Devon Bairoil to Beaver Creek CO2 Pipeline Project
Environmental Assessment

BLM Right-of-Way #WYW167970

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Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CO_2	Carbon dioxide
CRW	Crucial Winter Range
DOE	Department of Energy
DV	Deciview
EA	Environmental Assessment
EI	Environmental Inspector
EOR	Enhanced Oil Recovery
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FPSP	Fire Prevention and Suppression Plan
GVW	Gross Vehicle Weight
HMA	Herd Management Area
IMPROVE	Inter-Agency Monitoring of Protected Visual Environments
LRMP	Lander Resource Management Plan
MMScfd	Million Standard Cubic Feet Per Day
MSDS	Material Safety Data Sheet
NAA	No-Action Alternative
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OOIP	Original-Oil-In-Place
OSLI	Office of State Lands and Investments
PA	Proposed Action
PLS	Pure Live Seed
POD	Plan of Development
RMP	Resource Management Plan
ROW	Right-of-Way
SEO	State Engineer's Office
SHPO	State Historic Preservation Office
SPCC	Spill Prevention, Control, and Countermeasure
Tscf	Trillion Standard Cubic Feet
TUA	Temporary Use Area
USACOE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Standards
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department

Table of Contents

1.0 Purpose of and Need for Action....5
1.1 Purpose and Need....5
1.2 Location....5
1.3 Plan Compliance....7
1.4 Scoping....7
1.5 Required federal, state, local permits, licenses, and other consultation requirements....8
2.0 Alternatives....9
2.1 Alternatives Retained for Analysis....9
2.1.1 Alternative A: No Action....9
2.1.2 Alternative B: Northern Gas Line Route....9
2.1.3 Alternative C: Proposed Action....11
2.1.4 Range of Alternatives Considered and Summary Comparison of Environmental Consequences 31
2.2 Alternatives Considered but Not Further Analyzed....32
2.2.1 Alternative Route: Option 2....32
2.2.2 Alternative Route: Option 3....32
2.2.3 Alternative Route: Option 4....32
2.2.4 Alternative Route: Jeffrey City Bypass....32
3.0 Affected Environment and Environmental Consequences....32
3.1 Cultural Resources....34
3.2 Wildlife Resources and Wild Horses....39
3.3 Soils and Vegetation....44
3.4 Floodplains and Riparian/Wetland Zones....49
3.5 Climate and Air Quality....52
3.5.1 Climate....52
3.5.2 Air Quality....52
3.6 Visual Resources....59
3.7 Socioeconomic and Noise Issues....61
3.8 Recreation....63
4.0 Mitigation Measures....67
5.0 List of Preparers....74
5.1 EA Preparers....74
5.2 Coordination....74
6.0 References....75
7.0 Appendices....77

1.0 Purpose of and Need for Action

1.1 Purpose and Need

As an oilfield ages, the natural oil reservoir pressure declines, thus, pumping becomes less efficient. To recover some of the remaining oil, it becomes necessary to employ enhanced methods of oil recovery such as waterflooding. Waterflooding consists of injecting water into wells and forcing it into the oil reservoir. As the water spreads out from the site of injection, it pushes some of the remaining oil towards producing wells. Waterflooding is relatively inexpensive to employ, is effective in displacing oil and increasing the pressure in the reservoir, and increases oil recovery from 15% to approximately 25%. Even after these secondary methods have been completed, 60% of the original oil is left in the ground.

At this point, other tertiary or enhanced recovery methods become necessary to liberate some of the remaining reserves. The CO_2 flooding technique is similar to waterflooding except that the CO2 gas acts as a solvent to reduce the viscosity of oil, rendering it more mobile, while maintaining pressure in the reservoir. According to the Department of Energy (DOE), enhanced oil recovery (EOR) with CO_2 could add 89 billion barrels to the recoverable oil resources of the United States (2006 Techline). Consequently, this project will access known reserves and supply the growing national need for domestic energy supplies.

Wyoming, a state that is largely dependent on the energy industry, can benefit from the development of CO_2 for enhanced oil recovery because:

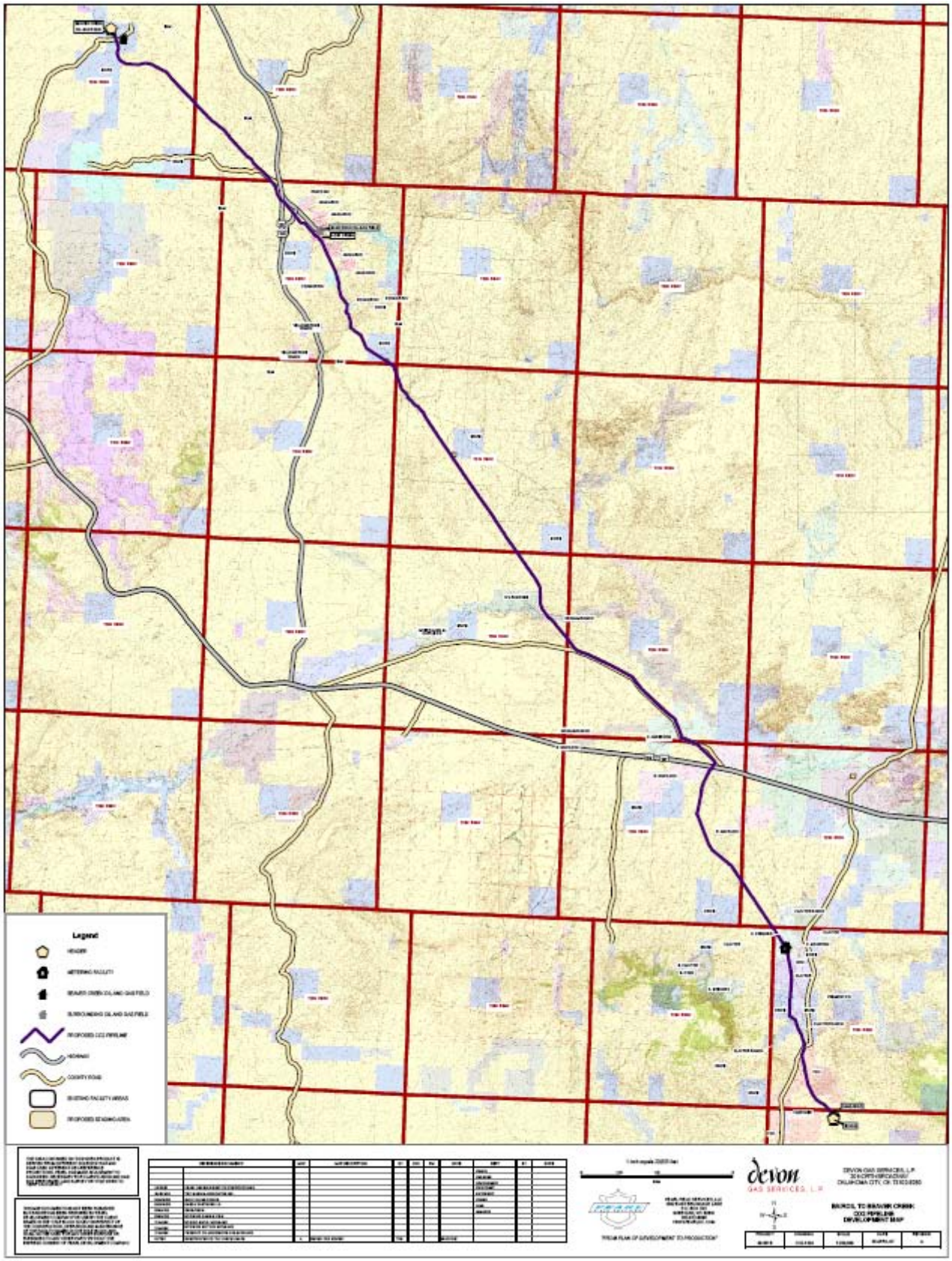
- Wyoming has vast CO_2 reserves, including the Greater Big Piney-LaBarge region and the Madden Field. These two reserves contain approximately 150 trillion standard cubic feet (Tscf) of CO_2, which is enough to potentially produce 21 billion barrels of recoverable oil.(Ogg, 2006)
- Wyoming is continuing to develop a large pipeline infrastructure that would make transportation of CO_2 safe and more efficient.
- There are many depleted oil reservoirs that are prime candidates for EOR. (Ogg, 2006)

Human-activity related greenhouse gas emissions are thought to be at least partially responsible for the increase in the earth's near-surface air and ocean average temperatures, resulting in a phenomenon that has been coined "global warming." The source of the CO_2 for Devon Gas Services, LP (Devon) is the Shute Creek natural gas facility. The gasses that are recovered from Shute Creek have a large amount of CO_2 that is captured for use or vented to the atmosphere. Therefore, in addition to utilizing CO2 to rejuvenate Wyoming's oil industry, this economical and readily available gas can be accumulated and injected rather than vented, which removes the Shute Creek vented gas from the global warming controversy (2004 Program Facts). Additionally, the Department of Energy reports that " the combination of rising [oil] consumption, the continued effects of production cuts by members of the Organization of Petroleum Exporting Countries (OPEC), and only modest increases in non-OPEC production have pulled commercial oil inventories down from their highest levels since 1998." Amid tensions between oil-producing and oil-consuming countries and hurricane concerns, this tightening of the world oil balance continues to put upward pressure on oil prices. This tight world oil supply/demand balance makes developing reserves on U.S. soil much more attractive. The proposed project would enhance oil recovery and provide the U.S. with increased petroleum to meet the oil supply and demand.

1.2 Location

The proposed pipeline would begin at the existing ExxonMobil connection in Baroil in the NWNW of Section 4, T27N, R92W in Fremont County. The pipeline would extend northwest approximately 2 miles where it would then parallel the Lost Creek Gathering pipeline, continuing north approximately 4 miles to the SWSE of Section 6, T28N, R92W. It then deviates from the Lost Creek line and continues northwest approximately 8 miles where it would be bored under Highway 287 and again travel parallel to the Lost Creek line, continuing northwest the remaining 34 miles to the Beaver Creek Oil Field (F*ig. 1.1*).

Figure 1.1 Proposed Action Route



1.3 Plan Compliance

The Lander Resource Management Plan (RMP) is the primary document directing the use of BLM public lands and resources in the project area. Specifically, the project area is contained within the Green Mountain and Beaver Creek Management Units of the RMP. The RMP states that "public lands would be made available for oil and gas leasing and development to the maximum extent possible, while giving due consideration to the protection of other significant resource values (USDI 1987 p.1)."

The project has been reviewed by the Army Corp of Engineers to ensure concurrence of coverage under Nationwide Permit 12.

1.4 Scoping

A scoping notice was published by the *Lander Journal* and the *Casper Star Tribune* on February 26, 2007. The notice included a brief description of the project and provided BLM contact information for public comments.

Three comments (letters and e-mail correspondence) were received by the BLM during the scoping period and are part of the analysis file.

1.4.1 Identified Issues

Scoping identified the following relevant issues that were used to develop and analyze the active alternatives. The issues were deemed relevant because 1) It is within the scope of the purpose and need 2) It suggests different actions, thus suggests different alternatives 3) It influences the decision.

Issue: Environmentally Sensitive Areas May be Disturbed by the Pipeline

Devon has addressed this issue by incorporating concerns into the engineering designs and by applying mitigation measures.

1.5 Required federal, state, local permits, licenses, and other consultation requirements.

The project was reviewed to ensure compliance with applicable rules and regulations (Table 1.1).

Table 1.1: Devon CO_2 Pipeline Required Permits, Approvals, and Reviews Required for Construction

Type of Permit	Location	Agency	Permit Needed By:
ROWs and temporary use permits (TUAs)	Entire pipeline route	BLM/OSLI	Before construction
Materials sales contracts	All BLM land	BLM	Before construction
Pesticide use proposal approval	All BLM land	BLM	Before pesticides are used
Endangered Species Act Section 7 consultation process for endangered or threatened species	Entire pipeline route	US Fish and Wildlife Service (USFWS)	Before construction
Section 106 of the National Historic Preservation Act review compliance activities as defined in the MOA	Entire pipeline route	State Historic Preservation Office (SHPO), BLM	Before construction and onsite in the event of a discovery
National Pollution Discharge Elimination System permit for discharges (storm water discharges during construction)	Entire pipeline route	Wyoming Department of Environmental Quality – Water Quality Division	Before construction
National Pollution Discharge Elimination System permit for discharges (hydrostatic water discharge)	All discharge points	Wyoming Department of Environmental Quality – Water Quality Division	Before construction
Permits for oversize and overweight loads	Wyoming highways	Wyoming Highway Department	As needed
Encroachment permits	Wyoming highways	Wyoming Highway Department	As needed
Easements to cross state lands	All state lands	Office of State Lands and Investments (OSLI)	Before construction
Permits to appropriate water for dust control and other uses	Entire pipeline route	Wyoming State Engineer's Office (SEO)	Before construction
Road crossing permits and licenses	County road crossings	Fremont County Commissioners	Before construction
Land use permits and licenses	Where applicable	Fremont County Commissioners	Before construction
Permit for temporary sanitation facilities	Where needed along pipeline route	Fremont County Health Department	Before construction
National Historic Preservation Act Section 106 Analysis	48FR4442, located in the SWSW of Section 18, T30N, R93W	BLM, Advisory Council on Historic Preservation, State Historic Preservation Office (SHPO)	Before construction

2.0 Alternatives

This EA contains three alternatives: 1) a No-Action alternative, 2) Alternative B: Following an older pipeline ROW (the Northern Gas Line Route Alternative), and 3) Alternative C: Following the Lost Creek Gathering Pipeline ROW (the Proposed Action). Alternatives were developed by taking into consideration the length of the pipeline and the associated surface disturbance, access points that were already in place and wouldn't require improvements, plans and timelines to avoid hindering wildlife activities in the area, routes that would be mitigated with the least amount of environmental disturbance, and public scoping. Alternatives selected for analysis were evaluated based on their associated environmental impacts, costs, public scoping, and safety issues.

2.1 Alternatives Retained for Analysis

2.1.1 Alternative A: No Action

The 'No Action' alternative provides a baseline for the comparison of the alternatives. This alternative describes the existing condition and the continuing trends. If this alternative were selected, the Devon CO_2 pipeline would not be constructed and therefore, the needs described within chapter one would not be met by this project. There would be no additional surface disturbance, no additional interference with wildlife, and no additional impacts from construction activities to either the natural or human environment.

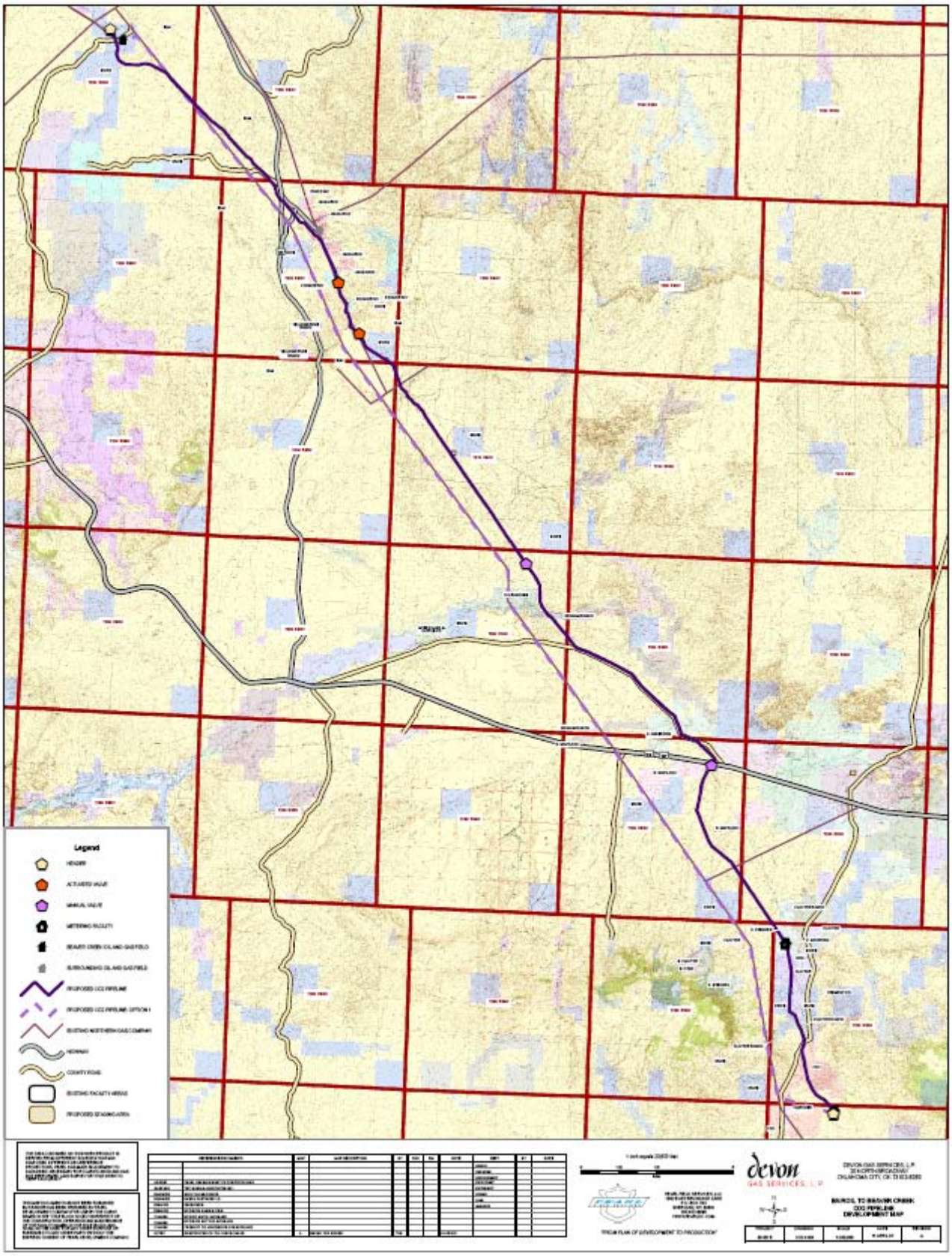
2.1.2 Alternative B: Northern Gas Line Route

This alternative was initially identified by Devon because it would parallel an existing gas pipeline. The Northern Gas pipeline ROW is located approximately one mile south of the Proposed Action route (Fig. 2.1) and follows roughly the same course and covers the same distance.

The Northern Gas Line route would result in approximately the same amount of disturbance as the Proposed Action. However, since the disturbance associated with this alternative route is older and the vegetation has been re-established, it would not be preferred to disturb established thriving vegetation. The BLM preferred that Devon develop an alternative that followed a route that was more recently disturbed.

As Devon would employ the same construction practices and environmental protection measures as in the PA, the impact analysis for the Northern Gas Line route is similar to the Proposed Action (PA).

Figure 2.1 Alternative B: Northern Gas Line Route



2.1.3 Alternative C: Proposed Action

Devon proposes to construct and operate a 47-mile, 8-inch buried CO_2 pipeline. The pipeline would be constructed within a 100-foot wide graded construction ROW that would allow safe passage of equipment and adequate storage for graded topsoil and excavated trench spoil. A 50-foot permanent ROW is being requested from the BLM, the state, and private landowners. The overall disturbance is approximately 570 acres (Table 2.6). The proposed action would overlap portions of an existing right-of-way disturbance. The pipeline transports CO_2 as a dense-phase fluid (achieved by manipulating pressure and temperature to force CO_2 gas into a supercritical fluid) for purposes of enhanced oil recovery (EOR) from the ExxonMobil Shute Creek-LaBarge facility to the Baroil metering facility located in Section 4, T27N R92W. From there, the proposed CO_2 pipeline would extend north from Baroil to the Beaver Creek Oil Field located south of Riverton, Wyoming.

Discussion of the construction and operation of the proposed pipeline and supporting facilities follows. Additional description of the construction and operation of the proposed pipeline can be found in the accompanying POD.

2.1.3.1 Description of Pipeline Components

Major components of the Devon CO_2 pipeline project include:

- The CO_2 Pipeline;
- Launchers/Receivers and Block Valves; and
- CO_2 Metering Facilities

All facilities in the system would be designed, constructed, operated, and maintained in accordance with the DOT Title 49 CFR Part 195, Transportation of Hazardous Liquids by Pipeline, and American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME) B31.4, *Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids.*

2.1.3.1.1 CO_2 Pipeline

The proposed route would parallel or cross at least fifteen other pipelines and at least five roads for approximately 43.3 miles or 92% of the total pipeline length. The proposed pipeline would traverse private, state, and federal lands. Approximately 18% of the route would be on private lands, 7% on state lands, and 75% on federal lands. An overview of the pipeline route is presented in *Figure 1.1*. Route maps are provided in Appendix C of the POD.

Initially, approximately 30 million standard cubic feet per day (MMscfd) of CO_2 would be transported through the buried pipeline. Pipeline route markers would be installed at road crossings, water crossings, property boundaries, and other pipeline crossings in locations where such markers would not interfere with existing land uses. Aerial markers would be installed at intervals along the route and at turning points, where possible, to facilitate periodic aerial patrol of the pipeline.

Pipe would be delivered to the construction site as it is needed.

As indicated in the Project's POD, during construction, access to the pipeline and related facilities would be provided by existing improved and two-track roads and along the ROW itself. To protect the public, wildlife, and livestock from hazards, traffic would be regulated by:

- Maintaining a speed limit
- Prohibiting vehicle and equipment traffic when soil moisture is high and could result in damage to soil or vegetation
- Prohibiting access to the ROW and construction site by erecting temporary fences
- Prohibiting off-road driving
- Installing appropriate traffic safety signs when construction would be within 20 feet of any road, at all equipment crossings of improved roads, and during times of high-volume of construction traffic.

2.1.3.1.2 Launchers/Receivers and Block Valves

PIGs, or pipeline inspection gauges, are tools sent down pipelines to clean the line or inspect the walls. Each pipeline generally has a launcher (the point at which the PIG is introduced to the pipeline) and a receiver (the point at which the PIG exits the pipeline).

A launcher would be installed at the Baroil metering facility and a receiver would be installed at the Beaver Creek facility. Block valves (on/off valves) would be installed at four (4) locations along the pipeline. Each receiver/launcher and block valve area would be graveled and enclosed using a chain link fence. Access would be year-round. Block valves will not be located in designated habitats such as sage grouse leks, mountain plover habitat, prairie dog towns or sensitive plant communities to prevent the structures from being used as perches for raptors and to minimize disturbance in these areas.

2.1.3.1.3 CO_2 Metering Facilities and Supervisory Control Data Acquisition (SCADA) System

A CO_2 delivery meter terminal would be built at the Baroil tie-in and the receipt meter terminal would be built at the Beaver Creek facility. Each metering facility would be constructed on a 1.5-acre site, and the area would be graveled and enclosed with a chain-link security fence to prevent access by cattle and people. The site would consist of a meter building, launcher/receiver, flow control valve, communications and satellite dish, CO_2 vent, and an electric service pole with a pad-mounted transformer. The meter building would contain a control room, metering facilities, and a 5-ton crane. The control room would contain equipment for local and remote operation of the system. Access would be year-round.

2.1.3.2 Pipeline Construction

The pipeline would be laid in a continuous operation and scheduled around the BLM wildlife stipulations. Four staging areas outside the right-of-way have been selected and approved for equipment storage, washing, fueling, and service. These staging areas (Table 2.1) have been located to minimize travel along the right-of-way as construction advances Construction would be expected to progress at an average rate of approximately 2,200 feet per day. However, given construction stipulations, possible adverse weather conditions, and potential equipment and delivery problems, it is possible that construction of segments of the pipeline may not be complete for 8-10 months.

Table 2.1: Staging Areas

Size (acres)	Location	Legal Description	Description	Reason
14.2	Jeffrey City	NESW, Sec. 3, T29N, R92W	Reclaimed gravel pit. Flat.	Equipment and vehicle storage/washing/fueling/servicing hazardous materials storage
9.57	State Section	SWSW, Sec. 16, T31N, R94W	Hilly topography. Would require some dirt work to level.	Equipment and vehicle storage/washing/fueling/servicing
7.89	State Section	SWSE, Sec. 36, T32N, R95W	Level topography.	Equipment and vehicle storage/washing/fueling/servicing
10.0	State Section – Beaver Creek Facility	SESW, Sec. 10, T33N, R96W	Level topography.	Equipment and vehicle storage/washing/fueling/servicing

Construction workers would live in permanent or rented residences, local motels, and personal trailers or pickup campers off site. Car pools, privately owned vehicles, and buses would be used to transport workers to the construction site.

If utilized, temporary headquarters would consist of an office trailer, a portable toilet, one or more warehouse trailers (or suitable rented space, if available), and storage for pipeline materials and construction equipment. Since the headquarters would be temporary and mobile, there would be no need to drill a water well or add other, more permanent, infrastructure. The facility would be located at the Jeffrey City or Beaver Creek Oil Field staging area and therefore will not impact the project.

