BUREAU of LAND MANAGEMENT

PINEDALE ANTICLINE PROJECT AREA

WILDLIFE MONITORING & MITIGATION PLAN

Updated April 2, 2012

Introduction

The Wildlife Monitoring and Mitigation Plan (WMMP) fulfills the intent of the Record of Decision for the Final Supplemental Environmental Impact Statement (SEIS ROD) for the Pinedale Anticline Oil and Gas Development Project to monitor wildlife populations while tracking their response to energy development. The WMMP is guided by the Wildlife Monitoring and Mitigation Matrix (WMMM) Appendix B of the SEIS ROD. The WMMM identifies specific species to be monitored as well as criteria to be measured and changes that will be monitored. The data gathered is used to inform management of gas field development and mitigation projects.

The WMMM outlines a sequence to be followed when applying mitigation measures. Per the SEIS ROD "The mitigation process utilizes performance-based measures to proactively react to emerging undesired changes, specifically declines in populations, early enough to assure both effective mitigation responses and a fluid pace of development over the life of the project. In that regard, this process is designed to provide certainty to the affected agencies and the public that impacts to wildlife will be addressed before consequences become severe or irreversible by monitoring changes and responding early" (SEIS ROD).

Potential mitigation responses are vast and complex. Specific responses cannot be fully detailed in this document. Responses should be tailored to the specific impact and the affected species. An appropriate response will be evaluated utilizing all available information, best science and coordination with appropriate agency specialists.

SWEPI, Ultra, and QEP (Operators) voluntarily proposed, and the Bureau of Land Management (BLM) acknowledged the creation of the Pinedale Anticline Monitoring and Mitigation Fund (Fund) to mitigate potential impacts to wildlife, air, and other resources based on the impacts and assumptions contained in the SEIS ROD. Specific information regarding the Fund is described in Sections 2.9, 3.6, 4.1, 4.6.1, and Appendix E of the SEIS ROD.

Background

A monitoring plan was developed in accordance with the 2008 SEIS ROD. The plan was developed by the BLM, Wyoming Game and Fish Department (WGFD), and Operators and approved by the BLM Authorizing Officer on April 10, 2009. The BLM, WGFD, and Operators co-developed the requirements for the 2009 monitoring contracts. The Pinedale Anticline Project Office (PAPO) was authorized to obtain, collect, store, and distribute monitoring information to support adaptive management and analyze mitigation projects. Per the 2009 WMMP, future monitoring contracts were to be developed and approved by the PAPO.

In 2009, the State Attorney General's office determined the PAPO was not a legal entity authorized to enter into contracts. On March 1, 2010 the PAPO Board of Directors agreed that all approved project contracts would be processed using the standard grant process developed by one of the represented state agencies, depending on the nature of the project. It was decided all wildlife projects, including WMMP projects, would follow the WGFD fiscal grant and contracting process.

On September 27, 2009 the Wyoming Cooperative Fish and Wildlife Research Unit (WY CFWRU) was hired to facilitate and coordinate a Peer Review of the PAPO Wildlife Monitoring Plans associated with the WMMM. The role of the Unit included formulating the design of the Review, selecting reviewers, and overseeing the production of the final Peer Review Reports. They identified four review teams, including one each for mule deer, pronghorn, sage grouse, and sensitive species (pygmy rabbits and white-tailed prairie dogs combined).

Review teams were asked to evaluate the following questions:

1. *Are the experimental designs and methods for monitoring described in the Monitoring Plans adequate to detect changes in the criteria identified by the Matrix within a reasonable timeframe?*
2. *If changes in an identified criteria (i.e., change in pronghorn survival) do occur in response to energy development on* the Pinedale Anticline Project Area (PAPA), *how likely are the monitoring methods described to detect this change and identify when stated thresholds have been met or surpassed?*

The questions were evaluated by four separate review teams. The reviewers identified inadequate components of the Monitoring Plans and suggested methods to improve the ability of the Monitoring Plans to meet the objective of tracking the biological criteria identified in the Matrix.

The BLM and WGFD prepared responses identifying changes that would be made to existing monitoring methods following the WY CFWRU review. The BLM then convened a team consisting of Wildlife Biologists from the BLM, and WGFD to review the elements of the agency

responses to determine if adaptive management was required following Appendix E of the SEIS ROD. It was found that three of the recommended changes involved deleting portions of the Matrix and required adaptive management. Changes to monitoring methods for pygmy rabbit and white-tailed prairie dog did not require any adaptive management action. The accepted changes are as follows:

Mule Deer

WGFD and BLM Biologists recommended modifying the WMMM criteria regarding Avoidance Distances by dropping the threshold criteria “average of 0.5 km change per year over any 2 year period.”

While approval was given to delete avoidance distance as a threshold criteria, mule deer distribution across the PAPA would continue to be monitored and modeled annually using Resource Selection Function (RSF) analyses. This analysis would be consistent with past monitoring efforts to assess deer response to ongoing mitigation efforts, reclamation, concentrated gas development, etc..

Pronghorn

WGFD and BLM Biologists recommended modifying the WMMM criteria “Size of habitat fragment used” by dropping the threshold criteria “10% decline in habitat availability for one year.”

Habitat use data would continue to be collected and analyzed as it is useful for monitoring distribution and use overtime and for assessing mitigation success. This analysis would be consistent with current monitoring efforts to assess pronghorn response to ongoing mitigation efforts, reclamation, concentrated gas development, etc..

Sage-grouse

WGFD and BLM Biologists recommended modifying the WMMM criteria by dropping nesting success and habitat selection monitoring component.

The adaptive management process included a public comment period, and the final changes were approved by the BLM Authorizing Officer on January 6, 2011. A separate monitoring project was added in 2009 to collect snow and traffic data. These variables are associated with habitat use and can be used in all other wildlife monitoring analysis, as needed.

The WMMM does not specify raptors as a sensitive species; however, the BLM is required to monitor migratory birds, as well as bald and golden eagles in accordance with Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act. The BLM, Operators, and U.S. Fish and Wildlife Service (USFWS) worked on several drafts of an avian conservation plan, but to date have not come to an agreement on a completed plan. In lieu of an approved avian conservation plan the BLM reviews operator requests for exception to seasonal restrictions

protecting raptors, bald and golden eagles, and seasonal habitats for migratory birds on a case-by-case basis in accordance with applicable laws, existing USFWS instructional memorandums, and Avian Protection Planning Guidelines. The PAPO has been responsible for contracting the monitoring for raptors since 2009 using monies from the Fund.

An annual update meeting on wildlife monitoring is held in October. The PAPO presents updates about wildlife monitoring and recommendations for modifications, if needed. Annual Reports, proposed adaptive management changes, and annual meeting presentations for wildlife monitoring are posted on the PAPO web page (http://www.wy.blm.gov/jio-papo/).

In accordance with the SEIS ROD, the WMMP will be updated annually, based on the monitoring and mitigation results and future needs as identified. Contracts originating from a WGFD RFP's may be renewed annually for up to two years. This Plan includes modifications to original contract for monitoring through 2012.

Monitoring methods are described as follows from original RFP and/or contract between the WGFD and the Contractor.

MULE DEER MONITORING

BACKGROUND

A Request for Quote (RFQ) was prepared by the agencies and Operators and advertised by the PAPO in 2009 seeking a contractor to conduct mule deer monitoring. On July 27, 2009 the RFQ review team selected Western EcoSystems Inc. (WEST Inc) to fulfill the mule deer monitoring contract for the 2009-2010 monitoring period.

The WGFD and Operators agreed to incorporate additional analysis in future monitoring to include the entire Sublette mule deer herd along with the Ryegrass/Soapholes until a mutually agreeable reference area can be determined.

On October 13, 2010, a Request for Proposal (RFP) for mule deer monitoring for the PAPO was advertised following WGFD procedures per the revised contracting process (above). WEST Inc. was contracted to gather the 2010-2011 quantitative monitoring of mule deer population parameters and habitat use within the PAPA.

In response to the WY CFWRU Review the Matrix trigger component associated with avoidance distance was removed beginning in 2011 however; we elected to continue collecting the data as it has proven useful in evaluating mitigation response. All other monitoring was completed following the protocols set out in the 2010-2011Contract.

