

#### **4.0 ENVIRONMENTAL IMPACTS**

The potential environmental consequences of construction, drilling, completion, and maintenance activities associated with the Proposed Action and No Action Alternative are discussed for each potentially affected resource. An environmental impact is defined as a change in the quality or quantity of a given resource due to a modification in the existing environment resulting from project-related activities. Impacts can be beneficial or adverse; a primary (direct) result or a secondary (indirect) result of an action; long-term (more than five years) or short-term (less than five years); and can vary in degree from a slightly discernable change to a total change in the environment.

In accordance with CEQ regulation 40 CFR 1502.16, this chapter includes a discussion of the significance of both direct and indirect effects of the Proposed Action and the No Action Alternative. Possible conflicts between the Proposed Action and No Action Alternative and the objectives of the Platte River RMP as well as state and local land use plans and policies are identified if such conflicts exist.

Potential impacts are quantified when possible; however, when impacts are not quantifiable appropriate adjectives are used to best describe the level of impact. Impact assessment assumes that all applicant-committed practices will be successfully implemented. If such measures are not implemented, additional adverse impacts may occur. Additional mitigation measures are suggested if such measures are appropriate, and BLM will decide whether to include such additional measures in the Decision Record. The Decision Record will be the decision document for this proposed project. Each resource discussed in this chapter will include a discussion of the following:

- impacts resulting from implementation of the Proposed Action;
- impacts resulting from the No Action Alternative;
- additional mitigation and monitoring measures;
- unavoidable adverse impacts; and
- cumulative impacts.

In addition, Section 4.5 discusses irreversible and irretrievable commitment of resources and Section 4.6 discusses short-term use of the environment versus long-term productivity.

## **4.1 CULTURAL RESOURCES**

### **4.1.1 The Proposed Action**

As indicated in Section 3.4, Class III cultural resource inventories have been completed on areas that would be disturbed in association construction operations on the proposed Raderville Fm. well locations. Twenty-eight cultural sites were identified in conjunction with these inventories including three sites which were considered as eligible for nomination to the NRHP. The discovery/identification of these three potentially eligible sites resulted in the relocation of the Stone Cabin #31-21 (Muddy Fm.) well location and access road route, relocation of the Stone Cabin #11-27R well location, and the relocation of the access road to the Stone Cabin #13-27R well location in order to avoid any surface disturbance to these three sites. In addition, the access road to the Stone Cabin #1 (Muddy Fm.) well location was also re-routed to avoid impacting two non-eligible cultural sites.

A Class III cultural resources inventory will be completed on all areas that would be disturbed in conjunction with the installation of the gas gathering system (areas not previously inventoried in conjunction with the well pad/access road inventories) and any cultural resources identified would be avoided or mitigated according to standard procedures.

Any unanticipated discoveries of cultural resources made during construction activities would be mitigated according to standard procedures and project personnel would be prohibited from collecting any artifacts or disturbing any significant cultural resources in the area (see Section 2.1.10.2). As a consequence, impacts to cultural resources would likely be negligible to nonexistent.

### **4.1.2 The No Action Alternative**

Under the No Action Alternative, there would be no project-related surface disturbance, and impacts to cultural resources would remain at current levels.

### **4.1.3 Mitigation and Monitoring**

The operator would be responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any archaeological, historical, or vertebrate fossil objects on-site. If archaeological, historical, or vertebrate fossil materials are discovered, the operator would suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations would not resume until written authorization to proceed is issued by the Authorized Officer.

Within five (5) working days, the Authorized Officer would evaluate the discovery and inform the operator of actions that would be necessary to prevent loss of significant cultural or scientific values.

The operator would be responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer would provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator would be allowed to resume operations.

#### **4.1.4 Unavoidable Adverse Impacts**

Some buried cultural resources could inadvertently be disturbed by construction activities.

#### **4.1.5 Cumulative Impacts**

The Class III cultural resource inventories that have been/would be conducted in the project area would add to the knowledge of the distribution of such remains in the area. Because all remains would be avoided or mitigated, no adverse cumulative impacts would occur.