The pipe and equipment would be shipped, as needed, to established staging areas and the ROW via truck. Approximately 2,266 tons of 8-inch pipe and associated materials including fittings, shrink sleeves, rebar, concrete, and crack arrestors would be required for the project. Distribution to construction sites would require an average of 5-6 truckloads of pipe per day during the period of peak activity and daily access by workers. Construction equipment (Table 2.2) would be kept within the ROW during construction operations (parked on the working side of the ROW) and at approved staging areas to avoid any additional disturbance. Pipe and equipment would be hauled to the construction site using various U.S. and state highways, county roads, private roads, and access roads to existing easements and ROW.

Table 2.2: Equipment Required for Construction of the Proposed Pipeline		
Equipment	**Approximate Weight (each, in lbs.)**	**# Required Per Crew**
D-8 Dozer with ripper	56,000	6
D-7 Dozer with winch and angle blade	35,000	1
572 Sideboom	67,000	7
Backhoe (3/4 yard)	21,000	3
Ditching machine	70,000	2
Track hoe	77,500	6
Motor grader	41,400	3
Motor crane	55,000	1
Bending machine	8,000	1
Boring machine	22,000	1
Air compressor	3,000	2
Flatbed truck	28,000	15
Pickup	9,000	20
Stringing truck	28,000	8
Skid truck	12,000	1
Dump truck	16,000	1
Tractor with lowboy	28,000	2
Mechanic's truck	16,000	1
Fuel truck	15,000	1
Water truck with sprinkler	15,000	2
Office trailer	10,000	1
Welding machines (200 amp, tractor-mounted)	1,500	4
Welders' trucks (1-ton)	10,000	20
Tractor (reclamation)	10,000	2-4
Disc ploughs (reclamation)	1,500	2-4
Chisel ploughs (reclamation)	1,500	2-4
Reseeding equipment (reclamation)	2,000	2-4

There are fifteen existing access roads, including county and state roads, which intersect and parallel the proposed pipeline ROW and that can be used in their present condition for pipeline construction (Table 2.3). Of these, fourteen are heavy-duty roads capable of handling traffic consisting of large trucks (greater than 21,000 pound gross vehicle weight-GVW), equipment (Table 2.2) and one road is a light-duty road capable of use by ¾- ton trucks or less. Per BLM Manual 9113, signs and markers placed on or adjacent to the roadway to regulate, inform, or guide vehicle and equipment occupants must conform to the requirements of Manual Section 9131 and the Federal Highway Administration's Manual of Uniform Traffic Control Devices.

Table 2.3: Access Roads					
Location	**Description**	**Road Use Weight**	**Road Access Frequency**	**Ownership**	**Length of road to be Used (miles)**
South from Jeffrey City	County Road 318	Heavy*	Daily+	County	8.4
Mine road from County 318 to Bairoil tie-in	Gravel	Heavy	Daily	BLM/Private	2.9
Sec. 29 and 32, T28N, R92W; Sec. 4, T27N, R92W	Gravel	Heavy	Daily	BLM/Private	2.9
Jeffrey City to Sweetwater Junction	Highway 287	Heavy	Daily	U.S.	19
Sec. 11 and 14, T29N, R93W	Two-track	Light	Daily	BLM/Private	1.7
T30N, R93-95W	Graham Ranch Road (County 233)	Heavy	Daily	County	15.5
Beaver Creek Road to Sweetwater Junction	Highway 135	Heavy	Daily	State	25.8
Hwy. 135 to Sec. 32, T32N, R94W (Findlay Lake)	BLM Cedar Rim Road (gravel)	Heavy	Daily	BLM	7.0
Findlay Lake To PR Staging Area Sec. 36, T32N, R95W	Two-Track	Heavy	Daily	BLM/State	2.2
Findlay Lake To Sec. 35, T32N, R95W (AV 1)	Two-Track	Heavy	Daily	BLM	4.5
Sand Draw Facilities To Sec. 23, T32N, R95W	Gravel Road	Heavy	Daily	BLM/Private	2.9
Hwy. 135 To Sand Draw Facilities (Hwy. 139)	Paved Road	Heavy	Daily	BLM/Private	1.7
Hwy. 135 To Sec. 33, T33N, R95W (Cty. Rd 525/238)	County Road	Heavy	Daily	County	0.8
Beaver Creek Facility To Sec. 14, T33N, R96W	Gravel Road	Heavy	Daily	BLM/State	1.7
Beaver Creek Facility	Gravel Road	Heavy	Daily	State	0.8

*Heavy = vehicle 21,000 pounds or greater

+ Daily = multiple trips for light vehicles (less than 21,000 pounds), one round-trip per day for heavy vehicles

Policies governing the use of access roads would be developed by Devon and followed by all contractors. Prior to construction, company and contractor employees would be instructed to use only designated access roads and the ROW for access. All off-road driving, other than on the ROW, would be prohibited. Signs would be installed on approved access sites and would also be used to identify roads where access is prohibited. As stipulated in the ROW grant, Devon would hold a pre-construction meeting with its key personnel and the BLM to ensure that road standards are being adhered to on BLM-administered lands.

Temporary Use Areas (TUAs) would be required for the special construction areas. "Temporary use" refers to those areas that are outside of the ROW and would be used for only a short period of time. In the case of the PA, TUAs would be used for soil storage and work space. The locations and estimated disturbance areas for the TUAs are provided in *Table 2.4*. In calculating the disturbance, the permanent (50 feet) and temporary (100 feet) ROW width was subtracted from the total TUA width to avoid duplication, since the pipeline disturbance area already accounts for the 50-foot permanent ROW width. Staging areas that would be used for servicing and washing vehicles and equipment would be located on state or private lands.

During construction of the pipeline, Devon would comply with existing federal, state, county, and private requirements developed to protect road networks. Load limit restrictions would be observed at all times to prevent damage to the road surface. As necessary, special arrangements would be made with the Wyoming Highway Department and county governments to transport oversized and heavy loads.

2.1.3.2.1 Right-of-Way Clearing and Grading

Clearing and grading of work areas within the construction ROW and TUAs is necessary to create work areas that would allow for the efficient installation of the pipeline. Clearing and grading would be allowed in only 30 feet of the 100-foot ROW width in wetlands and designated sage grouse habitat to minimize disturbance.

Topsoil would be segregated from the subsoil in an effort to ensure the success of the reclamation of the pipeline corridor. Unless otherwise specified by the BLM's Authorized Officer, the topsoil would be salvaged and stockpiled within the seventy-five feet ROW. The TUAs would be used for topsoil salvage and stockpiling during boring operations. Travel and equipment storage would only be permitted where topsoil has been stripped from the ROW.

The topography following the pipeline route is flat or moderately undulating, generally devoid of steep or sidehill slopes. The exception to this is the Beaver Rim; construction techniques for the area are covered in Section 2.3.3.2.4 *Special Construction Areas.* If it becomes necessary to avoid areas of difficult construction or areas that include sensitive resources such as archeological, nesting or brooding, or sensitive plant sites, the authorized ROW is wide enough to maintain the work area and soil/spoil storage areas.

Use of all livestock facilities and other public improvements would be maintained at all times.

Table 2.4: Summary of Construction Temporary Use Areas					
Description/Location	**Temporary Use Areas**				
	Milepost Marker (MP)	Width (ft) each side of bore	Length (ft) each side of bore	Area (ft^2) each side of bore	Additional Total Acres of Disturbance
Road and Wetland Bores					
Mine Road 1	0.09	50	50	2500	.24
Mine Road 2	2.14	50	50	2500	.24
County Road 318	2.72	50	50	2500	.24
Crook's Creek	2.31	50	50	2500	.24
Highway 287	13.17	50	50	2500	.24
County Road 233 (Graham Ranch Road)	14.16	50	50	2500	.24
Ice Slough	14.95	75	75	5625	.52
Sweetwater River	20.90	75	75	5625	.52
Beaver Rim	32.70	50	50	2500	.12
Highway 135	37.73	50	50	2500	.24
County Road 525 (Sand Draw)	38.64	50	50	2500	.24
County Road 524	45.9	50	50	2500	.24

Note: Area of TUA represents amount that is outside the ROW width. ROW area is accounted for in the pipeline disturbance area.

2.1.3.2.2 Right-of-Way Trenching

The pipeline trench would be excavated using rotary trenching equipment where the topography is gentle with deep soils. In more difficult construction areas, traditional tracked backhoes and excavators would be used. At all times, the equipment would operate within the approved ROW to avoid additional disturbance.

The trench would be excavated to a depth of approximately 5 feet, a depth sufficient to provide a minimum of 48 inches of cover over the backfilled line and meet the minimal requirements for outside trench padding material. The exception to the 48-inch minimum cover rule applies to most roadways and water crossings. In those instances, a minimum of 60" of cover over the top of the pipe is required. All highway crossings must have a minimum of 10 feet of cover. The top-trench width would be 24-36 inches where soil stability allows.

It would be necessary for trenches to be open for several days at a time until the pipe is placed and backfilled. The BLM will allow 10 miles of open trench with the understanding that escape ramps or soft plugs would be installed every ¼ mile, or at noticeable trails, to allow wildlife and domestic stock to escape the trench.

2.1.3.2.3 Pipeline Installation

Each step of the installation is described below and would be coordinated with the advance of the trenching and pipe-laying crews to minimize the length of time the trench is left open and to minimize the crowding by crews on specific tracts of land.

Stringing: Stringing is a method of pipeline delivery that involves trucking the pipe from the pipe supplier to designated locations along the ROW prior to bending, line-up, and welding. Sufficient pipe would be stockpiled in the vicinity of stream and road crossings but pipe may also be strung in other areas and moved to where it is needed.

Bending: After stringing is completed along a section of pipe, a hydraulic bending machine would field-bend each pipe to conform to vertical and horizontal changes in the trench. If a required bend exceeds certain design criteria, factory-bent segments may be required.

Welding: After the pipe segments are bent, they would be welded together in conformance with DOT Title 49 CFR Part 195, Subpart E, *"Welding of Steel Pipelines"* and the latest edition of API 1104, *Standard for Welding Pipelines and Related Facilities.* The pipeline would then be mounted on supports as a continuous line along the side of the trench.

X-ray/Inspection: A certified welding inspector would visually inspect each weld and 100% of the welds would be x-rayed in the field to detect flaws that could lead to pipeline failure. All welds of pre-fabricated assemblies and welds at road and stream crossings would be x-rayed.

Lowering: Sideboom tractors would then lower the pipeline into the open trench. Before backfilling, the trench and pipeline would be inspected to ensure that 1) the trench is deep enough to comply with minimum cover requirements; 2) the bottom of the trench is free of large rocks, tree limbs, large roots, and other debris; 3) the pipe bends adequately conform to the trench; and 4) the external coating on the pipe has not been damaged. If the trench line is located in rock, soil padding, and rock shield would be used to protect the pipeline from damage when it is lowered. Devon anticipates a minimal need for outside padding materials within the trench.

Hydrostatic Testing and Commissioning: After the pipe is placed in the trench, the line would be pressure tested with water for structural soundness. Test water for hydrostatic testing would be trucked from the Beaver Creek facility and returned, via the pipeline, to the facility.

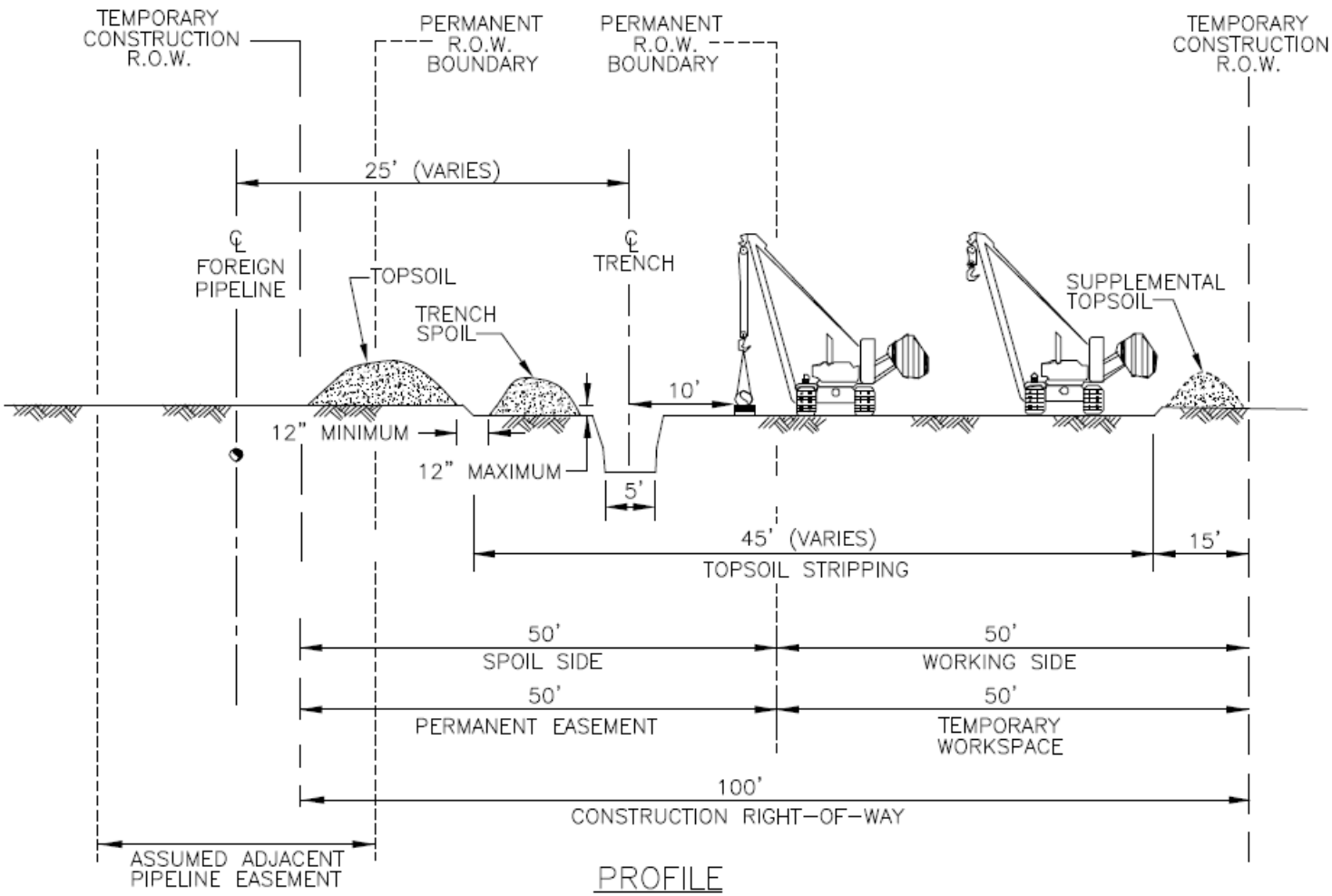
Trench Backfilling: Devon expects that deep subsoils with a minimal large rock fragment from along the pipeline route would provide most, if not all, of the backfill material. Devon recognizes that some backfill material may be obtained by sifting of subsoils through a mechanical padding machine.

After the trench is backfilled, the trench line would be compacted using bulldozers or other heavy machinery to eliminate voids in the trench. A 3- to 6-inch crown would be left over the centerline of the trench to allow for natural subsidence. Trench breakers, or water stops, would be installed, as necessary, adjacent to wetlands or stream crossings to eliminate groundwater migration along the trench. Trench breakers are areas along the pipeline where bentonite, or a similar material, is packed around the pipe. In the event of a pipe blowout, the trench breakers effectively stop water from washing out the area.

Topsoil would not be used as padding or backfill material. Imported backfill would only be used if there were insufficient, appropriate material from the excavated trench. Permits or sales contracts would be obtained from the BLM or private landowners prior to obtaining padding material from other areas of the ROW or from outside sources.

After the trench has been properly backfilled, disturbed areas would be re-graded as close to the pre-existing contour as possible and stockpiled topsoil would be redistributed over the ROW. Waste rock that is larger than pre-existing rock at the soil surface would be 1) used for barricades to prevent unauthorized use of the ROW, 2) used for backfilling the trench to the top of the existing bedrock profile, and/or 3) disposed of in a mined-out pit in the gravel pit at the Jeffrey City Staging area.

Figure 2.2 shows the typical ROW configuration for the CO_2 pipeline with the topsoil and trench spoil piles.



DEVON CO2 PIPELINE PROJECT

FIGURE 2.2

TYPICAL RIGHT-OF-WAY CONSTRUCTION CONFIGURATION WITH TOPSOIL SALVAGE

2.1.3.2.4 Special Construction Areas

Highways and County Roads Crossings: At the paved highways (Highways 287 and 135), the pipeline would be slick bored and directionally drilled to conform to requirements of the Wyoming Highway Department. "Slick boring" refers to the mix of bentonite, water, and gel that is used in the drilling process. Boring activities at road and highway crossings would occur outside the approved ROW width; the TUAs would be available for soil storage and construction activities in these areas. Devon would keep all road surfaces free of dirt, rock, or other debris that could be hazardous to the public. Construction crews would locate existing pipelines in the field from maps or with the use of a metal detector to avoid damage during trenching. Devon would communicate with the owners of existing pipelines and would allow representatives onsite if requested. Special techniques, including some hand digging, would be required to avoid damage. County Road 318 would be bored at one (1) location in Section 29, T28N, R92W. The Graham Ranch road (County Road 233) would be bored at one (1) location north of Highway 287. The pipeline would cross the Oregon Trail, but would stay within existing disturbance by following the borrow ditch on the north side of County Road 233. The crossing would stay in the borrow ditch until it is out of the line of sight of the Trail. Construction activities at the Trail crossing would be conducted in accordance with the procedures detailed in the Programmatic Agreement (Appendix B).

Historic Road Crossings and Viewsheds: The pipeline would intersect and be visible from a significant segment of the Oregon Trail. In this area, the pipeline would be confined within the existing disturbed Graham Ranch county road right-of-way. This restricted construction right-of-way is located between Milepost 14.8 and 14.2. The pipeline would also intersect or be visible from several significant segments of the Rawlins-Fort Washakie Road. In these areas, the pipeline would be confined within existing disturbed pipeline rights-of-way. The southern segment would be restricted to an existing Kinder Morgan pipeline disturbance zone from Milepost 6.8 to Milepost 9.6 The northern segment would be restricted to the existing Lost Creek Pipeline Beaver Creek Lateral disturbance zone from Milepost 19.4 to Milepost 19.8.

Utility Crossings: Some existing pipelines and other buried utility lines would be crossed during construction of the pipeline. The "One-Call System" would be implemented to identify and protect buried utilities. The proposed pipeline would cross beneath other pipelines and other facilities.

Ice Slough: The Ice Slough, a feature near the historic Oregon Trail route, lies on private property approximately a mile north of Highway 287. The landowner requested that Devon bore under Ice Slough.

Sage Grouse Leks in Sections 17 and 21, T31N, R94W: The Lost Creek line was constructed through these two sage grouse leks and the results were studied by the BLM to determine the likelihood of the grouse returning to a disturbed area. The sage grouse did return to these two leks, so the BLM would allow the Devon pipeline to construct in the same areas to avoid disturbing additional nesting habitat. Devon would, however, be required to "neck down" the width of the construction zone to preserve as much of the lek area as possible. The BLM also stipulates that no more than twenty (20) additional feet of new disturbance would be allowed in this section.

Beaver Rim Segment: The Beaver Rim is a high escarpment located east of Lander. Because of its visibility and steep topography, it would be necessary to mitigate any viewshed issues that would arise.

This construction area is comprised of two steep slope areas separated by a bench midway down the slope. The first is approximately 1300 feet long at 30% grade and the second, beginning at the end of the 490-foot bench, is 1200 feet long at 30% grade.

To maintain the visual quality, Devon has committed to steep slope construction procedures to minimize surface disturbance including the use of matting and waterbars for erosion control. Devon would also reduce the appearance of exposed white rock using methods prescribed by the BLM.

Final reclamation would be based on a site-specific plan that would be developed so that specific disturbed areas would receive the appropriate treatment. Elements of this plan would include the use of a special seed mixture and the use of erosion mats to stabilize soils on the steep slopes.

Stream and Wetland Crossings and Borings: Perennial (water flows throughout the year) stream crossings, including

Crook's Creek and the Sweetwater River, would be bored, negating the need for notifying the U.S. Army Corps of Engineers (ACOE) as regulated in Nationwide Permit 12. Please see Table 3.7 *Wetlands Crossed by the Proposed Devon Pipeline Project* for a list of streams and wetlands.

Stream crossing methods: Slick boring would be used to cross the Sweetwater River and Crook's Creek to minimize disturbance.

Wetland crossing methods:

- *Dry crossings*: Most of the wetlands crossed by the pipeline route are considered dry (no free water currently in the trench). In these areas, only the vegetation in the trench line would be cleared and graded, minimizing disturbance within jurisdictional (considered to be Waters of the United States) wetlands. Topsoil 1) would be salvaged only from the area over the trench line, 2) would be segregated from subsoil for reclamation use later, and 3) would be reapplied to the area from which it was stripped. Trenching and backfilling procedures would include the installation of trench plugs at the margins of wetlands to minimize subsurface migration of water down the trench line.
- *Wet crossings*: Army Corps of Engineers has determined that permanently saturated wetlands would be bored at least sixty inches under the channel and laterally outside the width of the floodplain.

Dry Washes, Ephemeral Streams, and Incised Channels: Dry washes or ephemeral streams, common in Wyoming, are areas where water flows in response to periodic and inconsistent precipitation events.

Where practical, backhoes would be utilized to trench crossings at dry washes and incised channels. The banks of washes would be excavated to create a slope gentle enough to allow equipment to reach the channel floor. Soil would be stockpiled at the top of the banks for dry washes and incised channels away from the channel edge to prevent soil from washing bank into the channel. After pipe installation is completed, the stockpiled soil would be used to restore the contour of the banks, aiding in natural revegetation. In areas where stabilization proves difficult due to soil type, increased slope, etc., reinforcing material such as erosion control fabric, fiber, or mats would be on recently planted slopes to protect seedlings until they are more established. This procedure may be modified to fit unusual situations where reinforcing material (erosion control fabric, fiber, or mats) may be required to comply with the Storm Water Discharge large area construction permit. Specific design will occur in the Storm Water Pollution Prevention Plan based on WDEQ's best management practices (BMPs). Slope protection measures are outlined in Devon's Storm Water Pollution Prevention Plan in Appendix F in the POD.

2.1.3.2.5 Reclamation

Devon has developed its reclamation plan in accordance with Wyoming Policy on Reclamation (BLM Instruction Memorandum No. WY-90-231, dated February 2, 1990), which outlines goals and objectives of reclamation and presents guidelines for evaluating reclamation processes.

To control erosion and sedimentation and minimize adverse impacts to adjacent lands within five years, proper construction practices would be utilized. Devon would measure the success of the reclamation by monitoring site stabilization and percentage of revegetation. By maintaining vegetative cover, "the interactive process between the soil and the plant are sufficient to cope with erosive forces (Lal, 1998) and recent research has suggested that soil with "30% total cover provided adequate erosion protection" (Linse, 2001). Devon would measure the success of its short-term reclamation goals by establishing a minimum of 30% vegetation cover and ensuring that no gullies or rills would occur. The WDEQ defines 'finally stabilized' as "…all soil disturbing activities at the site have been completed and a uniform perennial native vegetative cover with a density of 70% has been established on all disturbed areas not covered by permanent structures"(WDEQ, 2006). The success of reclamation goals would be monitored for the life of the pipeline (approximately 30 years). Within the Integrated Pest Management Plan (Appendix J) and the proposed Storm Water Pollution Prevention Plan (SWPPP) within the POD is additional information on reclamation practices that Devon will follow and which will be discussed, within this document, as mitigation measures to the impacts from the project.

To avoid prolonged surface disturbance, reclamation would immediately follow construction. Following pipe installation, the trench would be backfilled with excavated subsoil and compacted. Disturbed areas would be restored

to the original contour of the land using a dozer and a blade and the subsoil on the working side of the ROW would be ripped to alleviate compaction. The salvaged and stockpiled topsoil would then be redistributed over the ROW.

Erosion control methods would be utilized as needed, per the *SWPPP,* for stabilization of steep slopes and erodible soils. Methods utilized would include waterbars, sediment barriers, mulch application, and the use of erosion control fabric, fiber, or mats.

All disturbed areas would be reseeded according to BLM or landowner specifications and would take place immediately following construction or during the next prescribed seeding season. Seed mixes, planting depths, and seeding methods for federal surfaces would be determined by the BLM, including any special requirements for trees and seedlings in the Beaver Rim section (Section 2.1.3.2.9).

Reclamation schedule: Seeding and planting would occur after seedbed preparation and during locally recognized planting seasons. If weather conditions preclude re-vegetation of some areas during or immediately after construction, these areas would be revegetated as soon as access is possible, but not later than the following growing season. These are general guidelines and may be revised based on seasonal climatic conditions, on-site conditions, with concurrence of BLM or landowners.

Post-construction reclamation monitoring: A monitoring program would be initiated immediately following reclamation to determine the need for additional reclamation such as reseeding or soil stabilization measures. Monitoring would continue for an unspecified length of time, determined through mutual agreement between Devon and the BLM. Monitoring would be conducted by an independent range management or a reclamation specialist to determine revegetation of native herbaceous and woody species permanently. Any identified problem areas would be remediated as soon as possible. Effectiveness of erosion and sediment control measures would be assessed during construction and following revegetation and remedial actions would be taken on any problem areas, in keeping with the *SWPPP*. Unauthorized vehicle access would be noted during monitoring and measures to block access taken.