2010-2011 Monitoring Period
Language from Original WGFD Contract
Methods and Protocols Described as follows:

Specific level of change to be monitored:

- *The data collected for this project will be sufficient to identify changes in deer numbers and avoidance distances. Required monitoring includes determining any changes in mule deer population parameters and habitat use within the PAPA (treatment area) compared to the Sublette mule deer herd and the Ryegrass/Soapholes (study area) populations and habitat use. Data for the larger Sublette mule deer herd unit will be collected by the WGFD and provided to the contractor for analysis.*

- *The Wildlife Monitoring and Mitigation Matrix (Appendix B of the SEIS ROD) specifies that the changes requiring mitigation are as follows:*

    - *15% population decline in any year, or cumulatively overall years, compared to the Sublette mule deer herd unit or other mutually agreeable area (tentative - Ryegrass/Soapholes Study area).*
    - *Average of 0.5 km change in avoidance distances per year over 2 years, and a concurrent 15% decline in deer numbers in any year*

compared to the Sublette mule deer herd unit or other mutually agreeable area (tentative - Ryegrass/Soapholes Study area).

- *Changes in habitat use will be measured through change avoidance distances and distribution shifts.*

Goals and Objectives:

- *Monitor mule deer within the treatment and study areas during the winter and report changes in population numbers.*
- *Monitor female survival (based on collared mule deer mortality).*
- *Map collared mule deer locations and migration routes.*
- *Using a Resource Selection Function Model (RSF), identify mule deer distribution and habitat selection; and using a cumulative distribution function, evaluate changes in avoidance distance by mule deer to well pads and roads.*
- *For each objective, monitoring by contractor will occur within the PAPA (treatment) and Ryegrass/Soapholes (study area).*
- *Analyze changes in mule deer population numbers in treatment area compared to population changes in the Sublette Mule Deer Herd Unit and the Ryegrass/Soapholes study area.*

PROJECT SPECIFICATIONS AND REQUIREMENTS

RESPONSIBILITIES OF CONTRACTOR:

Goals: *Monitor change in deer numbers between years, and cumulative change over all years. Monitor avoidance distances from well pads and roads. Document long term trends and make year-to-year comparisons.*

Methodology

- *Contractor will capture and maintain 30 downloadable GPS collars (20 in treatment survey area, 10 in Ryegrass/Soapholes study area) on adult (>1 year of age), female mule deer.*
- *Collars will be programmable, downloadable GPS type (i.e., Telonics Inc. Spread Spectrum).*
- *Programming specifics to be discussed during contract stage.*
- *Contractor to maintain no less than 15 collars in treatment area and 5 collars in study area.*
- *Contractor will obtain Sublette Mule Deer Herd Unit population estimates from Pinedale WGFD personnel for analysis purposes.*
- *Collaring is to occur late December 2010, as needed.*
- *One fixed wing flight will be required to download data in early April 2011.*

Changes in deer numbers
Contractor will estimate abundance by conducting one aerial survey using 1-mi^2 quadrat units following WGFD protocols.

***Quadrat Sampling**:*

- Mule deer will be sampled by helicopter with observer counting all animals *observed in 46 square mile quadrats within the treatment survey area and 23 square mile quadrats within the study area in February 2011.*

REQUIREMENTS:

- *Contractor will use data protocol as provided by the PAPO for reporting data.*
- *Surveys will be conducted using protocol identified by the WGFD (Emmerich et al, Handbook of Biological Techniques Third Edition).*
- *Contractor is required to obtain and maintain a Chapter 33 Wildlife Capture permit with the WGFD.*
- *Contractor will submit all capture and location data to the WGFD Wildlife Observation System the year collected.*
- *Contractor will be responsible for recovery of any dropped collars.*

DATA SUBMISSION AND REPORTING:

- *Contractor will coordinate directly with the PAPO.*
- *Any equipment purchased from the project fund will be property of the PAPO.*
- *All raw data will be submitted as collected to the PAPO.*
- *Data will be submitted in electronic and hardcopy format using attributes table provided by the PAPO.*
- *All horizontal position data will be collected and reported inNAD 83, Zone 12, Universal Transverse Mercator (UTM).*
- *Preliminary reports will be submitted 30 days after completion of each objective.*
- *Invoices will include progress summary describing completed work included in billing.*
- *Draft Final Report is due May 31, 2011*
- *Final Report is due June 30, 2011.*

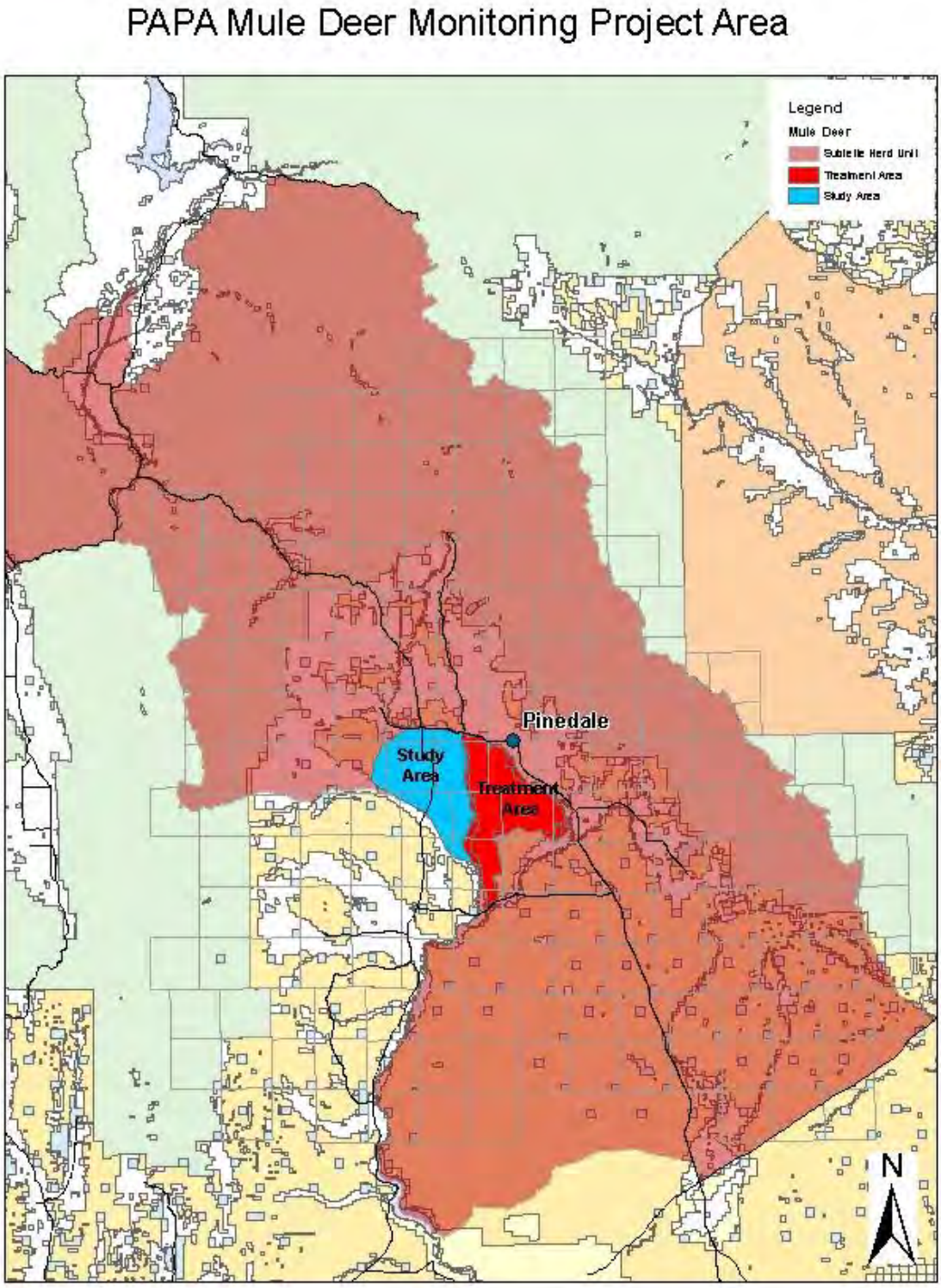
2011- 2012 Monitoring:
In November 2011 the contract with WEST Inc. was renewed for the 2011-2012 monitoring period. The work plan for 2011-2012 implements the same monitoring protocols conducted in 2010-2011.

Improved technology in GPS collars provided us with an opportunity to reduce mule deer captures. In January 2012 WEST Inc. captured 30 mule deer (17 in Mesa, 13 in Ryegrass/Soapholes) and equipped them with GPS collars. Improved technology in GPS collars provided us with the opportunity to reduce deer captures. Deer were equipped with Generation

4 store-on-board collars that will remain on the animal for up to 3 years. This change will result in increased data collection and overall cost savings. In 2013 and 2014 we will only replace collars from animals that die. The remaining collars will be replaced in 2015 with a goal to capture the same animal, so individuals can be followed through time.

