MODIFIED DECISION RECORD
FOR
Williams Production Company
Carr Draw Federal POD V Addition II
ENVIRONMENTAL ASSESSMENT –WY-070-09-123

BACKGROUND
The December 8, 2009 Wyoming State Director Review (SDR) No. WY-2010-03, of the September 25, 2009 Decision Record for Williams Production RMT Company's Carr Draw V Addition II Federal (CDVA2) Plan of Development (POD) affirmed in part and remanded in part the Buffalo Field Office (BFO) manager's CDVA2 decision.

The State Director set aside the portions of the CDVA2 decision relative to cumulative impacts to elk, site visit reports, and monthly elk observation reports. All other portions of the BFO's decision were affirmed.

DECISION
It is the BLMs decision to approve alternative C and that portion of alternative D relative to conditions that will mitigate impacts to the Fortification Lek as described in the attachments and authorize the following modifications to the remanded portions of Williams Production RMT Company's CDVA2 CBNG POD:

1. Cumulative Impacts to Elk

EA section 3.3.1.2 Big Game Cumulative Effects is replaced by Attachment 1, Fortification Elk Cumulative Impact Assessment

Note: During the 2009 field season, BFO staff conducted field verification of "existing oil & gas roads" within the Fortification Creek elk yearlong range resulting in a revised roads layer and therefore a different security habitat assessment than the 2007 environmental report and the original Carr Draw Federal POD V Addition II EA. View shed analysis utilizing the geographic information system (GIS) modeling with the best available data continue to be utilized by BLM to determine habitat effectiveness within the Fortification Creek elk yearlong range.

2. Conditions of Approval Remanded

The following COA has been removed: *"The operator will provide BLM with a proposed work schedule at the pre-construction meeting and a work summary report, due by the 12th of each month. The report shall summarize the work activities from the previous month, what activities were conducted, where the work was conducted, when the work was conducted, and any elk observations shall be recorded. The report shall also include the proposed activity schedule for the next month. The summary report shall be compared with the elk monitoring data to evaluate cause and affect relationships."*

Alternative mitigation measures to the above were considered however, none were determined to be effective and implementable.

All affirmed portions of the original CDVA2 DR and EA remain in effect. Therefore, this decision is subject to adherence with all of the operating plans and mitigating measures contained in the master surface use plan of operations, drilling plan, water management plan, and information in individual APDs.

This approval is also subject to operator compliance with all mitigation and monitoring requirements contained within the Powder River Oil and Gas Project Final Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003.

RATIONALE

The decision to authorize the modified Alternative C is based on the following:

1. The modified EA addresses the remanded portions following the State Director's review.
2. Alternative C will not result in any undue or unnecessary environmental degradation.
3. Site specific measures applied to Carr Draw Federal POD V Addition II will lessen impacts to the Fortification Creek elk herd, in particular timing limitations on surface disturbing activities.
4. Elk displacement is anticipated to be temporary, with complete displacement during the drilling and construction phases, followed by 50% of the elk returning during the production phase.
5. The Fortification Creek elk herd population viability will not be adversely affected by this decision.
6. Elk are not a listed or sensitive species; regardless, the BLM has consulted with the WGFD to consider their objectives in managing this herd.
7. The elk herd is approximately 150% of the WGFD objective.
8. It is in the public interest to approve this development to help meet the nation's future needs for energy reserves and reduce the U.S. dependence on foreign sources of energy. It also helps to stimulate local economies by maintaining stability for the workforce.
9. Approval of this alternative is in conformance with the PRB-FEIS, and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office, April 2001 (refer to Appendix E of that document relative to adaptive management).

ADMINISTRATIVE REVIEW AND APPEAL: Under BLM regulations, this decision is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received.

Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager, Buffalo Field Office

4/9/2010
Date

FINDING OF NO SIGNIFICANT IMPACT
For
Williams Production RMT Company's
Carr Draw Federal V Additions II POD
PLAN OF DEVELOPMENT

Based on the analysis of the potential environmental impacts, (see Attachment 1 – Fortification Elk Cumulative Impact Assessment and Attachment 2 – Carr Draw Federal POD V Additions II Cumulative Impacts Under Each Alternative) and the application of mitigation measures for the Fortification Creek elk herd and greater sage-grouse, I have determined that NO significant impacts are expected from the implementation of the selected alternatives, Alternative C & D, and, therefore, an environmental impact statement is not required.

Approval of Alternative C and appropriate components of Alternative D as described in the EA is in conformance with the PRB-FEIS, and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office, April 2001 (refer to Appendix E of that document relative to adaptive management). This FONSI incorporates by reference the Carr Draw Federal POD V Additions II Plan of Development Environmental Assessment (WY-070-09-123) and the 2007 Environmental Report: Coalbed Natural Gas Effects on the Fortification Creek Area Elk Herd.

Previous Effects Analysis for the Fortification Elk Herd

2003 Powder River Basin Oil and Gas Project Final Environmental Impact Statement (PRB FEIS)
The PRB FEIS considered cumulative impacts to elk within the Buffalo Field Office, but did not specifically address the isolated Fortification Creek elk herd with CBNG development forecasted throughout and completely surrounding the herd's seasonal ranges.

2007 Environmental Report
The 2007 Environmental Report identified past and present effects of road-building, oil and gas development and other activities on the elk herd and forecasted effects from full field 80-acre spacing development in the entire elk yearlong range. However, the 2007 report did not analyze the incremental effects of individually proposed development projects including potential mitigation measures and alternative development scenarios contemplated in site-specific environmental analyses.

Carr Draw Federal POD V Add IIPOD Environmental Assessment WY-070-09-123
The BLM Buffalo Field Office (BFO) issued a decision of Finding of No Significant Impact (FONSI) and Decision Record (DR) for the Carr Draw Federal POD V Add II Plan of Development (CDVA2POD) Environmental Assessment (EA) on July 22, 2009. Wyoming State Office (WSO) BLM received two separate requests for State Director Review (SDR) in accordance with the regulations at 43 CFR 3165.3(b) from Williams Production RMT Company on October 27, 2009 and Powder River Basin Resource Council, Wyoming Outdoor Council, Wyoming Wildlife Federation, and National Wildlife Federation (PRBRC et al.) on November 2, 2009. The Carr Draw Federal POD V Additions II State Director Review (WY-2010-03) decision issued November 30, 2009 set aside the portions of the BFO's September 25, 2009 decision with respect to cumulative impacts to elk, site visit reporting, and monthly elk observation reports. The WSO instructed BFO to remedy NEPA deficiencies identified. The Fortification Elk Cumulative Impact Assessment (Attachment 1) and Carr Draw Federal POD V Additions II Cumulative Impacts under each Alternative (Attachment 2) address those NEPA deficiencies and replace Section 3.3.1.2 ("Big Game Cumulative Effects") on page 13 of the CDVA2 EA.

Site specific measure applied to Carr Draw Federal POD V Additions II to lessen impacts to the Fortification elk herd:
Surface disturbing activities will be restricted within identified elk critical winter range November 15 to April 30 and elk parturition range May 1 to June 30 for the life of the project.

