Attachment 1

4.2.1.1 Big Game Cumulative Effects

4.2.1.1 .1 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)[1]. 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).

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[2] was used. This provides a reasonably complete assessment of current oil and gas development on fee, state, and federal lands.

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. For the purpose of this cumulative effects analysis it will be difficult to show the true incremental effect of the alternatives, as an alternative has already been selected, approved, and portions are constructed on the ground. However, the selected actions and effects will be represented here and below as part of the past and present actions.

Security Habitat and Connectivity
Security habitat occurs throughout the yearlong range and, subsequently, throughout the crucial winter and parturition ranges (Figure 2). WGFD 2009 Strategic Habitat Plan defines elk security habitat areas as any areas that, because of geography, topography, vegetation, or a combination of these features, will hold elk during periods of stress, especially during hunting season. Security habitat areas may be further defined as nonlinear blocks of hiding cover greater than 250 acres in size and greater than one-half mile from any open road. Elk security habitat areas are important to minimize elk vulnerability and loss of elk

[1] H-1790-1, BLM NEPA Handbook Page 57
[2] During the 2009 field season, BLM BFO staff conducted field verification of "existing oil and gas roads" within the CIAA. View shed analysis, utilizing GIS models and the best available data, continue to be utilized by the BFO to determine security habitat effectiveness within the CIAA. The results of the most current analysis reflect statistics that differ from those documented in the original environmental analyses.

during hunting related recreation. The most common impact to security cover is open roads. Modeling used to identify the security habitat was defined at more than one-half mile or not visible from any oil and gas road.

Prior to the developments in 2009, there were 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.

As of December 15, 2009, there are 493 existing wells (10 oil and 55 conventional gas wells) at 346 locations within the entire yearlong range, distributed in a non-uniform manner (Figure 3). 122 well locations exist within the CWR and 139 well locations within the PR. Ranching, hunting and various other recreational activities also occur within the CIAA, but do not differ from historic levels previously identified in 2003 PRB EIS and 1985 RMP. There is limited public access to the Fortification Creek area.

Pattern of Elk Use

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, Sawyer et al. 2007).

Table 1 details the percentage of documented elk collar locations in each of the defined ranges within the CIAA. 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 1. 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%**

Population Objectives

The WGFD 2008 Job Completion Report for the Fortification elk herd indicates that the current population trend is stable to decreasing. 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 1(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.

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 WSA, has been leased, therefore additional 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 Application for Permit to Drill (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. Access road alignments to state and fee locations are not known, and so are not included for the purposes of 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 development 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).

Pattern of Elk Use
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, Sawyer et al. 2007).