Similar to 2010-2011 methods, for 2011-2012 WEST Inc. will: 1) monitor movements of deer between the treatment PAPA and study area (Ryegrass/Soapholes) to ensure abundance counts are reliable; 2) estimate habitat use patterns and winter distribution of deer on the PAPA and 3) identify migration routes of collared deer as data becomes available. As outlined in the 2010-2011 RFP, WEST Inc. will also use helicopter counts to estimate abundance on the PAPA and Ryegrass/Soapholes regions, so that comparisons can be made between the two areas and the larger Sublette Herd Unit.

Mule Deer Monitoring Project Area Map



PRONGHORN MONITORING

BACKGROUND

A RFQ was prepared by the agencies and Operators and advertised by the PAPO in 2009 seeking a contractor to conduct pronghorn monitoring. On July 27, 2009 the RFQ review team selected WEST Inc. to fulfill the pronghorn monitoring contract for the 2009-2010 monitoring period.

The WGFD and Operators agreed to incorporate additional analysis in future monitoring to include the entire Sublette pronghorn herd along with the Bench Corral (study area) until a mutually agreeable reference area can be determined.

On October 13, 2010, a Request for Proposal (RFP) for pronghorn monitoring for the PAPO was advertised following WGFD procedures per the revised contracting process (above). WEST Inc. was contracted to gather the 2010-2011 quantitative monitoring of pronghorn population parameters and habitat use within the PAPA.

In response to the WY CFWRU Review the Matrix trigger component associated with avoidance distance was removed beginning in 2011 however; we elected to continue collecting the data as it has proven useful in evaluating mitigation response. All other monitoring was completed following the protocols set out in the 2010-2011Contract.

2010-2011 Monitoring Period
Language from Original WGFD Contract
Methods and Protocols Described as follows:

Specific level of change to be monitored:

- *The data collected for this project will be sufficient to identify changes in pronghorn populations and avoidance distances. Required monitoring includes determining any changes in pronghorn population parameters and habitat use within the PAPA (Treatment Area) compared to the Sublette pronghorn herd, and the Bench Corral (Study Area) populations and habitat use. Data for the larger Sublette pronghorn herd unit will be collected by the WGFD and provided to the contractor for analysis.*

- *The Wildlife Monitoring and Mitigation Matrix (Appendix B of the SEIS ROD) specifies that the changes requiring mitigation are as follows:*

    - *15% population decline in any year, or cumulatively over all years, compared to the Sublette pronghorn herd unit or other mutually agreeable area (tentative - Bench Corral Study area).*
    - *10% decline in habitat availability for one year, and a concurrent 15%*

change in antelope numbers for that year, compared to the Sublette pronghorn herd unit or other mutually agreeable area (tentative - Bench Corral Study area).

- *Changes in habitat use will be measured through changes in avoidance distances and distribution shifts in home range.*

Goals and Objectives:

- *Census pronghorn within the Treatment Area and Study Area during winter and report changes in population numbers.*
- *Monitor female survival (based on collared pronghorn mortality).*
- *Monitor pronghorn distribution and group size (monthly winter flights).*
- *Map collared pronghorn locations and migration routes.*
- *Using a Resource Selection Function Model (RSF), identify pronghorn distribution and habitat selection. Use a Cumulative Distribution Function to assess changes in habitat availability.*
- *For each objective, monitoring by contractor will occur within the PAPA (Treatment) and Bench Corral (Study Area).*
- *Analyze changes in pronghorn population numbers in Treatment Area compared to population changes in the Sublette Pronghorn Herd Unit and the Bench Corral (Study Area).*

PROJECT SPECIFICATIONS AND REQUIREMENTS

RESPONSIBILITIES OF CONTRACTOR:

GOALS: *Monitor change in pronghorn numbers between years, and cumulative change over all years. Monitor avoidance distances from well pads and roads. Document long-term trends and make year-to-year comparisons.*

Methodology

- *Contractor will capture and maintain 30 Global Positioning System (GPS) collars (15 in the Treatment Area and 15 in the Bench Corral Study Area) on adult (>1 year of age), female pronghorn. Collaring is to occur late December 2010.*
- *Collars will be programmed to drop off in November 2011. Contractor will be required to recover collars and download data to be included in final report.*
- *Contractor will conduct monthly (January, February, and March, 2011) aerial fixed wing flights of the Treatment and Study Areas, using approximately ½ mile interval transects.*
    - *We estimate 8-10 hours flight time per survey area (one day for treatment, one day for study area). Flights are to be completed for each area within one day and consecutive days are preferred for surveying*

both areas.
  - *Flights should be conducted at an elevation high enough to avoid excessive disturbance or movement of animals.*
  - *Flights should be conducted once monthly during January through March with a minimum of 20 days between flights.*
- *Contractor will map locations of groups and accurately count group sizes without double counting.*

  It is recommended that flights include two observers to include: 1 observer counting numbers of individuals and the second observer utilizing high definition digital photography or digital video to capture images of groups. Images can be used to crosscheck counts made by observer 1.
- *Contractor will relocate all GPS collared animals within the Treatment and Study Areas identified on the Project Area map during aerial surveys.*
- *Contractor will use a receiver with scanning capability during aerial surveys to identify GPS collared animals in treatment and study areas.*
- *Where GPS collared animals are not found during Treatment and Study Area surveys an additional aerial investigation may be necessary in March to locate these animals.*
- *Contractor will recover all collars on mortality, avoiding unnecessary disturbance to pronghorn and other big game on winter ranges.*
- *Contractor will obtain Sublette Pronghorn Herd Unit population estimates from Pinedale WGFD personnel for analysis purposes.*

REQUIREMENTS:

- *Contractor will use data protocol as provided by the PAPO for reporting data.*
- *Surveys will be conducted using protocol identified by the WGFD (Emmerich et. al. Handbook of Biological Techniques Third Edition).*
- *Contractor is required to obtain and maintain a Chapter 33 Wildlife Capture Permit with the WGFD.*
- *Contractor will submit all capture and location data to the WGFD Wildlife Observation System the year collected.*
- *Contractor will be responsible for recovery of any dropped collars.*

DATA SUBMISSION AND REPORTING:

- *Contractor will coordinate directly with the PAPO.*
- *Any equipment purchased from the project fund will be property of the PAPO.*
- *All raw data will be submitted as collected to the PAPO.*
- *Summary Report will be submitted within 1 month of each survey.*
- *Data will be submitted in electronic and hardcopy format using attributes table provided by the PAPO.*
- *All horizontal position data will be collected and reported in NAD 83, Zone 12,*

Universal Transverse Mercator (UTM).

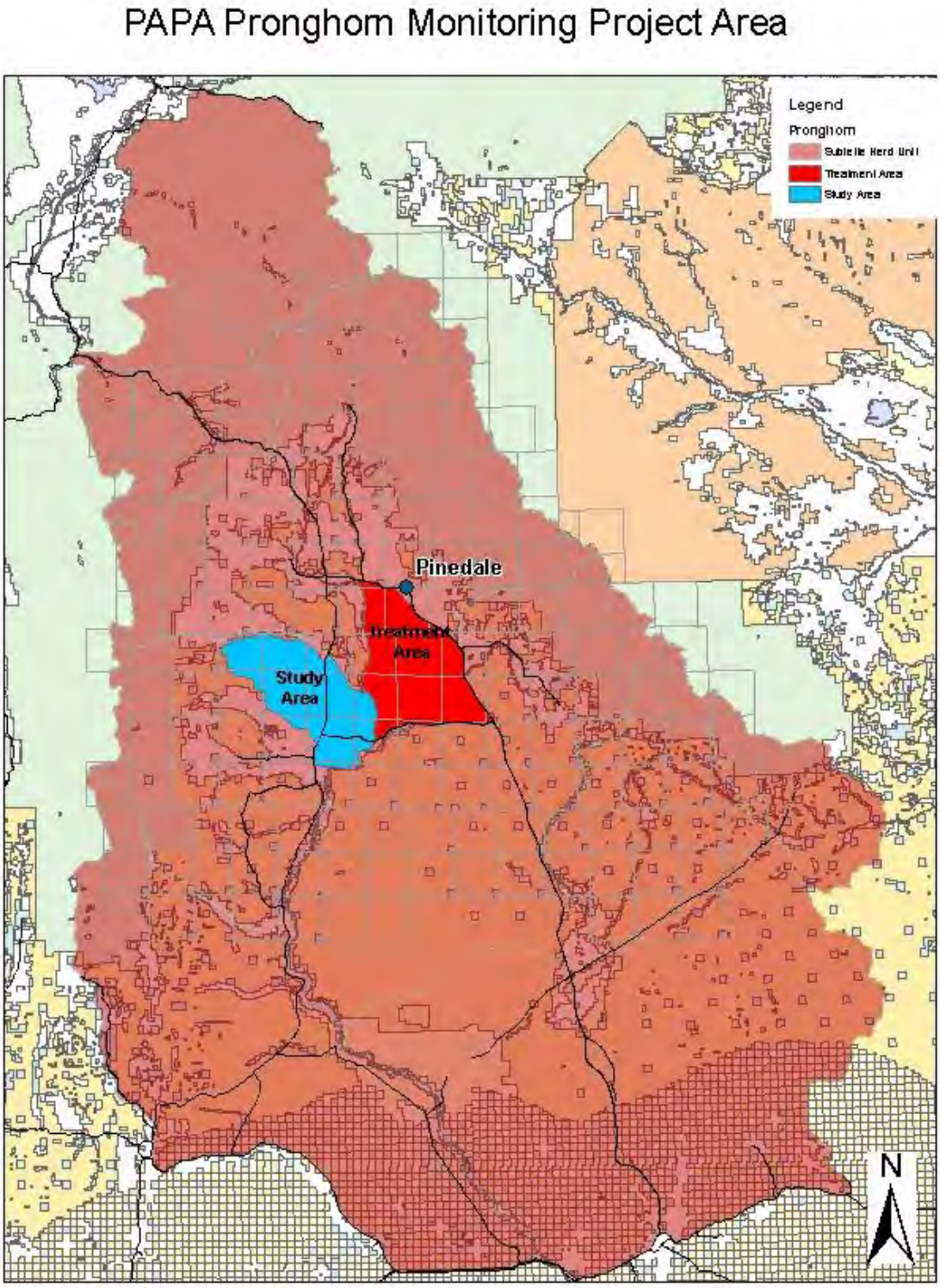
- *Preliminary reports will be submitted 30 days after completion of each objective.*
- *Invoices will include progress summary describing completed work included in billing.*
- *Draft Report is due March 1, 2011.*
- *Final Report is due April 15, 2011.*