Removal of the site specific measures "site visit report" and "elk observation report" which were applied to lessen impacts to and assist in monitoring of, the Fortification Creek elk herd will not result in a significant impact.

The Fortification Creek elk herd population managers, the Wyoming Game & Fish Department, verbally commented to the BLM that the security habitat threshold proposed in the Fortification Creek Draft RMP Amendment EA should not necessarily apply to the entire Elk Yearlong range. Population viability of the Fortification Creek elk herd will not be threatened by the projected impacts of the Carr Draw Federal POD V Additions II POD.

Elk displacement is anticipated to be temporary, with complete displacement during the drilling and construction phases, followed by approximately 50% of the elk returning during the production phase.

Mitigation measures were selected from the range of alternatives in this context to best meet the purpose and need for the proposed action. With the application of mitigation measures selected from Alternative C, population viability of the Fortification elk herd will not be compromised.

Site specific measures applied to Carr Draw Federal POD V Additions II to lessen impacts to greater sage-grouse:

a. No surface disturbing activities are permitted from March 1 to June 15. This condition will be implemented on an annual basis for the life of the project. This condition affects the ENTIRE project area.
b. A sage-grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
c. Maximum design speed on all operator-constructed and maintained roads (except county roads) will not exceed 25 miles per hour.
d. No surface use will be permitted within the 0.25 mile CSU for the Fortification lek.

The 2003 PRB-FEIS disclosed significant impacts to sage-grouse (pg. 4-270). Removing the site visit limitation will not result in impacts not previously disclosed and analyzed in the 2003 PRB-FEIS.

Removal of the site specific measure for "site visit report" to lessen impacts to sage-grouse will not result in impacts to sage-grouse not previously disclosed and analyzed in the 2003 PRB-FEIS. In conformance with Appendix E, *Record of Decision, Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment* BLM Buffalo Field Office has initiated actions within the PRB FEIS analysis area in response to additional information regarding impacts to sage-grouse. These measures include:

1. Early initiation of a Resource Management Plan (RMP) revision, based on the evaluation of monitoring data generated under the mitigation monitoring and reporting plan (MMRP) in the PRB-FEIS Record of Decision.

2. Establishment of greater sage-grouse "focus" areas, encompassing approximately 1 million acres of sage-grouse habitat. These areas are managed under strict guidelines designed to preserve sage-grouse habitat for development of alternatives during the RMP process (Appendix 1).

3. Initiation of a population viability analysis in the Powder River Basin. This is a 24-month project involving the USGS, BLM Miles City Field Office, BLM Buffalo Field Office, and the University of Montana.

4. Development of alternatives that modify the proposed action to reflect the best available science in sage-grouse management.

5. Development of conditions of approval, specific to sage-grouse management, that incorporate some recommendations from recent research, the NE Local Sage-grouse Working Group, and the Petroleum Association of Wyoming.

The selected alternative incorporates components of the Wyoming Governor's Sage-Grouse Implementation Team's "core population area" strategy and executive order and local research to provide appropriate protections for sage-grouse, while meeting the purpose and need for the CDVA2 project (WYGF, 2009).

The selected alternative was developed with the recognition that: 1) many of the project components modified to minimize surface disturbance may also reduce impacts to elk and sage-grouse habitat; 2) portions of the analyzed alternatives may not correspond to the desires of the surface owner in the project area; and 3) appropriate local sage-grouse research and the best available science from across the species' range were incorporated in development of conditions of approval attached. The implementation of the selected alternative best meets the stated purpose and need for the proposed action. With the application of mitigating measures selected from Alternative C & D, sage-grouse population viability in the Powder River Basin will not be compromised.

ADMINISTRATIVE REVIEW AND APPEAL: Under BLM regulations, this decision is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received.

Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager, Buffalo Field Office

4/9/2010
Date

Attachment 1

Attachment 2

Attachment 1
Fortification Elk Cumulative Impact Assessment

Big Game Cumulative Effects

Elk

The purpose of cumulative effects analysis is to ensure that Federal decision-makers consider the full range of consequences of actions (the proposed action and alternatives, including the No Action Alternative). The Cumulative Impact Assessment Area (CIAA) is the Fortification elk herd yearlong range as defined by the Wyoming Game and Fish Department (WGFD), which consists of 122,930 acres.

The WGFD defined two types of important wildlife habitats that are located within the yearlong range; crucial winter range (CWR) and parturition range (PR). Both provide important seasonal habitat functions during sensitive periods for elk (Figure 1).

Table 1 Fortification Creek Elk Ranges

Range	Size (Acres)
Yearlong	122,930
Crucial Winter	38,233 (31% of Yearlong Range)
Parturition	59,291 (48% of Yearlong Range)

For the purposes of this analysis, the BLM selected three factors and corresponding metrics to evaluate cumulative effects upon elk. These factors (and metrics) are (1) habitat condition and availability (security habitat and connectivity), (2) pattern of elk use (collaring data), and (3) population objectives (number of elk).

Past and Present Actions Resulting in Effects to the Fortification Elk Herd

To disclose the past and present actions within the CIAA (1) Wyoming Oil and Gas Conservation Commission (WOGCC) well data were obtained, (2) Federal wells were verified with Automated Fluid Minerals Support System (AFMSS), and (3) an updated GIS layer displaying existing oil and gas access roads were used. The CIAA provides a reasonably complete assessment of current oil and gas development on fee, state, and federal lands including the Augusta Unit Zeta POD, the Carr Draw III West POD, and Carr Draw V Add II POD.

Past and present actions for this analysis include wells and associated infrastructure that are authorized. The Augusta Unit Zeta POD, the Carr Draw III West POD, and Carr Draw V Add II POD were authorized under full force and effect with separate decision records, subsequent to an environmental assessment and Finding of No Significant Impact (FONSI) for each. As a result of the full force and effect decisions, many of the wells have been constructed and are operating at this time.

Impacts to elk habitat and elk have already occurred during construction and drilling activities related to federal and non-federal wells. The Buffalo Field Office's ability to rescind Applications for Permit to Drill and mandate wells already drilled to be plugged and abandoned is limited (thus, the No Action Alternative must include these wells). Future Environmental Assessments (EAs) for new Plans of Development (PODs) will consider cumulative impacts to elk within the entire yearlong range, or other appropriate CIA boundary.

Regardless if the Carr Draw V add II (CDVa2) wells drilled as of December 15, 2009 were included as past & present OR reasonably foreseeable future actions, the decision-maker is still provided (in sum) a description of the impacts within the CIAA to elk, thereby allowing an informed decision regarding cumulative impacts. However, the selected actions and effects will be represented here and below as part of the past and present actions.

Attachment 1
Fortification Elk Cumulative Impact Assessment

Security Habitat and Connectivity
A security area is defined as "any area that will hold elk during periods of stress because of geography, topography, vegetation, or a combination of those features" (Lyon and Christensen 1992). Hillis et al. (1991) quantified security areas as nonlinear blocks of hiding cover = 250 acres in size and = one-half mile from any open road. Elk vulnerability increases when less than 30% of an analysis unit is comprised of security areas (Canfield 1991, Hillis et al 1991). WGFD uses this definition in the A Rocky Mountain Elk Habitat Conservation Plan for the WGFD Sheridan Region.