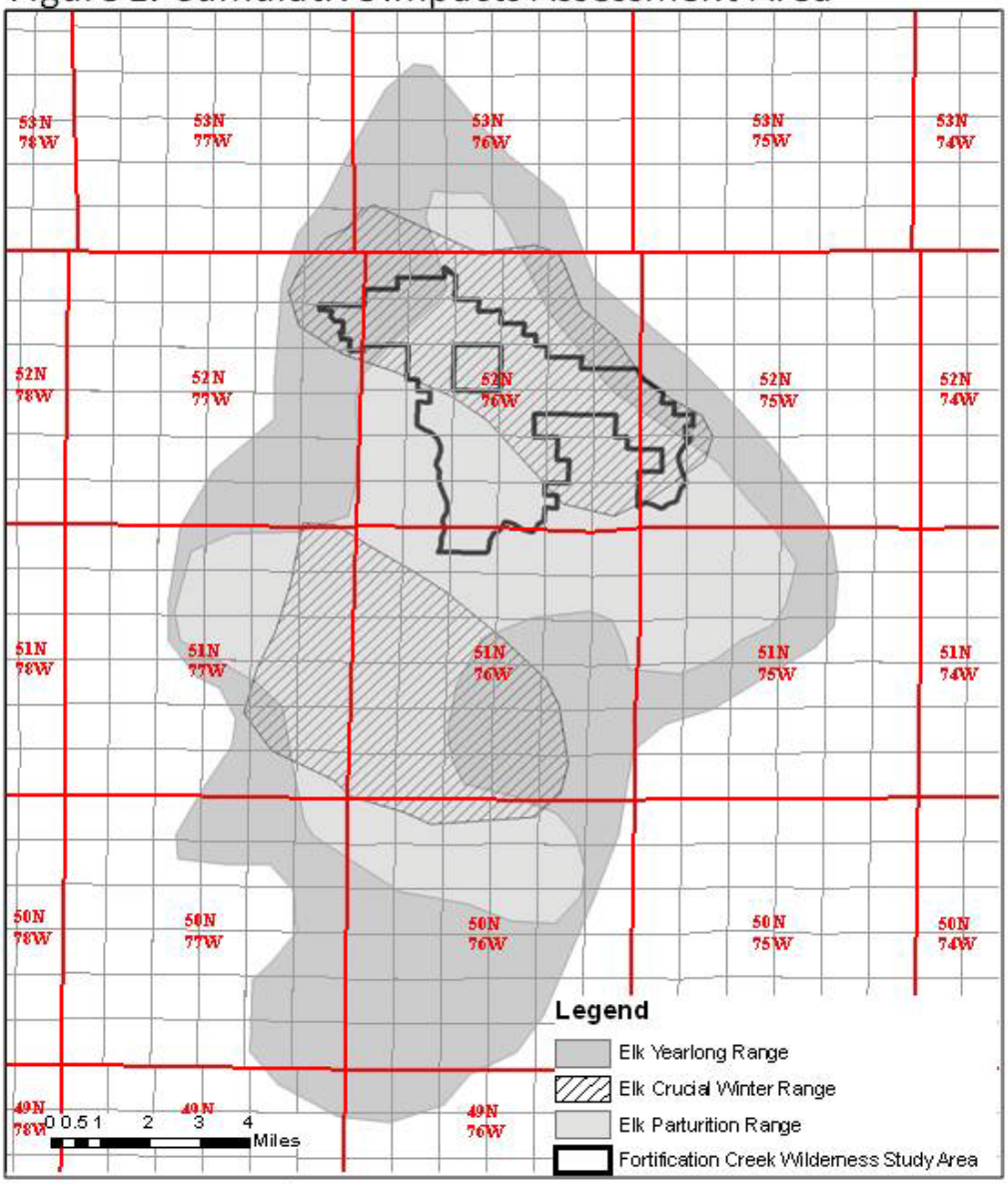
Continued use of radio-telemetry and GPS collaring data will show impacts to the pattern of elk use from the development within the Fortification elk herd yearlong range. Projected loss of habitat and connectivity will affect past patterns of use, however due to the projected amounts of remaining security 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 at or below 50% of pre-disturbance levels after the facilities are constructed. However, it is anticipated that big game will avoid those areas frequented by human activity during the production phase of the CBNG development.

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 have more or less impacts. 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