2011-2012 Monitoring:
In November 2011 the contract with WEST Inc. was renewed for the 2011-2012 monitoring period. The work plan for 2011-2012 implements the same monitoring protocols conducted in 2010-2011.

Improved technology in GPS collars provided us with an opportunity to reduce pronghorn captures. In January 2012, WEST Inc. captured 30 pronghorn (15 in the PAPA, 15 in the Bench Corral Study Area) and equipped them with Generation 4 store-on-board GPS collars that will remain on the animal for up to 2 years. This change will result in increased data collection and overall cost savings. In 2013 we would only replace collars from animals that die. The remaining collars will be replaced in 2014 with a goal to capture the same animal so individuals can be followed through time.

Similar to 2011, WEST Inc. will use the GPS data to: 1) monitor movements of pronghorn between the treatment (PAPA) & study area (Bench Corral), 2) estimate habitat use patterns and winter distribution of pronghorn in the PAPA, and 3) identify migration routes of all GPS-collared pronghorn. As outlined by the Wildlife Monitoring and Mitigation Matrix, they will also use three fixed-wing aerial surveys to census pronghorn in the PAPA and Bench Corral Study areas, so that trends across years can be made, along with comparisons between the two areas and the larger Sublette herd unit. In addition, ground surveys will be conducted along with the aerial surveys. Ground surveys will allow for estimation of age/sex ratios and comparisons over time and among areas and the larger Sublette herd unit.

Pronghorn Monitoring Project Area Map



GREATER SAGE-GROUSE MONITORING

BACKGROUND

A RFQ was prepared by the agencies and Operators and advertised by the PAPO in 2009 seeking a contractor to conduct sage-grouse monitoring. KC Harvey was hired in March 2009 to fulfill the sage-grouse monitoring contract for the 2009 monitoring period. Wyoming Wildlife Consultants was selected to conduct nest success monitoring for the 2010 nesting season. Lek surveys were conducted in both years, by agency personnel with data provided to the contractors for their analysis.

Following the WY CFWRU Review beginning in 2011, monitoring methods were modified. Monitoring of nest success and habitat use was eliminated. The remaining components of sage-grouse monitoring were assigned to WGFD and BLM personnel.

In 2010, routine monitoring of all suitable habitats for sage-grouse leks was incorporated into the ongoing monitoring protocol. The PAPO staff collected noise monitoring data at several Reference area leks to aid in identifying ambient noise levels for future analysis.

The WY CFWRU Review identified a need for additional winter sage grouse data to help understand seasonal impacts of energy development on sage-grouse in the Upper Green River Basin. Beginning in January 2011 agency biologists from WGFD and BLM conducted systematic winter concentration use aerial surveys.

Lek searches were conducted in 2011 at all complexes with exception to the East Fork Complex that was inaccessible due to winter snow conditions. No new (or moved) leks were identified within the Treatment or Reference areas.

The WY CFWRU lead to a clarification for the criteria “Peak numbers of males attending lek complexes”. These criteria would be analyzed comparing Treatment and Reference areas using a running average of the **last** 2 years of data. This comparison would average peak numbers of males by complex for each respective area (Treatment compared to Reference area) and assess if a 30% change has occurred over that 2 year period.

Current Monitoring and methods are described as follows:

Specific level of change to be monitored:

- *The Wildlife Monitoring and Mitigation Matrix (Appendix B of the SEIS ROD) specifies that the changes requiring mitigation are as follows:*

- *30% decline in total number of active leks, or 30% decline in the number of leks in a single complex.*
- *Average of 30% decline in peak numbers of males attending leks over 2 years compared to reference area.*

Lek Monitoring:
Agencies will follow protocols described in the WGFD Handbook of Biological Techniques Third Edition, Lek Monitoring Techniques (March 7, 2006)

Lek Searches
The monitoring framework for lek searches will entail systematic aerial and ground searches. Aerial searches will cover all 6 lek complexes over a 3 year period (2 complexes/year) will be conducted over a 4-5 day period from April 1 to May 15. Flights will initiate at daylight and terminate after 2 hours. Systematic transects will be surveyed in each complex at 1 mile intervals. For years when complexes are not searched aerially, ground searches will be conducted. A minimum of 3 days per complex will be scheduled annually by Agency Biologists to search for potential new lek sites.

Winter concentration surveys
Agency biologists from WGFD and BLM will conduct systematic aerial surveys that will be repeated for 4 to 5 years. This data will be combined with agency data from prior years to assess winter sage grouse use in both the treatment and reference areas. Agency biologists will conduct 1 mid-winter (January - February) flight over a 5 to 7 day period to systematically survey both treatment and reference areas at ½ mile intervals.

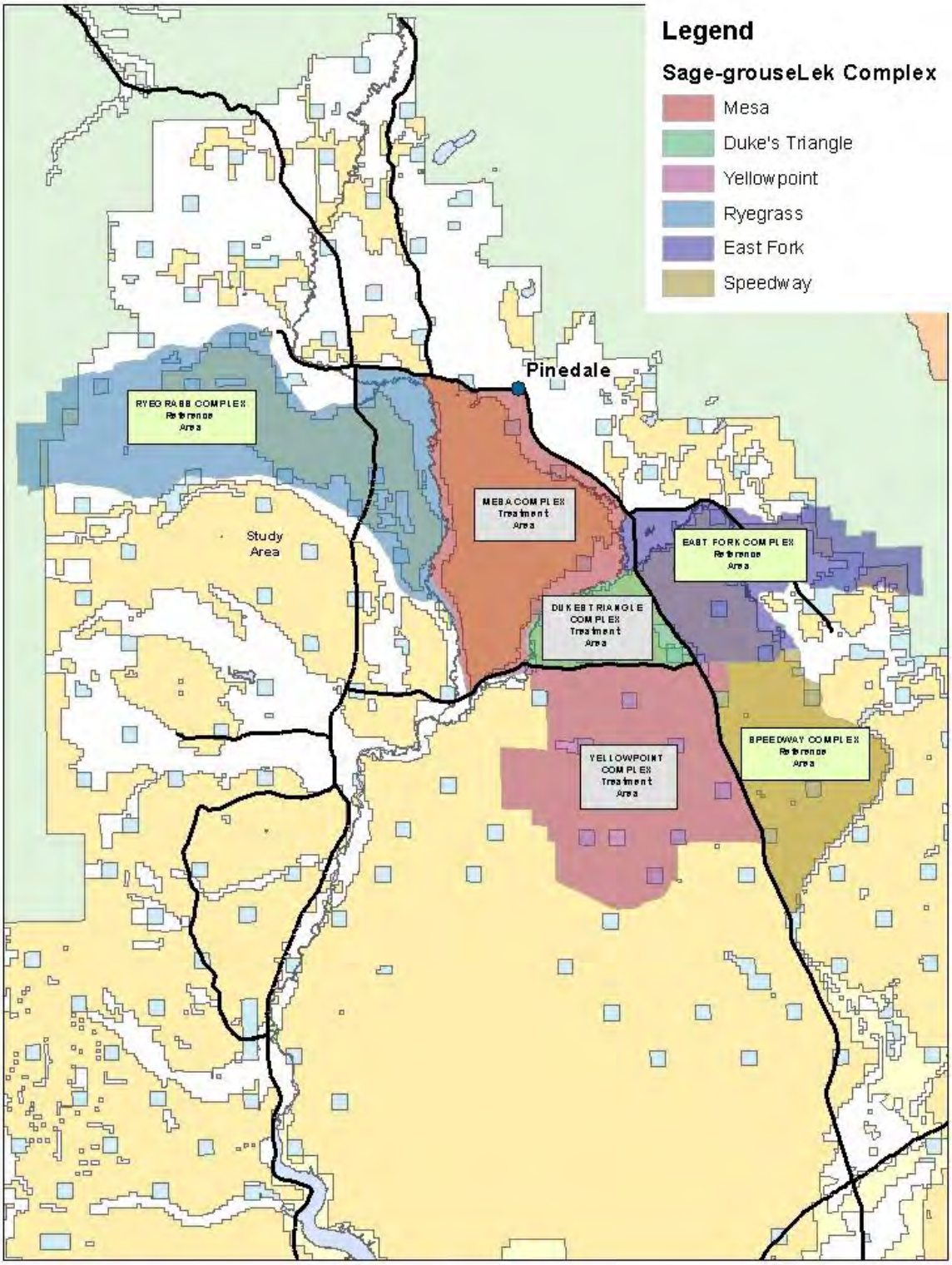
Over time (next 4-5 years), this data will provide the basis for refining existing sage grouse winter concentration and winter use maps. Once a more complete understanding of winter sage grouse distribution is achieved, a monitoring protocol will be established to assess if a 30% decline in winter habitat use has occurred (i.e. collar large sample of birds and apply distance estimation method as recommended by WY CFWRU Reviewers). In the interim, Agency biologists proposed suspending the 30% criteria in favor of presence/absence monitoring while additional winter use data is collected to document sage-grouse use of winter concentration sites.