In the 2007 Environmental Report, BLM used the elk relocation data (prior to 2008) and a viewshed model to further define security habitat within the Fortification Creek area based on elk avoidance of oil and gas wells and roads. Two types of habitat were considered in the model habitat effectiveness and security habitat. Habitat effectiveness is the total area greater than 0.5 miles from roads, or less than 0.5 miles from a road but not visible from a road. It generally refers to the available habitat during nonhunting conditions, particularly summer and fall (Lyon 1983). To simplify the model, all area is considered useable habitat, vegetation and other factors affecting habitat suitability are not included. Security habitat is a subset of effective habitat. Elk often retreat when disturbance in their usual range is intensified, such as during the hunting season, with elk appearing to be most comfortable or secure within effective habitat areas of a minimum size (Lyon 1983). A commonly used minimum patch size for security habitat is 250 contiguous acres more than 0.5 miles from an open road (Christensen et al. 1991, Leege 1984).

Modeling used to identify the security habitat was defined at more than one-half mile or not visible from an existing oil and gas road.

Prior to federal CBNGdevelopments in 2009, there were approximately 60,000 acres of security habitat present within the CIAA. Population monitoring conducted by WGFD as disclosed in the annual Job Completion Reports suggests connectivity between remaining security patches was relatively unimpeded prior to 2009 (WGFD 2008).

Table 2 Elk Security Habitat within the Fortification Creek Elk Ranges

Range	Security Habitat (Acres)
Yearlong	60,000
Crucial Winter	23,150 (39% of security habitat)
Parturition	33,770 (56% of security habitat)

As of December 15, 2009, WOGCC reports 493 existing federal and nonfederal oil and gas wells (including 10 oil, 55 conventional gas, and 428 CBNG wells) at 346 locations within the entire yearlong range, distributed in a non-uniform manner (Figure 3). The majority of these existing wells are concentrated in developed CBNG and conventional oil and gas fields across roughly 48,000 acres within the elk Yearlong range. This includes 122 existing well locations within the CWR and 139 existing well locations within the PR. The proportion of existing federal well locations that are within the CWR and PR are 90% and 62% respectively. At this time none of the 8 well locations approved in the Carr Draw V Add II POD have been drilled.

Pattern of Elk Use
Radio-telemetry and GPS collaring data collected by BLM and WGFD since 2005 have shown that the Fortification elk tend to avoid oil and gas development by moving to less developed areas. Disruptive activity is usually temporary in nature, however, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gussey 1986, WGFD

2000), albeit at 50% or less of the previous levels in forested environments (Hayden-Wing Associates 1990).

Sawyer (2005) observed similar response of elk within the more open terrain of the Jack Morrow Hills of Wyoming. The literature consistently shows a correlation between elk avoidance response and the level of human activity associated with oil and gas development.

Table 3 details the percentage of documented elk collar locations in each of the defined ranges within the CIAA. Elk use of the identified range focused on the time period when the elk are most apt to be utilizing the given range. BLM and WGFD assume a period of 2 weeks for elk to acclimate to reduced oil and gas activity during the timing limitation stipulations periods. Therefore Table 3 observations within the Parturition range occurred May 15-June 30. Observations within the Crucial Winter range were recorded December 1-April 30 of the corresponding year. Similarly, Figure 4 represents yearlong use, Figure 5 represents winter use, and Figure 6 represents parturition use as captured from the radio-telemetry and GPS collaring data.

Table 3 Percent of documented elk collar locations in each of the defined ranges within the CIAA.

Year / Range	Total observation points	Total observation points within respective range	% use of respective range
2008 Yearlong	**32,709**	**28,257**	**86%**
2009 Yearlong	**49,604**	**43,839**	**88%**
2008 Crucial Winter Season	**6,203**	**4,615**	**74%**
2009 Crucial Winter Season	**27,125**	**19,119**	**71%**
2008 Parturition Season	**7,626**	**5,594**	**73%**
2009 Parturition Season	**8,955**	**5,948**	**66%**

Note: Timing Limitation Stipulation (TLS) for elk Parturition range is May 1 – June 30
Timing Limitation Stipulation (TLS) for elk Crucial Winter range is November 15 to April 30.

Population Objectives

This small elk herd grew well above objective from 1995 to 1999, after which, regular harvest began to reduce the elk numbers and return the herd to slightly above objective. The post-hunt population objective, established by WGFD, for the Fortification elk herd is 150 animals. There are approximately 219 animals within this herd unit (WGFD post-season 2008). Their documented distribution in each of the ranges is identified in Figures 4 through 6 and Table 3(above). This herd has been somewhat controlled by annual harvests. Thus far, changes in environmental factors seem to have little impact on this elk herd, and currently the population is estimated to be above the management objective. The WGFD 2008 Job Completion Report for the Fortification elk herd indicates that the current population trend is stable to decreasing. (2009 Post Season Population Estimate: 183)

Reasonably Foreseeable Future Actions (RFFA) Resulting In Effects to the Fortification Elk Herd

One hundred percent of the Federal mineral estate within the CIAA, excluding the Wilderness Study Area (WSA), has been leased, therefore additional Application for Permit to Drill (APD) filings are expected in the future. WOGCC and BLM data were used to predict the RFFA within the CIAA. Oil and gas wells were considered reasonably foreseeable if the WOGCC data showed the locations as AP status (Approved Permit) for state & fee locations, or if the BLM had received an APD. Access roads to Federal locations have been submitted with the APDs, and these alignments were used to predict future disturbance (assuming an average short-term disturbance width of 50 feet) and arrangement of disruptive activities within the CIAA. BLM has utilized the best available data collected in the field as well as data received from various operators that includes road alignments to both federal and non-federal locations. However

access road alignments to all non-federal locations are not known, and so not all are included in this analysis. The reasonably foreseeable future development within the CIAA as proposed within these parameters consists of 520 CBNG additional well locations, 436.2 miles of new roads resulting in approximately 2,644 acres of surface disturbance (Figure 7).

Security Habitat and Connectivity

As stated, the reasonably foreseeable future actions within the CIAA as proposed within the parameters above consists of 520 CBNG additional well locations, 436.2 miles of new roads resulting in approximately 2,644 acres of surface disturbance. Of those 520 proposed well locations 70 are within elk CWR resulting in approximately 199.8 miles of new roads and 1,211 acres of surface disturbance and 145 are within PR, resulting in approximately 146.1 miles of new roads and 885 acres of surface disturbance (Figure 7). Ranching, hunting and various other recreational activities are also expected to occur within the CIAA, but are not anticipated to differ from historic levels previously identified in 2003 PRB EIS and 1985 RMP. Large expanses of yearlong range containing security habitat without any oil and gas development will still remain following the foreseeable development (Figure 7).

Table 4 summarized the security habitat projected to remain following reasonably foreseeable future actions within the elk yearlong range.