### **4.2 RANGE MANAGEMENT**

#### **4.2.1 General Discussion of Livestock Disturbance**

Potential impacts to the range resource, other than those discussed below, would include the possible displacement of livestock from portions of those grazing leases directly adjacent to roads and well pads as a result of increased level(s) of human activity (including vehicular traffic) and associated noise. The extent of this potential displacement is difficult to predict when one considers that response to noise and human presence varies from species to species as well as among individuals of the same species. In most cases, domestic livestock appear to habituate to noise and human presence after initial exposure, and will utilize areas that are subject to, often, intense human activity (e.g., construction, drilling, and completion activities).

In addition to a possible avoidance response, an increased human presence intensifies the potential for livestock-human interactions ranging from the disturbance of grazing livestock, separation of cow-calf pairs, and accidental traffic-related mortality on area roads. Considering the relatively minimal road network to be constructed in association with the ten Raderville Fm. wells proposed in the WCPA, the generally short duration of intensive field activities (i.e., construction, drilling, and completion operations), combined with the insignificant amount of

daily/weekly production traffic expected within the field, the potential for adverse livestock-human interaction is considered to be minimal. As a consequence, no mitigation is recommended in this regard and these impacts will not be discussed further in this analysis document.

#### **4.2.2 Native Forage (Vegetation)**

##### **4.2.2.1 The Proposed Action**

Impacts to range resources would primarily involve the short-term loss of 77.20 acres of native forage (vegetation) resulting from construction activities associated with the Proposed Action. Based upon an average of 7.37 AUM's for the WCPA, the short-term disturbance of 77.20 acres of native forage would result in a net loss of 10.48 AUM's. Reclamation and subsequent revegetation of those areas not required for production facilities and/or on-going operations would result in a long-term loss of 16.00 acres of native forage, based upon the assumption that 1.68 acres of the well pad, twenty feet of the access road ROW, and all of the pipeline ROW's would be reclaimed and revegetated. Long-term reclamation of these areas would reduce the net loss of AUM's from 10.48 to 2.17, which represents a seventy-nine percent reduction in AUM's lost to the Proposed Action. The loss of 10.48 AUM's over the short-term and 2.17 AUM's over the long-term is not considered as a significant impact to the range resource.

No impacts to range improvements would occur in conjunction with either the Proposed Action or No Action Alternatives.

##### **4.2.2.2 The No Action Alternative**

Under the No Action Alternative impacts to forage (vegetation) would continue at existing levels, and would be affected primarily by weather, grazing, and natural tendency towards a climax stage.

##### **4.2.2.3 Mitigation and Monitoring**

No additional mitigation or monitoring is recommended.

#### 4.2.2.4 Unavoidable Adverse Impacts

The removal of existing native vegetation would result in an increase of invasive non-native species, including noxious weeds, within the project area. Vegetation would be removed on 77.20 acres in the short-term and 16.00 acres in the long-term, and disturbed areas would provide habitat for undesirable plant species (see following Section 4.2.3).

#### 4.2.2.5 Cumulative Impacts

The short-term removal of 77.20 acres of vegetation, and the long-term removal of 16.00 acres of vegetation, would add to the area from which vegetation has already been removed for roads, buildings, oil and gas developments, etc. However, the total area involved in the project is small, and no unique or unusual habitats are involved.

### **4.2.3 Invasive Non-Native Species (Noxious Weeds)**

#### 4.2.3.1 The Proposed Action

BBC would control any invasive non-native species (noxious weeds) on/along road and pipeline ROW's, wellpads, and other applicable facilities (see Section 2.1.10.3). However, invasive non-native species (noxious weeds) not adjacent to project-related facilities would not be treated by BBC.

#### 4.2.3.2 The No Action Alternative

Under the No Action Alternative the status of invasive non-native species would remain the same as occurs today and any alternations in this status would be controlled by factors unrelated to project development. Less invasive non-native species would occur within the project area under this alternative.

#### 4.2.3.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended.

#### 4.2.3.4 Unavoidable Adverse Impacts

No unavoidable adverse impacts would occur.

#### 4.2.3.5 Cumulative Impacts

Because non-native invasive plant species (noxious weeds) would be controlled, it is unlikely that the Proposed Action would have any adverse cumulative impacts. However, any surface disturbance does present an opportunity for the establishment of invasive non-native species.

### **4.3 SOILS**

#### **4.3.1 The Proposed Action**

Removal of native vegetation and disturbance of the underlying soil material as a result of surface disturbing activities associated with the Proposed Action would increase the potential for loss of the existing soil resource through erosion. This potential would increase proportionately as degree of slope increases. Information concerning the acres of disturbance within each individual Soil Mapping Unit (SMU) resulting from road, wellpad and pipeline construction, as well as the sensitivity of each affected SMU, is presented in Table 4.1.