Noise Monitoring
Noise monitoring will be conducted between March 1 and May 15 at all lek sites to detect impacts to sage-grouse. Monitoring has been put on hold until ambient noise levels and protocols have been established.

2012 Monitoring Period:
The PAPO contracted with the University of California at Davis (UC Davis) to develop baseline ambient noise levels and a noise measurement protocol to support sage grouse noise stipulations and WMMP requirements. Dr. Patricelli, Associate Professor with UC Davis and her research team worked with WGFD at a state-wide level, investigating the impacts of noise from natural gas development activities on greater sage-grouse lek attendance, stress levels and behaviors. They are developing data collection guidelines for noise monitoring within the Pinedale Region to be used beginning in 2013 to fulfill noise monitoring required by the SEIS ROD.

The WY CFWRU Review identified that the 2007 baseline does not represent predevelopment. The first year of significant lek survey coverage occurred in 2003. The average number of active leks from 2003 to 2005 has been recommended as the baseline for comparison of changes in the treatment areas. An Adaptive Management Request was submitted in 2011 by the PAPO. If approved through the adaptive management process, this annual comparison would be conducted in 2012 instead of comparing active lek status to a single baseline year (2007) as described in the Mitigation Matrix.

Sage-grouse Monitoring Project Area



PYGMY RABBIT MONITORING

BACKGROUND

A RFQ was prepared by the agencies and Operators and advertised by the PAPO in 2009 seeking a contractor to conduct pygmy rabbit monitoring. In May 2009, the RFQ review team selected Wyoming Natural Diversity Database (WYNDD) to fulfill the pygmy rabbit monitoring contract for the 2009 monitoring period. Approximately 857 randomly chosen plots (400m x 400m) were identified in the PAPA (treatment) and Boulder (reference) areas to be surveyed and mapped following the 2009 RFQ. WYNDD completed surveys and mapping of 444 of those plots in 2009.

Following the revised contracting process on March 23, 2010, a RFP for monitoring pygmy rabbits for the PAPO was advertised following WGFD procedures. Hayden-Wing Associates LLC was contracted to facilitate 2010 quantitative monitoring of pygmy rabbit population parameters and habitat use within the PAPA.

In response to the WY CFWRU Review, beginning in 2010, monitoring methods were modified to include Occupancy Modeling methods described in Andelt et al (2009) and MacKenzie et al (2006). Additionally, a power analysis was conducted to evaluate adequate sample size needed. Using Program MARK (White and Burnham 1999) revealed that two site visits to 390 equally distributed plots (195 per area, treatment and reference) would meet statistical requirements to estimate occupancy and detection probability to detect 3 consecutive years of decline in presence or absence or an average of 15% decline in number of individual each year over 3 years.

WGFD contracting process allows for existing contracts to be renewed for up to 2 additional years. In May 2011, the contract with Hayden-Wing Associates LLC. was renewed. The work plan followed the protocols set out in 2010.

2010-2011 Monitoring Period
Language from Original WGFD Contract
Methods and Protocols Described as follows:

Specific level of change to be monitored:

- *The Wildlife Monitoring and Mitigation Matrix (Appendix B of the SEIS ROD) specifies that the changes requiring mitigation are as follows:*
    - *A three year change in presence/absence of species and in numbers of individuals of each species compared to reference areas and,*
    - *Identify three consecutive years of decline in presence or absence of a species or an average of 15% decline in numbers of individuals*

each year over three years".

Contractor will quantitatively monitor and report occurrence and patterns of relative abundance of pygmy rabbits in the PAPA and Boulder Reference areas, and to identify changes in distribution and numbers. The specific objectives that will be used to meet these goals are:

- *Objective 1. map distribution of pygmy rabbit burrows in the PAPA (treatment) and Boulder (reference) areas,*
- *Objective 2. Monitor burrows for presence/absence, and*
- *Objective 3. Report change in population numbers or active burrows.*

PROJECT SPECIFICATIONS AND REQUIREMENTS

RESPONSIBILITIES OF CONTRACTOR:

Goals and Objectives: *Conduct monitoring sufficient to identify three consecutive years of decline in presence or absence of pygmy rabbit populations or an average of 15% decline in numbers of individuals each year over three years.*

- *Contractor shall provide copies of the original datasheets and an excel spreadsheet with all data summarized for each survey location.*
- *Raw data will be provided to the WGFD and PAPO.*
- *Data collected will be the property of the WGFD and/or PAPO.*
- *The Contractor will prepare Project Summaries for each objective.*
- *Contractor shall be responsible for contacting and arranging with landowners (i.e., private and federal) for permission to trespass prior to the initiation of the surveys.*
- *Any equipment purchased using PAPO funds will be property of the PAPO.*

REQUIREMENTS

<u>Mapping</u>

- *Contractor will map 44 known pygmy rabbit locations not surveyed in 2009 and validate pygmy activity.*
- *The contractor will be required to conduct pygmy rabbit surveys at approximately 340 locations (includes 44 known locations) not surveyed in 2009, consisting of 2 randomly chosen 400m X 400m plots per square mile in the PAPA and the reference area. The points have been generated at random by the BLM.*
- *The plots will consist of nine transects that run in a North-South direction. Transects are spaced 50 m apart.*
- *The surveyors will follow the designated 50m transects but when suitable pygmy*

rabbit habitat is seen off the transect, the surveyor should veer off the transect line to monitor habitat patches that were encountered between transects.