Table 4 Elk Security Habitat Remaining Post RFFA

Range	Security Habitat (Acres)
Yearlong	44,484 (74% of 2009 security habitat, Table 2)
Crucial Winter	20,533 (89% of 2009 security habitat Table 2)
Parturition	27,295 (81% of 2009 security habitat Table 2)

Pattern of Elk Use

Fortification Creek radio-telemetry and GPS collaring data collected since 2005, have shown elk avoid oil and gas development by moving to less developed areas. Disruptive activity is usually temporary in nature, however, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gussey 1986, WGFD 2000), albeit at 50% of the previous levels in forested environments (Hayden-Wing Associates 1990).

Continued use of radio-telemetry and GPS collaring data will show changes to the pattern of elk use arising from oil and gas development, natural causes, and from other land uses within the Fortification elk herd yearlong range. Projected loss of habitat and connectivity will affect past patterns of use, however due to the projected amounts of remaining security habitat and the imposed timing limitation stipulations (TLS), it is anticipated that the elk usage patterns will decrease initially in areas of development and then gradually return to 50% pre-disturbance levels after the facilities are constructed. However, since it is anticipated that big game will avoid those areas frequented by human activity during the production phase of the CBNG development; the level of human activity will determine the level of elk return. (Powell 2003, Sawyer 2005, Sawyer etal 2007).

As more information is gathered about the foreseeable future development (new APDs not received to date or permits relinquished etc), it is likely the foreseeable future development could change. As additional data is collected with the continued use of radio-telemetry and GPS collaring data, future site specific analysis will need to be done.

Population Objectives

Through on-going research with BLM's partners (WGFD and University of Wyoming); the impacts of

development on the Fortification elk population will continue to be monitored. Response of elk to development will be evaluated and BLM will coordinate with WGFD to identify objectives for future management decisions.

Figure 1. Cumulative Impact Assessment Area

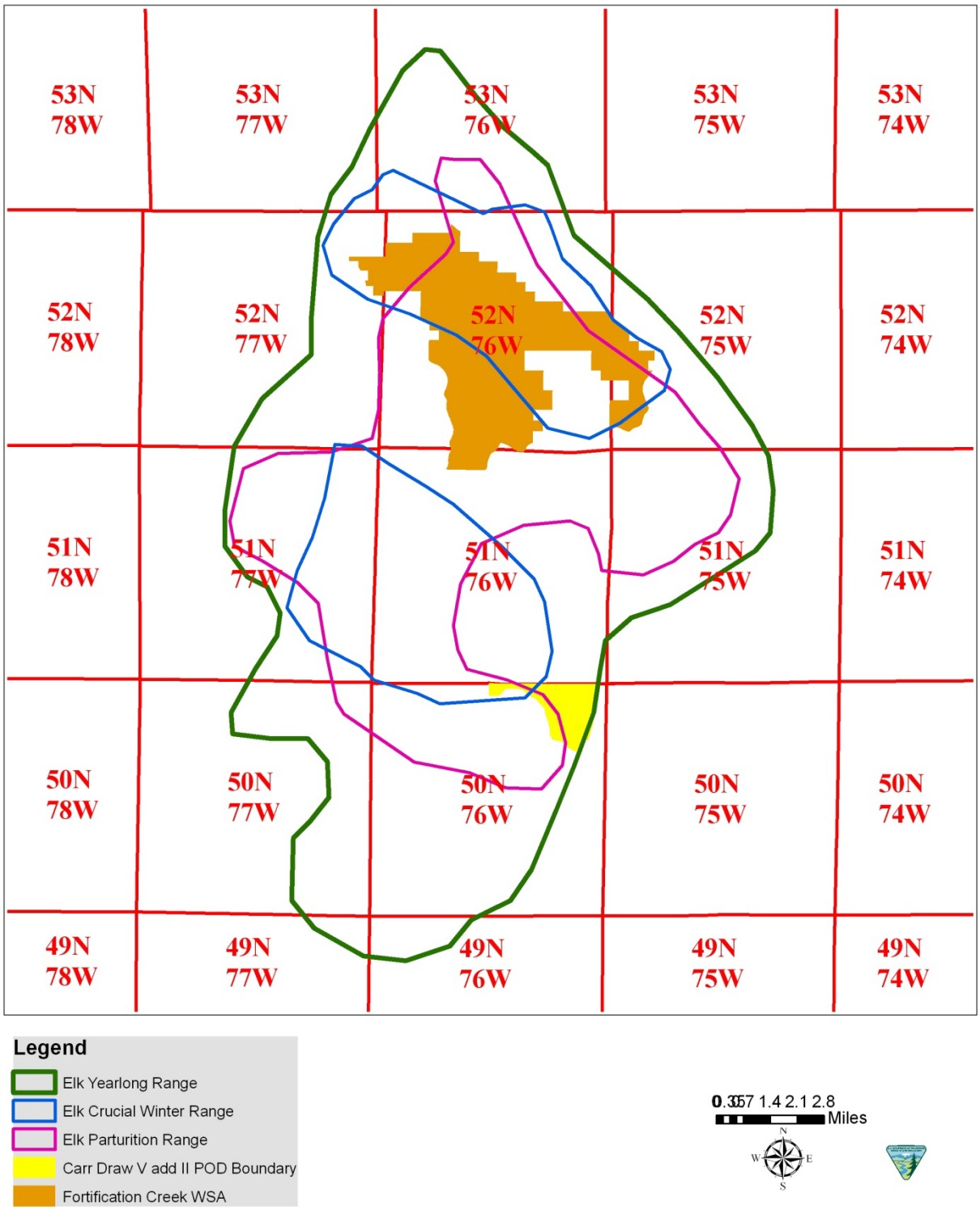


Figure 2. Elk Security Habitat Remaining within the CIAA (as of December 2009)