Evaluating reclamation success: Devon would conduct reclamation evaluations and would include assessment of soil stability and revegetation success. Final revegetation success would be determined using the following criteria:

- Post-disturbance plant cover would be at least 70% of that on adjacent lands. In forested and shrubby areas where comparison to adjacent lands is impractical, success would be measured by evaluating the vegetation density and composition.
- Species composition includes a high percentage of seeded species and desirable native volunteers.
- Ability to withstand grazing pressure similar to adjacent areas. Where revegetated areas may be sensitive to grazing pressure, Devon will seek BLM and landowner concurrence to defer, reduce, or control grazing or to fence sensitive areas on the ROW for one to three growing seasons until plants are well-established.
- Plant reproduction is evident.
- Where applicable, replanted woody species have at least a 50% survival rate.
- Vegetative cover is sufficient to mitigate visual impacts.
- Lack of erosion. Indicators of erosion problems include:
    - Headcuts or bank failure in drainages.
    - Existence of soil pedestals that are 0.50 inch high or more and/or at a frequency of 10 or more per 100 square feet.
    - Existence of rills more than 3 inches deeps and found at 10-foot intervals.
    - Gullies occurring more frequently than 200-foot intervals and that appear unstable (do not support perennial vegetation).
    - Trench subsidence or slumping.
    - Disturbance of plant root systems.

- Existence of wind-scoured depressions deeper than 0.50 inch over 25% of a 100 square foot area.
- Flow patterns that show translocation of soil and surface litter.

2.1.3.2.6 Waste Management

The sections below outline waste management practices that would apply to this project. For additional information, please see the *Spill Prevention Control and Countermeasure (SPCC) Plan* in the POD (Appendix H).

Hazardous Materials: The most common and potentially hazardous substances that would be used during the construction of the pipeline include diesel fuel, gasoline, lubricating oils, paints, and solvents. The SPCC Plan includes procedures that would be followed for hazardous materials storage, handling, and disposal in addition to the clean up and reporting procedures that would be followed in the event of a spill. To protect watercourses, wetlands, and riparian areas, all equipment staging areas would be located on state or private lands and would be positioned at least 50 feet away from these areas. Vehicles would be refueled at least 100 feet from watercourses. Potentially hazardous materials would be stored only in designated and permitted staging areas that will be at least 100 feet from all watercourses and wetlands. Any excess material would be returned to the vendor or would be disposed of in accordance with all applicable laws and regulations.

As specified in the SPCC Plan, spill containment supplies (universal absorbent pads, universal absorbent boom material, heavy-duty trash bags, certified weed-free straw bales, securing stakes, plastic sheeting) would be kept onsite during construction and all personnel would be trained in spill containment and clean up. Material Safety Data Sheets (MSDS) for each potentially hazardous substance would also be maintained onsite. In the event of a spill, Devon would notify the local emergency management authority or state or federal response authorities. Please see Appendix D of the POD for details regarding the SPCC Plan.

Non-hazardous materials: Non-hazardous materials (paper, plastic, wood, etc.) would be collected and stored in appropriate waste containers with lids. Portable toilets would be confined to trailers while parked in the ROW on BLM-administered lands. Devon would contract with a sanitation company to periodically remove solid, non-hazardous waste materials and deposit them in an approved landfill.

2.1.3.2.7 Operation and Maintenance

Access: Devon would use existing county, state, private, and BLM-managed roads. As required by maintenance agreements, private and BLM-managed roads would be maintained in the same or better condition as existed prior to the start of operations. Maintenance of existing roads used to access the pipeline ROW corridor would continue until final abandonment and reclamation of the corridor occurs. Excessive rutting or other surface disturbances would be avoided. Operations would be suspended temporarily during adverse weather conditions if excessive rutting is occurring when access routes are wet, soft, or partially frozen. Access roads that would be used can be found in Table 2.3.

Where needed, a Devon representative would conduct a "Plans in Hand" review with contractors to review the access routes to the pipeline and directional markers would be temporarily placed to mark access routes. The pipeline centerline would be staked and clearly marked. All markers would be removed as soon as they are no longer needed.

Pipe and Pump Removal and Confinement of Maintenance Activities: Under special circumstances such as corrosion or leaks, removal and/or addition of pipe would be required as part of pipeline maintenance. Pumps would then be used to pressure-test the new segment of pipe.

All maintenance activities would be confined to the ROW.

Fire Prevention and Suppression Plan (FPSP): The risk of fire due to construction and operation activities such as vehicle operation, welding activities, and the use of flammable or explosive materials, and fire-risk due to natural causes (lightning) are always a concern on Wyoming lands. Devon would implement a fire prevention and suppression plan that would remain in effect throughout construction, operation, and maintenance of the CO_2 pipeline. Details of the FPSP can be found in Section 9.5 of the POD.

Monitoring: Devon's construction and environmental inspectors would monitor the project area for compliance with the FPSP. Federal, state, and local agencies have the right to perform inspections in areas under their jurisdictions.

2.1.3.2.8 Abandonment

A termination and reclamation plan would be developed and submitted to the BLM at least one year prior to abandonment. This plan would include, but would not be limited to, removal of aboveground facilities, reclamation procedures for aboveground facility sites and access roads, and an abandonment and reclamation schedule.

All surface facilities would be removed upon abandonment and economic components would be sold for salvage. Cement foundations would be broken and hauled to an approved disposal site. Gravel pads would also be buried on-site or hauled to a disposal site. Compacted areas would be ripped, recontoured, and then stockpiled topsoil would be redistributed, prepared, and revegetated. Devon would be responsible for reclamation until it meets BLM requirements.

Because the economic and environmental costs preclude excavation and removal of the pipeline, it would be purged and abandoned in place.

2.1.3.2.9 Environmental Protection Measures

An environmental inspector (EI) will oversee the entire project for continuity and will act as the liaison between the agencies and the construction contractors. The EI will directly oversee all environmental inspection activities and will summarize reported occurrences of non-compliance and the results of any resource monitoring.

Cultural and Paleontological Resources

- The PA intersects the Oregon Trail where the PA parallels Graham Ranch county road. The pipeline would stay within the disturbed existing county road right-of-way within line-of-sight of the Oregon Trail to preserve the Trail's historical viewshed. The trail crossing and 50 ft either direction from the trail crossing would be fenced at the edge of the existing disturbed right-of-way at each side of the county road to prevent disturbance to the physical remains of the road itself.
- The PA intersects multiple significant variants of the Rawlins-Ft. Washakie Road slightly north of the Graham Ranch Road where the PA parallels the existing Lost Creek Pipeline Beaver Creek Lateral. The pipeline would stay within the existing disturbance of the Lost Creek Pipeline within direct line-of-sight of the road to preserve the road's historical viewshed. The road crossings and 50 ft either direction from road crossing would be fenced at each edge of the existing disturbed pipeline right-of-way to prevent disturbance to the physical remains of the road itself.
- The PA parallels a significant segment of the Rawlins-Fort Washakie Road north of Crooks Gap where the PA parallels an existing Kinder-Morgan pipeline. The proposed pipeline would stay within the existing disturbance of the Kinder Morgan pipeline within direct line-of-sight of the significant segment of the road to preserve the road's historical viewshed.
- Devon would use pipeline markers that would be as non-intrusive as possible within the viewshed of the Oregon Trail and Rawlins-Fort Washakie Road. Devon is currently proposing to use aerial markers that are low to the ground and slanted at a 45-degree angle.
- Devon would restrict its ROW through Site 48FR4234 to avoid the portions of the site that contribute to its significance. A qualified archaeologist would supervise the placement of a fence along the northeast edge of the ROW through the site. The archaeologist will ensure that the fence is placed outside the edge of the aeolian deposit that has the potential to contain significant buried cultural deposits. The archaeologist would restrict Devon's construction ROW up to the edge of the existing Lost Creek Pipeline ROW disturbance within the site if necessary. A qualified archaeologist would monitor right-of-way grading through the site.
- Devon has redesigned the PA to avoid the Graham Ranch site and Site 48FR506. The edge of the construction right-of-way would be fenced immediately adjacent to each site. A qualified archaeologist would monitor right-of-way grading adjacent to each site.
- A qualified archaeologist would monitor right-of-way blading and conduct open trench inspection in areas with high potential to contain unidentified subsurface cultural material. Those areas are defined in the

Treatment Plan included in the POD. Cultural properties and/or human remains identified during construction monitoring, open trench inspection, or general construction activity would be treated according to the guidelines provided in the Discovery Plan included in the POD to ensure appropriate protection, evaluation, and treatment.

- If substantial fossiliferous deposits, specifically vertebrate fossil deposits, are discovered during construction, construction would be suspended, a paleontologist from the appropriate state or federal agency would be contacted immediately and measures would be taken to identify and preserve the fossils. In areas where the potential for occurrence is high, a paleontological monitor may be assigned to observe trench excavation and salvage potentially significant resources.
- To minimize indirect impacts to cultural and paleontological resources, project-related personnel would be educated about the sensitive nature of the resources. A strict policy of prohibiting casual collecting of these resources would be implemented.

Soils and Vegetation

- All vegetation removed from the ROW would be incorporated with the salvaged topsoil material within the ROW or within adjacent TUAs during construction and would be redistributed following construction, allowing seed and surviving plants to easily repopulate the area.
- As much as possible, native subsoils would be used to backfill the open trench.
- A hand crew would be utilized to manually replace trees, rock, and shrubs along the Beaver Rim special construction area.
- To relieve soil compaction along the ROW, non-essential access roads, staging areas, and other work areas would be chisel plowed, ripped, or disked. Depth of relief is site-specific. In areas where the topsoil has been segregated, the subsoil would be loosened, as necessary, prior to redistribution of the topsoil.
- Replaced topsoil would be left in a roughened condition to discourage erosion and additional stabilization techniques may be required on steeper slopes, in areas that have highly erodible soils, and in areas adjacent to, or within, drainages. Topsoil would be replaced perpendicular to the slope. The length of time between topsoil stockpiling and redistribution would be minimized, depending on the proposed construction schedule.
- Plant species selected for revegetation are based on the plant community composition, soil types, establishment potential, growth characteristics, soil stabilizing qualities, palatability to wildlife and livestock, commercial availability, post-construction land use objectives, and agency recommendations. Native species would be used as much as possible. Willows would be replaced in wetland areas. Forbs would be required as part of the seed mix to help restore disturbed sites as sage grouse habitat.
- Seed would be purchased from a certified seed source in accordance with Pure Live Seed (PLS) specifications for seed mixtures and would be weed free. Per Instruction Memorandum No. 2006-073, "prior to BLM accepting seed from any source, all seed must be tested for noxious weed seed at official state seed analysis labs" and the "seed lot shall contain no noxious, prohibited, or restricted weed seeds according to State seed laws in the respective State(s)…If the seed does not meet the BLM and State/Federal standard for noxious weed seed content or other crop seed allowances, it shall not be applied to public land." All seed used on the Project (certified and non-certified) would be tested for noxious weed seed content so that no western states-designated noxious weeds are introduced. To determine the percentage of non-certified seed in the PLS, seed would be analyzed by an approved testing facility. All seed test results would be submitted to the BLM. Seeds would be used within nine (9) months of testing to assure seed viability. Seed bag tags would be saved and submitted to the jurisdictional BLM offices as rehabilitation progresses.
- Plant surveys for sensitive species were conducted through areas with suitable habitat within the project area. These surveys coincided with the flowering periods of identified sensitive species. Appropriate protection measures (Table 2.5), including narrowing the construction width of the ROW or shifting the centerline to avoid individual plants, have been developed and implemented in coordination with the BLM. Botanists will assist the staking crew to ensure proper marking of the required sites occurs and impacts to sensitive species

is minimized to the extent practicable.

Table 2.5: Sensitive Plant Species and Construction Stipulations						
Species	**Label**	**# Individuals**	**Size of Population**	**Stipulation Applied**		**Conditions of Approval**
				Yes	**No**	
Porter's Sagebrush	ArtPor1	50	65'x145'		**X**	
	ArtPor2	50	50'x100'		**X**	
Beaver Rim Phlox	Phlox2	20	10'x20'		**X**	
Cedar Rim Thistle	CirAri1	2	2'x3'		**X**	
	CirAri2	2	5'x5'		**X**	
	CirAri3	1	1'x1'		**X**	
	CirAri4	1	1'x1'		**X**	
	CirAri5	1	1'x1'		**X**	
	CirAri6	4	20'x20'	**X**		No more than 25' of new disturbance
	CirAri7	5	10'x30'		**X**	
	CirAri8	25	15'x40'	**X**		No more than 30' of new disturbance
	CirAri9	28	10'x30'	**X**		No more than 30' of new disturbance
	CirAri10	13	15'x45'		**X**	

- Although it is preferable to avoid sensitive plant species, Devon and the BLM have agreed that, for this project, some loss of individual plants will be allowed, with conditions, because 1) it's not possible to neck down to the point of avoidance and still have enough room for construction and 2.) rerouting around the populations would result in additional new disturbance, rather than utilizing the existing disturbance. Furthermore, because some individual plants were documented in previously disturbed areas and these species typically occur on barren slopes or in sparsely vegetated habitats, re-establishment of the plants may occur from seed from nearby populations.

- Fall seeding would be completed after September 15th and prior to ground frost. If applicable, spring seeding would be completed after the frost has left the ground and prior to May 15th. The seeding would be repeated until a satisfactory stand, as determined by the BLM Authorized Officer, is achieved. The first evaluation of growth would be made following the completion of the first growing season. No reclamation work would be completed when soils are frozen or overly wet. Scarification and re-seeding activities are considered best in the fall, unless requested otherwise by the BLM Authorized Officer or the private surface owner(s).
- If there is a need for immediate soil stabilization, a chemical soil binder may be applied, either alone or with mulch. These chemical stabilizers would be applied per the manufacturer's recommended rate.
- To control erosion both during and after construction, short- and long-term erosion control measures such as waterbars, silt fences, check dams, riprap, gabions, erosion control fabric, fiber, or mats would be constructed or installed as outlined in the project's reclamation plan.
- In areas with riparian/wetland vegetation, the construction ROW would be reduced to 30 feet in width.
- Prior to construction, noxious weed surveys would be conducted in areas of proposed disturbance as directed by the BLM. After the surveys are completed, a Pesticide Use Proposal (PUP) would be developed with the

BLM Lander Field Office to facilitate the treatment of known and likely noxious/invasive weed species. Additionally, equipment and vehicle washing stations would be lined and the liners and waste would be removed and deposited in an approved landfill.

- During high soil moisture conditions, vehicle traffic and equipment operation would be restricted to prevent rutting in excess of four (4) inches in depth and subsequent erosion.
- Trench breakers, or water stops, would be installed along the Beaver Rim Segment to minimize damage in the event of a pipe blowout.

Water Resources and Wetlands

- Waterbars would be constructed, prior to reestablishment of vegetation, on ascent/descent slopes and in areas of erodible soils to direct runoff from the disturbed areas to adjacent vegetation or rock in an effort to minimize erosion of channels and sediment transport. Waterbars would also be constructed at the entrances and exits to all stream and wetland crossings. Waterbars would be constructed at intervals directed by the BLM and would be sufficiently sized to survive 3 to 5 years. Water bars are to be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet. The water bar would be extended into established vegetation where necessary. All water bars are to be constructed with the berm on the downhill side to prevent the soft material from silting in the trench. The initial water bar should be constructed at the top of the back slope.
- Willows would be replanted along riparian zones and in wetland areas where woody species have been removed. Stock (native species) would come from nursery stock or cuttings. The replacement ratio would be dependent on the value and quality of the riparian or wetland habitat impacted during construction and would be coordinated with the landowner or BLM. Temporary protective fences of sufficient height would be installed around these areas to protect the plantings from wildlife and livestock until they have become established.
- At the landowner's request, Devon would repair an existing headcut at the Crook's Creek crossing.
- Crook's Creek, the Ice Slough, and the Sweetwater River would be bored.
- No temporary bridges would be used for access across Crook's Creek or the Sweetwater River. Existing access roads would be used to transport equipment around the wetland bore locations.

Air Quality

- Water would be used to control dust along the ROW and access roads in accordance with federal, state, and local requirements. On private land, water would be used to control dust at the landowner's request. Any dust control water would be obtained by permits or by purchase contracts with owners of valid, existing water rights.

Wildlife

- A continuous distribution line trench that isn't interrupted by a road, or other point of egress from the trench, would be modified to enable livestock or wildlife that fall into the trench to exit. Earthen ramps that are sloped enough to be negotiated by large animals would be constructed at least every ¼ mile.
- Devon would install soft plugs in areas where established wildlife and livestock trails meet the trenches to minimize the impact.
- For purposes of this EA, Devon would first conduct surveys to identify potential habitat of specific species. Devon and jurisdictional agencies are aware of existing lek sites, raptor nests, and big game ranges. If others are identified during seasonal surveys, to avoid adverse impacts it is possible that the pipeline route would need to be altered.
- Prior to construction, during the breeding season (February 1 to July 31), aerial and/or pedestrian raptor surveys would be conducted through areas of suitable habitat, in coordination with the jurisdictional agencies, to identify any potentially active nest sites in the project area. Appropriate protection measures, including

prohibiting construction during the period of February 1 to July 31 for active raptor nests would be implemented on species specific and site-specific basis. Raptor nests identified within the proposed areas of disturbance would be avoided to prevent abandonment. In addition, no trees 10 inches in diameter or greater would be removed from the project area during construction to protect potential future nest sites.

- Construction activities would be prohibited during the period of May 1 to September 30 for nesting burrowing owls
- To prevent adverse impacts to sage grouse breeding sites and habitat, a permanent 0.25-mile construction buffer area would be implemented around known lek sites, determined in coordination with the BLM. During the breeding season, surveys would be conducted, prior to construction, to identify active lek sites in the project area and a 2-mile seasonal construction buffer would be implemented. Construction would be prohibited during the period of March 1 to July 15 on public lands administered by the BLM.
- Prior to construction and during the breeding season, mountain plover surveys would be conducted, in conjunction with the BLM, in areas where suitable habitat occurs to identify any potentially active nest sites in the project area. Construction would be prohibited during the period of April 10 to July 10 in suitable mountain plover habitat unless inventories indicate breeding or nesting activity is not occurring.
- To prevent adverse impacts to wintering big game species, construction would be prohibited during the period of November 15 through April 30 in crucial winter range (CRW).
- Prior to construction, active white-tailed prairie dog colonies would be mapped along the project ROW in order to identify ways to mitigate/avoid or analyze impacts to these towns. Prairie dog towns would be avoided if possible. This area falls within a USFWS block-cleared area for black-footed ferrets, so ferret surveys would not be required.
- Fiberglass high-impact markers would be used near sage grouse leks and in mountain plover breeding/nesting habitat if it is not possible to modify marker placement enough to avoid these areas entirely. Fiberglass markers are specially designed to flex on impact or when weight is added and then return to their original upright positions.
- Wildlife surveys would be conducted in 2008, or subsequent years, if pipeline construction is not completed in 2007.
- The following table describes the pipeline route wildlife stipulations and constraint dates. Devon would comply with all stipulations in order to preserve the wildlife resources in the area.

Table 2.6: Wildlife Resources and Construction Stipulations			
Milepost	**Species**	**Constraint**	**Constraint Dates**
1.5-2.65, 2.95-4.41, 4.65-8.25, 8.4-9.95, 13.15-13.65, 20.05-21.9, 22.1-22.6, 22.9-24.3, 29.9-30.45, 32.3-33.85, 35.6-37.1, 37.45-42.5, 42.8-46.05	Raptor	Nesting	Feb. 1 – July 31
7.9-13.25, 21.11-30.3, 33.65-37.85	Sage Grouse	Nesting	March 1 – July 15
9.15-19.25, 20.7-21.2, 21.6-26.6, 43.6-46.3	Big Game	Crucial Winter Range	Nov. 15 – April 30
9.45-9.95, 10.3-10.5, 22.1-22.6	Mountain Plover	Breeding/nesting	April 10 – July 10

Visual Resources

- The segment of the Beaver Rim (a BLM Class II Visual Resource Management, or VRM, area) would be crossed by pipeline along the same route as the Lost Creek line and would be in view of motorists on State Highway 135 between Riverton and Sweetwater Station on U.S. Highway 287. To maintain the visual quality, Devon has committed to steep slope construction procedures to minimize surface disturbance including the use of matting and waterbars for erosion control. Devon would also reduce the appearance of exposed white rock using methods prescribed by the BLM. As directed by the BLM, Devon would include seedling and tree plantings to aid in the restoration of the visual quality.
- Following construction, all aboveground facilities would be painted to blend with the natural surroundings. A reflective material may be used to reduce the possibility of accidents when structures are near roads. Otherwise a non-glare, non-reflective, non-chalking paint would be used. Color selections and uses would be coordinated with the BLM.

Range Resources

- Fences would be adequately braced along both sides of the ROW before wires are cut and temporary gates installed. After construction, openings would be closed with fencing of the same specifications as the original. In some locations permanent gates may be installed, with landowner permission, to provide access to the pipeline ROW. If a natural barrier used for livestock control were damaged during construction, the area would be adequately fenced to prevent the escape of livestock. No gates on established roads over public lands would be locked or blocked. Any cattle guards or gates damaged during construction would be repaired or replaced.
- In livestock use areas, open trenches would also be temporarily fenced at the end of each workday to prevent potential livestock injuries or losses.

- If natural barriers used for livestock control are damaged or removed during construction, they would be replaced by fences according to BLM specifications.
- All damaged livestock fences would be repaired to the landowner's satisfaction. All existing improvements, such as fences and gates, would be maintained and repaired to at least pre-construction condition.
- Temporary protective fences of sufficient height would be installed around sensitive resource areas as needed to defer grazing pressure until the vegetation has adequately reestablished (one to three growing seasons).
- Any range improvements damaged by project construction would be repaired to the BLM or landowner's specifications.

2.1.4 Range of Alternatives Considered and Summary Comparison of Environmental Consequences

The table below summarizes and compares the economic and environmental similarities and differences of the project alternatives analyzed in this EA.

Table 2.7 Summary Comparison of Alternatives

	Alternative A: No Action	**Alternative B:** Northern Gas Line Route	**Alternative C:** Proposed Action
Increased oil recovery	None	Contribute up to 15% added recovery rate in existing oil fields (Ogg, 2006)	Contribute up to 15% added recovery rate in existing oil fields (Ogg, 2006)
Economic use of waste gas	No	Yes	Yes
Sequester CO_2	N/A	Up to ¾ of CO_2 used in EOR operations remains sequestered (Ogg, 2006)	Up to ¾ of CO_2 used in EOR operations remains sequestered (Ogg, 2006)
Pipeline infrastructure	N/A	47 miles	47 miles

2.2 Alternatives Considered but Not Further Analyzed

2.2.1 Alternative Route: Option 2

This option would parallel the Lost Creek line ROW until it crossed U.S. Highway 287 in Section 12, T29N, R93W. At this point, it would travel almost due south to the Kinder Morgan ROW in Section 14. This alternative was dismissed because 1) there is no other surface disturbance in this area, 2) it is within view of the Rawlins-Fort Washakie stage route, and 3) it falls within the ¼ mile buffer area required around an existing sage grouse lek in Section 14.

2.2.2 Alternative Route: Option 3

This option also parallels the Lost Creek line ROW until crossing U.S. Highway 287. This option would take the pipeline southeast through Section 12 until it met an existing two-track road in the NWNE of Section 13. The pipeline would then turn southwest until meeting the Kinder Morgan ROW in Section 24. This alternative was dismissed because 1) it also is within view of the Rawlins-Fort Washakie stage route and 2) the southern end of this section of pipeline would run through the center of an active sage grouse lek.

2.2.3 Alternative Route: Option 4

This option also parallels the Lost Creek line ROW until crossing U.S. Highway 287. This option would take the pipeline southeast through Section 12 until it met an existing two-track road in the NESE of Section 13. The pipeline would then travel southwest until meeting the Kinder Morgan ROW in Section 24. This alternative was dismissed because it is in view of the Rawlins-Fort Washakie stage route for approximately two miles longer than the PA and would therefore have a greater impact on the historical viewshed of the trail.

2.2.4 Alternative Route: Jeffrey City Bypass

This option parallels the Lost Creek line ROW north approximately seven (7) miles from the NWNW of Section 29, T28N R92W through Section 22, T29N R92W. At this point, the CO2 pipeline would bypass Jeffrey City on the south instead of following the Lost Creek line ROW around the north side of the town. This alternative was dismissed because 1) this route increases the pipeline length by almost three (3) miles, thereby increasing the overall disturbance, 2) more of the pipeline route would fall within the pronghorn crucial winter range, 3) in order to stay in the existing disturbance, the turns would have to be sharper than what is recommended for steel pipeline transporting CO_2, 4) CO_2 is denser than air and, if there were a failure, the CO_2 would stay close to the ground, acting as an asphyxiate that could potentially affect the population of Jeffrey City, and 5) the closer the pipeline gets to Jeffrey City, the more public and private utilities and road crossings there would be.

