# Agency Response to University of Wyoming COOP Unit coordinated third-party review of monitoring protocol for mule deer in the PAPO development area

## I. Change in Deer Numbers

Reviewer Assessment:

Estimation of mule deer numbers is difficult for several reasons:

a.) There is considerable variability in how deer are distributed throughout a winter range resulting in large variance across sampled quadrats.

b.) Deer use of winter ranges varies by year with deer being clustered in small areas during harsh winters and more scattered during mild winters.

c.) Not all deer are detected within sampled quadrats even though they may be present.

d.) Previous monitoring (2003-2007) of deer numbers resulted in relatively good population estimates (avg CV = 12%). However, questions remain if level of precision (12%) is adequate to detect a 15% decline as outlined in Matrix.

Reviewer Recommendations:

1.) The desired goal of detecting a 15% population decline with the present survey effort is unobtainable. A sample of 62 quadrats is needed to detect a 15% decline thus an additional 12 quadrats would be needed to be surveyed each year.

2.) Reviewers suggest that present monitoring plan should focus on more intensive monitoring of adult female deer survival. A much larger sample of collared adult females than the present sample of 20 is needed. In addition, more precise estimates of over-winter fawn survival and fawn production are needed.

3.) Reviewers recommend PAPO contract with Western Ecosystems Technology Inc., to develop a new, more effective monitoring scheme.

BLM and WGFD Biologist Response to Recommendation #1: Agency Biologists agree with the Reviewers recommendation. We will incorporate an additional 12 quadrats for a total sample of 62 quadrats per year to achieve the sample size needed to detect a 15% change in population between years. We estimate costs for 12 additional quadrats at $7,000 annually.

BLM and WGFD Biologist Response to Recommendation #2: We appreciate the reviewers comment on additional effort in evaluating female survival rates. However, we believe the best relevant method at detecting changes in accordance with what is designated in the matrix is to compare the PAPO population with the reference area population. By increasing the quadrat sample size as suggested by the reviewers (see recommendation 1 response) in both populations, we feel confident in being able to detect a 15% difference in change between the PAPO and reference area herds annually. The 15% change in comparison is the monitoring threshold; not a measured change in survival. In all fairness to the reviewers, agency Biologists completely agree that to conduct a statistically rigorous adult female survival study, a significantly larger sample of collared adult female deer is needed. To clarify, the current sample of GPS collared adult female deer (n=20) on the

Mesa is primarily intended for Resource Selection Function (RSF) modeling. Additionally, from a management perspective, we are comfortable based on Sawyer et al. (2009), adult female survival rates for Mesa Treatment area from 1998 to 2007 varied from year to year but were not statistically different from the Wind River Front reference area. This rigorous 10-year data set with 40 to 60 collared animals per area has provided local managers with important winter survival estimates but also indicated 60% of adult female mortality occurred outside the winter period making winter estimates less precise than annual survival estimates. In short, the survival analysis would complement the abundance counts and a survival analysis would provide some insight into population changes. However, relatively small changes in survival (<10%) can determine whether a population is increasing or decreasing, and detecting such small changes is extremely difficult and costly. Since the primary matrix objective is to measure a 15% change in population, it has been decided to place pronghorn monitoring resources into detecting a 15% decline in populations and not estimate survival rates.

Regarding fawn production and survival, we see no need to conduct an evaluation as suggested by the reviewers. To clarify, WGFD managers annually conduct early-winter composition surveys to derive buck:doe:fawn ratios, but also collect early-spring herd composition surveys to assess winter fawn losses. Sample sizes from these composition surveys typically are very robust, accounting for around one-quarter (spring) to one-third (fall) of the population estimate. Survey data from December and April are used to document the proportion of fawn:100 adults for the entire herd unit. By documenting the change in fawn:100 adult ratios from December to April, a minimum estimate of fawn mortality is calculated. Again from a management perspective, analysis of change-in-ratio data has proven effective in identifying winters of significant fawn mortality. The change-in-ratio procedure is not intended to precisely measure annual changes in fawn survival but rather provides managers long term trend data to depict winters with extreme fawn mortality.

<u>BLM and WGFD Biologist Response to Recommendation #3:</u> Agency Biologists agree with the Reviewers recommendation. Based on an assessment from WEST Inc., *"…the original intent of the abundance counts was not solely to compare year-to-year estimates. Rather, it was intended to document long term trends and make* year-*to-year comparisons."* West Inc. went on to recommend "The *current methodology is adequate for evaluating long-term trends (via weighted regression analysis) and detecting relatively large changes in year-to-year abundance. We believe that both should be used to assess changes in deer numbers."* West Inc., also agreed that number of sampled quadrats would need to be increased to detect changes of 15% on an annual basis.

Budget: 12 Additional Quadrats; $7,000 additional cost to current budget

## II. Avoidance Distances

<u>Reviewer Assessment</u>:

a.) Reviewers concluded there was not enough detail provided to describe how the criterion of a 0.5 km change per year over 2 years in mule deer avoidance would be measured.
b.) Avoidance by wintering deer displaces them to areas of lower value (forage quality, snow depths, temperatures, etc.). Avoidance or displacement does not entail an "even swap" of habitat quality.
c.) By virtue of having more well pads and roads over the life of the project, it is highly probable that deer will by necessity be located closer to a road or well pad unless they leave the winter range altogether. Avoidance measures would show that deer are in fact closer to roads and well pads than historically when fewer pads and miles of roads existed. The interpretation that deer did not avoid well pads or roads would be incorrect and contrary to all expectations.

Reviewer Recommendations:

1.) Reviewers recommend PAPO contract with Western Ecosystems Technology Inc., to develop a new, more effective monitoring scheme for assessing avoidance distances.

BLM and WGFD Biologist Response to Recommendation #1: Agency Biologists agree with the Reviewers recommendation. Following recent consultation with West Inc., Agency Biologists recommend modifying the Matrix criteria regarding Avoidance Distances by dropping the threshold criteria "average of 0.5 km change per year over any 2 year period " due to the issues outlined by the reviewers and the fact that changes in avoidance do not trigger any mitigation action by itself, only when changes in population have been documented to exceed 15%. Mule deer distribution across the PAPA would continue to be monitored from a sample of GPS collared adult females (n=20) and modeled annually using Resource Selection Function (RSF) analyses. This analysis would be consistent with past monitoring efforts conducted by Sawyer et al. (2009) (See Section 3.0, pages 3-0 to 3-23). In addition to modeling, the geographic area described in Sawyer et al. (2009), fine scale analysis would monitor mule deer distribution in Development Areas (DA) 1 and 2 annually to assess deer response to ongoing mitigation efforts, reclamation, concentrated gas development, etc. This approach would still provide Agency Biologists detailed data on annual mule deer distribution in relation to PAPA development activities without using arbitrary avoidance criteria.