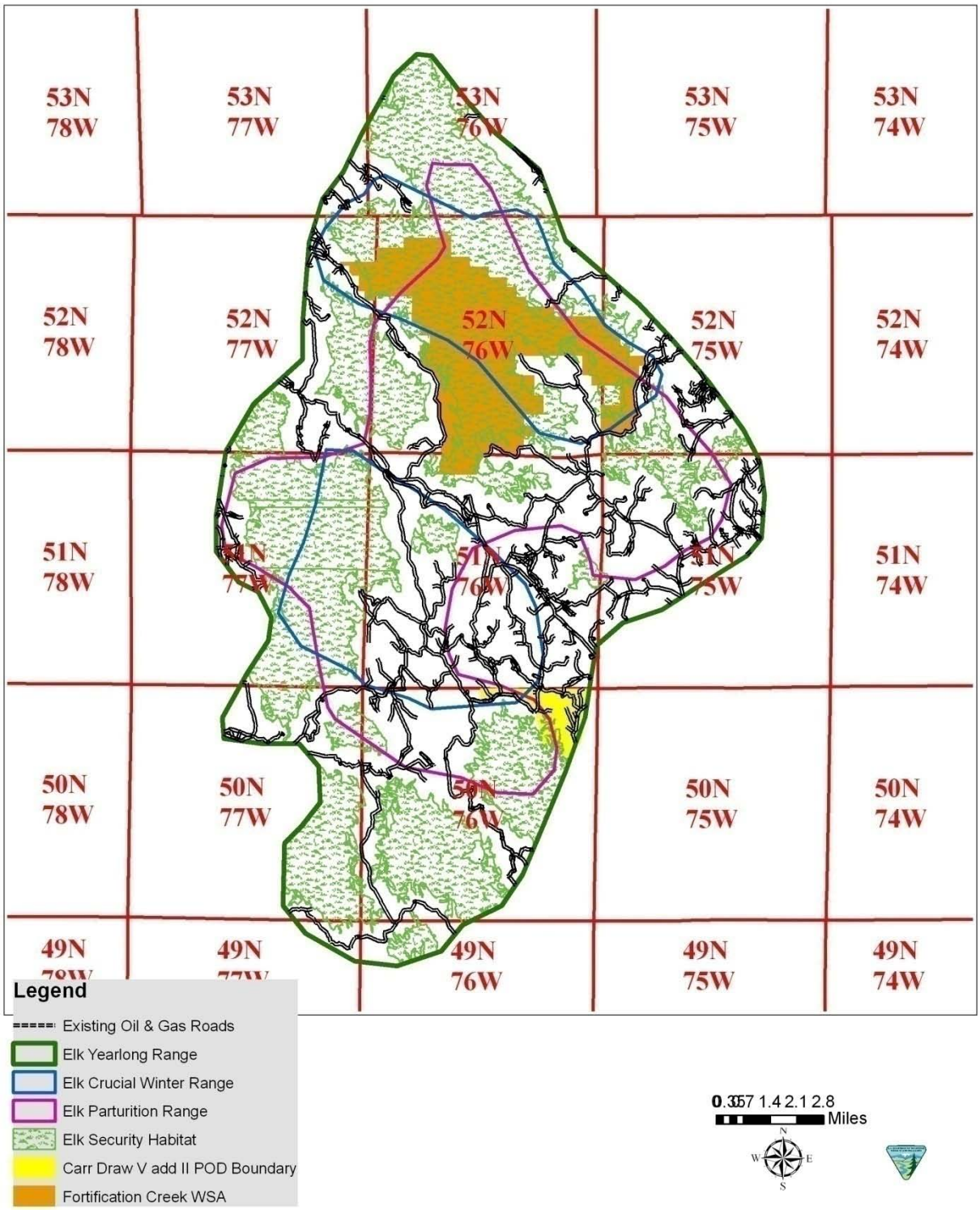


Figure 3. Existing Wells (as of December 15, 2009) within the CIAA

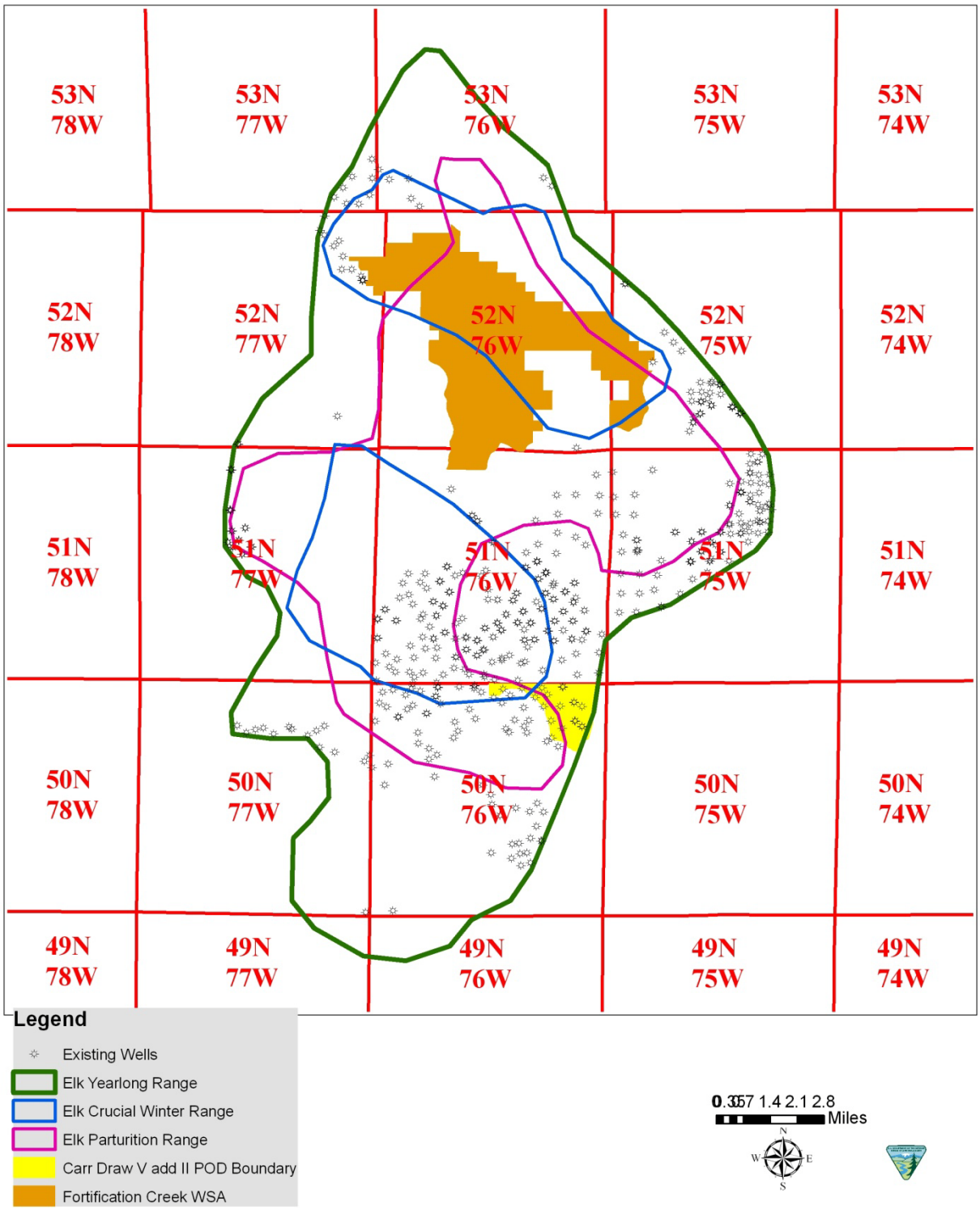


Figure 4. Fortification Creek Elk Yearlong Range Use

