

APPENDIX I

BASELINE HABITAT FRAGMENTATION MODELING REPORT

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**Analysis of Baseline Habitat Fragmentation Modeling for the
West Tavaputs Plateau Full Field Natural Gas Development Plan
Environmental Impact Statement**



Prepared for:

Bureau of Land Management
Price Field Office
Price, UT

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I. Introduction

Based on comments received in response to the West Tavaputs Plateau (WTP) Preliminary Draft Environmental Impact Statement (PDEIS), it was determined that the impact analyses for certain resources could be strengthened by fragmentation analysis. Because fragmentation modeling requires extensive time, the Bureau of Land Management (BLM) Price Field Office decided that Buys & Associates (B&A) should conduct preliminary fragmentation analyses based on existing disturbance, which could be used as a baseline for comparison with other alternatives. The following sections discuss the baseline fragmentation analyses as they pertain to wildlife and wilderness resources.

II. Goals of the Fragmentation Modeling Exercise for Wildlife

- To determine/quantify the extent and spatial configuration of habitat fragmentation in the following wildlife habitats within the WTP Project Area: crucial winter habitat for mule deer; crucial winter habitat for elk; sage-grouse core winter use areas; and wild horse use areas within the Range Creek Herd Management Area (HMA).
- To determine/quantify patch size, edge effects, and connectivity to supplement existing analyses in the WTP PDEIS.

Ila. Assumptions Used to Build and Run the Baseline Model for Wildlife and Wild Horses

Based on Wyoming Game and Fish Department (2007) literature provided by the BLM Price Field Office and discussions with Resource Specialists, the following spatial buffers were placed around existing development within the WTP Project Area in order to determine the extent of existing habitat fragmentation.

a. Mule Deer

- 200-meter buffer around all existing well pads; and
- 200-meter buffer from the centerline of all existing roads and pipelines.

b. Elk

- 1.2-mile buffer around all existing well pads; and
- 0.5-mile buffer from the centerline of all existing roads and pipelines.

c. Sage-grouse

- 2-mile buffer around all existing well pads; and
- 2-mile buffer from the centerline of all existing roads and pipelines.

d. Wild Horses

- 200-meter buffer around all existing well pads; and
- 200-meter buffer from the centerline of all existing roads and pipelines.

These spatial buffers were then clipped to various wildlife habitats within the WTP Project Area (i.e., crucial winter habitat for mule deer and elk, sage-grouse core winter

use areas, and wild horse use areas within the Range Creek HMA) to determine/quantify the extent and spatial configuration of existing habitat fragmentation within the WTP Project Area. It should be noted that some roads and pipelines (i.e., those not currently shown from existing data), and cross-country pipelines were not included in determining the extent or spatial configuration of existing habitat fragmentation within the WTP Project Area.

IIb. Results of the Baseline Model for Wildlife and Wild Horses

Mule Deer – The extent of existing habitat fragmentation in mule deer crucial winter habitat within the WTP Project Area is summarized below in **Table 1** and illustrated in **Figure 1**. In a few instances, the map shows producing wells that are not connected to the existing transportation or gathering system by road or pipeline. Thus, some well pads erroneously appear to be “floating” in **Figure 1**.

Table 1. Extent of Existing Habitat Fragmentation in Mule Deer Crucial Winter Habitat within the WTP Project Area					
Total Crucial Winter Habitat Lost (acres)	Percent of Crucial Winter Habitat	# of Patches	Average Patch Size (acres)	Smallest Patch (acres)	Largest Patch (acres)
17,345	23.6	29	1,964	2	9,468

Elk – The extent of existing habitat fragmentation in elk crucial winter habitat within the WTP Project Area is summarized below in **Table 2** and illustrated in **Figure 2**.

Table 2. Extent of Existing Habitat Fragmentation in Elk Crucial Winter Habitat within the WTP Project Area					
Total Crucial Winter Habitat Lost (acres)	Percent of Crucial Winter Habitat	# of Patches	Average Patch Size (acres)	Smallest Patch (acres)	Largest Patch (acres)
54,046	67.4	18	1,207	16	7,015

Sage-grouse – All sage-grouse core winter use areas within the WTP Project Area are fragmented as illustrated in **Figure 3**.