Approximately fifty percent of all surface disturbance associated with the Proposed Action would occur in SMU 209, which exhibits a slight hazard of water erosion and a moderate to severe hazard of wind erosion. An additional twenty percent would occur in SMU 228, which exhibits a severe hazard of water erosion and moderate hazard of wind erosion in the Orella clay loams. The remaining thirty percent of soil disturbance would occur over the balance of the SMU's identified in Table 4.1, with the hazard of water erosion ranging from slight to severe and the hazard of wind erosion ranging from moderate to severe. Notwithstanding the sensitive nature of the soils in the WCPA, the overall disturbance of approximately 77.20 acres of the soil resource is not considered as a significant impact thereto.

In this regard, a detailed analysis of projected soil erosion rates was conducted for the *Cave Gulch-Bullfrog-Waltman Natural Gas Development Project* (BLM 1997). The Modified Soil Loss Equation (MSLE) was used to calculate soil erosion and erosion rates were determined based on general assumptions of conditions and operating procedures for the comparison of alternatives.

**Table 4.1**

**Sensitivity and Acres of Disturbance for Each Individual Soil Mapping Unit Encountered Within the WCPA**

Map Unit	Name of Soil Mapping Unit	Total Acres Disturbed <sup>1</sup>	% of Total	Sensitive Soil
117	Badland	1.31	1.70	Yes
167	Cushman-Forkwood association; 3 to 15% slopes	1.89	2.45	No
188	Forkwood-Zigweid association, sloping; 3 to 15% slopes	3.14	4.07	No
195	Haverdad-Clarkelen complex, saline; 0 to 3% slopes	0.75	0.97	No
209	Keyner-Absted-Slickspots complex, 0 to 6% slopes	37.29	48.30	Yes
227	Orella-Cadoma-Petrie clay loams, 3 to 30% slopes	15.56	20.15	Yes
228	Orella-Rock outcrop complex; 3 to 30% slopes	11.45	14.83	Yes
256	Rock outcrop-Ustic Torriothents, shallow-Rubble land complex; 30 to 100% slopes	5.81	7.53	Yes
<b>TOTALS</b>		<b>77.20</b>	<b>100.00</b>	

Includes estimated surface disturbance for well locations (2.25 acres/location), roads (based upon a 40' total disturbed ROW), and pipelines (based upon ROW widths identified in Table 2.3 and Section 2.1.5)

These values are presented in Table 4.2 (Grah 1997). These calculations suggest that soil erosion could be reduced to significantly with the application of Best Management Practices (BMP). A summary of the estimated erosion which would result from surface disturbing activities associated with/arising from the Proposed Action is provided in Table 4.3.

**Table 4.2**

**Estimated Erosion Rates per Acre of Surface Disturbance Calculated Both With and Without the Application of Best Management Practices in Tons/Acre/Year**

Type of Disturbance	Bare Soil Surface - BMP Not Applied	BMP Applied - Erosion After One Year	BMP Applied - Erosion After Five Years
Individual Well Pads	13.8 tons/acre/year	1.5 tons/acre/year	0.2 tons/acre/year
Gathering Pipelines	73.7 tons/acre/year	1.8 tons/acre/year	0.5 tons/acre/year
Access Roads	5.8 tons/acre/year	2.3 tons/acre/year	0.5 tons/acre/year

Source: Soils, Water, and Vegetation Resources Technical Report. Report prepared for the *Cave Gulch-Bullfrog-Waltman Natural Gas Development Project EIS* (Grah 1997).

**Table 4.3**

**Estimated Erosion Rates With and Without Application of Best Management Practices in the Reclamation of Disturbed Soils in Tons per Year**

Project Facility	Acres	Year 1				Year 5			
		Without BMP		With BMP		Without BMP		With BMP	
		t/ac/yr	t/yr	t/ac/yr	t/yr	t/ac/yr	t/yr	t/ac/yr	t/yr
Well Pads	22.50	13.8	310.50	1.5	33.75	3.1	69.75	0.2	4.50
Access Roads	13.68	5.8	79.34	2.3	31.46	1.5	20.52	0.5	6.84
Gathering Pipelines	37.61	73.7	2,771.86	2.3	86.50	16.4	616.80	0.5	18.81
Compressor Station	3.41	----	----	----	----	----	----	----	----
<b>Totals</b>	<b>77.20</b>	<b>----</b>	<b>3161.70</b>	<b>---</b>	<b>151.71</b>	<b>---</b>	<b>707.07</b>	<b>---</b>	<b>30.15</b>