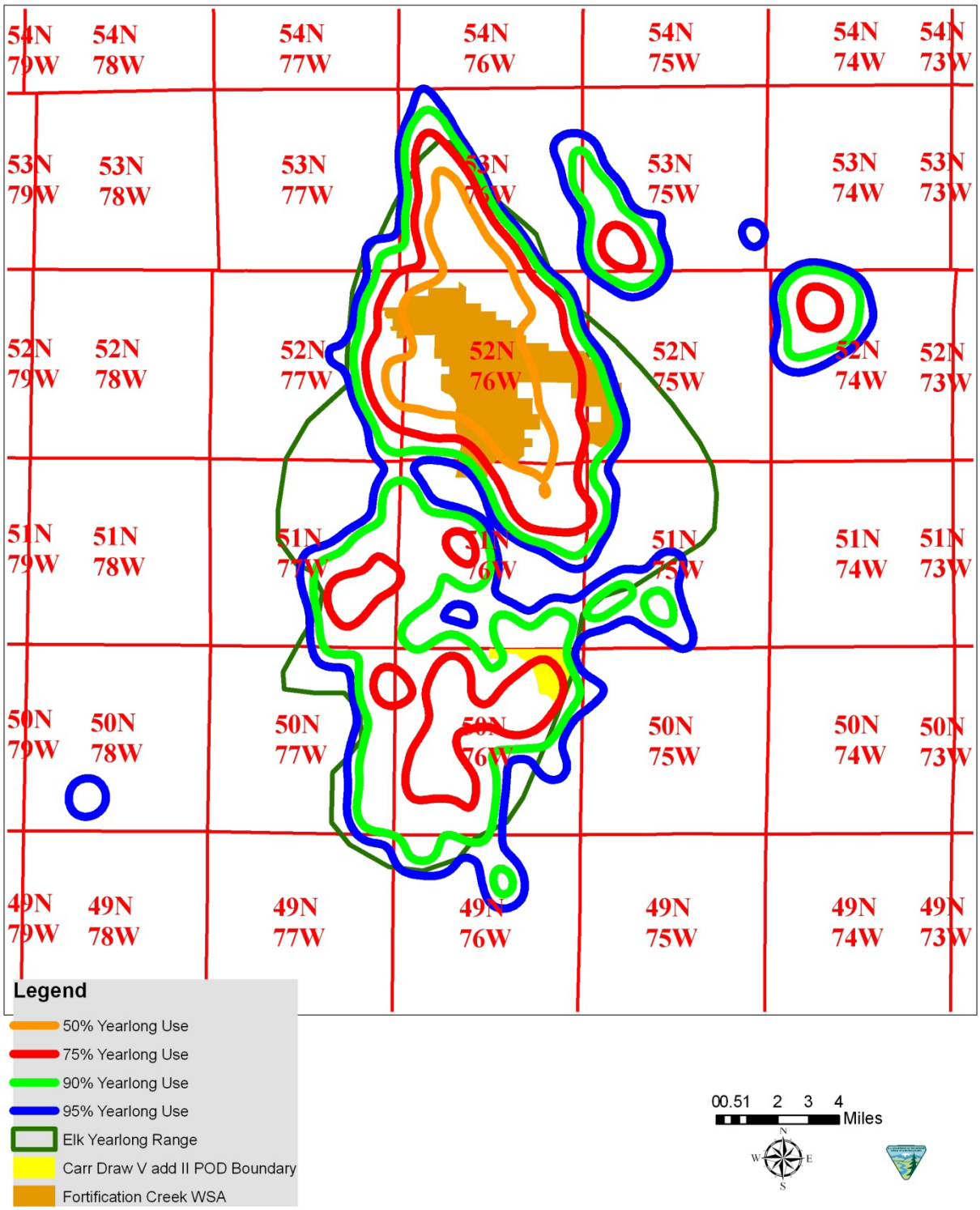


Figure 5. Fortification Creek Elk Crucial Winter Range Use

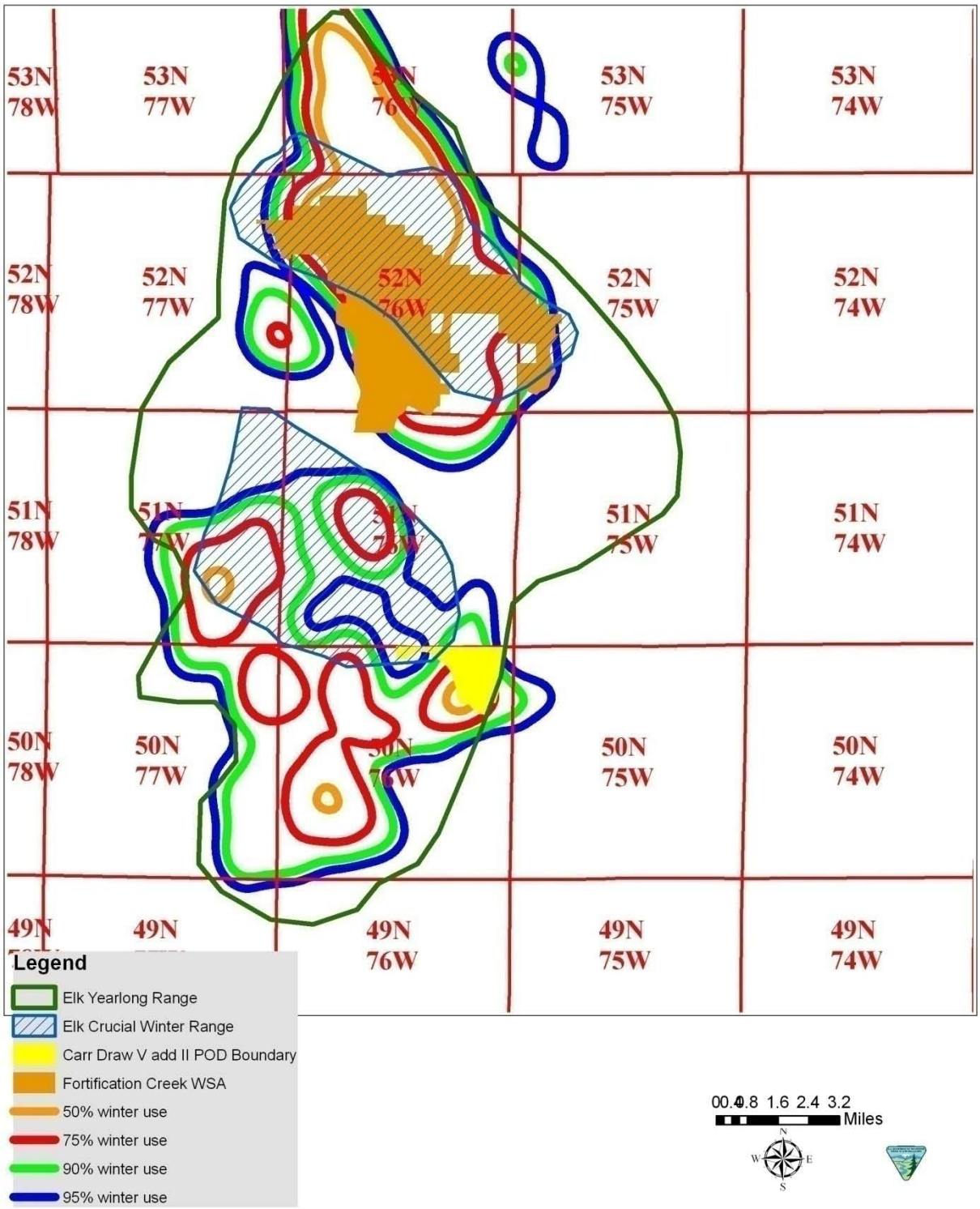


Figure 6. Fortification Creek Elk Parturition Range Use

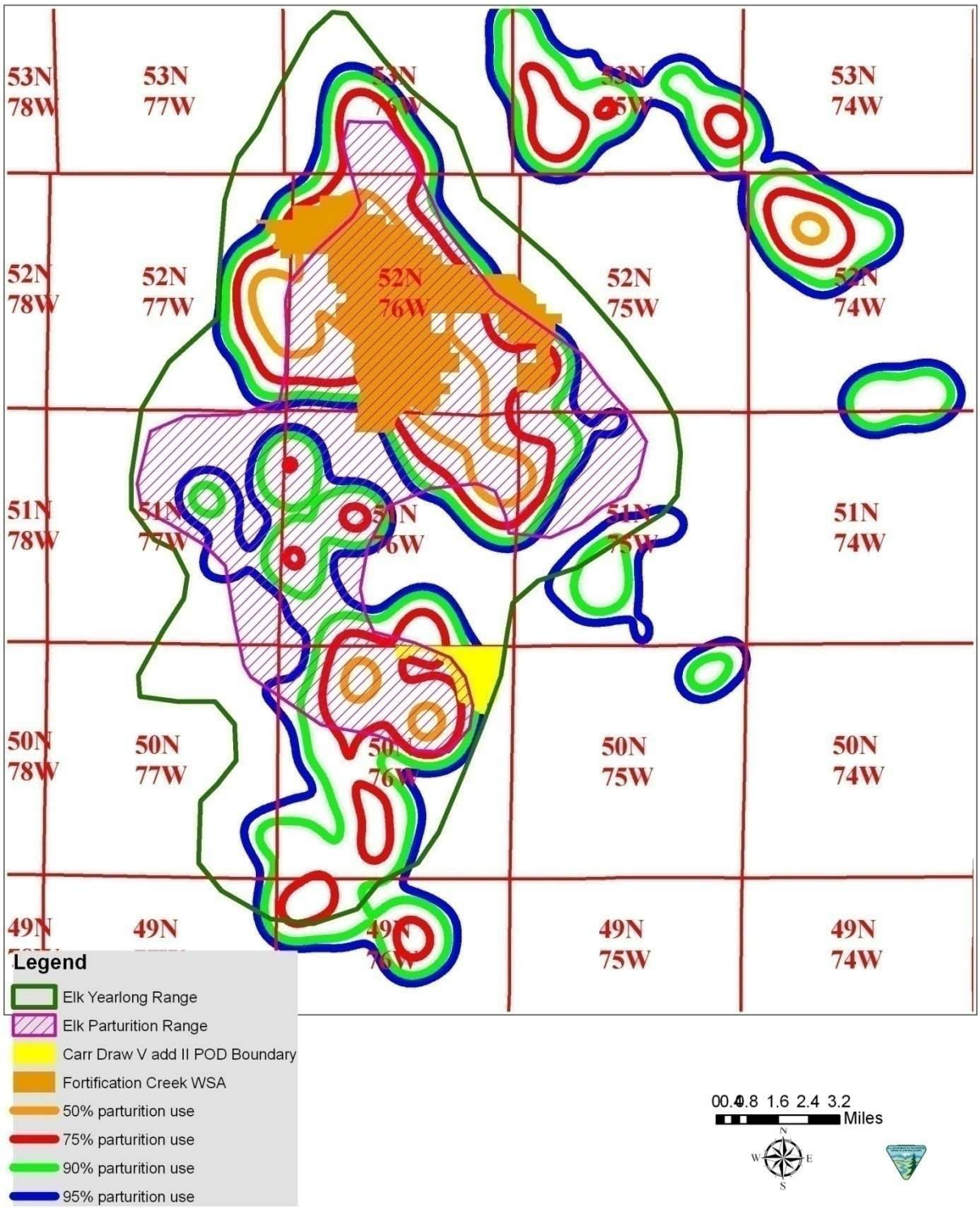