3.0 Affected Environment and Environmental Consequences

The BLM is required to characterize the affected environmental conditions for critical elements of the human environment including cultural resources; water quality; riparian/wetland zones; soil quality; air quality; floodplains; threatened, endangered, and BLM sensitive species; vegetation; visual resources; recreation, socioeconomics; and noise issues.

The information sources for this chapter include the review of agency databases, published and unpublished literature, interviews with agency staff, and surveys conducted on the ground within the Project area. Critical and other elements of the human environment relevant to the Proposed Action were analyzed in depth. These elements, and those that were dismissed from further analysis, are summarized in the Table 3.1.

Table 3.1: Critical and Other Elements of the Human Environment		
Issue/Resource	**Affected**	**Rationale**
Environmental justice	No	No minority or low-income communities would be crossed by this Project.
Fisheries	No	All stream and river systems supporting fisheries would be bored by this Project.
Geology/topography	No	"The risk of pipeline damage from regional earthquake events is considered low, based on the location of regional faults ad the low frequency and intensity of historic events. No slope instability hazards resulting from active landslides or slumps, or extremely steep slopes requiring special construction and stabilization measures are present along the proposed ROW." (BLM, 1999). The Devon pipeline would not cross any active mining operations or existing natural gas production sites. There are two exploratory notices for in-situ uranium mines, one in the Crook's Gap area and the other is west of Bairoil. However, both are several miles from the proposed Project and are at least 1-2 years before actual production. (Rymerson, 2007)
Native American religious concerns	No	Native American groups were consulted. To date, no concerns have been raised concerning sacred sites or traditional use areas. (Bromley, 2007)
Prime/unique farmland	No	No prime or unique farmland would be crossed by this Project.
Threatened and Endangered species	No	Desert Yellowhead: Species not found as no suitable habitat within project area. Critical Habitat for Desert Yellowhead: Project is outside designated habitat boundary Black-footed ferret: Project area is within an area block cleared for ferrets by USFWS. Bald Eagle: No birds were found during the inventory. Survey revealed a lack of suitable nesting trees in the project area.
BLM Sensitive Species	Yes	White-tailed Prairie Dog: Surveys indicate prairie dog towns that could be impacted by the proposed action Pygmy rabbit: One area with potentially suitable habitat, but no rabbits observed. Swift fox: Low probability of occurrence. Mountain Plover: Two observations, but no nesting sites identified. Ferruginous Hawk: There are active nests near the ROW that could be impacted if construction occurs during the nesting period. Greater Sage-grouse: The project would impact strutting grounds (leks) and nesting habitat Long-billed Curlew: Impacts should be minimal to non-existent as majority of suitable habitat will be bored under. Burrowing Owl: Suitable habitat in the prairie dog towns along ROW Sage Thrasher, Loggerhead Shrike, Brewer's Sparrow, Sage Sparrow: There would be some loss of suitable habitat with removal of sagebrush. Nests could be impacted with construction if occurring during nesting period. Northern Leopard Frog: Impacts should be minimal to non-existent as majority of suitable habitat will be bored under. Porter's Sagebrush, Cedar Rim Thistle, Beaver Rim Phlox: Species found through along ROW during inventory Rocky Mountain Twinpod: Species not found in project area during inventory
Water quality	No	Surface water: All stream and river systems would be bored by this Project and no surface water withdrawals would occur. Additionally, Devon is committed to comply with the Project's reclamation, Stormwater Pollution Prevention, and Spill Containment, Control, and Countermeasure plans. Groundwater: the Project would not alter existing groundwater quality.
Wilderness	No	No designated wilderness areas would be crossed by this Project.
Road System	No	No new road construction, modification, or upgrades
Wild Horses	Yes	Project falls between 2 Herd management Areas.
Wilderness	No	No wilderness areas will be affected by this project.

Table 3.1: Critical and Other Elements of the Human Environment (cont.)		
Areas of Critical Environmental Concern	Yes	The pipeline would cross the Oregon/Mormon Trail ACEC near Ice Slough.
Wild and Scenic Rivers	No	No designated wild and scenic rivers would be crossed by this project
Climate and Air Quality	Yes	Section 3.5 Affected Environment and Table 3.11 Potential Environmental Consequences.
Cultural Resources	Yes	3.1 Affected Environment and Potential Environmental Consequences
Floodplains, Wetlands, Riparian Areas	Yes	Section 3.4 Affected Environment and Table 3.8 Potential Environmental Consequences.
Hazardous and Solid Wastes	No	No hazardous or solid wastes would be generated by this project
Soils and Vegetation	Yes	Section 3.3 Affected Environment, Tables 3.4, 3.5, 3.6.
Visual Resources	Yes	Section 3.6 Affected Environment and Table 3.12 Potential Environmental Consequences.
Socioeconomic and Noise Issues	Yes	Section 3.7 Affected Environment and Table 3.13 Potential Environmental Consequences.
Recreation	Yes	Section 3.8 Affected Environment and Table 3.14 Potential Environmental Consequences.

This section describes existing environmental conditions in areas potentially affected by the Proposed Action and the alternatives. This section also describes the potential impacts to relevant environmental resources.

Those resources considered relevant to this proposed project are cultural and paleontological resources, wildlife, soils, vegetation, floodplains and riparian/wetland zones, air quality, visual resources, socioeconomic issues, noise issues and recreation. They are relevant because they are present along the proposed route and will be affected by the project.. Impacts are classified as 1) direct impacts, which are caused by the action and occur at the same time and place; 2) indirect impacts, which are caused by the action and are later in time or farther removed in distance; and 3) cumulative impacts that are incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions.

In October of 1999, a Finding of No Significant Impact (FONSI) was issued for the Lost Creek Gathering System Project, a 120-mile gas gathering pipeline system constructed in Sweetwater and Fremont counties. The proposed Devon CO_2 pipeline would follow the Lost Creek line almost exclusively. A map comparing the routes can be found in Appendix E. Per NEPA requirements, all relevant resource data will be updated (wildlife, cultural, etc.) unless it has remained unchanged in the period between construction of the Lost Creek pipeline and analysis of the PA.

For those sections where the Devon CO_2 line does not follow the Lost Creek line, additional analysis and information will be presented for public comment in this chapter.

3.1 Cultural Resources

Affected Environment

Cultural resources are the products of human history in the form of material items produced by human workmanship or use, and elements of the natural environment that were altered by human activities. Physical manifestations of human activity must normally be more than 50 years old to be considered cultural resources, but sites, structures or objects less than 50 years old may also be considered to be cultural resources if those resources have exceptional significance.

In addition to physical manifestations, cultural resources may also include Traditional Cultural Properties (TCPs), which are properties that are critical to a living community's beliefs, customs, and practices. TCPs may include religious or ceremonial sites, other locations important in the belief systems of the community, and

areas used by the community for gathering or otherwise producing materials used for traditional ceremonial, spiritual, medicinal, or subsistence purposes. TCPs may be topographical features; stone alignments, rock art, or other physical artifacts; sources of plants or other materials; or areas without obvious physical manifestation of the site's cultural significance.

The affected environment in regard to cultural resources consists only of those properties that are listed on or are eligible for nomination to the National Register of Historic Places (NRHP), potentially including archaeological and historic sites, historic structures, and TCPs. Eligibility of properties for nomination to the NRHP is evaluated according to criteria published in the Code of Federal Regulations (36CFR60). Archaeological sites are usually evaluated for their potential to yield scientific information that would advance knowledge of prehistory or history, although some archaeological sites include artistic, architectural, or other cultural values. Historic properties are usually evaluated according to their representation of important historic events or patterns, lives of persons important in history, or important achievements in architecture, engineering, or art.

The proposed pipeline is located in the eastern Wind River Basin and western Sweetwater Arch, which are geographically, ecologically, and archaeologically intermediate between the Northwestern and Northern Plains to the north and the main body of the Wyoming Basin to the southwest. The project area is generally considered to be more similar to the Northwestern Plains to the east and north, with which it is geographically continuous. However, the archaeological record of the central Wyoming Basin indicates that the prehistory of the region was in many respects more similar to that of the western Wyoming Basin. For example, during the mid-Holocene, the inhabitants of the Wind River Basin constructed simple basin housepits of a sort typical of the western Wyoming Basin. Other important attributes of the archaeological record of the project area include evidence of intensive occupation of stabilized sand dunes; a diet that relied heavily on such resources as pronghorn, lagomorphs, and weedy annual plant seeds; and a general scarcity of such typical Northwestern Plains site types as communal bison kills.

Prehistoric cultural properties in the general vicinity of the proposed pipeline typically consist of combinations of flaked stone tools and debris from the manufacture of flaked stone tools, hearths and scattered rock heated in hearths, and grinding stones. Sites with the remains of houses built over shallow basins are also common. Sites with stone circles and sites with deep baking pits also occur with some frequency. Localized areas with windblown deposits are common along the proposed pipeline route. As a result, sites with buried prehistoric occupation surfaces are moderately abundant, including sites that lack any surface expression. Therefore, the proposed pipeline route has a moderately high potential to contain cultural resources that are not detected during surface inventory. Such resources are often scientifically significant, because buried sites often retain materials that are typically not present on surface sites, such as datable organic materials, food remains, and pollen in association with artifacts and features.

In the historic period, human activity in the project area has been dominated by transportation and ranching. Early fur trappers pursued beaver in the area, particularly along the Sweetwater River and its tributaries, and trappers and their suppliers met in annual rendezvous at locations to the north and west of the current project area in the 1830s and 1840s. However, the history of the area began in earnest in the 1840s with the development of the South Pass route of the Oregon Trail, which followed the Sweetwater River valley westward through the current project area. After the completion of the Union Pacific Railroad in 1869 to the south of the current project area, the primary transportation corridor through the project area became realigned along a north-south axis, between railroad towns and points to the north, particularly by way of the Rawlins to Fort Washakie freight and stage road. Historic ranching and homesteading followed, especially from the 1870s on. Settlement within the project area was tightly concentrated within the Sweetwater River valley and along the other perennial streams, although ranching activity spread across the surrounding landscape. The more recent history of the area has included oil, gas, and uranium exploration and production.

Typical historic cultural properties in the general project area consist of the remains of homesteads and trash scatters most commonly associated with stockherding activities. Historic road traces are also present, as are ground disturbances associated with historic energy exploration and development activities.

Class I literature reviews were conducted to identify cultural resource properties within 1 mile of the Preferred Alternative (PA). The primary sources for the data were the State of Wyoming Division of Cultural Resources/SHPO Cultural Records in Laramie, and information from the BLM Lander Field Office. Representatives of the Northern Arapahoe and Eastern Shoshone tribes were also consulted.

The entire PA has been the subject of intensive Class III cultural resource inventory in accordance with the process outlined in Section 106 of the National Historic Preservation Act. The identified cultural resources were evaluated according to the criteria of eligibility for inclusion on the National Register of Historic Places (NRHP) as stated in 36 CFR 60.4.

The majority of the PA pipeline right-of-way falls within a 200-ft wide corridor inventoried for the Lost Creek Pipeline in 1999 (Neihardt et al. 2000) and subject to open trench inspection during the construction of the Lost Creek Pipeline in 2000 (Nelson et al. 2001). The remainder of the PA was inventoried in 2006 and 2007, including three segments of the proposed pipeline right-of-way that diverge from the Lost Creek Pipeline corridor; temporary use areas at highway, road, and wetland bore locations; staging areas; and unimproved access roads (McNees 2007).

Thirty-five archaeological sites have been identified as a result of the Class III inventory of the PA. Twenty-five sites were identified as a result of the Class III inventory for the Lost Creek Pipeline right-of-way, six sites were identified during open trench inspection for the Lost Creek Pipeline, and three sites were identified as a result of new Class III inventory along segments of the proposed right-of-way that diverge from the Lost Creek Pipeline right-of-way. The Oregon Trail, Rawlins to Fort Washakie Road, Graham Ranch site, and Sites 48FR4234, 48FR4246, and 48FR4251 have been determined eligible for nomination to the NRHP; and Site 48FR506 remains unevaluated with regard to its eligibility for inclusion on the NRHP. The remaining sites have been previously determined ineligible for nomination to the NRHP either in conjunction with various phases of the Lost Creek Pipeline project (Neihardt et al. 2000; Nelson et al. 2001; McClelland et al. 2004) or during the inventory for the Devon pipeline in 2006-2007 (McNees 2007).

The **Oregon Trail** is an element of the National Historic Trails System. It qualifies for inclusion on the NRHP under Criterion A. It is a property of major national significance for its role in the settling of the American West. Its primary period of use was from approximately 1843 until 1869 when the Union Pacific Railroad was completed, although it received continued use after that date. The PA crosses the trail immediately adjacent to the Graham Ranch county road, construction of which removed the immediately adjacent portion of the trail. The condition and setting of the trail adjacent to the county road and PA are otherwise very good. Ruts and swales are in good condition and highly visible. The historic setting in the area is also good, except for the Graham Ranch county road, the Anderson Ranch which is visible from the trail, and more distant modern features on the landscape. The Lost Creek pipeline crossed the Trail in the SWSW corner of Section 35, T30N, R93W and was buried in the county road borrow ditch until it was out of line-of-sight of the Trail. The Lost Creek pipeline is not visible from the the Trail.

The **Rawlins-Fort Washakie Road** was a historic freight and stage route. It has been determined eligible for inclusion on the NRHP under Criterion A. It was first established by the military to transport troops and supplies to Fort Augur in 1869 or 1870, then to Fort Washakie on the Wind River Indian Reservation in 1871. Stage and mail service was established on the road in 1885, at which time a series of stage stations was built, and it came to serve Lander and ultimately points as far north as Red Lodge, Montana. Stage service was discontinued in 1906 with completion of rail service to Lander, but the road continued to be the main route to the town of Bairoil and on to Lander until 1926, when the precursor to the modern U.S. Highway 287 was completed. It follows the general direction and bearing of the PA from Crooks Gap to a point just north of the Graham Ranch county road in Sections 18 and 19, T30N, R93W and then veers west, away from the proposed pipeline route. The PA intersects the road near Crooks Gap and just north of Graham Ranch county road.

The **Graham Ranch site** is a prehistoric camp and bison butchering site overlooking the Sweetwater River. It has been determined eligible for inclusion on the NRHP under Criterion D. Major data recovery excavations were conducted at the site in conjunction with the Lost Creek Pipeline project (Smith 2005). Most of the artifacts and faunal remains were associated with the most deeply buried cultural component, which yielded radiocarbon age estimates of 4,410, 4,310, and 4,320 years before present. It most likely represents a single occupation where bison processing, retooling, and limited tool manufacture and finishing took place. Close proximity of cultural materials and faunal remains around four features indicates that all activities were tightly clustered around the central processing area encompassed by a shallow depression that possibly reflected the remains of a small structure.

Site 48FR4234 is a prehistoric camp on a finger ridge overlooking a tributary of Little Sand Draw. It is associated primarily with an area of wind-blown deposits on the crest and lee slope of the ridge. It has been determined eligible for nomination to the NRHP under Criterion D. Cultural material identified at the site is limited to a flaked stone tool, debris from the manufacture of flaked stone tools, and rock heated in hearths. Lost Creek Pipeline and the PA cross a portion of the site that lacks the elements that qualify the site for nomination to the NRHP, including the potential to contain buried prehistoric occupation surfaces.

Site 48FR4246 is a prehistoric camp on a terrace of an ephemeral tributary of the Sweetwater River. It is associated primarily with patches of wind-blown sand. It has been determined eligible for nomination to the NRHP under Criterion D. Cultural material identified at the site is limited to debris from the manufacture of flaked stone tools and rock heated in hearths. Lost Creek Pipeline and the PA cross a portion of the site that lacks the elements that qualify the site for nomination to the NRHP, including the potential to contain buried prehistoric occupation surfaces.

Site 48FR4251 is a large prehistoric camp at the southwestern edge of the Sweetwater River floodplain. It is associated primarily with an area of wind-blown deposits. It has been determined eligible for nomination to the NRHP under Criterion D. Diagnostic artifacts dating to several different prehistoric periods have been recorded at the site. Other cultural material identified at the site includes a hearth, charcoal stained sediment, a grinding stone, and debris from the manufacture of flaked stone tools. Lost Creek Pipeline and the PA cross a portion of the site that lacks the elements that qualify the site for nomination to the NRHP, including the potential to contain buried prehistoric occupation surfaces.

Site 48FR506 is a prehistoric open camp on the top and end of a dune-capped finger ridge in the Beaver Creek Oil Field. The site consists of the remains of several prehistoric hearths, grinding stone fragments, flaked stone tools, and debris from the manufacture of flaked stone tools. It is potentially eligible for nomination to the NRHP with under Criterion D but has not been formally evaluated since it will be avoided by a realignment of the PA.

The 28 cultural properties previously determined ineligible for inclusion on the NRHP are primarily prehistoric camps or limited activity areas. The primary exception is the Crooks Gap Oil Field, a minor historic oil field dating primarily from the mid-1940s. Other exceptions include a minor historic ditch near the Sweetwater River and several trash scatters.

The Northern Gas Line alternative (Alternative B) follows a route that is very similar to that of PA with regard to the types of archaeological resources likely to be present, including archaeological sites not identifiable on the ground surface, and the Alternative B route also crosses the Oregon Trail and the Rawlins Fort Washakie Road. Most of the Alternative B route has not been inventoried for cultural resources, but it may have higher potential to contain a greater number of significant prehistoric and historic cultural properties than the PA, because the Lost Creek Pipeline corridor followed by the PA avoided NRHP-eligible sites while the Northern Gas Line route did not avoid any sites.

Potential Environmental Consequences – Cultural Resources

Construction of the pipeline according to the Preferred Alternative would impact one prehistoric archaeological site that has been determined eligible for nomination to the National Register of Historic Places (NRHP). The pipeline would be constructed through a portion of Site 48FR4251 that lacks the characteristics that qualify the site as a whole for the NRHP, and therefore the impact to the site would be negligible. Otherwise, the final Preferred alternative has been designed to avoid NRHP-eligible or unevaluated archaeological sites. Construction according to the Preferred Alternative has potential to impact buried archaeological resources that may be eligible for nomination to the NRHP, but impacts to buried sites are not foreseeable or avoidable. Impacts to buried sites during construction are likely to be spatially limited to the width and depth of the pipeline trench, except potentially in areas of wider excavation for borings, stream bottom access, or escarpment ascent or descent. Impacts to buried sites discovered during construction would be addressed according to a discovery plan approved by the BLM.

Construction according to the Preferred Alternative would cross the Oregon Trail and the Rawlins-Fort Washakie Road, both of which have been determined eligible for the NRHP. Construction across these historic routes and their viewsheds would be restricted to previously disturbed areas, and therefore no long-term or permanent impacts would occur in regard to these resources. Temporary impacts during construction and reclamation phases will include presence of equipment,

construction materials, and personnel. Installation of pipeline markers in previously disturbed areas near the crossings of these historic routes will be a negligible impact

Indirect impacts to NRHP-eligible sites as a result of construction of the Preferred Alternative might include increased erosion of sites near the construction right-of-way caused by the disturbance of erosion-sensitive deposits within the construction right-of-way. Such erosion could result in the loss or degradation of elements or attributes of sites that contribute to their significance. Cultural properties buried in wind-blown sand, such as the Graham Ranch site, may be especially susceptible to such damage. Indirect impacts might also include increased damage to sites resulting from increased accessibility provided by the pipeline corridor, including greater unauthorized artifact collection and disturbance caused by off-road vehicles.

Alternative B (the Northern Gas Line route) would likely result in direct and indirect impacts to cultural resources similar to or possibly greater than those of the Preferred Alternative. The Alternative B route has not been the subject of cultural resource inventory, and the specific cultural properties potentially affected and/or the ability to avoid NRHP-eligible properties are not known. However, Alternative B is situated in a similar topographic and ecological context and is likely to contain cultural properties similar to those of Alternative C, including similar buried sites or sites with similar significant buried elements. Construction according to Alternative B also would intersect the Oregon Trail and the Rawlins-Fort Washakie Road. In contrast to the Preferred Alternative, it is not known if any identified NRHP-eligible sites could be avoided or if the construction right-of-way could be restricted to previously disturbed areas adjacent to the Oregon Trail and Rawlins-Fort Washakie Road or their viewsheds. Therefore, Alternative B could potentially have greater direct impacts on NRHP-eligible properties than the Preferred Alternative. Potential indirect impacts under Alternative B are identical to those of the Preferred Alternative.

Potential cumulative impacts for cultural resources primarily consist of diminishment of the body of scientific information available from archaeological sites and successive removal of physical elements that represent events or patterns in history. Although this project is 47 miles long, it has a narrow disturbance zone, and the Preferred Alternative has been designed to avoid impacts to historic and prehistoric resources. Construction according to the Preferred Alternative would result in no foreseeable cumulative impacts to cultural resources. Construction according to Alternative B would have unknown potential for cumulative impacts, because that route has not been inventoried for cultural resources. The potential for cumulative impacts arising from disturbance of as yet unknown, buried archaeological sites is similar for Alternative B and the Preferred Alternative, and such impacts would be ameliorated through recordation and treatment according to the archaeological discovery plan.

Alternative A (No Action) would not result in any impacts to cultural resources.

3.2 Wildlife Resources and Wild Horses

Affected Environment

Criteria for determining affected wildlife resources for the PA and alternatives were adapted from the criteria used for evaluation in the Lost Creek Gathering System Project EA. Wildlife surveys would be completed during the appropriate periods and if any new information is found, it would be added to the EA and appropriate mitigation methods, including rerouting the pipeline or constructing outside wildlife stipulations, would be implemented as needed.

Big game species that occur in the area of the proposed Project include pronghorn, mule deer, white-tailed deer, moose and Rocky Mountain elk. Key winter areas defined as "crucial winter range" for pronghorn, mule deer, white-tailed deer, and moose would be crossed by the proposed route. No important parturition areas would be crossed (BLM, 1999).

- Pronghorn and mule deer occur throughout the majority of the proposed Project area.
- White-tailed deer summer habitat occurs along the willow-waterbirch and cottonwood stands along creeks and rivers and white-tailed deer winter habitat coincides with that of mule deer.
- Moose typically occupy forested riparian areas and are found along the Sweetwater River and in Crooks Gap.
- Rocky Mountain elk occur mainly at higher elevations, but have been documented within the Green Mountain area of the proposed Project.

Acres of seasonal habitat, for each of the big game species that would be impacted by the pipeline project, are described in the table below.

Table 3.2: Seasonal Big Game Habitat Impacted by Devon CO_2 Pipeline Project

	Pronghorm	Mule Deer	Moose	Elk
Crucial Winter Range (acres)	189	NA	9.4	NA
Spring/Summer/Fall (acres)	117	24.5	24.6	6.1
Yearlong (acres)	613	130	NA	NA
Winter/Yearlong (acres)	197	32.6	NA	NA

Bird species that occur in the proposed project area include neo-tropical migratory, upland game, water, and raptors. Representative neo-tropical birds found in the area include Say's phoebe, horned lark, barn swallow, black-billed magpie, lark bunting, and western meadowlark. Upland game birds found in the area include the greater sage-grouse, chukar, gray (Hungarian) partridge, and the mourning dove. Of these, the greater sage-grouse is considered the most sensitive upland game bird for the region, based on breeding, nesting, and brooding habitat requirements. Surveys for active leks have been conducted along the Project ROW using ground inventory procedures. All historic and newly identified leks within two (2) miles of the proposed Project ROW would be surveyed to determine whether or not they are active. The Lost Creek pipeline was allowed by the BLM to construct, outside of the timing stipulations, through two (2) sage grouse leks southeast of Cedar Rim. The PA will follow the same route, again outside of the timing stipulations. Since the birds returned to the site following construction of the first pipeline, Devon expects similar results. In an effort to minimize disturbance, there will be no more than twenty (20) feet of additional disturbance in the area from Milepost 24.34 to Milepost 30.35.

Numerous species of waterfowl nest and migrate throughout the proposed Project region. Key yearlong species include the Canada goose and mallard, green-winged teal, northern pintail, American widgeon, and gadwall ducks. Summer residents include the blue-winged teal, cinnamon teal, northern shoveler, and redhead ducks.

Raptor species that could potentially occupy the habitats within the Project area include golden eagles, buteos (red-tailed hawk, Swainson's hawk, ferruginous hawk), falcons (peregrine falcon, prairie falcon, American kestrel), accipters (sharp-shinned hawk), owls (great-horned, burrowing, long-eared, and short-eared owls), the northern harrier, and the turkey vulture. Where the PA would cross the Sweetwater River, potential bald eagle habitat was surveyed but was ruled out as "unsuitable" for roosting and nesting due to the predominance of willow and shrubs and the lack of adequately sized trees.