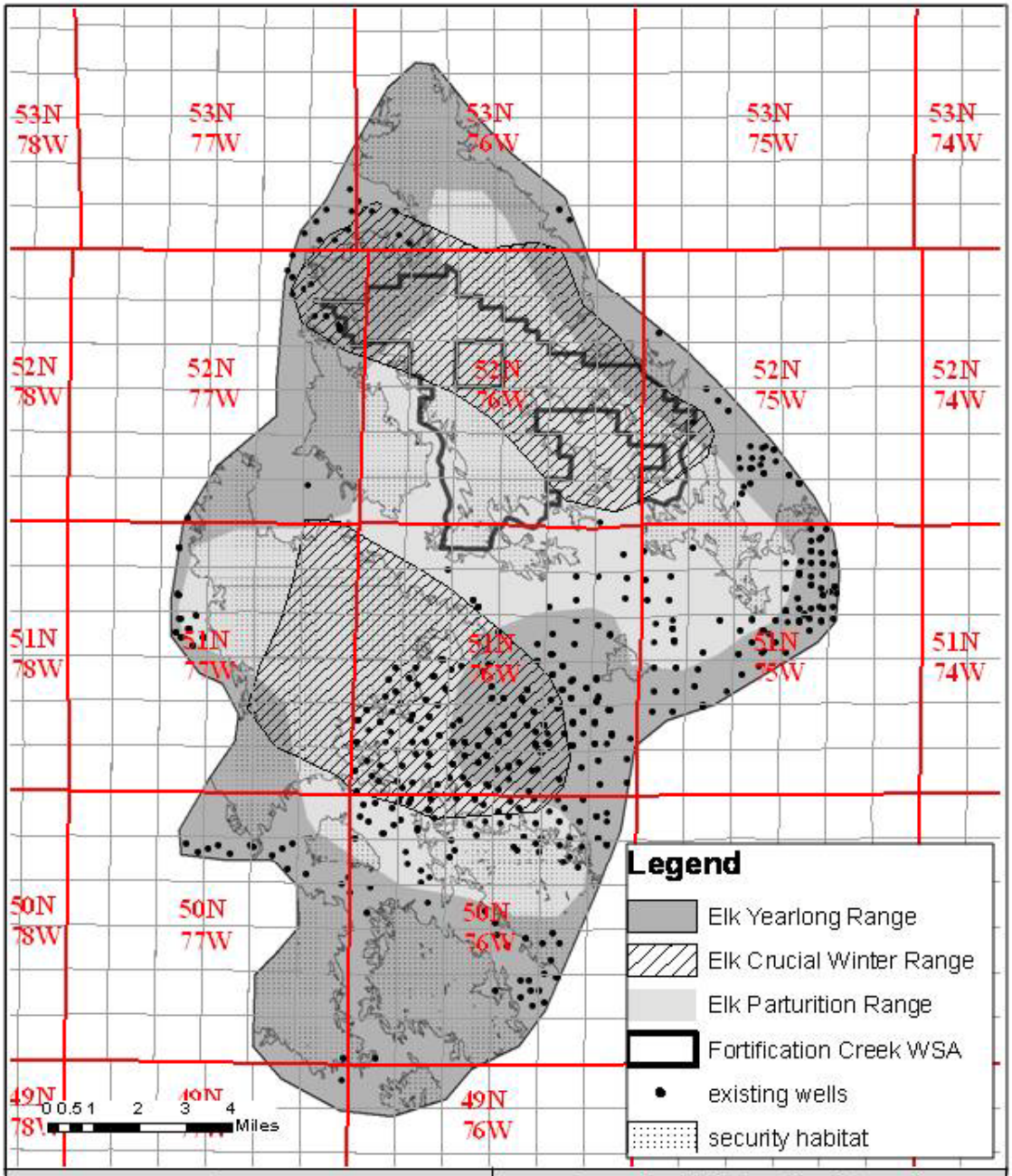
development will be evaluated and BLM will coordinate with WGFD to identify objectives for future management decisions.

Figure 1. Cumulative Impacts Assessment Area



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

Figure 2. Security habitat remaining within the CIAA (as of December 2009)