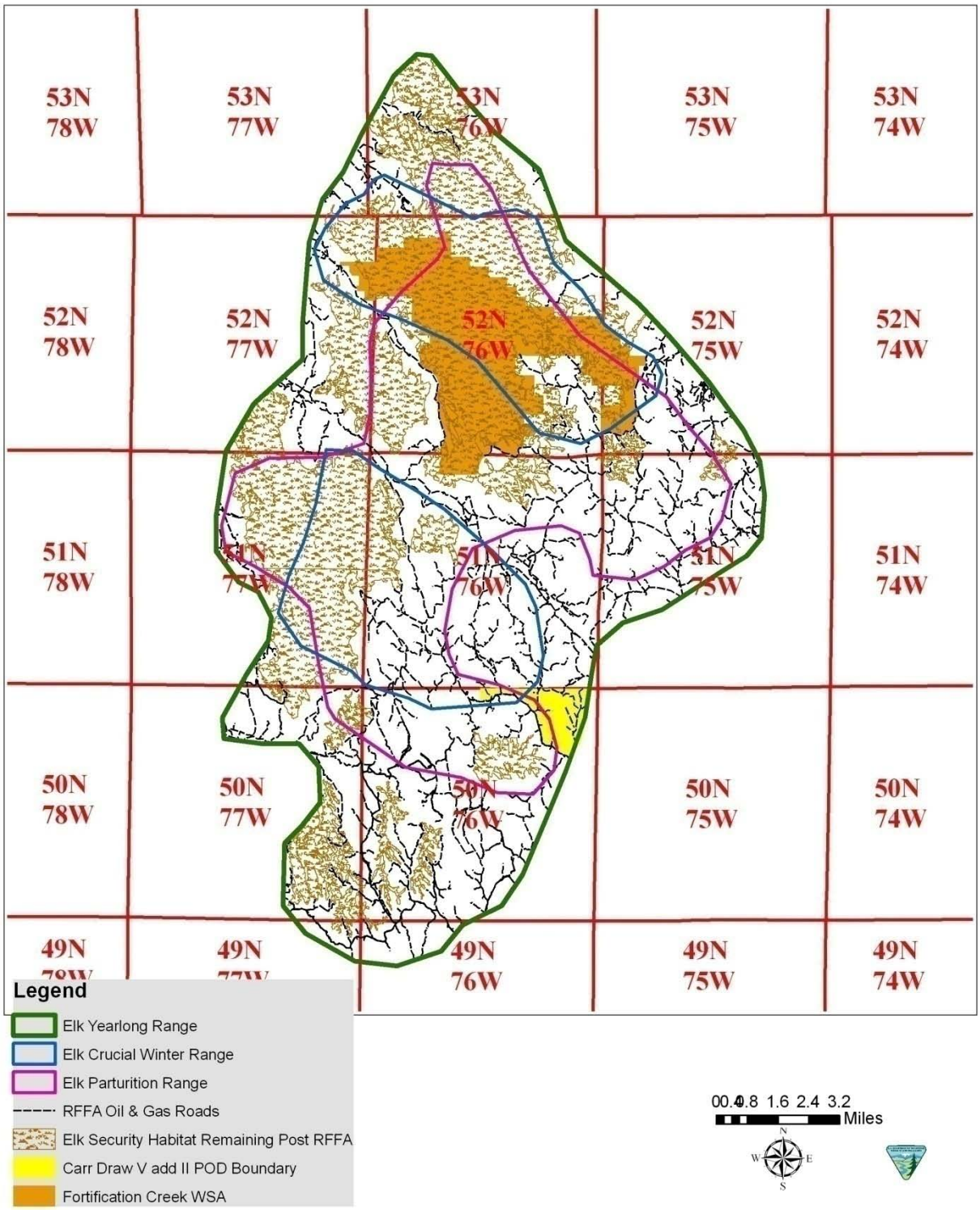


Figure 7. Elk Security Habitat Remaining Post RFFA



REFERENCES

Bureau of Land Management, National Environmental Policy Act Handbook, H-1790-1, page 57.