During the 2007 surveys, ARCADIS confirmed the location and current breeding season status for six of the 24 historic nest locations. Two of the six nests were documented as active (great horned owl and red-tailed hawk). Biologists also documented thirty-nine previously unrecorded nests within ¾ mile of the pipeline route. These nests include:

- 20 – Ferruginous hawk (a BLM listed Sensitive Species)
- 5 – Common raven
- 4 – Red-tailed hawk
- 1 – Golden eagle
- 1 – Burrowing owl (a BLM listed Sensitive Species)
- 8 - Unknown

Mammalian species known to occur in the project area include common predatory mammals such as the coyote, red fox, raccoon, long-tailed weasel, badger, striped skunk, and the bobcat. Also found are small mammals such as the white-tailed jackrabbit, least chipmunk, northern pocket gopher, Ord's kangaroo rat, deer mouse, and voles.

Reptile and Amphibians known to occur in the project area include the eastern short-horned lizard, northern sagebrush lizard, prairies rattlesnake, bullsnake, wandering garter snake and tiger salamander.

BLM Sensitive species: Several Wyoming-BLM listed Sensitive Species occur within the project area. Strutting greater sage grouse were observed at four previously identified leks and three additional leks along the proposed pipeline route. The sagebrush steppe habitat within the project area is suitable for sage grouse breeding, nesting, brood-rearing, and wintering. Sagebrush canopy cover and height along the central and southern portions of the pipeline route is adequate for sage grouse nest concealment. Riparian areas along drainages contain a diverse mix of forbs that could potentially be used by sage grouse and their broods during summer and early fall. The proposed route largely follows and existing ROW; therefore, additional fragmentation of expansive stands of sagebrush is not anticipated (ARCADIS, 2007).

There is suitable habitat for breeding and nesting mountain plovers along the proposed pipeline, specifically in previously disturbed sites that have not substantially vegetated. Much of the project would occur in habitat generally unsuitable for mountain plovers as herbaceous vegetative cover exceeds 30% and plant height is over 4 inches. Surveys have been completed by ARCADIS biologists for suitable mountain plover habitat and plover use within these areas. There were three mountain plover observations (One pair and two individuals), but no nests were found in the project area.

White-tailed prairie dog colony surveys are completed and twelve small colonies have been identified along the proposed ROW. Towns ranged between 0.50 and 133.86 acres and occurred primarily along the previously disturbed pipeline corridor (ARCADIS, 2007).

Pygmy rabbit habitat surveys have been completed. One area in the Crook's Creek area was looked at as potential habitat but has been ruled out as "unsuitable" due to the riparian nature of the site (ARCADIS, 2007).

Sage thrashers, loggerhead shrikes, Brewer's sparrows, and sage sparrows are Sensitive Species songbirds found in the project area. They are sagebrush obligate species dependent on the shrub community found along the proposed ROW. Long-billed curlews may occur in habitats near or on riparian habitats along the proposed route.

The northern leopard frog could occur in permanent water near the Sweetwater River, Ice Slough, or Crooks Creek.

Only two perennial streams (the Sweetwater River and Crook's Creek) contain **fish species**. The Sweetwater River in the area of the proposed Project crossing is designated by the Wyoming Game and Fish Department (WGFD) as a Class 2 trout stream. Game fish species inhabiting this section of the river include brown trout, rainbow trout, Snake River cutthroat trout, and Bear River cutthroat trout. Both rainbow and brown trout naturally reproduce in this section of the river and brown trout is stocked by the WGFD in upstream areas. Native non-game species in this section of the Sweetwater River include the creek chub, lake chub, white sucker, longnose dace, and longnose sucker.

Crook's Creek is also considered a Class 3 trout stream due to the presence of brook trout; the segment crossed by the proposed pipeline is considered marginal habitat, however, due to low summer flows, erosion, and lack of cover. Non-game species in Crook's Creek include creek chub and longnose sucker.

Wild Horse herds occur in two general areas of the PA. The Crooks Mountain Herd Management Area (HMA) is located west of the PA and "directly southeast of Sweetwater Station, Wyoming, and encompasses about 51,000 acres, The appropriate management level (AML) for this HMA is 65-100 adult horses…(the) topography within the HMA is generally rolling hills and slopes to the north and south of Crook Mountain. The Crooks Mountain portion of the herd area is quite steep and broken with mountainous terrain. The area supports substantial wildlife populations of elk, deer, and antelope. Livestock graze the area from May to December."

The Green Mountain HMA lies to the east of the Bairoil pipeline tie-in and "encompasses 88,000 acres. Of which 74,000 are BLM-administered public lands. Topography within the herd area is generally gently rolling hills and slopes north and south of Green Mountain…The AML for this HMA is 300 horses…Domestic cattle and sheep utilize the area in all seasons with summer cattle use predominating. Vegetation around the mountain is dominated by various sage, grass, woodland, and riparian species. The area supports substantial wildlife populations of elk, deer, antelope, and moose."

Table 3.3: Potential Environmental Consequences – Wildlife Resources and Wild Horses			
	Direct Impacts	**Indirect Impacts**	**Cumulative Impacts**
Alternative A: No Action	No impacts	No impacts	No impacts
Alternative B: Northern Gas Line Route	**Big game species**: Construction activities would result in incremental, short-term loss of native vegetation within the ROW. Blading of the ROW and TUAs would remove shrubs and result in the loss of forage plants for wintering antelope and mule deer until sagebrush or woody plants are reestablished. Big game species would be temporarily displaced from construction and human presence up to approximately 0.5 mile away from the proposed ROW. There would be a temporary disruption of migratory routes if construction occurs during spring or fall migration periods. There would be an increased potential for collisions between vehicles and big game during construction activities. **Bird species (including Sensitive Species)**: There would be a loss of seasonal (wintering, breeding, nesting, and/or brooding) and foraging habitats for raptors, neo-tropical, and upland game birds until disturbance areas return to pre-construction conditions. Until sagebrush establishes, there would be a reduction in amount of suitable nesting and foraging habitat for sagebrush obligate songbirds and upland game birds such as sage grouse, sage thrasher, Brewer's sparrow, and sage sparrow as well as for species dependent on sagebrush habitats for their prey base (raptors, loggerhead shrike). Construction activities during the breeding season for all bird species could result in nest failure, predation, abandonment or destruction, affecting the annual year's recruitment. Noise from construction activities and human presence could displace birds into less desirable habitats having reduced hiding cover and/or poorer forage quantity and quality. Many of the raptor nests are located on utility line poles, knolls, and trees, which results in a direct line-of-site with the proposed route and could result in nest abandonment or loss of eggs or young. Burrowing owls could be crushed if prairie dog towns/burrows are impacted by construction activity. Removal of plant material and leveling of the ROW could create additional suitable breeding and nesting habitat for	**Big game species:** Additional stress could be placed on animals if construction occurs during birthing or winter periods when big game are most vulnerable. Stress during these periods could result in decreased reproductive success and nutritional conditions from increased energy expenditure. There could be continued avoidance of disturbed areas after construction is completed. Areas not fully reclaimed would result in continued habitat loss. Habitat fragmentation could influence the suitability of adjacent habitats, particularly in undisturbed areas. **Bird species (including Sensitive Species)**: Since sage grouse depend on the availability of Wyoming big sage for cover and forage, the removal of sage during the construction period could affect the birds' ability to use the area for an extended period of time (>5 years). Areas not fully reclaimed would result in continued habitat loss. Habitat fragmentation could influence the suitability of adjacent habitats, particularly in undisturbed areas. **Small Mammals (including Sensitive Species)**: Habitat fragmentation could influence the suitability of adjacent habitats, particularly in undisturbed areas.	**Big game species:** This project would contribute to the number of habitat acres that have been altered or lost by disturbance and development affecting its capability to provide forage and cover requirements for big game. **Bird species (including Sensitive Species)**: While individual nests and breeding grounds would be protected, it is likely that habitat fragmentation would occur within the project area as other development projects arise. Impacts to sage grouse breeding and nesting habitats could contribute to the decline of the species to the point of it being listed as threatened or endangered. This project would contribute to the reduction in the number of suitable habitat acres that provide forage and cover for birds. **Small Mammals (including Sensitive Species)**: Constructing the pipeline along the Northern Gas Line route could result in increased surface in the area of the Alternative A route and could result in incremental losses in forage vegetation and increased habitat fragmentation. This project would contribute to the number of altered habitat acres that provide forage and cover for small mammals. **Reptiles and Amphibians (including Sensitive Species):** This project would contribute to the number of acres that have been altered by disturbance that provide habitat for reptiles and amphibians.

Table 3.3: Potential Environmental Consequences – Wildlife Resources and Wild Horses (cont.)			
Alternative B: Northern Gas Line Route (cont.)	mountain plover. **Small Mammals (including Sensitive Species)**: Mortalities of less mobile, burrowing species within the ROW could occur from crushing by vehicles and equipment. It is expected that species with greater mobility would be temporarily displaced due to the short-term loss of vegetation and from noise due to construction activities. There would be an incremental increase in habitat fragmentation until disturbance areas are fully reclaimed. There would be displacement of prairie dogs during construction. Some mortality of individuals could occur from blading and trenching operations, including other burrowing inhabitants of dog colonies such as badgers, chipmunks, ground squirrels, and burrowing owls. **Reptiles and Amphibians (including Sensitive Species):** Mortality of individual reptile species could occur due to crushing by vehicles and equipment or by falling into trench and not being able to get out. There could be animal mortality and loss of suitable habitat for amphibians, including the northern leopard frog, which would be limited to those riparian habitats where the pipeline is not bored under. **Fisheries**: Sediment loads could be added to fisheries from soil stockpiles adjacent to pipeline bore activities. **Wild Horses:** No direct impacts are expected as the PA does not cross either HMA. Horses could be temporarily displaced due to construction noise. Horses could get into the open trench and not be able to get out if the boundary fence close to the proposed ROW is breached.	**Reptiles and Amphibians (including Sensitive Species):** Areas not fully reclaimed would result in continued habitat loss. Habitat fragmentation could influence the suitability of adjacent habitats, particularly in undisturbed areas**.** **Fisheries**: None **Wild Horses**: None	**Fisheries**: None **Wild Horses**: None
Alternative C: Proposed Action	Impacts would be the same as in Alternative B, except that there would be a small decrease in the amount of sagebrush removed from the ROW because the ROW would overlap the existing Lost Creek pipeline. There would be an impact to the sage grouse leks on Cedar Rim as the pipeline would go through the ¼-mile lek protection buffer. Physical alteration of these leks could cause sage grouse to abandon the strutting grounds resulting in reduced breeding activity.	Impacts would be the same as in Alternative B. Physical alteration of the sage grouse leks on Cedar Rim could cause sage grouse to abandon these strutting grounds in subsequent years, resulting in reduced recruitment into the population.	Impacts would be the same as in Alternative B.

3.3 Soils and Vegetation

Affected Environment

General soils information for the PA was obtained from the USDA Natural Resource Conservation Society (NRCS) or was inferred, based on vegetation and topographic features. The dominant vegetation type (91%) within two miles of the proposed Devon pipeline is Wyoming big sagebrush (*Artemesia tridentate wyomingensis)*. Other vegetation types found within the PA are listed in Table 3.4 *Land Cover Data from the Gap Analysis Project (GAP) Data of Wyoming (1996).* The topography in the Project area varies greatly, as do the associated soils (Table 3.5). In general, soils are loamy to sandy or gravelly and range from shallow to moderately deep. Badlands, characterized by steep, barren relief with high runoff and erosion rates, can be found in two areas at the northern end of the proposed route. Selenium, a naturally occurring element and a micro nutrient for both plants and animals, can be found in moderate to high concentrations in some Wyoming soils. The Wind River Basin, which would be partially crossed by the Project, possesses levels of selenium that may be highly toxic to animals in localized areas. Soils throughout the project area are susceptible to wind and water erosion, especially in badlands, in areas of naturally low vegetative cover, and in areas where overgrazing has occurred. Additionally, when disturbed, the sandy soils that are characteristic of the top of Beaver Rim and through Crook's Gap are also highly susceptible to wind erosion.

Table 3.4: Land Cover Data from the Gap Analysis Project (GAP) Data of Wyoming (1996)
Data sets are 1:100,000 scale. Acreage is based on a 2-mile buffer around the proposed pipeline route.

Veg Code	Vegetation cover type	Acres	% Project Area	Description
32007	Wyoming big sagebrush	113986	91.16%	Wyoming big sagebrush (*Artemsia tridentata* ssp. *Wyomingensis*) comprises more than 25% of the total vegetative cover. In areas with mixed grasses, sagebrush patches must occupy more than 50% of the total ground cover
42015	Juniper woodland type	3289	2.63%	Juniper species *(Juniperus* spp.) comprise more than 25% of the total vegetative cover. Found on foothills and rocky outcrops.
74001	Basin bare rock and soil	2252	1.80%	Naturally occurring areas of bare rock and soil with total vegetation cover less than 15%
42009	Limber pine woodland and scrub	2154	1.72%	Limber pine (*Pinus flexilis*) dominated woodland where trees constitute 25% of total vegetation cover. Found on dry slopes and ridges; often co-occurs with juniper and/or shrubs and grasses in understory.
62001	Shrub dominated riparian	1998	1.60%	Riparian zones where shrubs comprise more than 25% of the vegetation cover and where trees occupy less than 25% of the total vegetation cover. Diagnostic species include willow (*Salix* spp)., sage (*Artemisia* spp.) and greasewood, (*Sarcobatus vermiculatus)*.
75001	Mining operation/disturbed ground	743	0.59%	Development associated with active and unreclaimed mine sites or gas and oil extraction where vegetation has been removed or damaged over areas larger than 100 hectares.
62002	Grass dominated wetland	318	0.25%	Non-riverine wetland with vegetation dominated by forbs or grasses. Trees or shrubs cannot occupy more than 25% of total vegetation. Diagnostic species include *Sporobolus airoides*, *Typa* spp., *Distichlis stricta*, *Juncus balticus*, *Spartina gracilis*.
32012	Greasewood fans and flats	281	0.23%	Greasewood (*Sarcobatus vermiculatus*) comprises more than 75% of total shrub cover and where shrubs comprise more than 25% of the total vegetative cover.
31001	Mixed grass prairie	19	0.01%	"Catch-all" type for grasslands that contain a mixture of short grass and tall grass prairie species. Often occurs in patches intermixed with shrub species (i.e. *Artemisia tridentata*) where grass patches occupy more than 50% of landscape. Diagnostic species include *Agropyron smithii*, *Bouteloua gracilis*, *Stipa comata, Artemesia cana, Eurotia lanata, Carex filifolia, Poa sandbergii, Chyrsothamnus viscidiflores, Koeleria cristata, Tetradymia caespitosa, Opuntia polyacantha, Oryzopsis hymenoides.*
42004	Lodgepole pine	1	0.00%	Lodgepole pine (*Pinus contorta*) dominates the forest canopy with a canopy closure of greater than 25%.
	Total Acreage	**125040**	100%	

Source: Wyoming Gap Analysis project (WY-GAP) 1996.

The topography of the project area is characterized by gently rolling hills and moderately incised ephemeral drainages. Elevations range from 7000 feet on the southern end of the line to 6500 feet along the majority of the southern to middle portions of the line. The elevation reaches 7300 feet on Beaver Rim and, as the pipeline continues north, elevation drops significantly to 6100 feet in Sand Draw and then drops again to 5230 feet at the terminus of the proposed line at the Beaver Creek Oil Field (ARCADIS, 2007).

The upland portions of the project areas contained a mixture of shrubs, grasses, and forbs. As mentioned previously, Wyoming big sagebrush is the predominant shrub species along the proposed pipeline route. Sparse patches of Basin big sagebrush (*Artemesia tridentate tridentata)* occurred along stream bottom lands, Rubber rabbitbrush (*Chrysothamnus nauseosus)* was frequently observed along disturbed areas, and antelope bitterbrush (*Pursia tridentata*) was found on shallow soils and rocky ridges along the route (ARCADIS, 2007).

Cottonwood and aspen trees (*Populus spp.*), willows (*Salix spp.*), Russian olive (*Elaeagnus angustifolia*) and Limber pine (*Pinus flexilis*) were encountered sporadically along the pipeline route. Cottonwood and aspen stands were documented along Crooks Creek, Mason Creek, and Beaver Creek where sufficient hydrology occurred to sustain these riparian species. Stands of willow occurred along Mason Creek and the Sweetwater River floodplain. Invasive Russian olive trees were observed along Beaver Creek in the northern portion of the project area. Pine trees were present at higher elevations on Beaver Rim and Crooks Peak (ARCADIS, 2007).

Typical grass and forb species intermixed with the sagebrush include Western wheatgrass (*Pascopyrum smithii* var. Rosanna), Blue grama (*Bouteloua gracilis*), needle-and-thread grass (*Hesperostipa comata*), Sandberg bluegrass (*Poa sanbergii*), prickly pear cactus (*Opuntia polycantha*), Indian ricegrass (*Achnatherum hymenoides*), cushion phlox (*Phlox hoodii*), lance-leaf stonecrop (*Sedum lanceolatum*), asters (*Aster spp.*), yarrow (*Achillea millefolium*), buchwheats (*Eriogonum spp.*), parsley (*Lomantium spp.*), and pepperweeds (*Lipidium spp.*). Invasive downy brome (*Bromus tectorum*) was encountered consistently within the project area (ARCADIS, 2007).

Threatened and Endangered Species: Desert yellowhead (Y*ermo xanthocephalus)* is a USFWS Threatened species. ARCADIS conducted surveys for this species during the summer of 2007 and, although potential habitat was found, no plants were observed in or out of the project area. The proposed action would occur outside designated Critical Habitat for Desert yellowhead.

Sensitive Species: Cedar Rim Thistle (*Cirsium aridum*), Porter's sagebrush (*Artemisia porteri),* Rocky mountain twinpod (*Physaria saximontana* var. saximontana), and Beaver Rim Phlox (*Phlox pungens*) are considered to be Wyoming BLM Sensitive Species. ARCADIS conducted surveys for these species during the appropriate season (summer, 2007). Potential habitat was found for all four species, but Rocky mountain twinpod was not observed in or out of the project area. Any suitable habitat for Ute's Ladies Tresses identified during the wetland survey would be bored by the PA (ARCADIS, 2007).

Porter's sagebrush was observed at two locations, both at the northern end of the pipeline route in the Big Sand Draw Oil and Gas Field. Cedar Rim thistle was observed at 10 locations. Seven of the populations were located on either side of the Beaver Rim and the other three were located in the Jeffrey City and Crooks Gap gas field areas. Beaver Rim phlox was observed in two locations, one of which was well outside the project area. The second population was located on a south-facing slope north of Cedar Rim (ARCADIS, 2007).

Weeds: The invasion and spread of noxious weeds is a problem on both public and private lands. Please see the Integrated Pest Management Plan in Appendix H of the POD for specifics related to the control of weeds identified in the project area.

Table 3.5: USDA NRCS Soils Characterization				
Soil Name	**Ecosite**	**Texture**	**Total Acres**	**Mileposts (Appendix C)**
Absher-Elkol Complex	Saline lowland	Clay loam or clay	28.5	45.1-45.5, 45.6-off, 45.7-46.4, 45.0-45.1
Almy-Monbutte-Rallod Complex	Loamy	Loam or sandy clay loam	75.6	36.1-36.2, 36.6-37.2, 39.2, 39.3-off, 41.0-42.6, 42.9-43.3, 43.5, 43.8, 43.9-44.1
Blackhall-Carmody Association	Shallow sandy	Loam, sand, or clay	58.8	6.52, 6.79-6.91, 7.20-7.27, 7.51-7.64, 8.62-8.70, 8.72-8.82, 8.95-9.15, 20.3-20.5, 31.4-31.5, 31.6-31.7, 32.8-32.9, 33.1, 34.6-34.8, 36.1, 36.2-36.6, 40.5-41.0, 43.3-43.4,
Brownsto very bouldery-Decross variant-Brownsto Complex	Coarse upland	Loam, sandy clay sand >35% rocks	1.13	3.76-3.78
Bluerim-Onason Complex	Sandy	Loam or sandy clay loam	10.2	1.03-1.20, 1.28-1.43, 1.85-1.98
Blazon-Rock Outcrop-Carmody Complex	Shallow clayey	Rock outcrop, loam, sand, or clay	28.9	33.1-34.4
Bosler-Ryan Park Fine Sandy Loams	Sandy	Loam, Sandy clay loam, or sand >35% rocks	44.4	15.2-15.4, 15.6-16.4, 17.2-17.9, 21.1-21.2, 21.4-21.5
Bosler-Rock River Sandy Loams	Sandy	Loam, Sandy clay loam, or sand >35% rocks	186	3.85-4.43, 4.53-4.86, 5.38-5.98, 6.14-6.22, 9.5-9.50-9.78, 10.0-10.2, 10.3, 10.5-10.8, 12.6-14.9, 15.4-15.6, 16.4-17.2, 22.3-23.1, 24.7-24.9, 26.4-26.9, 27.3-27.4, 27.6-27.7, 27.8-off
Badland-Seaverson-Blazon Complex	Saline upland	Loam, sand, or clay	4.52	38.8-off, 39.0, 40.6-off, 43.6-43.7, 43.7-43.8, 45.1-off, 45.5-45.6
Countryman-Absher Complex	Saline subirrigated	Loam, sand, or clay	5.90	20.8-21.1
Cragosen-Bosler-Cushool Association	Shallow loamy	Loam, sand, or clay	28.5	24.2-24.3, 25.4-off, 25.8-26.0, 26.9-27.3, 29.3-29.7
Cragosen-Carmody-Blazon Complex	Shallow loamy	Loam, sandy clay sand >35% rocks	12.7	6.28-6.35, 19.3-19.5, 29.9-30.0, 30.2, 30.6
Cragosen-Rock Outcrop-Carmody Complex	Shallow loamy	Loam, sandy clay sand >35% rocks	95.3	21.2-21.4, 21.5-22.1, 23.1-23.2, 23.3-23.6, 23.6-24.4, 24.3-24.7, 24.9-2538, 25.9-off, 26.0-26.4, 27.4-27.6, 27.7-27.8, 29.2-29.3, 29.7-29.8, 32.6-32.8,
Cushool-Rock River Association	Sandy	Loam, sand, or clay	91.2	6.22-6.28, 6.35-6.79, 6.91-7.2, 7.27-7.51, 7.64-7.74, 8.56-8.62, 17.9-19.3, 19.5-19.6, 20.1-20.3, 20.5-20.8, 20.9, 22.1-22.3, 39.0-39.2, 40.2-40.3,
Diamondville-Forelle Association	Loamy	Loam or sandy clay loam	84.6	27.8-29.2, 30.0-30.6, 30.7-31.4, 31.5-31.6, 31.7-32.5, 32.9-33.0
Dahlquist-Rock River Complex	Coarse upland	Loam, sandy clay sand >35% rocks	25.1	0.8-1.03, 7.74-8.56

Table 3.5: USDA NRCS Soils Characterization (cont.)				
Forelle-Poposhia Association	Loamy	Loam or sandy clay loam	9.72	34.8-34.9, 35.0-35.2, 35.7-35.8
Havre-Absher-Forelle Loams	Loamy overflow	Loam or sandy clay loam	55.6	3.26-3.72, 5.98-6.14, 37.5-38.8, 44.1-44.3, 44.4-44.5, 44.8-45.0
Havre-Forelle-Glendive Complex	Loamy overflow	Loam or sandy clay loam	39.3	2.26, 2.38, 3.68-off, 3.78-3.85, 4.94-5.00, 5.33-5.38, 9.15-9.24, 10.2, 23.2-23.3, 23.6, 34.1-off, 34.4-34.6, 35.9-36.1, , 44.3-44.4, 44.5-44.8, 44.9, 45.1, 45.6-45.7
Havre-Havre Variant-Elkol Complex	Loamy overflow	Loam or sandy clay loam	0.07	45.8-off
Iceslew-Countryman Complex	Saline subirrigated	Loam or sandy clay loam	5.87	15.0-15.2
Poposhia-Blazon-Carmody Complex	Saline subirrigated	Loam, sand, or clay	23.8	34.9-35.0, 31.2-35.7, 35.8-35.9, 37.2-37.5, 37.9-off
Rock Outcrop-Blackhall Complex	Shallow sandy	Sandy loam	0.32	33.0-33.1
Ryan Park-Carmody Association	Sandy	Sandy loam	78.4	4.43-4.53, 4.86-4.94, 5.00-5.33, 8.62-off, 8.70-8.72, 8.82-8.95, 9.00-off, 9.24-9.50, 9.78-10.0, 10.2-10.3, 10.3-10.5, 10.8-11.8, 12.3-12.6, 19.8-20.1, 29.8-29.9, 32.5-32.6,
Ryan Park Loam Fine Sand	Sandy	Sandy loam	17.1	11.8-12.3, 15.1-off, 19.6-19.8
Rallod-Rock Outcrop-Seaverson Complex	Shallow clayey	Clay loam to clay	49.3	38.8-39.0, 39.2-40.2, 40.3-40.5, 40.8-off, 41.8-off, 42.6-42.9, 43.4, 43.5-43.6, 43.7, 43.8-43.9
Ryark Sandy Loam	Sandy	Sandy loam	61.6	0.00-0.80, 1.20-1.28, 1.43-1.85, 1.98-2.26, 2.38-3.26, 3.72-3.76
Tisworth-Ryan Park-Countryman Complex	Sandy	Loam or sandy clay loam	1.68	14.9-15.0

Table 3.6: Potential Environmental Consequences – Soils and Vegetation			
	Direct Impacts	**Indirect Impacts**	**Cumulative Impacts**
Alternative A: No Action	No impacts	No impacts	No impacts
Alternative B: Northern Gas Line Route	**Soils**: Construction activities would cause mixing and compaction of subsurface soils along the ROW, clearing activities would temporarily increase wind and water soil erosion in the cleared area of the ROW until vegetation is reestablished. **Vegetation**: Construction and clearing activities would result in the removal and crushing of vegetation within the ROW, TUAs, and ancillary facilities, long-term loss (5-15 years) of woody species. **Sensitive plant species**: Individual plants as well as small populations could be removed during blading operations along the ROW.	**Soils:** Compaction of subsurface soils could result in decreased moisture infiltration and decreased vegetation production; increased soil erosion could result in the loss of valuable soil nutrients and a more pronounced decrease in vegetation production. **Vegetation**: Short-term reduction in herbaceous, and other, forage productivity due to low vegetative cover, potential invasion of noxious weeds due to surface disturbance. **Sensitive plant species**: Adjacent populations could be impacted from dust generated from construction activities affecting their propagation ability.	**Soils**: No cumulative effects by existing and reasonably foreseeable projects are expected. **Vegetation**: See **Soils** above. **Sensitive plant species**: Loss of individual plants or populations could contribute to the overall decline in sensitive species populations, resulting future listing of the species.
Alternative C: Proposed Action	**Soils**: Construction activities would cause mixing and compaction of subsurface soils along the ROW, clearing activities would temporarily increase wind and water soil erosion in the cleared area of the ROW until vegetation is reestablished. **Vegetation**: Construction and clearing activities would result in the removal and crushing of vegetation within the ROW, TUAs, and ancillary facilities, long-term loss (5-15 years) of woody species. **Sensitive plant species:** Individual plants as well as small populations could be removed during blading operations along the ROW. **Acres of direct impacts: 474.1**	**Soils:** Compaction of subsurface soils could result in decreased moisture infiltration and decreased vegetation production. Increased soil erosion could result in the loss of valuable soil nutrients and a more pronounced decrease in vegetation production. **Vegetation**: Short-term reduction in herbaceous, and other, forage productivity due to low vegetative cover, potential invasion of noxious weeds due to surface disturbance. **Sensitive plant species**: Adjacent populations could be impacted from dust generated from construction activities affecting their propagation ability.	**Soils**: No cumulative effects by existing and reasonably foreseeable projects are expected. **Vegetation**: See **Soils** above. **Sensitive plant species**: Loss of individual plants or populations could contribute to the overall decline in sensitive species populations, resulting future listing of the species **Acres of cumulative impacts, in acres, based on the assumption of disturbance for an additional pipeline in the same general area**: **948.2**

3.4 Floodplains and Riparian/Wetland Zones

Affected Environment

Wetlands identified within the proposed project area were identified using the National Wetland Inventory (NWI) maps and recently completed surveys have confirmed that, due to the small size of most of the classified wetlands and the fact that larger perennial wetlands would be bored, Devon is covered under Nationwide Permit 12 (Burgan, 2007).