- *UTM coordinates will be used to navigate to each of the random points which will then be used as the southwestern corners of the 400x400 meter plots that were described above.*

Population Monitoring

- *Contractor will provide methods sufficient to identify three consecutive years of decline in presence or absence of pygmy rabbit populations or an average of 15% decline in numbers of individuals each year over three years.*

Reporting

- *Data will be submitted as collected to the PAPO database.*
- *Data and shapefiles will be submitted electronic and hard copy using attribute tables provided by the PAPO.*
- *Shapefiles will include metadata.*
- *All horizontal position data will be collected and reported in NAD 83, Zone 12, Universal Transverse Mercator (UTM).*
- *Contractor will provide a draft report on or before November 1, 2010.*
- *Contractor will provide a final report on or before December 31, 2010.*

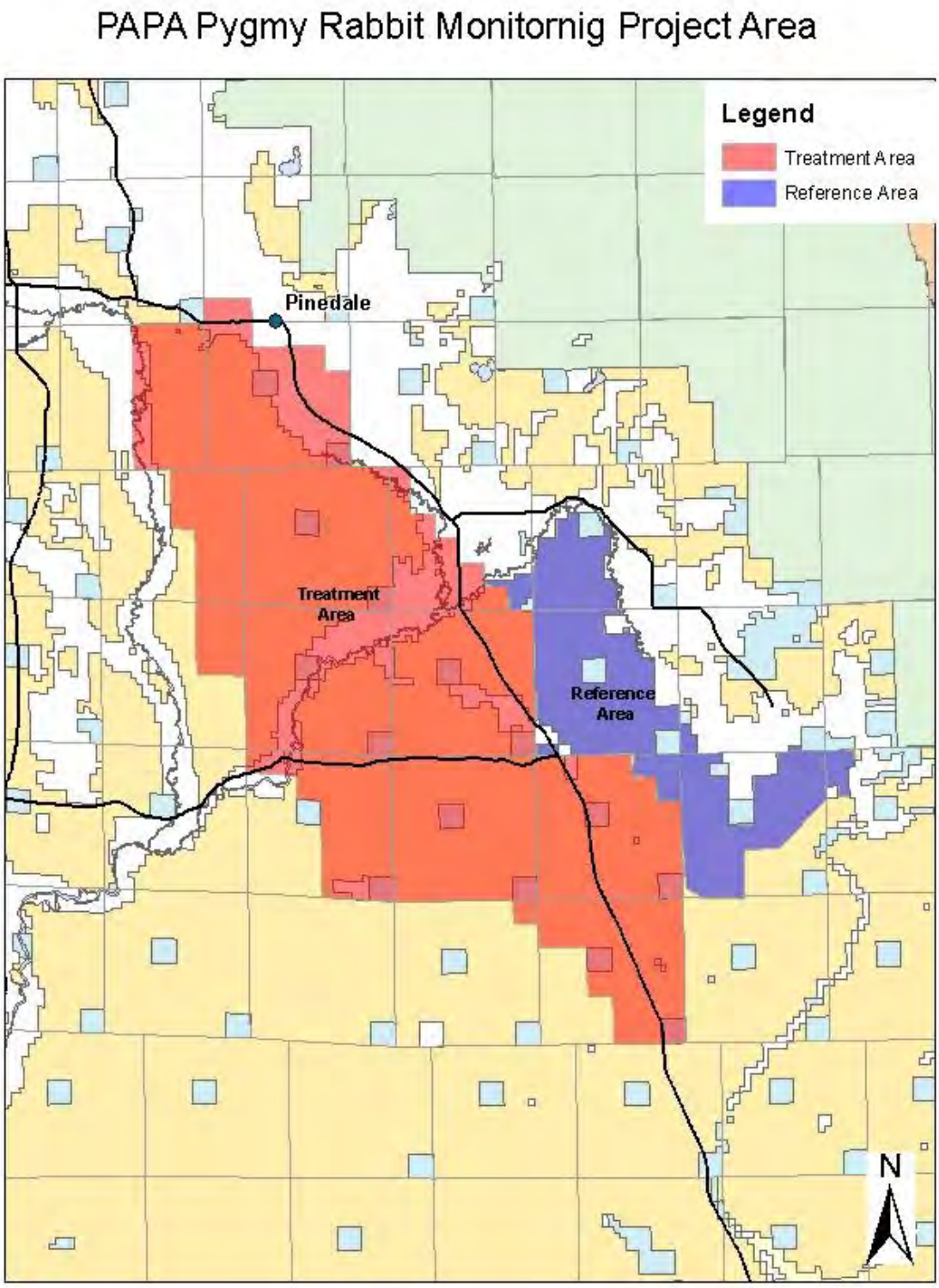
2011 Contract Language Changes Made to 2010 Monitoring Requirements:

- *Contractor will survey 390 sites (195 in treatment area, 195 in reference area)*
- *Contractor will survey each site twice. More than one site-visit (survey) is necessary to estimate detection probability and generate unbiased estimates of occupancy.*
- *To ensure independence of the two surveys, the second survey will be conducted by a different observer than the first, and combinations of observers will be randomized. The second observer will not see data collected by the first observer.*
- *During the first survey all pygmy rabbit sign within site boundaries will be documented (fresh and old scat, diggings, burrows) and recorded following BLM data reporting protocols (http://www.blm.gov/wy/st/en/field_offices/Pinedale/wildlife.html).*
- *During the second survey, only presence/absence data will be collected; if evidence of recent pygmy rabbit occupancy is found (i.e. fresh scat) the rest of the site does not need to be surveyed.*
- *Biologists will begin surveys at the westernmost transect, in order to facilitate potential analyses at differing scales.*

2012 Monitoring

Following WGFD processes the contract with Hayden-Wing Associates LLC. was renewed to conduct monitoring in 2012. The work plan implements the same monitoring protocols conducted in 2011.

Pygmy Rabbit Monitoring Area Map



WHITE-TAILED PRAIRIE DOG MONITORING

BACKGROUND

A RFQ was prepared by the agencies and Operators and advertised by the PAPO in 2009 seeking a contractor to conduct white-tailed prairie dog monitoring. In May 2009 the RFQ review team selected Hayden-Wing Associates LLC to fulfill the white-tailed prairie dog monitoring contract for the 2009 monitoring period
Following the revised contracting process on March 23, 2010, a RFP for monitoring white-tailed prairie dog for the PAPO was advertised following WGFD procedures. WEST Inc. was contracted to facilitate 2010 quantitative monitoring of white-tailed prairie dog population parameters and habitat use within the PAPA.

In response to the WY CFWRU Review, beginning in 2010, monitoring methods were changed to include Occupancy Modeling methods described in Andelt et al (2009) and MacKenzie et al (2006). A power analysis was conducted using Program MARK (White 2008) to evaluate adequate sample size needed to detect 3 consecutive years of decline in presence or absence or an average of 15% decline in number of individual each year over 3 years. The power analysis and data collected in 2010 suggested we would need to survey 2000 or more plots meet our objectives. Costs for this level of monitoring were found to be prohibitive.

WGFD contracting process allows for existing contracts to be renewed for up to 2 additional years. In May 2011, the contract with WEST INC. for monitoring white-tailed prairie dogs was renewed. The work plan followed the protocols set out in 2009. We returned to the original methods described by Biggins et al (1993) for mapping prairie dog towns.
Protocols included:

1) Mapping of previously identified prairie dog towns, with intention to conduct searches for new towns every 5 years.
2) Calculation of changes in town boundaries/sizes,
3) Estimation of burrow and population densities based on the strip transect protocols developed by Biggins et al (1992), and
4) Comparison of densities between the PAPA and Reference Areas.

2010-2011 Monitoring Period
Language from Original WGFD Contract
Methods and Protocols Described as follows:

Specific level of change to be monitored:

- *The Wildlife Monitoring and Mitigation Matrix (Appendix B Record of Decision, Final Supplemental Environmental Impact Statement for the Pinedale Anticline*

Oil and Gas Exploration and Development Project) specifies that the changes requiring mitigation are as follows:

- *A three year change in presence/absence of species and in numbers of individuals of each species compared to reference areas and,*
- *Identify three consecutive years of decline in presence or absence of a species or an average of 15% decline in numbers of individuals each year over three years".*

Contractor will quantitatively monitor and report presence or absence of white-tailed prairie dog populations in the PAPA and reference areas and identify changes in distribution and numbers. The specific objectives that will be used to meet these goals are to:

- *Objective 1. Identify white-tailed prairie dog town or complex locations on public lands within the PAPA and reference areas*
- *Objective 2. Monitor towns for white-tailed prairie dog presence or absence, and*
- *Objective 3. Accurately monitor trends in relative abundance.*
- *Objective 4, Report changes in population numbers or active towns*

Objective 1, to identify white-tailed prairie dog town or complex locations on public lands within the PAPA and reference areas was completed in 2009. All colonies located on public land within the study area were mapped and confirmed as occupied or unoccupied.

Objective 2, to monitor towns for white-tailed prairie dog presence/absence; was initiated in 2009 by recording presence of prairie dog and fresh prairie dog sign within colonies.