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

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

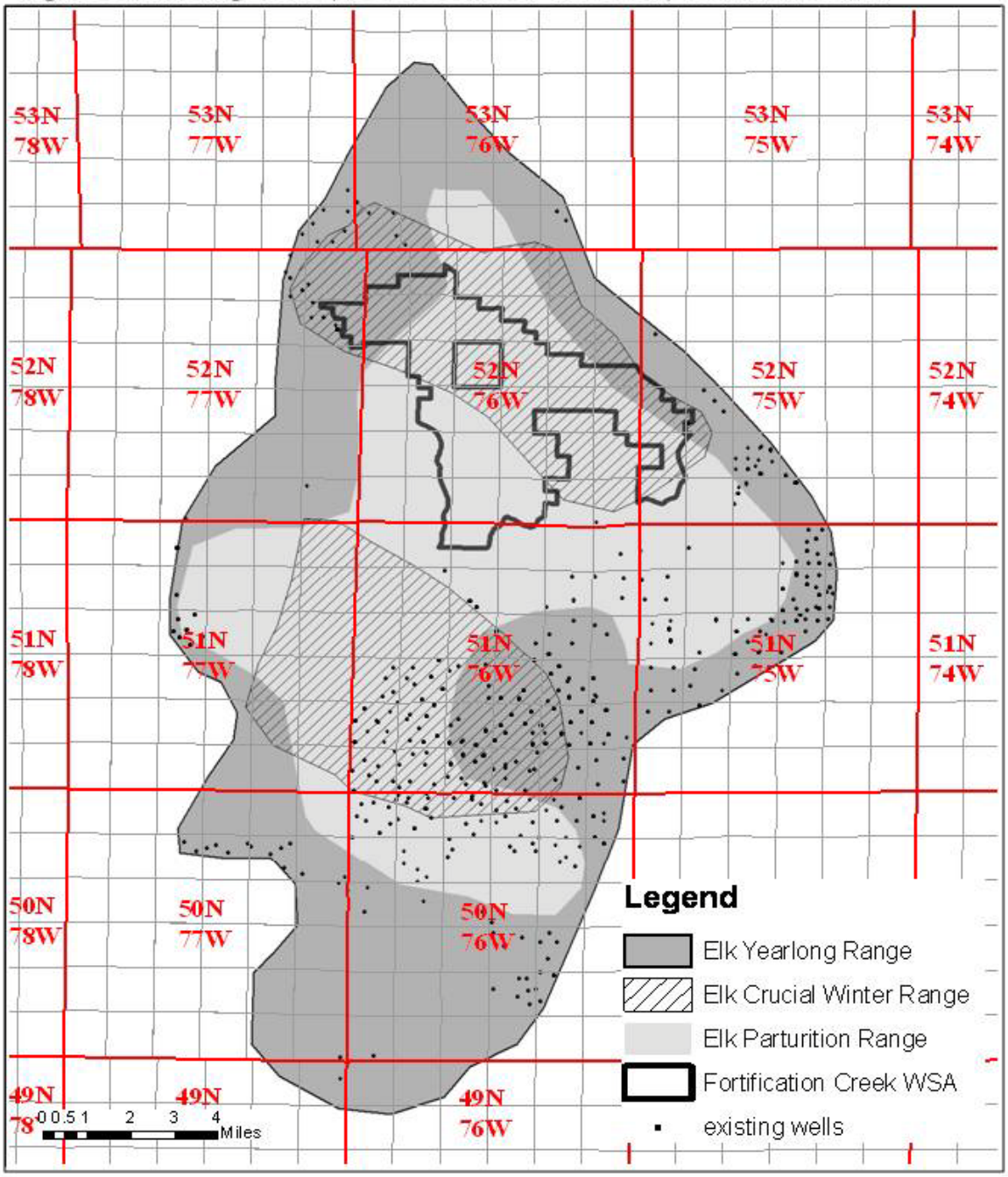


