitive Colorado River fish.

### 5.2.10 TRANSPORTATION

The CIAA for transportation is the VFO Planning Area. Potential cumulative transportation impacts associated with future natural gas development and production operations in the BPPA include increases in industrial traffic and associated user conflicts on segments of Federal, State, and Uintah County roads providing access to the Project Area; and increased roads and traffic within and adjacent to the Project Area.

Two State highways provide access to the majority of ongoing and reasonably foreseeable development within the Uinta Basin. Traffic on State Highways is monitored by the Utah Department of Transportation (UDOT). Between 2000 and 2005 traffic increased on Highways 45 and 88 by approximately 35 percent.

Traffic on County roads is monitored by the Uintah County Roads Department. Historical county traffic data are insufficient to serve as a baseline for a measurable analysis; however, industrial traffic has noticeably increased on the majority of roads in the southern portion of the County.

Traffic associated with future natural gas development and production operations within the BPPA would incrementally and cumulatively increase industrial traffic on Federal, State, and county roads within the CIAA. As previously stated, traffic would be highest during the drilling and construction phase and would decline during the production and maintenance phase.

## 5.2.11 LIVESTOCK GRAZING

The CIAA for livestock grazing is the combined area of the three grazing allotments, portions of which fall within the BPPA. Cumulative impacts from oil and gas development to livestock grazing would include the loss of AUMs during the life of the disturbances and disturbance to range facilities. Recreation activities also contribute to cumulative impacts to livestock grazing, but the incremental contribution is impossible to quantify. **Table 5-4** displays the past, present and reasonably foreseeable oil and gas development in the livestock grazing CIAA.

**Table 5-4. AUMs Lost from Existing and Reasonable Foreseeable Oil and Gas Developments in the Livestock Grazing CIAA**

| Alternative | Allotment Name | Total AUMs in CIAA | AUMs Lost from Project Alternative | Past and Present AUMs[1] Lost | RFD AUMs [1] Lost | Total Reasonably Foreseeable AUMs[2] Lost in CIAA | % of Total AUMs in CIAA |
|---|---|---|---|---|---|---|---|
| A | Olsen AMP | 9,268 | 74 | 152 | 90 | **316** | 3.4 |
| | Sand Wash | 4,526 | 0 | 74 | 44 | **118** | 2.6 |
| | Sunday School Canyon | 3,667 | 2 | 60 | 35 | **97** | 2.6 |
| | **TOTAL for CIAA** | **17,461** | **75** | **286** | **169** | **530** | **3.0** |
| B | Olsen AMP | 9,268 | 1 | 152 | 90 | 243 | 2.6 |
| | Sand Wash | 4,526 | 0 | 74 | 44 | 118 | 2.6 |
| | Sunday School Canyon | 3,667 | 0 | 60 | 35 | 95 | 2.6 |
| | **TOTAL for CIAA** | **17,461** | **1** | **286** | **169** | **456** | **2.6** |
| C | Olsen AMP | 9,268 | 67 | 152 | 90 | **309** | 3.3 |
| | Sand Wash | 4,526 | 0 | 74 | 44 | **118** | 2.6 |
| | Sunday School Canyon | 3,667 | 2 | 60 | 35 | **97** | 2.6 |
| | **TOTAL for CIAA** | **17,461** | **68** | **286** | **169** | **523** | **3.0** |

[1] Wells for this calculation were assumed to be equally distributed in the CIAA.
[2] The Reasonable Foreseeable AUMs were calculated by adding the following columns: Past and Present AUMs lost, RFD AUMs lost, and Total AUM's lost from Project Alternative.

In addition to the loss of AUMs, the development of roads has both adverse and beneficial impacts on livestock grazing activities. Roads would beneficially provide additional access to portions of the grazing allotments that currently do not have access. Livestock are known to use roads as easy access to grazing areas, thus improving livestock distribution to some areas that have been previously inaccessible or under-utilized by livestock. Conversely, increased roads within the CIAA would contribute to difficulties in controlling livestock as more natural barriers to livestock movement are removed, and as more livestock use roads as travel routes. Furthermore, increased road and pipeline ROWs could contribute to changes in water flow, thereby reducing flows to livestock ponds. These past, present, and future construction activities, and other visual and noise impacts in the CIAA could cause livestock to move to

adjacent undisturbed areas, thereby leading to additional livestock impacts on vegetation in those locations. Vegetative recovery, via revegetation efforts, may become increasingly more difficult as grazing animals compete for resources that may become less available due to continued prolonged drought conditions. Interim and final reclamation may reduce adverse effects on livestock resources.

### 5.2.12 RECREATION

The CIAA for recreation is the BPPA. The Project Area includes approximately 90 acres of existing surface disturbance. Disturbances from oil and gas development have reduced the value of the Project Area for recreationists seeking pristine landscapes but have also increased access to the area. Recreation activities on public lands in the winter months generally includes hunting of pronghorn, deer and elk. Throughout the remainder of the year, recreational use can best be classified as dispersed and is generally quite low. The impacts from the Proposed Action and alternatives would incrementally and cumulatively add to the impacts to recreational activities in the Project Area.

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