Two wetland systems, as determined by the USFWS's classification of Wetland and Deepwater Habitats of the United States (USFWS 1979), occur in the Project area. The **Riverine Systems** include deepwater habitats contained within a river or stream channel. These systems are semipermanently to permanently flooded and are typical of perennial streams and ephemeral washes. **Palustrine Systems** include vegetated wetlands such as marshes; fringe areas adjacent to stream channels that are temporarily or seasonally flooded; and small, shallow, permanent or intermittent water bodies (ponds). These systems are dominated by persistent emergent vegetation adapted for growth in saturated soils, or trees and/or shrubs requiring elevated water tables during a portion of the growing season.

A survey was conducted by ARCADIS biologists to locate and describe wetlands that fall along the route of the PA (Table 3.7). ARCADIS biologists documented wetland characteristics as seven sites along the proposed route. These sites contained hydric soils along stream channels, had gentle sloping banks where wetland vegetative species were observed, including rush (*Juncus spp.*), spikerush (*Eleocharis spp.*), and sedges (*Carex spp.*), along narrow bands of the stream corridors where soils remained saturated well into the growing season.

Table 3.7: Wetlands Crossed or Bored by the Proposed Devon Pipeline Project					
Milepost	**Legal Description**	**Description**	**Crossing Length (ft)**	**Wetland Type[1]**	**Comment**
1.25	SENW, S32, T28N, R92W	Tributary to Crook's Creek	45.6	PEMC	Palustrine Emergent Wetland 4.2-8.0 ft. east
2.30	**SWNW, S29, T28N, R92W**	**Crook's Creek**	**51.4**	**R2UBH**	**Wetland Perennial Stream 44.9-59.2 ft. west**
3.85	SWSE, S10, T28N, R92W	Mason Creek	85.5	Wetland	Wetland 19.9-29.0 ft. west
4.45	SWSE, S07, T28N, R92W	Tributary to Crook's Creek	44.4	Ephemeral stream	Eph. Stream w/Water 12.9-16.2 ft. west
14.95	**NWSE, S34, T30N, R93W**	**Ice Slough**	**1146**	**PEMA/PEMC**	**Isolated wetland**
20.85	**NESW, S13, T30N, R94W**	**Sweetwater River**	**803**	**R2UBH**	**Sweetwater 8.6 ft. east**
33.44	NENW, S26, T32N, R95W	Obrien Spring	37.7	Palustrine emergent	11.5 ft. east

[1] PAEM = Palustrine emergent wetland
PEMC = Palustrine emergent wetland, seasonally flooded
R2UBH = Lower perennial stream or river, permanently flooded
PEMA = Palustrine emergent wetland, temporarily flooded

[2] Wetlands in **bold** will be bored

The majority of the ephemeral drainages crossed by the proposed PA do not have well-delineated floodplains. The Sweetwater River that has produced the only wide, active floodplain that would be crossed by the project.

Table 3.8: Potential Environmental Consequences – Floodplains and Riparian/Wetland Zones			
	Direct Impacts	**Indirect Impacts**	**Cumulative Impacts**
Alternative A: No Action	No impacts	No impacts	No impacts
Alternative B: Northern Gas Line Route	Loss of herbaceous and woody vegetation in palustrine emergent wetlands;. Direct impacts would include the loss of woody wetland species (approximately 0.10 acre) A total of nine (9) wetlands, with a total boring width of 2844 feet (0.54 mile), have been identified as possible crossing sites. Should this alternative be chosen, site-specific analysis would be conducted at that time to confirm the presence of any jurisdictional (associated with Waters of the U.S.) wetlands and the impacts of construction.	Long-term loss of woody wetland species, which are food sources and habitat for wetland wildlife species, would occur until replanted saplings are reestablished. With the exception of the Sweetwater River and Crook's Creek, no impacts to floodplains or wetlands would occur as a result of project construction because the surface and groundwater flow patterns would not be modified; channels would not be modified; no above-ground facilities would be located on floodplains or wetlands; and larger perennial wetlands would be slick bored.	No cumulative effects to floodplains or wetlands would occur as a result of Project construction because the surface and groundwater flow patterns would not be modified; channel shapes would not be modified; no permanent above-ground facilities would be located on floodplains or wetlands; and larger perennial wetlands would be bored.
Alternative C: Proposed Action	Loss of herbaceous and woody vegetation in palustrine emergent wetlands; no direct impacts to riverine systems as they would be slick bored with the boring equipment located outside the floodplain.	Long-term loss of woody wetland species, which are food sources and habitat for wetland wildlife species, would occur until replanted saplings are reestablished. Bank degradation in the Sweetwater River and Crook's Creek would not occur and therefore would not increase sedimentation in the river, bank instability and woody vegetation loss because Devon would not be entering the riparian areas. No additional effects to floodplains or wetlands are expected as a result of Project construction because the surface and groundwater flow patterns would not be modified, channel shapes would not be modified, and no above-ground facilities would be located on floodplains or wetlands.	No cumulative effects to floodplains or wetlands would occur as a result of the PA because the surface and groundwater flow patterns would not be modified; channel shapes would not be modified; no permanent above-ground facilities would be located on floodplains or wetlands; and no existing or foreseeable projects would disturb or fill wetlands.

3.5 Climate and Air Quality

Affected Environment

This section summarizes the existing climate and air quality within the area potentially affected by the proposed pipeline.

Please see the Lost Creek Gathering System Project EA for additional information regarding the affected environment and the environmental consequences.

3.5.1 Climate

The proposed project area is within the inter-mountain semi-desert province. The climate of this eco-region is characterized by:

"The climate of the plateaus is semiarid and cool, with an average annual temperature of about 50F (10C). Average annual precipitation ranges from less than 10 in (260 mm) in the west (in the rain shadow of the Cascade Range) to 20 in (510 mm) in the east. Precipitation is fairly evenly distributed throughout the year, except during the summer months, when there is little rain.

The higher overall elevation of the Wyoming Basin gives it slightly lower average temperatures and precipitation than on the plateaus. Winters are cold, and summers are short and hot. Average annual temperatures range from 40 to 52F (4 to 11C), and the average growing season has fewer than 100 days in the south and 140 days in the north and east. Average annual precipitation ranges from 5 to 14 in (130 to 360 mm), and is fairly evenly distributed throughout the year."(USDA, 2007).

The USDA NCRS Soil Survey of Fremont County, East Part and the Dubois Area, 1993, page 222, describes the local climate as "generally characterized by a continental climate that is arid or semiarid. In the small part of the survey area that is in the mountains, however, the climate is cool and subhumid."

3.5.2 Air Quality

Air quality in the area potentially affected by the proposed pipeline is in compliance with regulatory health-based standards, and is consistent with voluntary thresholds and levels-of-concern for visibility and atmospheric deposition.

3.5.2.1 Concentrations

Pollutant concentration refers to the amount of pollutant present in a volume of air, and can be reported in units of micrograms per cubic meter ($\mu g/m^3$), parts per million (ppm) or parts per billion (ppb). The State of Wyoming has used monitoring and modeling to determine that the region is in compliance with Wyoming and federal concentration standards.

Table 3.9 presents the background concentration of criteria pollutants representative of the area potentially affected by the proposed pipeline. Table 3.10 presents the National and Wyoming Ambient Air Quality Standards for comparison.

Table 3.9: Background Concentrations of Air Pollutants - Riverton Dome EIS and Bear Canyon EA (2007, Caplan)		
Pollutant and Averaging Period	**Background Concentration ($\mu g/m^3$)**	**Source**
CO 1-hour	3,336	A
CO 8-hour	1,381	A
NO_2 annual	3.4	B
O_3 8-hour	147	C
PM_{10} 24-hour	51	D
PM_{10} annual	21	D
$PM_{2.5}$ 24-hour	30	D
$PM_{2.5}$ annual	8	D
SO_2 3-hour	93	E
SO_2 24-hour	32	E
SO_2 annual	4	E

A Data collected by Amoco at Ryckman Creek for an 8 month period during 1978-1979, summarized in the Riley Ridge EIS (BLM 1983)

B Data collected at Green River Basin Visibility Study site during the period January - December 2001 (ARS 2002)

C Data collected at Green River Basin Visibility Study site during the period June 10, 1998 - December 31, 2001 (ARS 2001). Data represents the top tenth percentile maximum 1-hour value.

D Data collected by WDEQ at Lander, WY, 2005 (Personal Communication with WDEQ, February 13, 2007). Data may be affected by the use of woodstoves.

E Data collected at Lost Cabin Gas Plant (preconstruction monitoring) Fremont County, WY 1986-1987LaBarge Study Area at the Northwest Pipeline Craven Creek site, 1982-1983 (WDEQ)

All short-term data are second-maximum values unless otherwise specified. Annual data represent averages.

Table 3.10: National and Wyoming Ambient Air Quality Standards (2007, Caplan)							
Pollutant	**Averaging Time**	**NAAQS**			**WAAQS**		
		(µg/m3)	**(ppm)**	**(ppb)**	**(µg/m3)**	**(ppm)**	**(ppb)**
Carbon Monoxide (CO)	1 hour	40,000	35	35,000	40,000	35	35,000
	8 hour	10,000	9	9,000	10,000	9	9,000
Lead (Pb)	Calendar quarter	1.5			1.5		
Nitrogen Dioxide (NO_2)	Annual	100	.053	53	100	.053	53
Ozone (O3)	8 hour	157	.08	80	157	.08	80
Particulate Matter (PM_{10})	24 hour	150			150		
	Annual[1]	50			50		
Particulate Matter ($PM_{2.5}$)	24 hour[1]	65			65		
	Annual	15			15		
Sulfur Dioxide SO_2	3 hour	1300	.5	500	1300	.5	500
	24 hour	365	.14	140	260	.099	99
	Annual	80	.030	30	60	.023	23

[1] On 21 September 2006, EPA announced final revisions to the National Ambient Air Quality Standards (NAAQS) for particulate matter. The revision strengthens the 24 hour $PM_{2.5}$ standard from 65 to 35 µg/m^3 and revokes the annual PM_{10} standard of 50 µg/m^3. EPA retained the existing annual $PM_{2.5}$ standard of 15 and the 24 hour PM10 standard of 150 µg/m^3. The final rule is anticipated to be published in the Federal Register on 17 October 2007 and will not be effective until 60 days after publication in the Federal Register. After the final rule becomes effective, the State of Wyoming will enter into rule-making to revise the Wyoming Ambient Air Quality Standard (WAAQS). It is anticipated that the final rule will become effective in mid-December of 2007.

3.5.2.2 Visibility

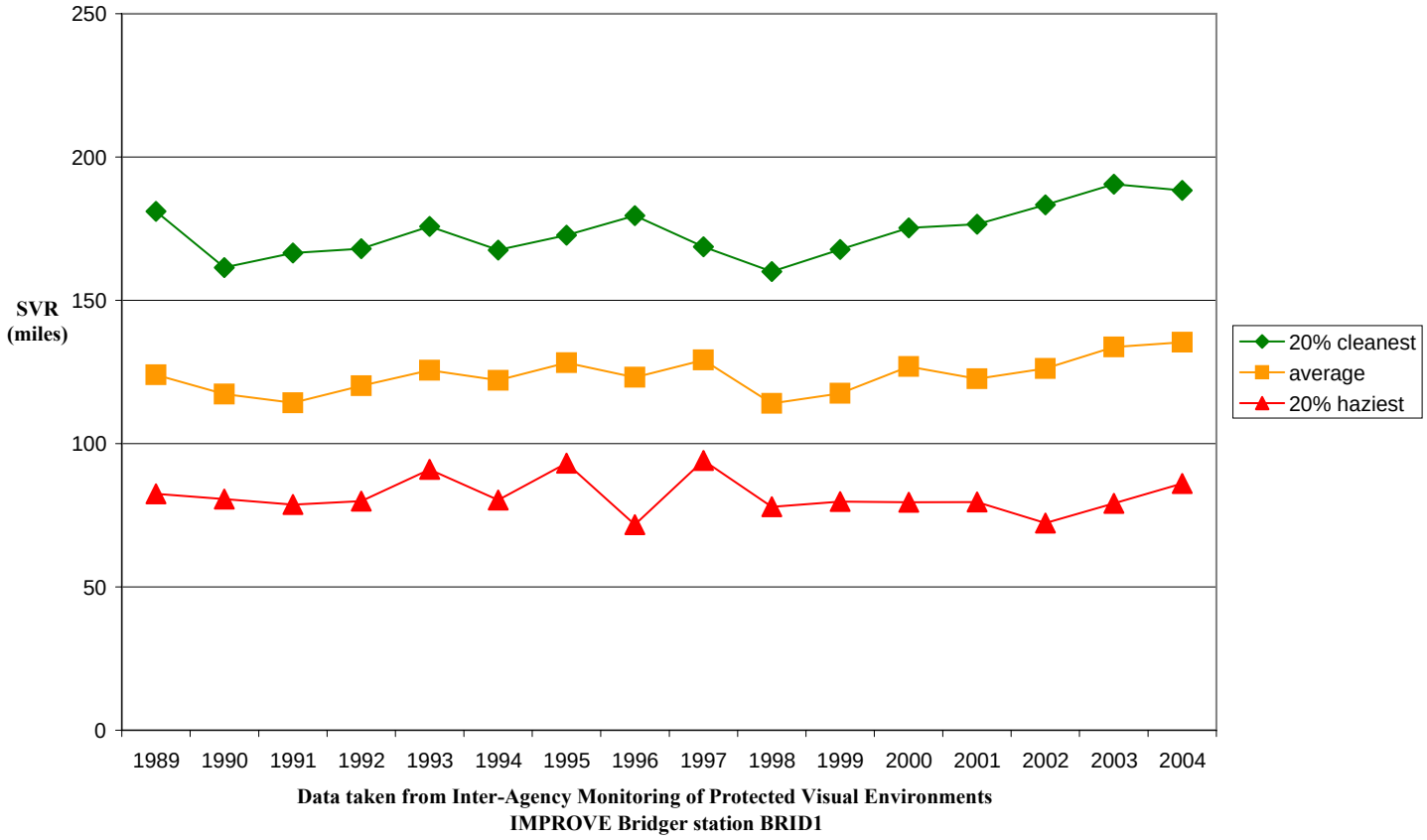
The **I**nter-Agency **M**onitoring of **Pro**tected **V**isual **E**nvironments (IMPROVE) has measured visibility in national parks and wilderness areas in the United States since the 1980's. There are six IMPROVE stations in Wyoming. Visibility can be expressed in terms of standard visual range (the distance at which one can discern color, contrast and texture) and deciview (dv), a measure for describing perceived changes in visibility. One dv is defined as a change in visibility that is just perceptible to the average person.

Visibility data are calculated for each day, ranked from cleanest to haziest, and reported into three categories:

- 20% cleanest: mean visibility for the 20% of days with the best visibility
- average: the annual mean visibility
- 20% haziest: mean visibility for the 20% of days with the poorest visibility

The IMPROVE station nearest to the proposed pipeline is located near the Bridger Wilderness (Fig. 3.1).

Figure 3.1: Annual Visibility (Standard Visual Range) in Bridger Wilderness

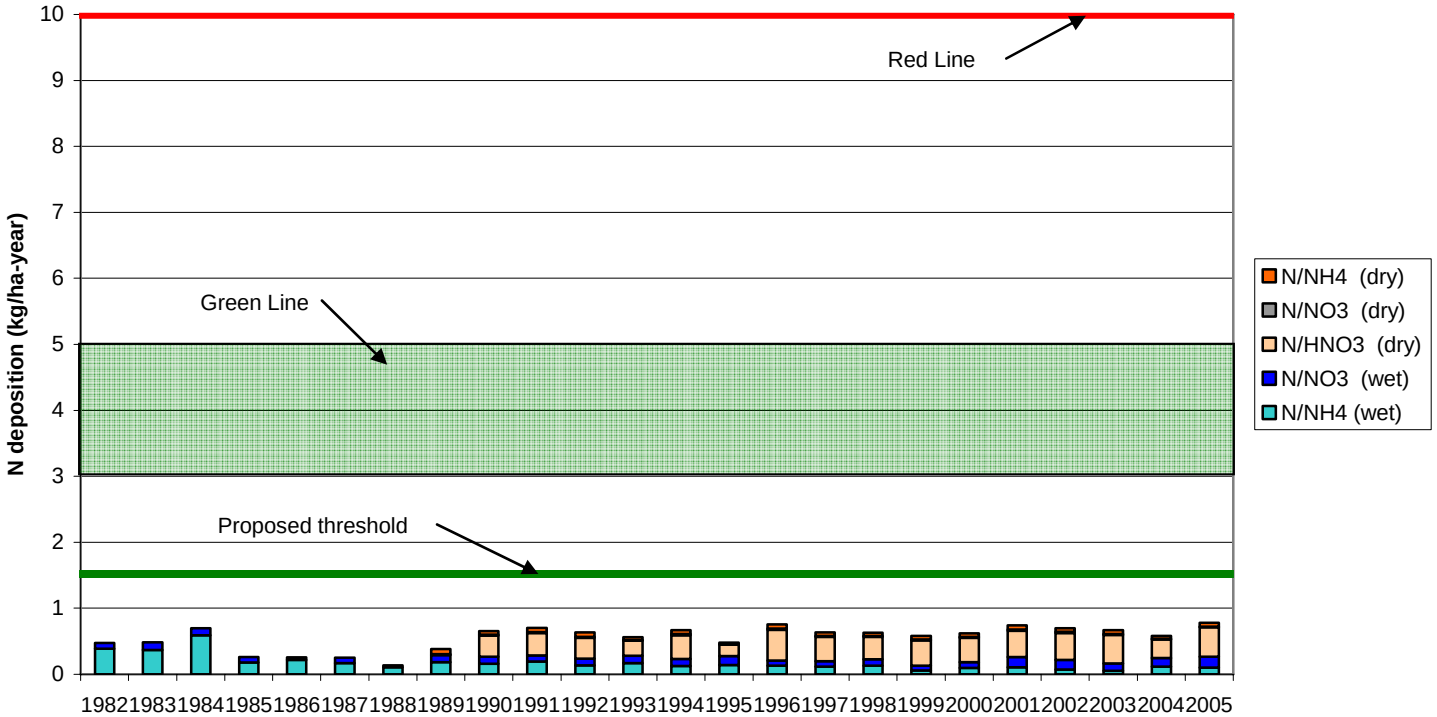


3.5.2.3 Atmospheric Deposition

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems, and is reported as the mass of material deposited on an area (kilogram per hectare - year). Air pollutants are deposited by wet deposition (precipitation) and dry deposition (gravitational settling of particles and adherence of gaseous pollutants to soil, water and vegetation).

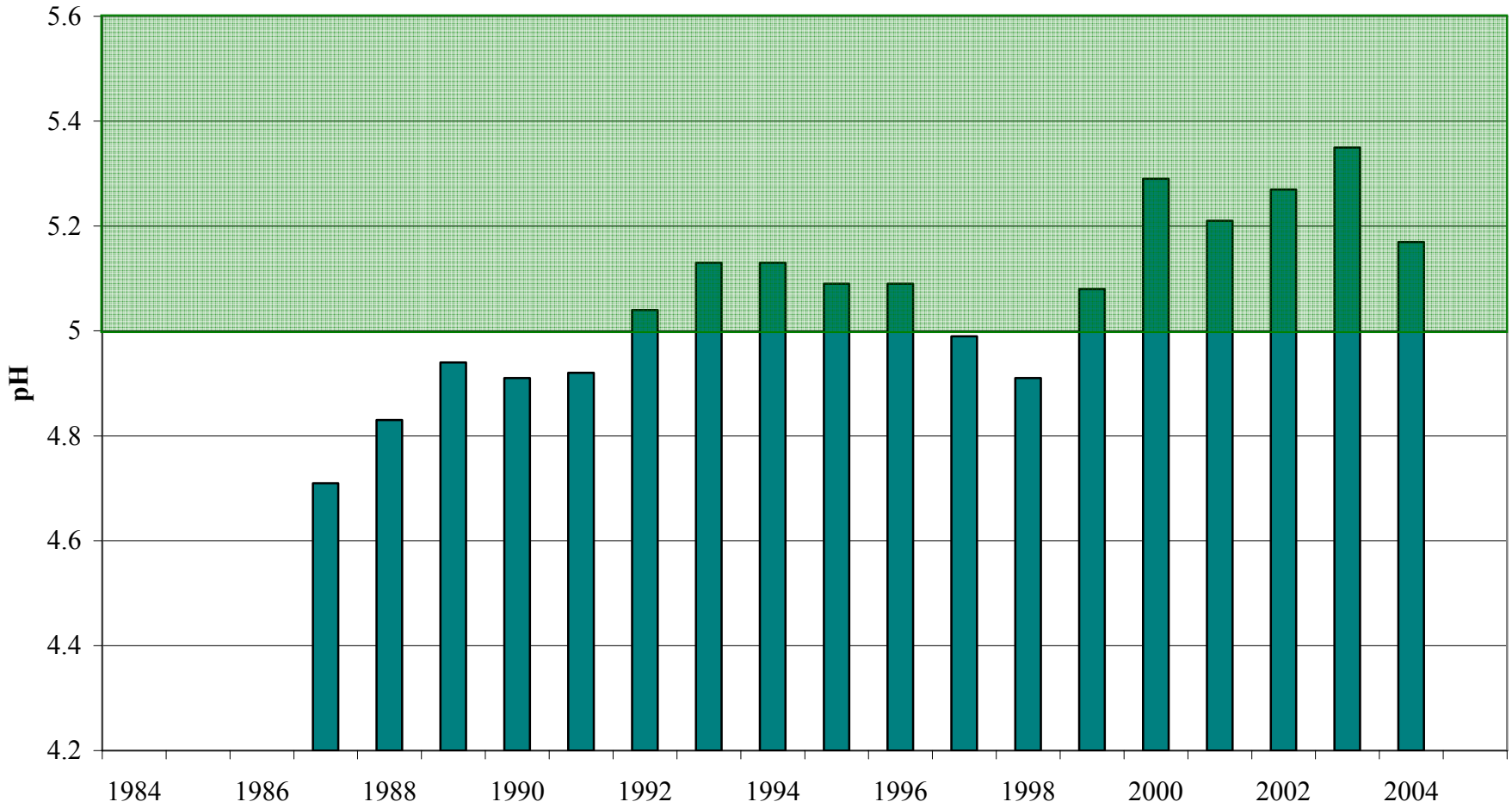
Figure 3.2 presents the mean annual total nitrogen deposition near Pinedale, Wyoming. Figure 3.3 presents the precipitation pH near Sinks Canyon, Wyoming.