Figure 4. Elk Yearlong Use

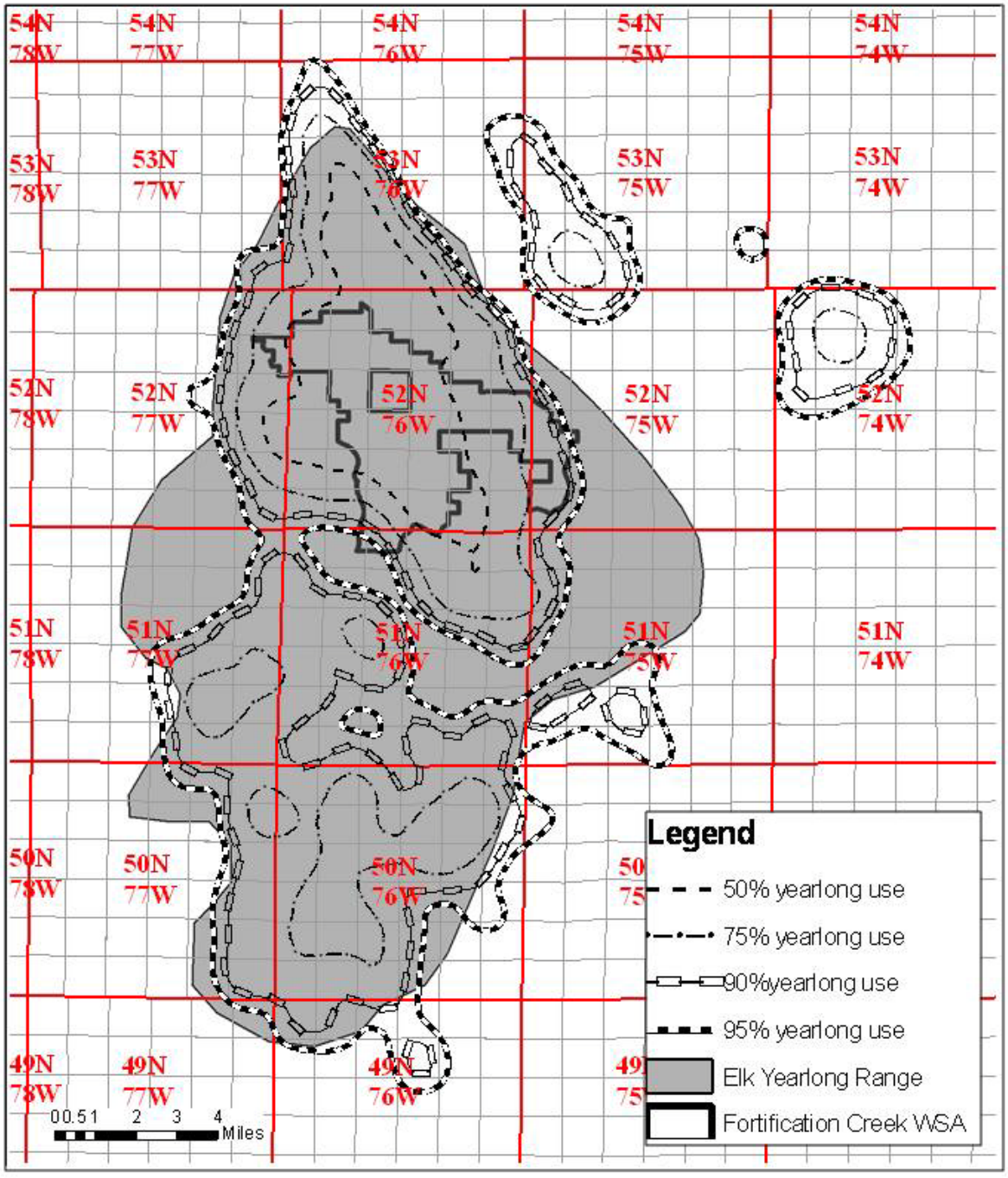


Figure 5. Elk Winter Use