Wild Horses – The extent of existing habitat fragmentation in wild horse use areas of the Range Creek HMA within the WTP Project Area is summarized below in **Table 3** and illustrated in **Figure 4**. As previously mentioned, in a few instances, the map shows producing wells that are not connected to the existing transportation or gathering system by road or pipeline. Thus, some well pads erroneously appear to be “floating” in **Figure 4**.

Wild Horse Use Areas within the Range Creek HMA	Total Herd Use Area Lost (acres)	Percent of Herd Use Area	# of Patches	Average Patch Size (acres)	Smallest Patch (acres)	Largest Patch (acres)
Flat Iron/Twin Hollow	4,383	40.1	5	1,693	102	6,424
Cottonwood Ridge	5,090	34.7	9	1,064	208	2,618
Cedar Ridge/Bishop	1,535	14.0	4	2,329	183	4,981

IIc. Discussion and Recommendations for Wildlife and Wild Horses

As shown in the results section, existing wildlife habitats analyzed for this baseline modeling exercise have been fragmented to varying degrees by existing development. Based on the assumptions used for this modeling, the existing roads, pipelines, and well pads have altered the suitability of habitat for wildlife within the WTP Project Area. The fragmentation of previously undisturbed lands may have reduced usage or caused abandonment of remaining habitat patches, dependent on the species' threshold to patch size and connectivity to other patches. Based on the extent of existing habitat fragmentation within the baseline model, additional habitat fragmentation models for the Proposed Action and alternatives would not substantially supplement the existing impact analyses in the Environmental Impact Statement (EIS), and therefore have not been conducted as comparative tools to the baseline model exercise.

III. Goals of the Fragmentation Modeling Exercise for Wilderness Study Areas (WSAs) and Non-WSA lands with Wilderness Characteristics

- To quantify the indirect impacts (e.g., sight and sound) that the proposed development could potentially have on naturalness, and opportunities for solitude, and/or opportunities for primitive and unconfined recreation.
- To quantify how many acres of the WSAs or lands within wilderness characteristics would be segregated from the remainder of the WSAs or lands with wilderness characteristics.
- To quantify how fragmentation would directly impact size of WSAs and areas with wilderness characteristics.

IIIa. Assumptions Used to Build and Run the Baseline Model for WSAs and Non-WSA lands with Wilderness Characteristics Areas

Size – The following sources were used to determine the size of the existing WSAs and wilderness characteristics areas.

- The Jack and Desolation Canyon WSAs include all areas studied under Section 603 of the Federal Land Policy Management Act and included in the Utah BLM Statewide Wilderness Inventory Report.

- The Jack Canyon wilderness characteristics area includes all areas determined to have wilderness characteristics following the 2007 wilderness characteristic review.
- The Desolation Canyon wilderness characteristics area includes all areas determined to have wilderness characteristics in the 1999 Utah Wilderness Inventory¹.

In terms of indirect impacts, for the purposes of analysis, it is assumed that all areas within ½-mile of existing roads could lack some or all of the constituent elements that are used to define wilderness (i.e., naturalness and possessing opportunities for solitude or primitive and unconfined recreation). Using this assumption, a GIS-based analysis was conducted to determine those areas within the Jack and Desolation Canyon WSAs and within the Jack and Desolation Canyon areas with wilderness characteristics that are within ½-mile of existing roads (e.g., Cedar Ridge, Jack Ridge, and Jack Canyon).

IIIb. Results of the Model for WSAs and Non-WSA lands with Wilderness Characteristics Areas

As shown in **Table 4**, the alternative baseline analysis shows that wilderness constituents exist in only 4 percent of Jack Canyon wilderness characteristics area and 39 percent of Jack Canyon WSA. Within Desolation Canyon, wilderness constituents exist in approximately 60 percent of the wilderness characteristics area and 76 percent of the WSA.

It should be noted that this GIS-based analysis does not take into consideration variables such as existing road conditions and/or use, visual and topographical screening, or noise propagation in mountainous terrain.

Table 4. Indirect Impacts to Wilderness Using a ½- Mile Sight and Sound Buffer						
Name of Area	Total Acres	Acres in the WTP Project Area	Within ½-mile of Existing Roads		More than ½-mile from Existing Roads	
			Acres	Percent	Acres	Percent
Jack Canyon WSA	7,500	7,480	4,572	61	2,908	39
Desolation Canyon WSA	290,845	24,668	5,853	24	18,815	76
Jack Canyon Wilderness Characteristics Area	1,465	1,465	1,437	96	28	4
Desolation Canyon Wilderness Characteristics Area	211,220 ¹	31,744	12,711	40	19,033	60

¹Total acreage of the Desolation Canyon wilderness characteristics area is likely to change based upon the most recent wilderness characteristics review.