Figure 3.2: Mean Annual Total Nitrogen Deposition near Pinedale, Wyoming



Data fron National Atmospheric Deposition Program & Clean Air Status and Trends Network
NADP station WY06
CASTNet station PND165

Figure 3.3: Precipitation pH near Sinks Canyon, Wyoming



Data from National Atmospheric Deposition Program
NADP WY02 Sinks Canyon

Table 3.11: Potential Environmental Consequences – Air Quality			
	Direct Impacts	**Indirect Impacts**	**Cumulative Impacts**
Alternative A: No Action	No impacts	No impacts	No impacts
Alternative B: Northern Gas Line Route	Impacts likely similar to the Proposed Action.	Impacts likely similar to the Proposed Action.	No cumulative effects are expected with this, or foreseeable projects, because air pollutant issues are generally part of the construction activities only. No other projects are planned for the area during the same time period.
Alternative C: Proposed Action	Construction activities would increase local concentrations of air pollutants in the short-term. Grading, equipment movement, trenching, and back filling would increase fugitive dust levels near the ROW and disturbed soils on the ROW would be a source of wind-blown dust during periods of dry, windy conditions until vegetation is reestablished. No impacts to air quality are expected because construction emissions and metering station emissions would not exceed applicable WAAQS and NAAQS.	Because the levels of air pollutants are short-term, do not exceed WAAQS and NAAQS, and are continuously moving with the spread, no indirect impacts, to human health or the environment, are expected.	No cumulative effects are expected with this, or foreseeable projects, because air pollutant issues are generally part of the construction activities only. No other projects are planned for the area during the same time period.

3.6 Visual Resources

Affected Environment

Visual impacts would be considered significant if PA construction did not meet the BLM's Visual Resource Management (VRM) goals. The four VRM classes are:

- Class I: Includes primitive areas, some natural areas, wild and scenic rivers, and other similar sites where landscape modifications would be restricted. Allows for natural ecological changes and preservation of the natural landscape.
- Class II: Areas where changes in landscape form, line, color, or texture should not be evident in the characteristic landscape.
- Class III: Areas where changes in the form, line, color, or texture caused by a management activity may be evident in the landscape; however, the changes should remain subordinate to the existing landscape's visual effect.
- Class IV: Areas where changes may subordinate the original composition and character; however, changes should reflect what could be a natural occurrence within the characteristic landscape.

The duration of the impacts, the degree of visibility of the PA, and whether or not the proposed area of disturbance had been previously modified all play a part in VRM class determination. Based on these criteria, the Class II VRM at Beaver Rim is considered an area of concern. The BLM issued guidance for VRM in 1986 (BLM 1986b). The goal of this program is to manage the quality of the landscape by minimizing impacts to visual resources resulting from development activities.

Beaver Rim (Beaver Divide) is a long, east-west trending high escarpment located east of Lander. As mentioned above, the PA would cross Beaver Rim along an existing utility corridor. Although rehabilitation is progressing, the existing corridor is still highly visible as the slower growing trees and shrubs require more time to reestablish and soften the edges of the ROW. The corridor is visible from Highway 135 for approximately 6.3 miles as the highway travels south from the Oil Springs Road (BLM 2305). In several places, visibility is blocked by several erosional features that exist near the base of Beaver Rim. There is also a visible existing road that can be seen snaking up the side of the Rim and a communication tower cluster that lies to the east of the PA on the top of the Rim.

Because of its prominent location and size, development projects must navigate the Rim and mitigate any viewshed and reclamation issues that could arise.

The PA crossing location at Beaver Rim would parallel an existing utility corridor. To meet the VRM Class II objectives, Devon would implement special construction and reclamation methods that would minimize the visual effects of the ROW and enhance reclamation efforts to allow rehabilitation to occur as quickly as possible (*please see Sections 6.5.4 and 7.3.7 in the POD)*.

Other sections along the route have been given Class III or IV designations. Dirt roads access the Project area north of Beaver Rim and uranium mining disturbances are visible from the Gas Hills Highway. In the Crook's Gap area, oil field development and uranium mining are prominent.

Table 3.12: Potential Environmental Consequences – Visual Resources			
	Direct Impacts	**Indirect Impacts**	**Cumulative Impacts**
Alternative A: No Action	No impacts	No impacts	No impacts
Alternative B: Northern Gas Line Route	Construction activities would result in short-term disturbance of the soil and removal of vegetation along the ROW, resulting in visual intrusion in the landscape. Until vegetation is reestablished the pipeline route would be highly visible from Highway 135. If this alternate is chosen, a visual contrast rating would be performed on this more fully reclaimed route.	No indirect impacts are expected.	Reasonably forseeable development projects would likely have no cumulative effects because pipeline construction disturbance is largely short-term; following construction and a comprehensive reclamation program, the ROW should return to pre-disturbance conditions. No other projects are planned for the area during the same time period.
Alternative C: Proposed Action	Construction activities would result in short-term disturbance of the soil and removal of vegetation along the ROW, resulting in visual intrusion in the landscape. Until vegetation is reestablished the pipeline route would be highly visible from Highway 135.	No indirect impacts are expected.	Reasonably forseeable development projects would likely have no cumulative effects because pipeline construction disturbance is largely short-term; following construction and a comprehensive reclamation program, the ROW should return to pre-disturbance conditions. No other projects are planned for the area during the same time period.

3.7 Socioeconomic and Noise Issues

Affected Environment

Criteria for determining the affected socioeconomic resources and noise issues for the PA and alternatives were adapted from the criteria used for evaluation in the Lost Creek Gathering System Project EA. The affected socioeconomic environment for the PA includes Fremont County. Cities and towns near the PA include Lander, Riverton, and Jeffrey City. The economy of the region has traditionally been supported by agriculture and mining-based activities, although tourism has recently been added as an economic contributor. The region is predominantly rural and sparsely populated; the population density is a scant 3.7 people per square mile (Census, 2000).

Fremont County has experienced a reduction in the labor force since 1999 and a concurrent reduction in the unemployment rate, which is currently at 4.4% (WY Dept. Employment, 2006).

The PA would require two spreads during the construction phase of the project. Most of the workers locating from outside the area would likely make use of local RV parks, campgrounds, and possibly hotel/motels. Due to the short duration of the construction period, it is unlikely that workers would relocate families to the area, so there would be little need for single-family homes, mobile homes, or apartments. However, Jeffrey City has approximately four (4) vacant apartment units should the need arise.

The potentially affected communities, with the exception of Jeffrey City, have adequate tax bases to support full-service law enforcement and fire districts, hospitals, emergency response services, water and wastewater treatment services, solid waste disposal, road maintenance, schools, recreations programs, libraries, planning and zoning services, and social services. Jeffrey City is served by Fremont County law enforcement, a volunteer fire department and emergency medical technician, and an elementary school. Water and wastewater treatment and solid waste disposal services are also available in Jeffrey City.

The proposed Project would be constructed entirely through rural areas where the nearest residence would be approximately 0.5 mile from the ROW. Existing noise sources in the area are predominantly natural (wind, birds, etc.) and ambient noise associated with traffic along county and state roads and highways.

Table 3.13: Potential Environmental Consequences – Socioeconomic Resources and Noise Issues			
	Direct Impacts	**Indirect Impacts**	**Cumulative Impacts**
Alternative A: No Action	No impacts	No impacts	No impacts
Alternative B: Northern Gas Line Route	Two construction spreads, consisting of approximately 30 workers each, would be required for construction. The out-of-state work force would be employed full-time on a contract basis. As is true with any construction project, noise levels would increase, but impacts are not expected to be significant because, with the exception of traffic to and from the ROW, most of the noise would be confined to specific, rural sections of the ROW. No impacts to the socioeconomic environment would be expected because: 1) the influx of non-local employees would result in a less than 1 percent increase in the population of the surrounding cities and towns (with the exception of Jeffrey City); 2) the proposed construction schedule would occur outside the season of peak demand for temporary housing and outside the season of peak demand for tourism-related accommodations (RV parks, campgrounds, hotels, and motels); and 3) the demand for public services would not exceed capacities of existing public services.	Although non-local, the workers would provide additional business and income for local businesses including RV parks, campgrounds, hotels/motels, restaurants, and entertainment-based businesses. Construction of the pipeline would increase sales tax revenues for state, county, and city governments for the duration of the construction phase. Sales tax revenues for goods and services would also increase during this time period. Additionally, a pipeline would provide increased county property tax revenues over its lifetime. Properties assessed by the State, including pipelines, are assessed at, and taxed on, 11.5% of value (WY Dept. of Revenue, 2007). Property taxes are a primary source of county and school district revenue and tax funds are allocated to county funds, school districts, special districts, and municipalities.	Construction of the pipeline could cumulatively interact with other ongoing industrial projects in the region in terms of demand for temporary housing locations and short-term demands on public services. There are no foreseeable future projects, however. In the event that another project was proposed, the workforce would be spread out over a large region and would not selectively create demands on community infrastructure in a small area. No cumulative noise effects on private residences within 0.5 mile of the pipeline would be expected due to the lack of existing industrial noise sources in the area and the short-term nature of a pipeline project.
Alternative C: Proposed Action	**Same as Alternative B**	**Same as Alternative B**	**Same as Alternative B**

3.8 Recreation

Affected Environment

Criteria for determining the affected recreational environment for the PA and alternatives were adapted from the criteria used for evaluation in the Lost Creek Gathering System Project EA. Most of the recreational use on public lands in the project area is widely dispersed and includes hunting, fishing, picnicking, hiking, sight-seeing, horseback riding, snow machining, nature observation, rock collecting, and off-road (ORV) use. The area generally experiences low concentrations of recreational users and there are few restrictions on recreational activities.

Special Recreation Management Areas (SMRA) are heavily used for recreation purposes and require special management to ensure their protection. Two SMRAs are in the vicinity of, or would be crossed by, the PA. These include the Oregon-Mormon Pioneer National Historic Trail SMRA and the Continental Divide National Scenic Trail SMRA.

Big game and upland bird hunting is an important dispersed recreational activity that occurs along the ROW. Major species hunted include antelope and deer. Sage grouse, Hungarian partridge, chukar, and elk hunting also occur to a lesser extent.

ORV use is also a popular recreational activity in the vicinity of the Project ROW.

Table 3.14: Potential Environmental Consequences – Recreation			
	Direct Impacts	**Indirect Impacts**	**Cumulative Impacts**
Alternative A: No Action	No impacts	No impacts	No impacts
Alternative B: Northern Gas Line Route	Construction would restrict access to small portions of the Oregon Trail and to the Continental Divide National Scenic Trail. Impacts would be minimal since the construction schedule is largely outside the peak tourist season. Since *general* recreational use does not occur in the vicinity of the proposed crossings or the Oregon Trail and its route segments, which are on private property, no restrictions to access or potential impacts to the recreational experience would likely occur at these locations. Hunting opportunities would be affected as construction activities and noise levels would likely displace some game species, at least temporarily.	Although the majority of the proposed Project ROW (approximately 92%) would follow existing roadways or utility ROWs, Project construction through previously inaccessible areas could lead ORV users to attempt to access the ROW, possibly leading to increased erosion and resource degradation. Reclamation would also be hindered if ORVs used the ROW as a roadway.	No cumulative effects on developed or dispersed recreational opportunities are expected because access would be largely maintained throughout the construction phase. No other activities have been identified that would restrict public access.
Alternative C: Proposed Action	**Same as Alternative B**	**Same as Alternative B**	**Same as Alternative B**

Table 3.15: Summary of Resource Commitments for the Proposed Devon CO_2 Pipeline Project				
Resource	**Impacts**		**Commitment of Resources**	
	Short-Term	**Long-Term**	**Irreversible**	**Irretrievable**
Cultural Resources	X	X[1]	X[1]	X[1]
Wildlife	X			
Soils and Vegetation	X	X[2]		
Floodplains and Riparian/Wetland Zones	X			
Air Quality	X			
Visual Resources	X	X[3]		
Socioeconomics and Noise Issues	X	X[4]		
Recreation	X			

[1] There would be a gain in information for cultural resources due to excavation of known and currently unknown archaeological sites. However, there would also be some irreversible and irretrievable commitment of resources for the same reason.

[2] Vegetation community structure and forage production would be lost on disturbed land for an extended period of time (2-5 growing seasons) until reestablishment takes place; reestablishment of shrubs and woody species would be considerably longer.

[3] Visual effects due to facilities such as block valves and metering stations would be inevitable and long-term. But mitigation measures would be in place to lessen the impact.

[4] Long-term impacts would be beneficial impacts in the form of property taxes that are a primary source of county and school district revenue.

Table 3.16: Unavoidable Adverse Impacts to Resources	
Resources	**Unavoidable Adverse Impacts**
Cultural Resources	No unavoidable adverse impacts to cultural resources have been identified as a result of this project.
Wildlife and Wild Horses	A temporary loss of approximately 475 acres of wildlife seasonal habitat, forage plants, and migratory routes for big game species; loss of seasonal and foraging habitat for raptor species; and crushing of less mobile and/or burrowing reptiles, amphibians, and mammal species could occur.
Soils and Vegetation	Approximately 475 acres of soils and vegetation would be disturbed as a result of this project.
Floodplains and Riparian/Wetland Zones	No unavoidable adverse impacts to floodplains and riparian/wetland zones have been identified as a result of this project.
Air Quality	No unavoidable adverse impacts to air quality have been identified as a result of this project.
Visual Resources	Approximately 3.56 acres of the north side of the Beaver Rim would be disturbed, resulting in long-term adverse visual impacts.
Socioeconomic and Noise Issues	No unavoidable adverse impacts to socioeconomic issues have been identified as a result of this project. Short-term increase in noise from construction equipment would occur.
Recreation	No unavoidable adverse impacts to recreation have been identified as a result of this project.
Threatened and BLM Sensitive Species	A temporary loss of approximately 475 acres of wildlife habitat would occur. Loss of suitable nesting and foraging habitat for sagebrush obligate birds; seasonal and foraging habitat for raptor species; and crushing of burrowing owls, reptiles, amphibians, and burrowing mammal species could occur. Removal of individual sensitive plant species and habitat would occur.

4.0 Mitigation Measures

Mitigation Measures in Special Construction Areas

Highways and County Roads Crossings: At the paved highways (Highways 287 and 135), the pipeline would be slick bored and directionally drilled to conform to requirements of the Wyoming Highway Department. "Slick boring" refers to the mix of bentonite, water, and gel that is used in the drilling process. Boring activities at road and highway crossings would occur outside the approved ROW width; the TUAs would be available for soil storage and construction activities in these areas. Devon would keep all road surfaces free of dirt, rock, or other debris that could be hazardous to the public. Construction crews would locate existing pipelines in the field from maps or with the use of a metal detector to avoid damage during trenching. Devon would communicate with the owners of existing pipelines and would allow representatives onsite if requested. Special techniques, including some hand digging, would be required to avoid damage. County Road 318 would be bored at one (1) location in Section 29, T28N, R92W. The Graham Ranch road (County Road 233) would be bored at one (1) location north of Highway 287. The pipeline would cross the Oregon Trail, but would stay within existing disturbance by following the borrow ditch on the north side of County Road 233. The crossing would stay in the borrow ditch until it is out of the line of sight of the Trail. Construction activities at the Trail crossing would be conducted in accordance with the procedures detailed in the Programmatic Agreement (Appendix B).

Historic Road Crossings and Viewsheds: The pipeline would intersect and be visible from a significant segment of the Oregon Trail. In this area, the pipeline would be confined within the existing disturbed Graham Ranch county road right-of-way. This restricted construction right-of-way is located between Milepost 14.8 and 14.2. The pipeline would also intersect or be visible from several significant segments of the Rawlins-Fort Washakie Road. In these areas, the pipeline would be confined within existing disturbed pipeline rights-of-way. The southern segment would be restricted to an existing Kinder Morgan pipeline disturbance zone from Milepost 6.8 to Milepost 9.6 The northern segment would be restricted to the existing Lost Creek Pipeline Beaver Creek Lateral disturbance zone from Milepost 19.4 to Milepost 19.8.

Utility Crossings: Some existing pipelines and other buried utility lines would be crossed during construction of the pipeline. The "One-Call System" would be implemented to identify and protect buried utilities. The proposed pipeline would cross beneath other pipelines and other facilities.

Ice Slough: The Ice Slough, a feature near the historic Oregon Trail route, lies on private property approximately a mile north of Highway 287. The landowner requested that Devon bore under Ice Slough.

Sage Grouse Leks in Sections 17 and 21, T31N, R94W: The Lost Creek line was constructed through these two sage grouse leks and the results were studied by the BLM to determine the likelihood of the grouse returning to a disturbed area. The sage grouse did return to these two leks, so the BLM would allow the Devon pipeline to construct in the same areas to avoid disturbing additional nesting habitat. Devon would, however, be required to "neck down" the width of the construction zone to preserve as much of the lek area as possible. The BLM also stipulates that no more than twenty (20) additional feet of new disturbance would be allowed in this section.

Beaver Rim Segment: The Beaver Rim is a high escarpment located east of Lander. Because of its visibility and steep topography, it would be necessary to mitigate any viewshed issues that would arise.

This construction area is comprised of two steep slope areas separated by a bench midway down the slope. The first is approximately 1300 feet long at 30% grade and the second, beginning at the end of the 490-foot bench, is 1200 feet long at 30% grade.

To maintain the visual quality, Devon has committed to steep slope construction procedures to minimize surface disturbance including the use of matting and waterbars for erosion control. Devon would also reduce the appearance of exposed white rock using methods prescribed by the BLM.

Final reclamation would be based on a site-specific plan that would be developed so that specific disturbed areas would receive the appropriate treatment. Elements of this plan would include the use of a special seed mixture and the use of erosion mats to stabilize soils on the steep slopes.

Stream and Wetland Crossings and Borings: Perennial (water flows throughout the year) stream crossings, including Crook's Creek and the Sweetwater River, would be bored, negating the need for notifying the U.S. Army Corps of Engineers (ACOE) as regulated in Nationwide Permit 12. Please see Table 3.7 *Wetlands Crossed by the Proposed Devon Pipeline Project* for a list of streams and wetlands.

Stream crossing methods: Slick boring would be used to cross the Sweetwater River and Crook's Creek to minimize disturbance.

Wetland crossing methods:

- *Dry crossings*: Most of the wetlands crossed by the pipeline route are considered dry (no free water currently in the trench). In these areas, only the vegetation in the trench line would be cleared and graded, minimizing disturbance within jurisdictional (considered to be Waters of the United States) wetlands. Topsoil 1) would be salvaged only from the area over the trench line, 2) would be segregated from subsoil for reclamation use later, and 3) would be reapplied to the area from which it was stripped. Trenching and backfilling procedures would include the installation of trench plugs at the margins of wetlands to minimize subsurface migration of water down the trench line.
- *Wet crossings*: Army Corps of Engineers has determined that permanently saturated wetlands would be bored at least sixty inches under the channel and laterally outside the width of the floodplain.

Dry Washes, Ephemeral Streams, and Incised Channels: Dry washes or ephemeral streams, common in Wyoming, are areas where water flows in response to periodic and inconsistent precipitation events.

Where practical, backhoes would be utilized to trench crossings at dry washes and incised channels. The banks of washes would be excavated to create a slope gentle enough to allow equipment to reach the channel floor. Soil would be stockpiled at the top of the banks for dry washes and incised channels away from the channel edge to prevent soil from washing bank into the channel. After pipe installation is completed, the stockpiled soil would be used to restore the contour of the banks, aiding in natural revegetation. In areas where stabilization proves difficult due to soil type, increased slope, etc., reinforcing material such as erosion control fabric, fiber, or mats would be on recently planted slopes to protect seedlings until they are more established. This procedure may be modified to fit unusual situations where reinforcing material (erosion control fabric, fiber, or mats) may be required to comply with the Storm Water Discharge large area construction permit. Specific design will occur in the Storm Water Pollution Prevention Plan based on WDEQ's best management practices (BMPs). Slope protection measures are outlined in Devon's Storm Water Pollution Prevention Plan in Appendix F in the POD.

Other Mitigation Measures

- An environmental inspector (EI) will oversee the entire project for continuity and will act as the liaison between the agencies and the construction contractors. The EI will directly oversee all environmental inspection activities and will summarize reported occurrences of non-compliance and the results of any resource monitoring.
- No new roads would be built and access roads will not be upgraded.

Cultural and Paleontological Resources

- The PA intersects the Oregon Trail where the PA parallels Graham Ranch county road. The pipeline would stay within the disturbed existing county road right-of-way within line-of-sight of the Oregon Trail to preserve the Trail's historical viewshed. The trail crossing and 50 ft either direction from the trail crossing would be fenced at the edge of the existing disturbed right-of-way at each side of the county road to prevent disturbance to the physical remains of the road itself.
- The PA intersects multiple significant variants of the Rawlins-Ft. Washakie Road slightly north of the Graham Ranch Road where the PA parallels the existing Lost Creek Pipeline Beaver Creek Lateral. The pipeline would stay within the existing disturbance of the Lost Creek Pipeline within direct line-of-sight of the road to preserve the road's historical viewshed. The road crossings and 50 ft either direction from road crossing would be fenced at each edge of the existing disturbed pipeline right-of-way to prevent disturbance to the physical remains of the road itself.

- The PA parallels a significant segment of the Rawlins-Fort Washakie Road north of Crooks Gap where the PA parallels an existing Kinder-Morgan pipeline. The proposed pipeline would stay within the existing disturbance of the Kinder Morgan pipeline within direct line-of-sight of the significant segment of the road to preserve the road's historical viewshed.
- Devon would use pipeline markers that would be as non-intrusive as possible within the viewshed of the Oregon Trail and Rawlins-Fort Washakie Road. Devon is currently proposing to use aerial markers that are low to the ground and slanted at a 45-degree angle.
- Devon would restrict its ROW through Site 48FR4234 to avoid the portions of the site that contribute to its significance. A qualified archaeologist would supervise the placement of a fence along the northeast edge of the ROW through the site. The archaeologist will ensure that the fence is placed outside the edge of the aeolian deposit that has the potential to contain significant buried cultural deposits. The archaeologist would restrict Devon's construction ROW up to the edge of the existing Lost Creek Pipeline ROW disturbance within the site if necessary. A qualified archaeologist would monitor right-of-way grading through the site.
- Devon has redesigned the PA to avoid the Graham Ranch site and Site 48FR506. The edge of the construction right-of-way would be fenced immediately adjacent to each site. A qualified archaeologist would monitor right-of-way grading adjacent to each site.
- A qualified archaeologist would monitor right-of-way blading and conduct open trench inspection in areas with high potential to contain unidentified subsurface cultural material. Those areas are defined in the Treatment Plan included in the POD. Cultural properties and/or human remains identified during construction monitoring, open trench inspection, or general construction activity would be treated according to the guidelines provided in the Discovery Plan included in the POD to ensure appropriate protection, evaluation, and treatment.
- If substantial fossiliferous deposits, specifically vertebrate fossil deposits, are discovered during construction, construction would be suspended, a paleontologist from the appropriate state or federal agency would be contacted immediately and measures would be taken to identify and preserve the fossils. In areas where the potential for occurrence is high, a paleontological monitor may be assigned to observe trench excavation and salvage potentially significant resources.
- To minimize indirect impacts to cultural and paleontological resources, project-related personnel would be educated about the sensitive nature of the resources. A strict policy of prohibiting casual collecting of these resources would be implemented.

Soils and Vegetation

- All vegetation removed from the ROW would be incorporated with the salvaged topsoil material within the ROW or within adjacent TUAs during construction and would be redistributed following construction, allowing seed and surviving plants to easily repopulate the area.
- As much as possible, native subsoils would be used to backfill the open trench.
- A hand crew would be utilized to manually replace trees, rock, and shrubs along the Beaver Rim special construction area.
- To relieve soil compaction along the ROW, non-essential access roads, staging areas, and other work areas would be chisel plowed, ripped, or disked. Depth of relief is site-specific. In areas where the topsoil has been segregated, the subsoil would be loosened, as necessary, prior to redistribution of the topsoil.
- Replaced topsoil would be left in a roughened condition to discourage erosion and additional stabilization techniques may be required on steeper slopes, in areas that have highly erodible soils, and in areas adjacent to, or within, drainages. Topsoil would be replaced perpendicular to the slope. The length of time between topsoil stockpiling and redistribution would be minimized, depending on the proposed construction schedule.