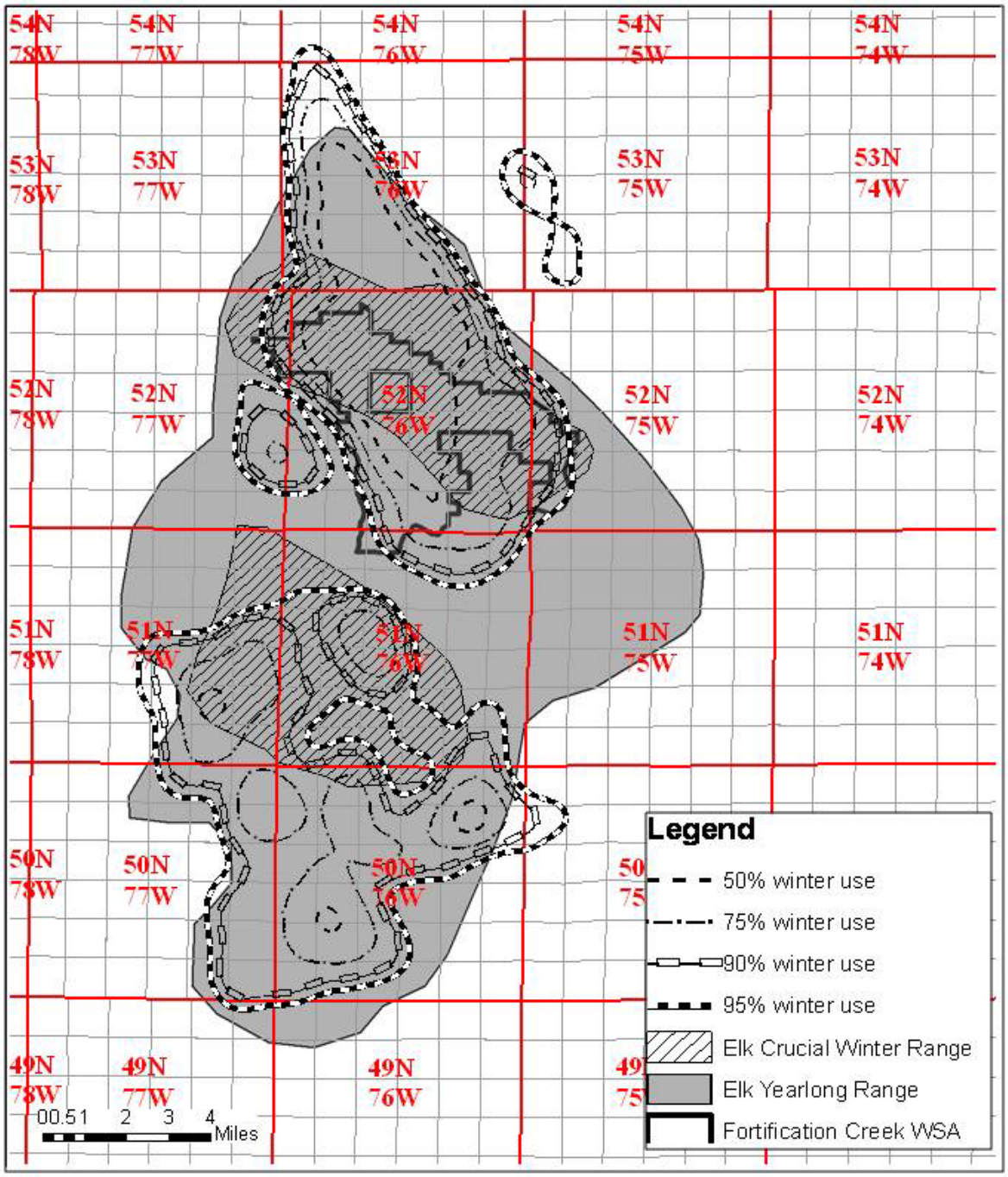


Figure 6. Elk Parturition Use

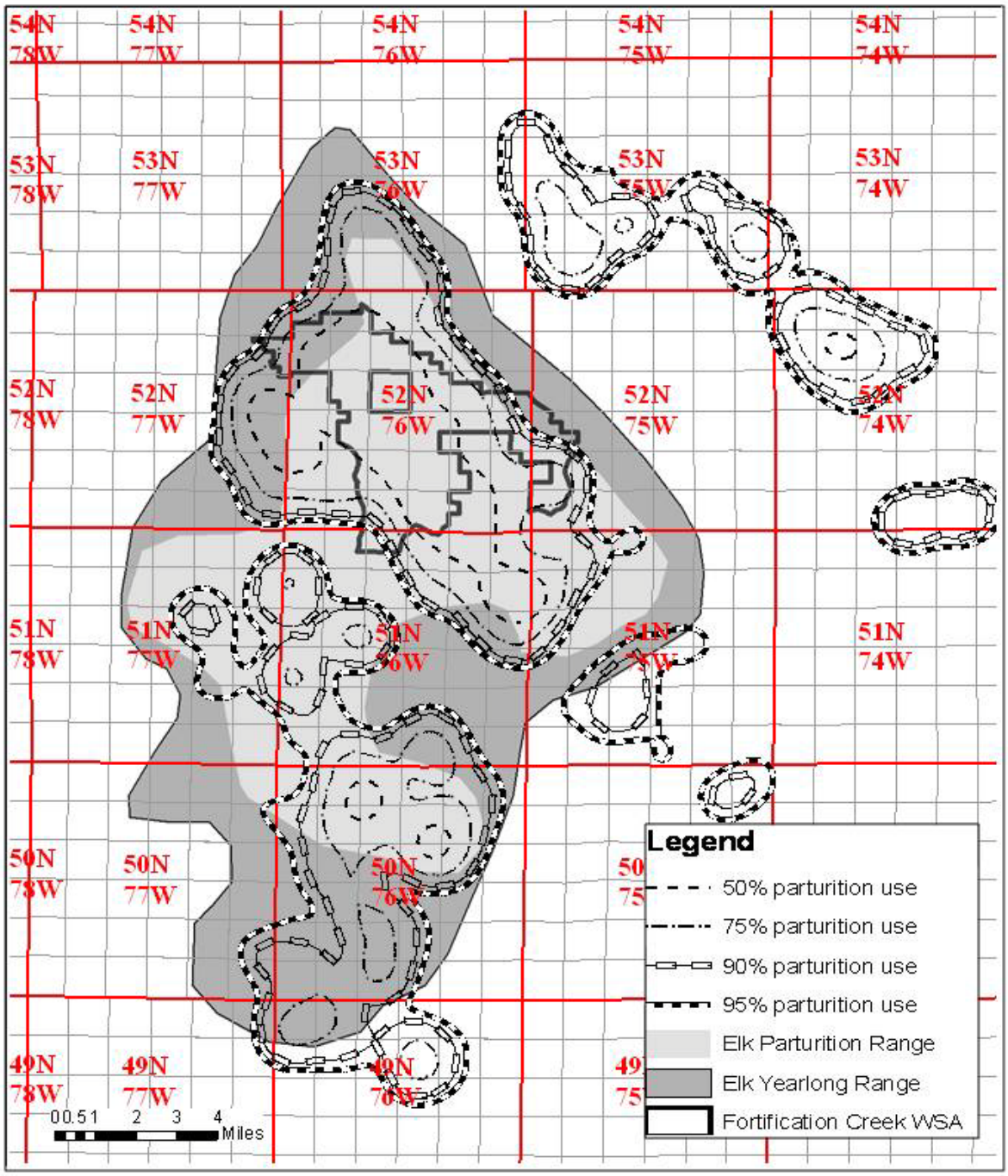
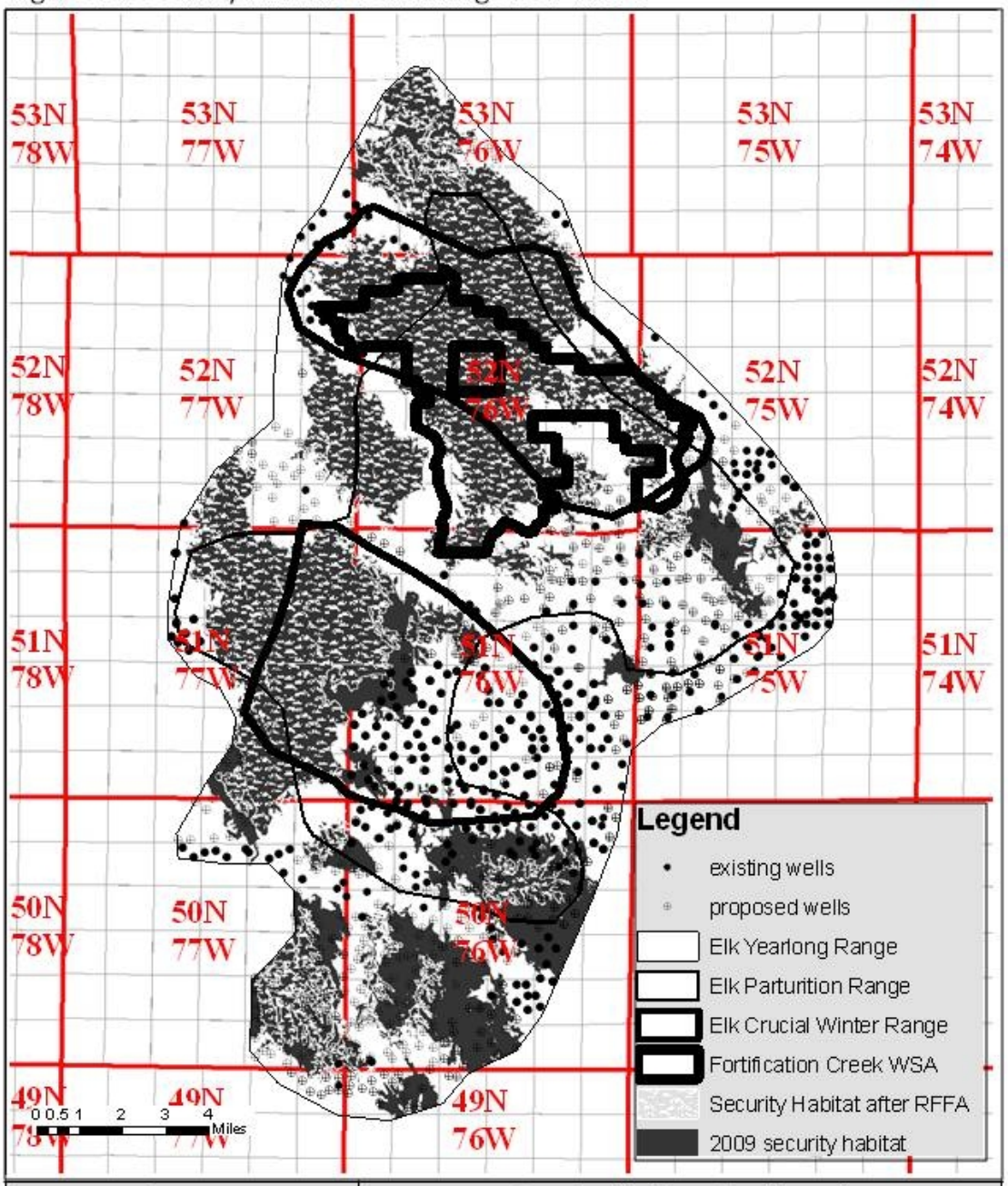


Figure 7. Security habitat remaining after RFFA.



Range	Security Habitat Size (Acres)
Yearlong	44,484 (74% of 2009 security habitat in CIAA)
Crucial Winter	20,533 (89% of 2009 security habitat in CWR)
Parturition	27,295 (81% of 2009 security habitat in PR)