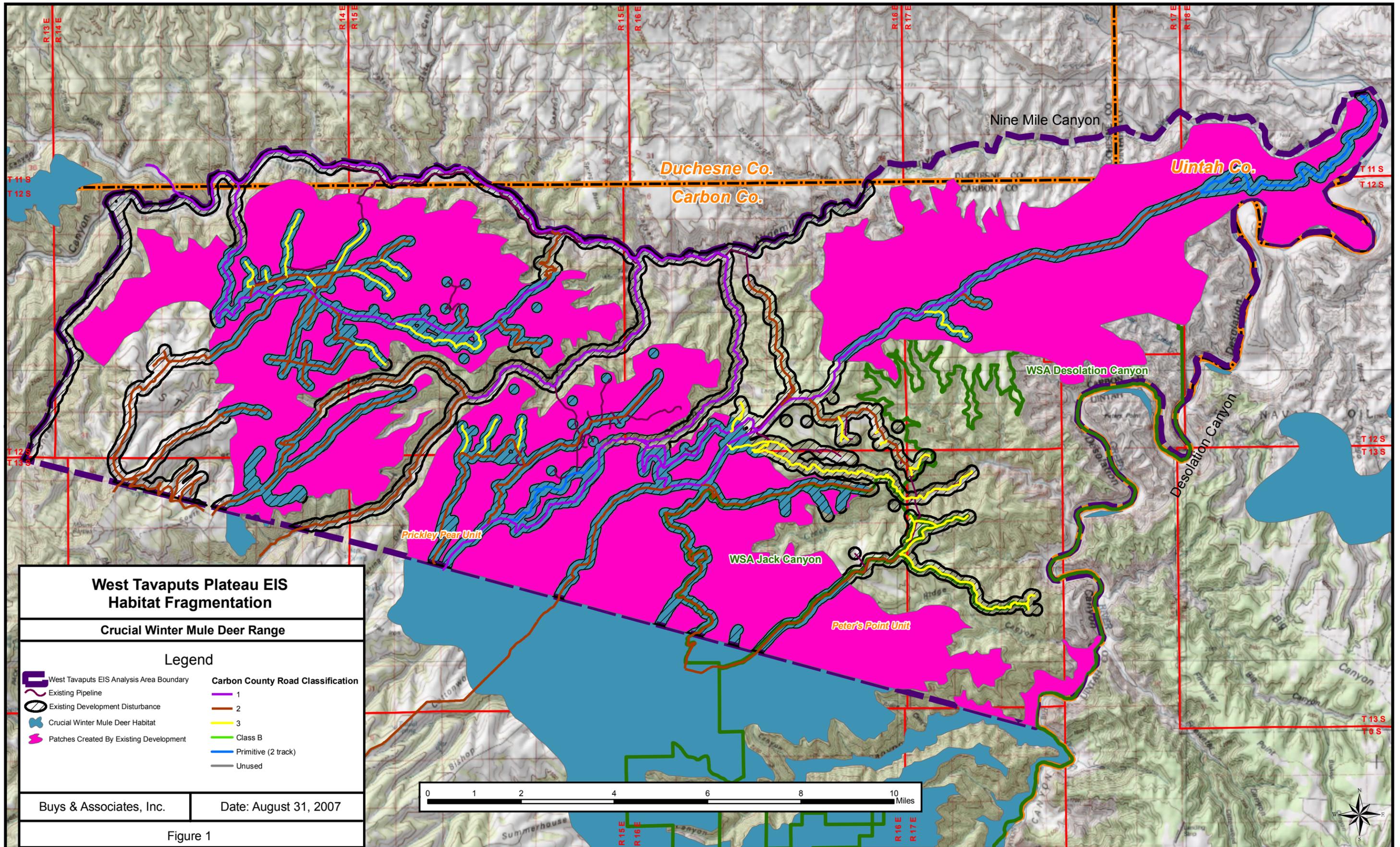
¹ Total acreage of the Desolation Canyon wilderness characteristics area is likely to change based upon the most recent wilderness characteristics review.

IV. References

USDA-USFS. 1982. ROS Users Guide.