PROJECT SPECIFICATIONS AND REQUIREMENTS

RESPONSIBILITIES OF THE CONTRACTOR:

***Goals and Objectives**: Conduct monitoring sufficient to identify three consecutive years of decline in presence or absence of white-tailed prairie dog populations or an average of 15% decline in numbers of individuals each year over three years".*

- *Contractor shall provide copies of the original datasheets and an excel spreadsheet with all data summarized for each survey location.*
- *Raw data will be provided to the WGFD and Pinedale Anticline Project Office (PAPO).*
- *Data collected will be the property of the WGFD and/or PAPO.*

- *The Contractor will prepare Project Summaries for each objective.*
- *Contractor shall be responsible for contacting and arranging with landowners (i.e., private and federal) for permission to trespass prior to the initiation of the surveys.*
- *Any equipment purchased using PAPO funds will be property of the PAPO.*

REQUIREMENTS

Population Monitoring

- *Contractor will conduct surveys for white-tailed prairie dog in treatment area and reference area following PAPO provided protocols.*

***Reporting**:*

- *Data will be submitted as collected.*
- *Data and shapefiles will be submitted electronic and hard copy using attribute tables provided by the PAPO.*
- *Shapefiles will include metadata.*
- *All horizontal position data will be collected and reported in NAD 83, Zone 12, Universal Transverse Mercator (UTM).*
- *Contractor will provide a draft report on or before November 1, 2010*
- *Contractor will provide a final report on or before December 31, 2010*

2011 Contract Language and Monitoring Changes Made to 2010 Monitoring Requirements:

Town Mapping and Population Surveys

Each town previously identified will be examined for increases or decreases to town size by ground verifying currently documented boundaries. Surveys will be conducted to estimate burrow density and number of individuals will be based on the techniques described in Biggins et al. (1992). To ensure an adequate sampling effort sufficient to estimate burrow densities within 10% of the true density, strip transects (3 m wide) will be systematically placed throughout the town, with the area sampled proportional to the size of the prairie dog town (Biggins et al. 1992). Approximately 5% of the area of each town will be surveyed and should provide a sufficient sample size to accurately estimate burrow density (Biggins et al. 1992). Strip transects will be oriented in a north-south direction and will be placed equidistant apart, with 60-m spacing. Observers will walk a straight transect line and count the number of burrows (active and inactive) within 1.5 m of either side of each transect line. Burrows will be counted if greater than 7 centimeter (cm) in diameter and deep enough that the end cannot be seen. Burrows will be identified as active or inactive, with active burrows defined by the presence of fresh scat within 0.5 meters of the burrow entrance. Burrows on the boundary or edge of transects will be counted if more than half of the counters, one for total numbers of burrows and one for active burrows. Data derived from transects will be expressed as the density of

active prairie dog burrows per town or complex surveyed. Density of active burrows will be used to estimate population density following the guidance in Biggins et al. (1992).

Monitoring Trends

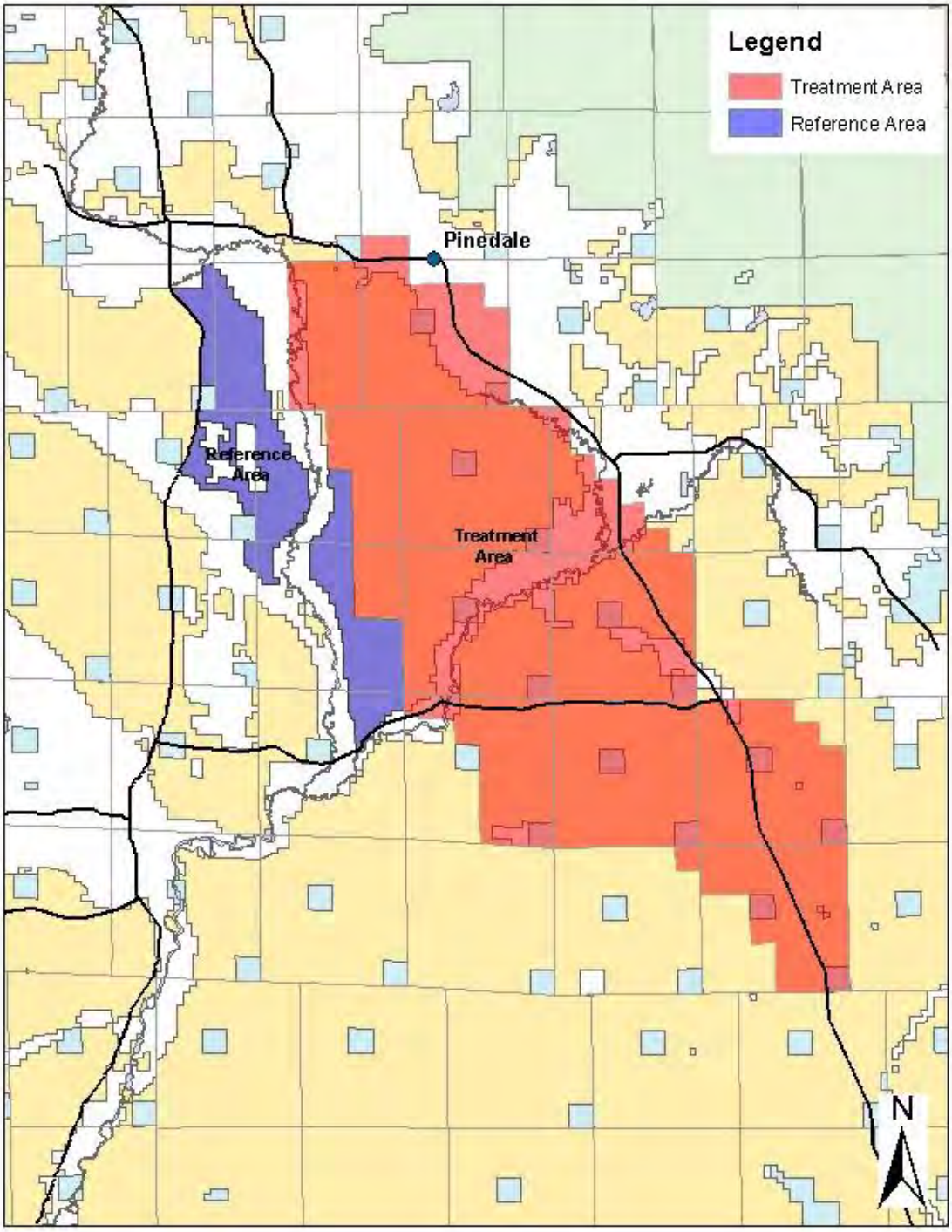
The density of active burrows will be calculated for each town and averaged across all towns in the PAPA and reference areas to obtain density estimates for each area (Thompson 1992). The variance of the density estimates across the towns will be used to calculate confidence intervals on the estimates (Thompson 1992). These means and variances will be used to make comparisons between the two areas, and would be applicable to a transformation to population estimates as in Biggins et al. (1992).

2012 Monitoring

Following WGFD processes the contract with WEST Inc. was renewed to conduct monitoring in 2012. The work plan implements the same monitoring protocols conducted in 2011.

White-tailed prairie dog project area map

PAPA White-tailed Prairie Dog Project Area



SNOW AND TRAFFIC MONITORING

BACKGROUND

The PAPO found similar variables used in habitat selection analysis could be shared between contractors monitoring pronghorn, mule deer and sage-grouse. Rather than duplicate efforts a separate Snow and Traffic Monitoring project was added in 2009. This was intended to be a data collection effort only with data shared in all other wildlife monitoring analysis as needed. Snow and traffic data has been found to be useful by Department of Environmental Quality for air quality analysis.

A RFQ was prepared by the agencies and Operators and advertised by the PAPO in 2009 seeking a contractor to conduct snow and traffic monitoring. Asset Environmental was selected and completed the 2009-10 winter snow and traffic surveys. In 2010, an Annual Report was added to the contract following a request from Operators.

On October 13, 2010 a RFP was advertised for monitoring snow and traffic for the PAPO following WGFD procedures. Asset Environmental Inc. was contracted to facilitate 2010-11 quantitative monitoring of snow and traffic.

2010-2011 Monitoring Period
Language from Original WGFD Contract
Methods and Protocols Described as follows:

Goals and Objectives:

Goals:

- *Quantitatively monitor and report traffic volumes within the PAPA.*
- *Quantitatively monitor and report snow depth within the PAPA and associated reference areas.*

Objectives:

- *Monitor traffic volumes within the PAPA development area (Treatment Area).*
- *Sample snow depths at fixed locations throughout winter months (November – April) within the Treatment Area and associated reference areas.*

PROJECT SPECIFICATIONS AND REQUIREMENTS

RESPONSIBILITIES OF CONTRACTOR:

Goals: *Monitor traffic and snow volumes for use in other PAPA monitoring and Mitigation Matrix wildlife analysis.*

Methodology for Traffic Monitoring

- *Contractor will install and operate traffic counters at 60 locations within the Treatment Area.*
- *Equipment is infrared sensor, battery operated type counters.*
- *Counters record hour and day stamp for each event*
- *Locations will be selected by the PAPO*
- *Contractor will download data from traffic counters at 7-10 day intervals.*
- *Traffic counters will be deployed in early November and remain active until the end of May.*
- *Monitors will be set at a sensitivity level sufficient to minimize the probability of recording hits by passing big game and timed to reduce probability of multiple hits for trucks hauling trailers.*
- *Contractor will be required to employ quality assurance/quality control to identify hits caused by events other than traffic or nonfunctioning counters.*