Canfield, J.E. 1991. Applying radiotelemetry data to timber sale effects analysis in the Harvey-Eightmile drainages in west-central Montana. in Elk Vulnerability- A Symposium (Montana State University, Bozeman, April 10-12, 1991).

Christensen, Alan G., L. Jack Lyon, and T.N. Lonner. 1991. Proceedings of Elk Vulnerability – a Symposium. Montana State University, Bozeman, MT. 330.

Hayden-Wing Associates. 1990. "Response of Elk to Exxon's Field Development in the Riley Ridge Area of Western Wyoming 1979-1990." Final report prepared for Exxon Company, USA and Wyoming Game and Fish Department. 33 pp.

Hillis, J.M., M.J. Thompson, J.E. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan, D.W. Cleery. 1991. Defining elk security: The Hillis Paradigm. in Elk Vulnerability - A Symposium. Montana State Univ., Bozeman, April 10-12, 1991.

Leege, Thomas A.1984. “Guidelines for Evaluating and Managing Summer Elk Habitats in Northern Idaho.” Idaho Dept. of Fish and Game Wildl. Bull. No. 11. Idaho Dept. of Fish and Game. Boise, ID.

Lyon, L.J., and A.G. Christensen. 1992. A partial glossary of elk management terms. Gen. Tech. Rep. INT-288. Ogden. UT: U.S. Dept. of Ag., Forest Service, Intermountain Research Station. 6p.

Lyon, L.J. 1983. Road density models describing habitat effectiveness for elk. J. For. 81(9):592-595.

Wyoming Game and Fish Department (WGFD). 2004. A Rocky Mountain Elk Habitat Conservation Plan for the WGFD Sheridan Region (And Portions of the Cody Region). Wyoming Game and Fish Department. Sheridan Region.

Wyoming Game & Fish Department. 2008. Job Completion Report; Fortification Creek (El 320) Hunt Area 2 2009 Hunting Season.

Attachment 2
Carr Draw V Additions II Cumulative Impacts Under Each Alternative

Methodology for Analysis of Cumulative Impacts Under Each Alternative

For each alternative, the BLM considered anticipated changes to the elk population, pattern of elk use, and conducted a view shed analysis utilizing the geographic information system (GIS) model to evaluate impacts to elk within the CIAA. The direct and indirect impacts for each alternative, together with impacts from past, present, and reasonably foreseeable future actions, with avoidance and mitigation measures are described and compared below. In making these determinations, the BLM also relied upon the reasoned expert opinion of staff biologists, being informed with a firsthand knowledge of the wildlife resources in the project area.

Table 1. Cumulative Impacts Analysis by Alternative for Past, Present, and Reasonably Foreseeable Future Actions

Issues/ Metrics	**Alt A** (No Action)	**Alt B** (Proposed Action)	**Alt C** (Modification at onsites and seasonal restrictions)	**Alt D – Sage-Grouse Emphasis** (Modification at onsites, seasonal restrictions, burying overhead power and 0.25 mile CSU for the Fortification lek.
Habitat condition/ availability (Security habitat and connectivity	1. Security habitat within the CIAA would be reduced by 12,017acres (18.8%). 2. 52,085 acres would remain. (81.3 %) 3. Connectivity between security patches will be compromised due to loss of security habitat resulting from federal (AUZ & CD3W) and non-federal development. Security habitat from 2 adjacent patches will be removed, leaving a much greater distance between remaining patches.	1. Impacts under Alternative B are identical to those under alternative A. 2. Approximately 154 acres (100%) of security habitat within the project area was lost as a result of federal (AUZ & CD3W) and non-federal development.	1. Impacts under Alternative C are identical to those under alternative A & B. 2. Approximately 154 acres (100%) of security habitat within the project area was lost as a result of federal (AUZ & CD3W) and non-federal development,	1. Impacts under Alternative D are identical to those under alternative A, B & C. 2. Approximately 154 acres (100%) of security habitat within the project area was lost as a result of federal (AUZ & CD3W) and non-federal development.

Attachment 2
Carr Draw V Additions II Cumulative Impacts Under Each Alternative

Issues/ Metrics	**Alt A** (No Action)	**Alt B** (Proposed Action)	**Alt C** (Modification at onsites and seasonal restrictions)	**Alt D – Sage-Grouse Emphasis** (Modification at onsites, seasonal restrictions, burying overhead power and 0.25 mile CSU for the Fortification lek.
15 *Pattern of elk use (collaring data)*	1. Elk are likely to seek refuge on undeveloped federal leases and remaining security patches. 2. A 50% or less return rate is anticipated following the completion of well drilling, construction and implementation of interim reclamation for the non-federal development.	1. Elk are likely to seek refuge on undeveloped federal leases and remaining security patches. 2. A 50% or less return rate is anticipated following the completion of well drilling, construction and implementation of interim reclamation for the non-federal and federal development. 3. Elk will avoid the project area and concentrate use in remaining security patches within the CIAA and/or may leave the herd unit during construction.	1. Elk are likely to seek refuge on undeveloped federal leases and remaining security patches. 2. A 50% or less return rate is anticipated following the completion of well drilling, construction and implementation of interim reclamation for the non-federal and federal development. 3. Due to the seasonal restrictions; elk will be more likely to continue utilizing CWR and PR during sensitive periods due to no development during these periods.	1. Elk are likely to seek refuge on undeveloped federal leases and remaining security patches. 2. A 50% or less return rate is anticipated following the completion of well drilling, construction and implementation of interim reclamation for the non-federal and federal development. 3. Due to the seasonal restrictions; elk will be more likely to continue utilizing CWR and PR during sensitive periods due to no development during these periods.

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Issues/ Metrics	**Alt A** (No Action)	**Alt B** (Proposed Action)	**Alt C** (Modification at onsites and seasonal restrictions)	**Alt D – Sage-Grouse Emphasis** (Modification at onsites, seasonal restrictions, burying overhead power and 0.25 mile CSU for the Fortification lek.
Population objectives (number of elk)	1. The elk population would likely remain stable or decrease within the current trend of 3% decline annually.	1. Due to the loss of security habitat and, therefore connectivity between patches, and a likely change in pattern of use, the population is likely to decrease.	1. Due to the loss of security habitat and, there- fore connectivity between patches, and a likely change in pattern of use, the population is likely to decrease, but less than Alternative B as lack of activity within areas under timing limitations will act as seasonal security patches.	1. Impacts under Alternative D are identical to those under alternative C, since there are no additional avoidance or mitigation measures for the benefit of elk.