USDI-BLM 2004. Price Resource Management Plan Draft EIS. Appendix 15. Recreational Opportunity Spectrum- Classification Standards.

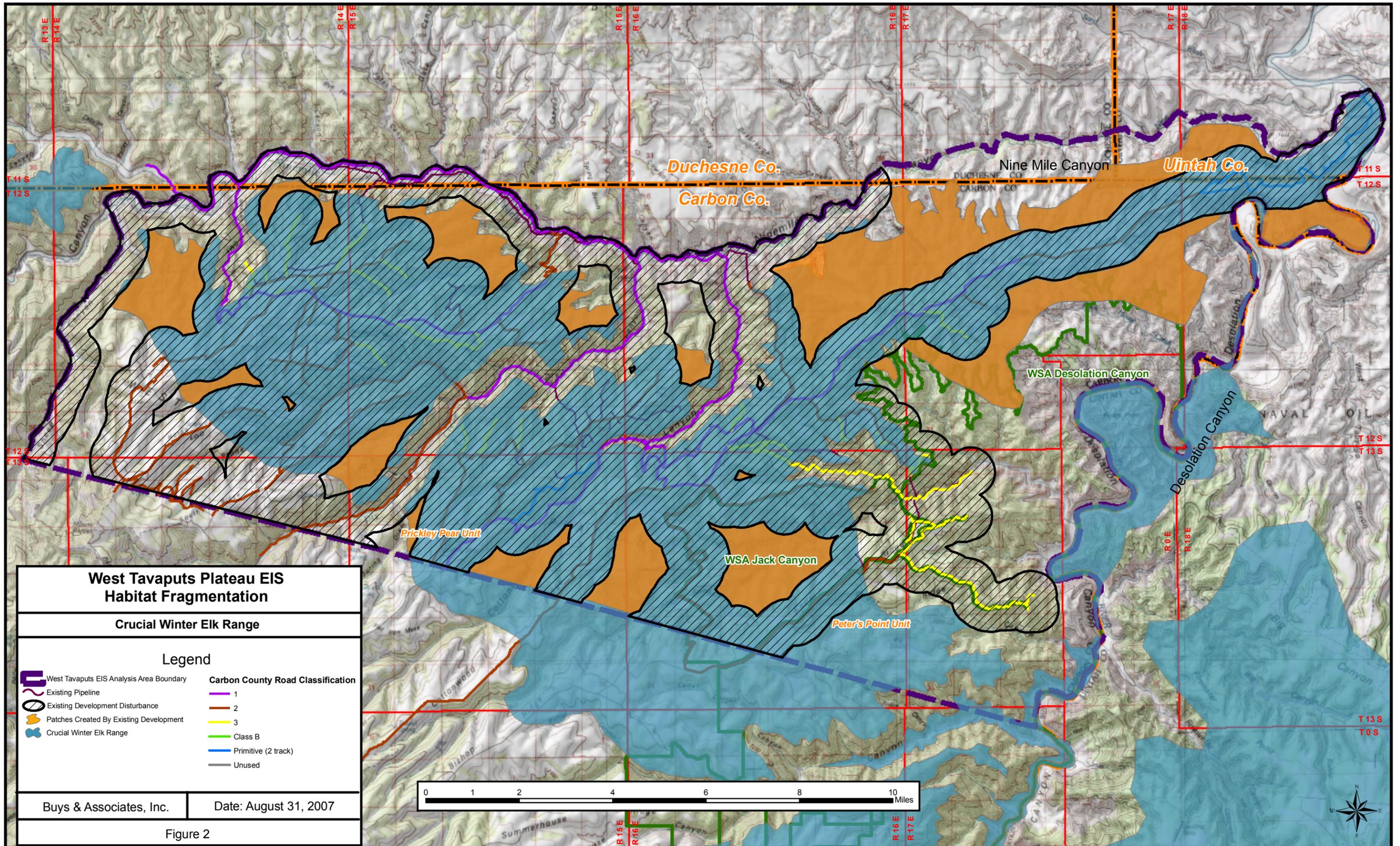
Wyoming Game and Fish Department. 2007. Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats. Version 2.0. Revised April 20, 2007. Cheyenne, Wyoming. 223 p.