Legend: t/ac/yr = tons per acre per year  
t/yr = tons per year

NOTE: The figures presented in Table 4.3 are calculated based upon TOTAL initial surface disturbance and do not reflect any reclamation and revegetation of disturbed soils that may be accomplished subsequent to the initial disturbance and should only be used for a comparison of estimated erosion rates based upon application of the BMP versus non-BMP reclamation practices. Moreover, the acres of surface disturbance for the expanded compressor station are provided for reference only – we do not expect that the compressor site will be reclaimed in the long-term nor do we have estimated erosion rates (BMP versus non-BMP) for this particular type of soil disturbance.

Implementation of BMP for reclamation and erosion control would result in a ninety-five percent reduction in erosion in the first year and a ninety-six percent reduction in erosion by the fifth year, with implementation of BMP resulting in an overall ninety-nine percent reduction in erosion after five years. These calculations suggest that soil erosion resulting from the Proposed Action could be significantly reduced with the application of BMP for reclamation and stabilization of disturbed soils - particularly where sensitive soils are involved as is the case in the WCPA.

**4.3.2 The No Action Alternative**

Under the No Action Alternative there would be no project-related disturbance of soils and soils would remain in their current state.

### **4.3.3 Mitigation and Monitoring**

In order to minimize the overall impact to soil resources within the WCPA which could result from the Proposed Action, the following mitigation measures are recommended.

- In order to protect sensitive soils, no occupancy or surface disturbance should be allowed on slopes in excess of 25%.
- All available topsoil (e.g., 6 to 12 inches) should be removed (stripped) from the areas of new construction and stockpiled for future reclamation of these disturbed areas. This stored topsoil, as well as cut and fill slopes on the well pad, should be secured from erosion through mulching and temporary revegetation (hydroseeding) if reclamation is not anticipated within one (1) year following initial construction.
- Unused areas (borrow ditch) along the proposed access road route(s) which would be denuded of existing vegetation during initial construction should be reseeded in order to re-establish vegetative cover and reduce the overall potential for erosion and off-site sedimentation.
- Construction and/or surface disturbing activities would be prohibited during periods when the soil material is saturated, frozen, or when watershed damage is likely to occur.

### **4.3.4 Unavoidable Adverse Impacts**

Some very small amount of soils would move off disturbed areas; however, such movement would likely cease once the soils reach undisturbed areas.

### **4.3.5 Cumulative Impacts**

Cumulative impacts to soils would be negligible based on efforts to prevent soil movement.

## **4.4 WILDLIFE**

### **4.4.1 The Proposed Action**

Impacts on local wildlife populations would result from direct removal or alteration of habitat, increased human presence associated with additional oil/gas exploration and development

activity, and direct wildlife/human interaction. Activities associated with additional exploration and/or development activity within the WCPA would temporarily eliminate approximately 77.20 acres of wildlife habitat, consisting mostly of shrubs, grasses and forbs. This would result in a proportionate reduction in the amount of herbaceous and browse forage available to herbivorous species such as antelope and mule deer, as well as a reduction in nesting, feeding and security habitat for game birds (e.g., sage grouse) and those smaller vertebrate species that may inhabit the affected areas. These habitat losses can generally be classified as being either short-term or long-term in duration, with these terms defined below.

- Short-term loss refers to disturbances that would be reclaimed immediately after exploration and/or development activities are completed. Loss or alteration of habitats in grass-shrub meadows and/or on grassy slopes would be considered short-term and are expected to occur in conjunction with lease development.
- Long-term loss would occur in areas that could not be returned to their original vegetative state within a reasonable period of time (three to five years), such as producing well sites and access roads.

In this regard, the removal of 77.20 acres of wildlife habitat in the short-term and 16.00 acres in the long-term would have a negligible impact on wildlife populations because of the small area(s) affected and the relative availability of similar, undisturbed habitats in directly adjacent areas. Once the Wallace Creek project ends, these affected habitats would return to pre-project conditions.