- Plant species selected for revegetation are based on the plant community composition, soil types, establishment potential, growth characteristics, soil stabilizing qualities, palatability to wildlife and livestock, commercial availability, post-construction land use objectives, and agency recommendations. Native species would be used as much as possible. Willows would be replaced in wetland areas. Forbs would be required as part of the seed mix to help restore disturbed sites as sage grouse habitat.
- Seed would be purchased from a certified seed source in accordance with Pure Live Seed (PLS) specifications for seed mixtures and would be weed free. Per Instruction Memorandum No. 2006-073, "prior to BLM accepting seed from any source, all seed must be tested for noxious weed seed at official state seed analysis labs" and the "seed lot shall contain no noxious, prohibited, or restricted weed seeds according to State seed laws in the respective State(s)…If the seed does not meet the BLM and State/Federal standard for noxious weed seed content or other crop seed allowances, it shall not be applied to public land." All seed used on the Project (certified and non-certified) would be tested for noxious weed seed content so that no western states-designated noxious weeds are introduced. To determine the percentage of non-certified seed in the PLS, seed would be analyzed by an approved testing facility. All seed test results would be submitted to the BLM. Seeds would be used within nine (9) months of testing to assure seed viability. Seed bag tags would be saved and submitted to the jurisdictional BLM offices as rehabilitation progresses.
- Plant surveys for sensitive species were conducted through areas with suitable habitat within the project area. These surveys coincided with the flowering periods of identified sensitive species. Appropriate protection measures (Table 4.1), including narrowing the construction width of the ROW or shifting the centerline to avoid individual plants, have been developed and implemented in coordination with the BLM. Botanists will assist the staking crew to ensure proper marking of the required sites occurs and impacts to sensitive species is minimized to the extent practicable.

Table 4.1: Sensitive Plant Species and Construction Stipulations

Species	Label	# Individuals	Size of Population	Stipulation Applied		Conditions of Approval
				Yes	No	
Porter's Sagebrush	ArtPor1	50	65'x145'		X	
	ArtPor2	50	50'x100'		X	
Beaver Rim Phlox	Phlox2	20	10'x20'		X	
Cedar Rim Thistle	CirAri1	2	2'x3'		X	
	CirAri2	2	5'x5'		X	
	CirAri3	1	1'x1'		X	
	CirAri4	1	1'x1'		X	
	CirAri5	1	1'x1'		X	
	CirAri6	4	20'x20'	X		No more than 25' of new disturbance
	CirAri7	5	10'x30'		X	
	CirAri8	25	15'x40'	X		No more than 30' of new disturbance
	CirAri9	28	10'x30'	X		No more than 30' of new disturbance
	CirAri10	13	15'x45'		X	

- Although it is preferable to avoid sensitive plant species, Devon and the BLM have agreed that, for this project, some loss of individual plants will be allowed, with conditions, because 1) it's not possible to neck down to the point of avoidance and still have enough room for construction and 2.) rerouting around the

populations would result in additional new disturbance, rather than utilizing the existing disturbance. Furthermore, because some individual plants were documented in previously disturbed areas and these species typically occur on barren slopes or in sparsely vegetated habitats, re-establishment of the plants may occur from seed from nearby populations.

- Fall seeding would be completed after September 15th and prior to ground frost. If applicable, spring seeding would be completed after the frost has left the ground and prior to May 15th. The seeding would be repeated until a satisfactory stand, as determined by the BLM Authorized Officer, is achieved. The first evaluation of growth would be made following the completion of the first growing season. No reclamation work would be completed when soils are frozen or overly wet. Scarification and re-seeding activities are considered best in the fall, unless requested otherwise by the BLM Authorized Officer or the private surface owner(s).
- If there is a need for immediate soil stabilization, a chemical soil binder may be applied, either alone or with mulch. These chemical stabilizers would be applied per the manufacturer's recommended rate.
- To control erosion both during and after construction, short- and long-term erosion control measures such as waterbars, silt fences, check dams, riprap, gabions, erosion control fabric, fiber, or mats would be constructed or installed as outlined in the project's reclamation plan.
- In areas with riparian/wetland vegetation, the construction ROW would be reduced to 30 feet in width.
- Prior to construction, noxious weed surveys would be conducted in areas of proposed disturbance as directed by the BLM. After the surveys are completed, a Pesticide Use Proposal (PUP) would be developed with the BLM Lander Field Office to facilitate the treatment of known and likely noxious/invasive weed species. Additionally, equipment and vehicle washing stations would be lined and the liners and waste would be removed and deposited in an approved landfill.
- During high soil moisture conditions, vehicle traffic and equipment operation would be restricted to prevent rutting in excess of four (4) inches in depth and subsequent erosion.
- Trench breakers, or water stops, would be installed along the Beaver Rim Segment to minimize damage in the event of a pipe blowout.

Water Resources and Wetlands

- Waterbars would be constructed, prior to reestablishment of vegetation, on ascent/descent slopes and in areas of erodible soils to direct runoff from the disturbed areas to adjacent vegetation or rock in an effort to minimize erosion of channels and sediment transport. Waterbars would also be constructed at the entrances and exits to all stream and wetland crossings. Waterbars would be constructed at intervals directed by the BLM and would be sufficiently sized to survive 3 to 5 years. Water bars are to be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet. The water bar would be extended into established vegetation where necessary. All water bars are to be constructed with the berm on the downhill side to prevent the soft material from silting in the trench. The initial water bar should be constructed at the top of the back slope.
- Willows would be replanted along riparian zones and in wetland areas where woody species have been removed. Stock (native species) would come from nursery stock or cuttings. The replacement ratio would be dependent on the value and quality of the riparian or wetland habitat impacted during construction and would be coordinated with the landowner or BLM. Temporary protective fences of sufficient height would be installed around these areas to protect the plantings from wildlife and livestock until they have become established.
- At the landowner's request, Devon would repair an existing headcut at the Crook's Creek crossing.
- Crook's Creek, the Ice Slough, and the Sweetwater River would be bored.
- No temporary bridges would be used for access across Crook's Creek or the Sweetwater River. Existing access roads would be used to transport equipment around the wetland bore locations.

Air Quality

- Water would be used to control dust along the ROW and access roads in accordance with federal, state, and local requirements. On private land, water would be used to control dust at the landowner's request. Any dust control water would be obtained by permits or by purchase contracts with owners of valid, existing water rights.

Wildlife

- A continuous distribution line trench that isn't interrupted by a road, or other point of egress from the trench, would be modified to enable livestock or wildlife that fall into the trench to exit. Earthen ramps that are sloped enough to be negotiated by large animals would be constructed at least every ¼ mile.
- Devon would install soft plugs in areas where established wildlife and livestock trails meet the trenches to minimize the impact.
- For purposes of this EA, Devon would first conduct surveys to identify potential habitat of specific species. Devon and jurisdictional agencies are aware of existing lek sites, raptor nests, and big game ranges. If others are identified during seasonal surveys, to avoid adverse impacts it is possible that the pipeline route would need to be altered.
- Prior to construction, during the breeding season (February 1 to July 31), aerial and/or pedestrian raptor surveys would be conducted through areas of suitable habitat, in coordination with the jurisdictional agencies, to identify any potentially active nest sites in the project area. Appropriate protection measures, including prohibiting construction during the period of February 1 to July 31 for active raptor nests would be implemented on species specific and site-specific basis. Raptor nests identified within the proposed areas of disturbance would be avoided to prevent abandonment. In addition, no trees 10 inches in diameter or greater would be removed from the project area during construction to protect potential future nest sites.
- Construction activities would be prohibited during the period of May 1 to September 30 for nesting burrowing owls
- To prevent adverse impacts to sage grouse breeding sites and habitat, a permanent 0.25-mile construction buffer area would be implemented around known lek sites, determined in coordination with the BLM. During the breeding season, surveys would be conducted, prior to construction, to identify active lek sites in the project area and a 2-mile seasonal construction buffer would be implemented. Construction would be prohibited during the period of March 1 to July 15 on public lands administered by the BLM.
- Prior to construction and during the breeding season, mountain plover surveys would be conducted, in conjunction with the BLM, in areas where suitable habitat occurs to identify any potentially active nest sites in the project area. Construction would be prohibited during the period of April 10 to July 10 in suitable mountain plover habitat unless inventories indicate breeding or nesting activity is not occurring.
- To prevent adverse impacts to wintering big game species, construction would be prohibited during the period of November 15 through April 30 in crucial winter range (CRW).
- Prior to construction, active white-tailed prairie dog colonies would be mapped along the project ROW in order to identify ways to mitigate/avoid or analyze impacts to these towns. Prairie dog towns would be avoided if possible. This area falls within a USFWS block-cleared area for black-footed ferrets, so ferret surveys would not be required.
- Fiberglass high-impact markers would be used near sage grouse leks and in mountain plover breeding/nesting habitat if it is not possible to modify marker placement enough to avoid these areas entirely. Fiberglass markers are specially designed to flex on impact or when weight is added and then return to their original upright positions.
- Wildlife surveys would be conducted in 2008, or subsequent years, if pipeline construction is not completed in 2007.

- The following table (Table 4.2) describes the pipeline route wildlife stipulations and constraint dates. Devon would comply with all stipulations in order to preserve the wildlife resources in the area.

Table 4.2: Wildlife Resources and Construction Stipulations

Milepost	Species	Constraint	Constraint Dates
1.5-2.65, 2.95-4.41, 4.65-8.25, 8.4-9.95, 13.15-13.65, 20.05-21.9, 22.1-22.6, 22.9-24.3, 29.9-30.45, 32.3-33.85, 35.6-37.1, 37.45-42.5, 42.8-46.05	Raptor	Nesting	Feb. 1 – July 31
7.9-13.25, 21.11-30.3, 33.65-37.85	Sage Grouse	Nesting	March 1 – July 15
9.15-19.25, 20.7-21.2, 21.6-26.6, 43.6-46.3	Big Game	Crucial Winter Range	Nov. 15 – April 30
9.45-9.95, 10.3-10.5, 22.1-22.6	Mountain Plover	Breeding/nesting	April 10 – July 10

Visual Resources

- The segment of the Beaver Rim (a BLM Class II Visual Resource Management, or VRM, area) would be crossed by pipeline along the same route as the Lost Creek line and would be in view of motorists on State Highway 135 between Riverton and Sweetwater Station on U.S. Highway 287. To maintain the visual quality, Devon has committed to steep slope construction procedures to minimize surface disturbance including the use of matting and waterbars for erosion control. Devon would also reduce the appearance of exposed white rock using methods prescribed by the BLM. As directed by the BLM, Devon would include seedling and tree plantings to aid in the restoration of the visual quality.
- Following construction, all aboveground facilities would be painted to blend with the natural surroundings. A reflective material may be used to reduce the possibility of accidents when structures are near roads. Otherwise a non-glare, non-reflective, non-chalking paint would be used. Color selections and uses would be coordinated with the BLM.

Range Resources

- Fences would be adequately braced along both sides of the ROW before wires are cut and temporary gates installed. After construction, openings would be closed with fencing of the same specifications as the original. In some locations permanent gates may be installed, with landowner permission, to provide access to the pipeline ROW. If a natural barrier used for livestock control were damaged during construction, the area would be adequately fenced to prevent the escape of livestock. No gates on established roads over public lands would be locked or blocked. Any cattle guards or gates damaged during construction would be repaired or replaced.
- In livestock use areas, open trenches would also be temporarily fenced at the end of each workday to prevent potential livestock injuries or losses.
- If natural barriers used for livestock control are damaged or removed during construction, they would be replaced by fences according to BLM specifications.
- All damaged livestock fences would be repaired to the landowner's satisfaction. All existing improvements, such as fences and gates, would be maintained and repaired to at least pre-construction condition.
- Temporary protective fences of sufficient height would be installed around sensitive resource areas as needed to defer grazing pressure until the vegetation has adequately reestablished (one to three growing seasons).

Any range improvements damaged by project construction would be repaired to the BLM or landowner's specifications.

5.0 List of Preparers

5.1 EA Preparers

Lead Agency: Bureau of Land Management

Lander Field Office

Leta Rinker – Project Manager/Realty Specialist
Greg Bautz – Soil Scientist
Craig Bromley – Archaeologist
Sue Oberlie – Wildlife Biologist
Pam Olson – Assistant Field Manager
Debra Larsen – Land Law Examiner

Pearl Field Services, LLC

Bret Rhinesmith
Christi Haswell
Eddie Relaford
Curtis Good
Christian Vanderhoef
Matt Dokken
Bill Kovar
Eric Rolli
Amy Hansen
Tammy Davis
Joey Sheeley
Andy Ogg

Greystone-ARCADIS

Tracey Ostheimer – Wildlife Biologist
Brian Heath – Wildlife Biologist

Entrix, Inc.

Craig Smith – Archaeologist
Lance McNees - Archaeologist

5.2 Coordination

Fremont County Weed and Pest
Fremont County Road Department

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7.0 Appendices

Appendix A: Visual Contrast Rating Worksheet

Appendix B: Soil and Weed Maps

Appendix C: Map Comparing Lost Creek and Proposed Action Routes

APPENDIX A
Visual Contrast Rating Worksheets

Form 8400-4
(September 1985)

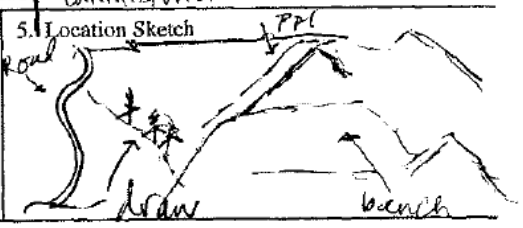
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date: 6/29/07
District: LFO
Resource Area:
Activity (program):

SECTION A. PROJECT INFORMATION

1. Project Name: Devon CO_2 pipeline
2. Key Observation Point: Sand Draw Highway turnoff
3. VRM Class: 2
4. Location
   Township: 32N
   Range: 95W
   Section: 5
5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat Steep concave wave surface	Transitioning bare to woody growth	X
LINE	Horizontal + vertical. Rim Pipeline	diffuse	vertical comm. tower to left
COLOR	Green, lighter tan, beige	Green dark + light tan	X
TEXTURE	vertically gradational going from smooth to	Medium grain + density. Scattered	X

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat Steep	bare, solid strip through directionally grading vegetation	X
LINE	Horizontal + vertical	hard edge (Short term) diffuse (long term)	X
COLOR	light tans (Short term) beige green (long term)	light + dark	X
TEXTURE	Smooth (Short term) vertical	fine	X

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONTRAST

ELEMENTS	FEATURES: LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form		✓					✓					✓
Line		✓					✓					✓
Color			✓				✓					✓
Texture		✓					✓					✓

2. Does project design meet visual resource management objectives? ☑ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluators' Names: Angie Lake
Dates: 6/29/07

SECTION D. (Continued)

Comments from item 2.

VRM Long Term: Attention of observer (after recovery) to area expected to be low. Little to no movement after completion. Natural feature re-establishment projected to be similar to that before disturbance

Additional Mitigating Measures (See item 3)

Preference of Matting used to stabilize Soils
Placement of rocks diagonally up slope (dull side up)
Horizontal H_2O bars downslope placed to avoid gullys & wash out erosion
Seed w/ approved seed mix - BLM Soil Scientist - until rehab is complete

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Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 6/29/07

District Lander Field Office

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

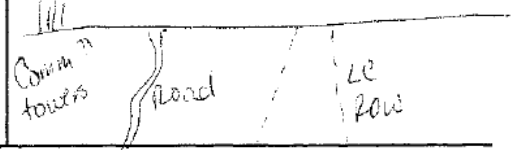
1. Project Name: Devon CO_2 pipeline

2. Key Observation Point: Sand Draw 139 turnoff (Hwy 135)

3. VRM Class: II

4. Location
Township 32 N
Range 95 W
Section 5

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Prominent feature, steep, undulating	Transitioning - bare soil to trees	—
LINE	horizontal, vertical	Diffuse / Butt edge	Communication towers - vertical on horizon
COLOR	Beiges, lite greens	Shades of green	—
TEXTURE	Vertically "terraced" (benches)	Medium - grain density dotted, scattered	—

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Prominent feature, steep, undulating	Bareground, lite colored strip vertical thru horizontal landform	—
LINE	Horizontal, vertical	Butt edge	Communication towers - vertical on horizon
COLOR	Beiges / lite greens - long term lite tans - short term	Greens	—
TEXTURE	Smooth	Smooth, fine grain, fine density (grasses)	—

SECTION D. CONTRAST RATING ☒ SHORT TERM ☐ LONG TERM

1. DEGREE OF CONTRAST

ELEMENTS	FEATURES: LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form			X		X							X
Line			X		X							X
Color		X				X						X
Texture			X		X							X

2. Does project design meet visual resource management objectives? ☐ Yes ☒ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☒ Yes ☐ No (Explain on reverse side)

Evaluators' Names: Joey Sheeley

Dates: 6/29/07

Dev

SECTION D. (Continued)

Comments from item 2.

Soil will be disturbed and vegetation will be removed for the pipeline trench. It will take time to rehabilitate the ROW

Additional Mitigating Measures (See item 3)

1. Waterbars horizontal to/at an angle downslope + placed appropriately
2. Erosion matting (like coconut matting)
3. Plant appropriate species of trees
4. ~~used~~ Use approved seed mix (BLM)
5. Overturned rocks - flip so dull side is up.
6. Reseed as necessary until rehabilitation is complete

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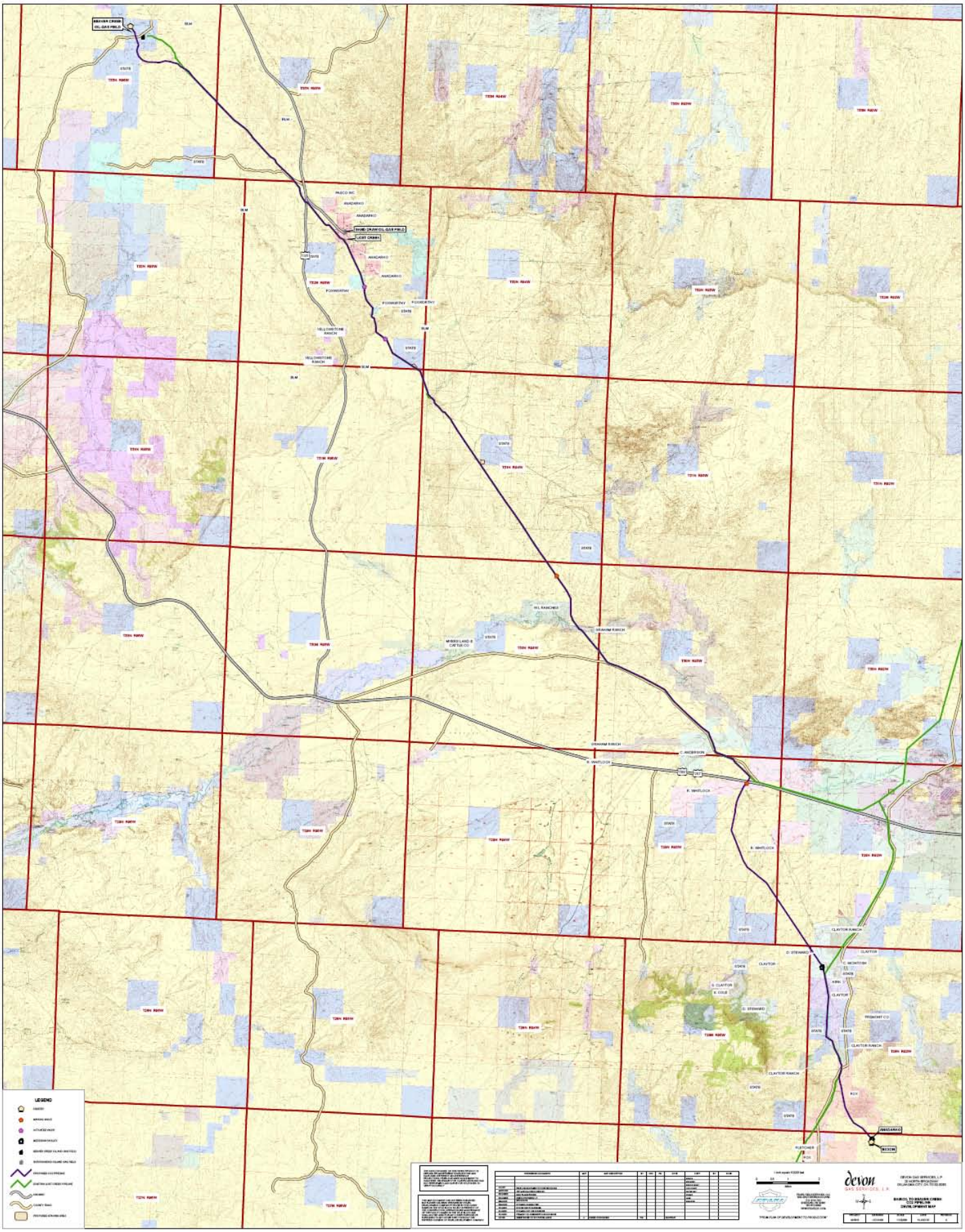
APPENDIX B
Soil and Weed Maps

These maps can be viewed at the BLM Lander Field Office.

APPENDIX C

Map Comparing Lost Creek and Proposed Action Routes


BEAVER CREEK
OIL GAS FIELD
SAND DRAW OIL GAS FIELD
LOST CREEK
MALCO INC
ANADARKO
POGGENPOHL
YELLOWSTONE RANCH
OIL RANCHES
GRAHAM RANCH
MYERS LAND & CATTLE CO
C. ANDERSON
R. WHITLOCK
CLAYTON RANCH
D. STEWARD
C. MCINTOSH
S. CLAYTON
R. COLE
PRESIDENT CO
FLETCHER
RICH
BEECH
T23N R25W
T22N R25W
T21N R25W
T20N R25W
T19N R25W
T18N R25W
T17N R25W
T16N R25W
T15N R25W
T14N R25W
T13N R25W
T12N R25W
T11N R25W
T10N R25W
T9N R25W
T8N R25W
T7N R25W
T6N R25W
T5N R25W
T4N R25W
T3N R25W
T2N R25W
T1N R25W
LEGEND
PROPOSED CO2 PIPELINE
EXISTING LOST CREEK PIPELINE
RAILROAD
COUNTY ROAD
PROPOSED STRAWN AREA
devon
GAS SERVICES, L.P.
DEVON GAS SERVICES, L.P.
20 NORTH BROADWAY
OKLAHOMA CITY, OK 73102-8260
BEAVER CREEK
CO2 PIPELINE
DEVELOPMENT MAP
PROJECT
DRAWN
DATE
SCALE
FILENAME
REVISION
0
FROM PLAN OF DEVELOPMENT TO PRODUCTION

List of Tables and Figures

Tables

Table 1.1 *Devon CO_2 Pipeline Required Permits, Approvals, and Reviews Required for Construction*

Table 2.1 *Staging Areas*

Table 2.2 *Equipment Required for Construction of the Proposed Pipeline*

Table 2.3 *Access Roads*

Table 2.4 *Summary of Construction Temporary Use Areas for the Devon Pipeline P*roject

Table 2.5 *Sensitive Plant Species and Construction Stipulations*

Table 2.6 *Wildlife Resources and Construction Stipulations*

Table 2.7 *Summary Comparison of Alternatives*

Table 3.1 *Critical and Other Elements of the Human Environment*

Table 3.2 *Seasonal Big Game Habitat Impacted by Devon CO_2 Project*

Table 3.3 *Potential Environmental Consequences – Wildlife Resources and Wild Horses*

Table 3.4 *Land Cover Data from the Gap Analysis Project (GAP) Data of Wyoming (1996)*

Table 3.5 *USDA NRCS Soils Characterization*

Table 3.6 *Potential Environmental Consequences – Soils and Vegetation*

Table 3.7 *Wetlands Crossed or Bored by the Proposed Devon Pipeline Project*

Table 3.8 *Potential Environmental Consequences – Floodplains and Riparian/Wetland Zones*

Table 3.9 *Background Concentrations of Air Pollutants - Riverton Dome EIS and Bear Canyon EA*

Table 3.10 *National and Wyoming Ambient Air Quality Standards*

Table 3.11 *Potential Environmental Consequences – Air Quality*

Table 3.12 *Potential Environmental Consequences – Visual Resources*

Table 3.13 *Potential Environmental Consequences – Socioeconomic Resources and Noise Issues*

Table 3.14 *Potential Environmental Consequences – Recreation*

Table 3.15 *Summary of Resource Commitments for the Proposed Devon CO_2 Pipeline Project*

Table 3.16 *Unavoidable and Adverse Impacts to Resources*

Table 4.1 *Sensitive Plant Species and Construction Stipulations*

Table 4.2 *Wildlife Resources and Construction Stipulations*

Figures

Figure 1.1 *Proposed Action Route*

Figure 2.1 *Northern Gas Line Route Alternative*

Figure 2.2 *Typical Right-of-Way Construction Configuration*

Figure 3.1 *Annual Visibility (Standard Visual Range) in Bridger Wilderness*

Figure 3.2 *Mean Annual Total Nitrogen Deposition near Pinedale, Wyoming*

Figure 3.3 *Precipitation pH near Sinks Canyon, Wyoming*