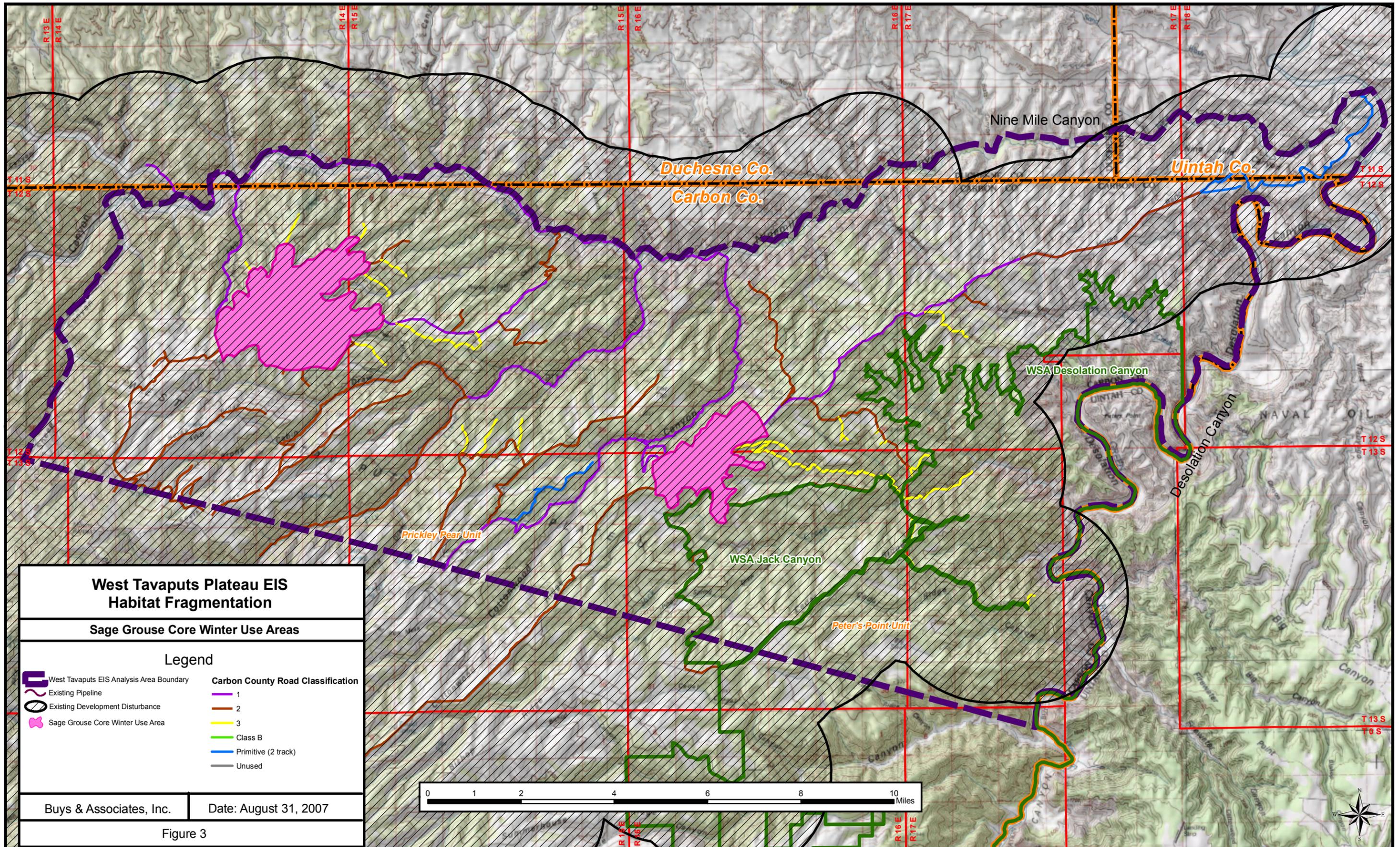


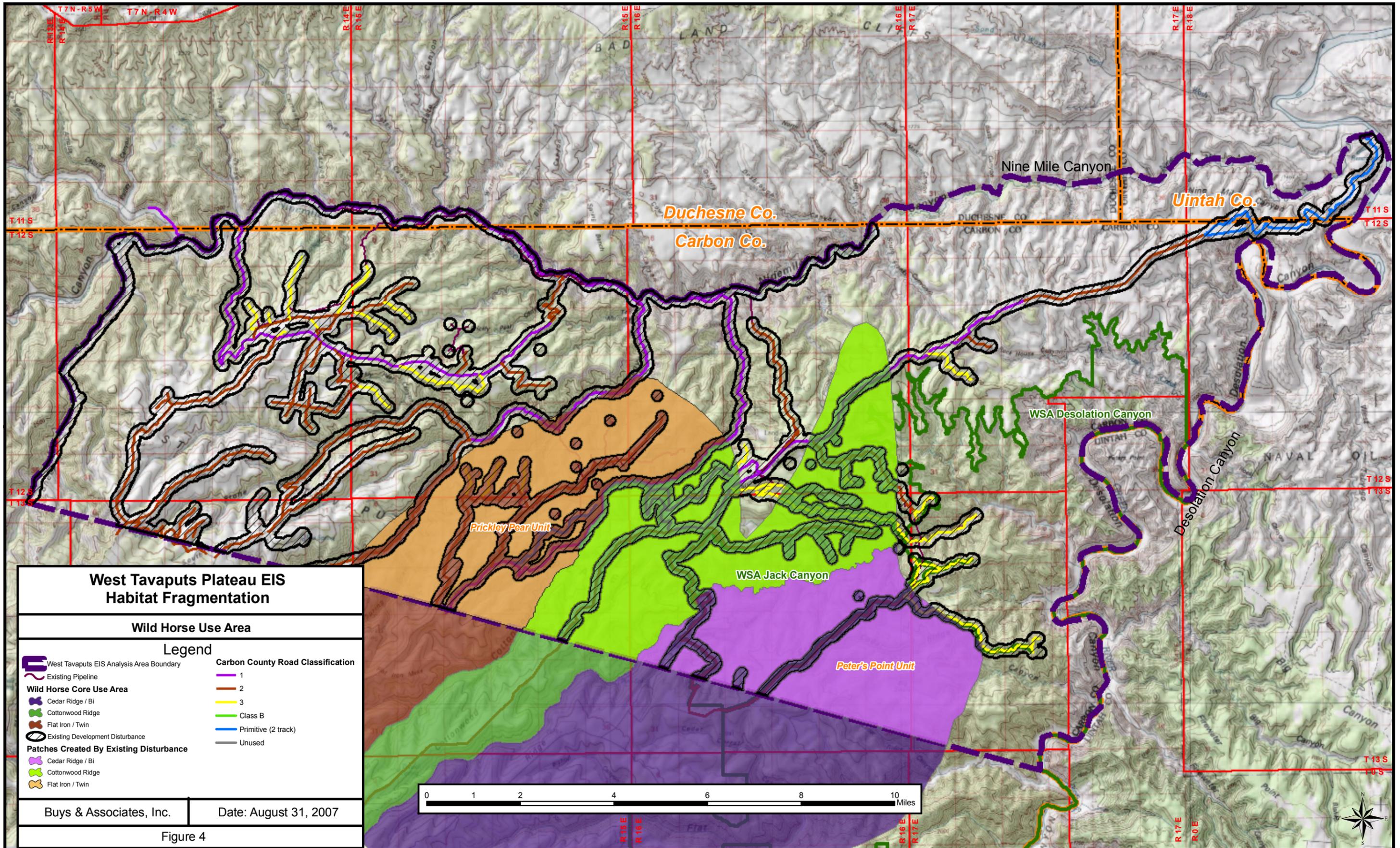
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Date: August 31, 2007

Figure 1







**West Tavaputs Plateau EIS
Habitat Fragmentation**

Wild Horse Use Area

Legend

- | | |
|--|-------------------------------------|
| West Tavaputs EIS Analysis Area Boundary | Carbon County Road Classification 1 |
| Existing Pipeline | Carbon County Road Classification 2 |
| Wild Horse Core Use Area | Carbon County Road Classification 3 |
| Cedar Ridge / Bi | Class B |
| Cottonwood Ridge | Primitive (2 track) |
| Flat Iron / Twin | Unused |
| Existing Development Disturbance | |
| Patches Created By Existing Disturbance | |
| Cedar Ridge / Bi | |
| Cottonwood Ridge | |
| Flat Iron / Twin | |

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Figure 4

Duchesne Co.
Carbon Co.

Uintah Co.

Prickley Pear Unit

WSA Jack Canyon

Peter's Point Unit

WSA Desolation Canyon

Nine Mile Canyon

Desolation Canyon