#### 4.4.1.1 Big Game Species

A majority of the WCPA falls within crucial winter/yearlong habitat for both pronghorn antelope and mule deer (refer to Figure 3.1). Of the ten wells proposed in conjunction with this project, only the Wallace Creek Unit #43-15R falls outside of the crucial winter/year long habitat identified in Figure 3.1. Consequently, impacts to big game species would most likely occur from increased human presence in the project area during the winter and early spring associated with construction and/or drilling activities. Likewise, workover/recompletion activities scheduled during the winter months when big game animals are most susceptible to stress-related mortality could have an adverse impact on those animals wintering in the WCPA by displacing them from preferred habitats to less than optimal habitats.

#### 4.4.1.2 Raptor Species

As indicated in Table 3.5, there are approximately twenty raptor nests known to exist either within or directly adjacent to the WCPA, two of which were active in 2003.

Surface disturbance and concomitant human intrusion(s) associated with additional oil/gas exploration and development activity within the WCPA could have a negative effect upon raptor breeding and/or nesting activities within the overall project area if these activities were allowed to proceed during the breeding/nesting season. Likewise workover/recompletion activities proposed during critical time periods in the breeding/nesting cycle could result in aborted breeding activity and/or nest abandonment.

#### **4.4.2 The No Action Alternative**

Under the No Action Alternative impacts to wildlife and raptor populations in the area would continue at existing levels, and would be affected primarily by weather, grazing, and natural tendency towards a climax stage.

#### **4.4.3 Mitigation and Monitoring**

The following mitigation measures are recommended to minimize impacts to wildlife resulting from additional oil/gas exploration and development activity within the WCPA.

- To protect wintering wildlife on crucial winter ranges, drilling and/or surface use will not be allowed during the period from November 15 to April 30.
- If unusual maintenance is proposed within crucial big game winter range between November 15 and April 30, the operator must contact the BLM Authorized Officer for prior approval of operations or maintenance which would be “unusual”. “Unusual” means extensive or significant operations, such as workover operations or other operations, which include loud noise or night-time activity. Emergency (safety) situations would not be restricted.
- To protect important raptor nesting habitat, drilling and/or surface use will not be allowed within 0.25 to 0.50 mile of occupied raptor nests during the period from February 1 to July 31.
- If unusual maintenance is proposed within 0.25 to 0.50 mile of an occupied nest between March 1 and June 15, the operator must contact the BLM Authorized Officer for prior approval of operations or maintenance which would be “unusual”. “Unusual” means extensive or significant operations, such as workover operations or other operations, which include loud noise or night-time activity. Emergency (safety) situations would not be restricted.
- Casual use activities away from existing roads and facilities that are scheduled to occur between March 1 and mid-June should be coordinated with the BLM in order to

minimize or avoid potential impacts to nesting raptors in the area. Casual uses include, but are not limited to, ground activities such as: (1) preliminary scouting of routes or sites, (2) land surveying and staking, and (3) cultural and wildlife surveys. Because casual use is generally not treated as a managed or permitted activity, there is a potential for causing impacts to nesting raptors.

#### **4.4.4 Unavoidable Adverse Impacts**

Some small mammals could be killed during construction or by collisions with vehicles during production, and a small amount of wildlife habitat would be removed for the life of the project.

#### **4.4.5 Cumulative Impacts**

The 77.20 acres of short-term and 16.00 acres of long-term removal of wildlife habitat would add to the amount of habitat that has been removed from production for various purposes. However, the small amount of habitat that would be removed would have minimal impacts on wildlife populations, and once the project was completed the project area would revert to its current state.

### **4.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

The primary irreversible and irretrievable commitment of resources resulting from the Proposed Action would be the removal of the hydrocarbon resource. Other such resource commitments would include any soils lost through wind and water erosion; inadvertent/accidental destruction of cultural resources; loss of animals due to earthmoving activities or by collisions with vehicles; and energy expended during project activities.

### **4.6 SHORT-TERM USE OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY**

Short-term use of the environment during the life of the project would not detract from long-term productivity of the area. Even during the life of the project, only the small areas from which vegetation is removed would be unavailable for grazing and wildlife habitat. Once the project is completed and disturbed areas are reclaimed the same resources that were available prior to the project would be available again, except for the hydrocarbons that were extracted. It may take up to twenty-five years to regenerate shrubs comparable to those present prior to project initiation, but reclamation would provide conditions to support wildlife and livestock grazing.