Methodology for Snow Depth Monitoring

- *Contractor will collect snow depth measurements every two weeks from November through the end of April at 60 fixed locations*
- *Contractor will monitor six locations along each of the ten identified snow plowed roads shown on the Project Area Map. We have established one location each representing the following slope or aspect was established:*
    - *North facing*
    - *South facing*
    - *East facing*
    - *West facing*
    - *Ridge line*
    - *Drainage*
- *Contractor will monitor fixed locations on public lands, placing a measuring device at each location in fall prior to big game winter closures (November 15). Measuring devices have large numbers that can be read through binoculars or spotting scope from access road.*

REQUIREMENTS:

- *Contractor will use Data submission and survey protocol as provided by the PAPO for reporting data.*

DATA SUBMISSION AND REPORTING:

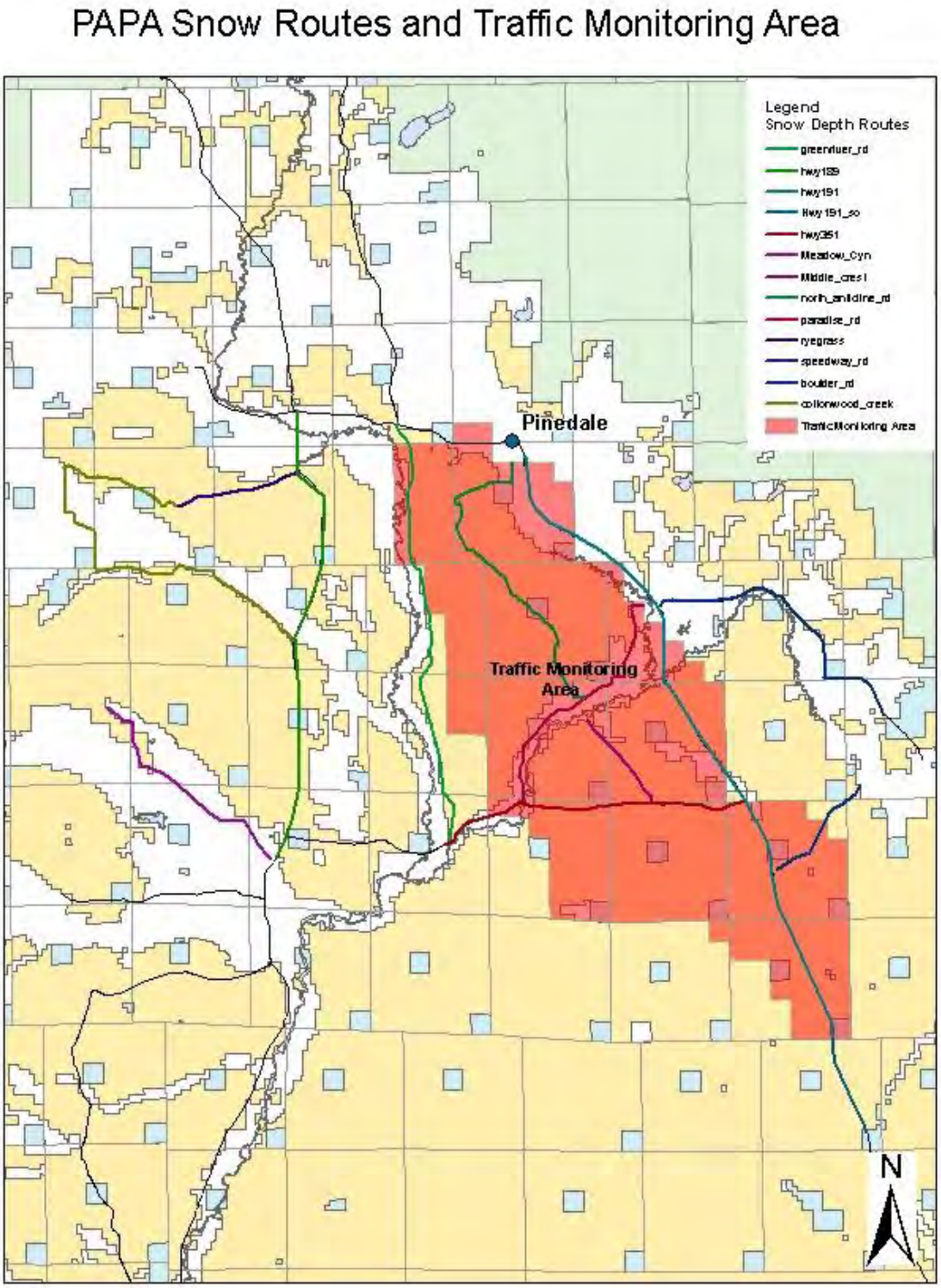
- *Contractor will coordinate directly with the PAPO.*
- *Any equipment purchased from the project fund will be property of the PAPO.*
- *All raw data will be submitted as collected to the PAPO.*
    - *Data will be submitted in electronic and hardcopy format using attributes table provided by the PAPO.*

- *All horizontal position data will be collected and reported in NAD 83, Zone 12, Universal Transverse Mercator (UTM).*
- *Invoices will include progress summary describing completed work included in billing.*

2011-12 Monitoring

WGFD contracting process allows for existing contracts to be renewed for up to 2 additional years. In November 2011, the contract with Asset Environmental Inc. for monitoring snow and traffic was renewed. The work plan followed the protocols set out in 2009.

Snow and Traffic Monitoring Project Areas



RAPTOR MONITORING

BACKGROUND

In March 2009, the agencies and Operators prepared and the PAPO advertised a RFQ seeking a contractor to conduct monitoring to determine the location and activity status of approximately 650 raptor nests/territories and nest searches for new nests within the PAPA and 1.0 mile buffer of the PAPA. Wyoming Wildlife Consultants was selected and completed the contract. Since 2009, monitoring of raptors has been a PAPO responsibility, paid for using the Fund.

Following the revised contracting process on April 16, 2010, a Request for Proposal for monitoring raptors for the PAPO was advertised following WGFD procedures. Hayden-Wing Associates LLC was contracted to facilitate 2010-11 monitoring of raptors within the PAPA.

2010-2011 Monitoring Period
Language from Original WGFD Contract
Methods and Protocols Described as follows:

PROJECT SPECIFICATIONS AND REQUIREMENTS

RESPONSIBILITIES OF CONTRACTOR:

Goals and Objectives: *Activity status and productivity surveys of active or suspected active raptor nests will be conducted within the PAPA and a 1.0 mile buffer.*

- *Contractor shall provide copies of the original datasheets and an excel spreadsheet with all data summarized for each survey location.*
- *Raw data will be provided to the WGFD, and PAPO.*
- *Data collected will be the property of the WGFD and/or PAPO.*
- *The Contractor will prepare Project Summaries for each objective.*
- *Contractor shall be responsible for contacting and arranging with landowners (i.e., private and federal) for permission to trespass prior to the initiation of the surveys.*
- *Any equipment purchased using PAPO funds will be property of the PAPO.*
- *Surveys will be conducted in accordance with the BLM Pinedale Field Office (PFO) Raptor, Burrowing Owl, and Bald Eagle Monitoring Protocols.*

REQUIREMENTS

Nest Monitoring:

- *Activity status and productivity surveys of active or suspected active raptor nests will be conducted within the PAPA and a 1.0 mile buffer.*
- *Monitoring of active nests will occur monthly through the nesting season (**beginning April 26, 2010 for this RFP – August 31, 2010**) until sufficient data are obtained to make productivity determinations (e.g., abandoned, hatched and fledged, hatched but failed).*
- *Surveys for burrowing owl should be conducted between **May 1, 2010 and October 31, 2010**.*
- *Surveys will be conducted in accordance with the PFO Raptor and Burrowing Owl and Bald Eagle Survey Protocols.*
- *Electronic raptor data (shapefile of new nests and excel table of nest checks) must be submitted monthly throughout the nesting season, documenting all the nests checked during that month, new nests and the survey results, following BLM Pinedale Field Office (PFO) Raptor, Burrowing Owl and Bald Eagle Monitoring Protocols.*

Winter Roost Monitoring:

- *Surveys of the New Fork and Green River Corridors within the PAPA boundary and a 1.0 mile buffer will be conducted to determine the occurrence/potential occurrence of winter bald eagle roosts.*
- *Surveys will be conducted in accordance with the PFO Bald Eagle Winter Roost Survey Protocol.*
- *Survey stands of coniferous and cottonwood trees during the period of **December 1, 2010 to March 1, 2011** from 1 hour before sunrise or sunset to 1 hour after sunrise or sunset.*
- *Helicopters or fixed-wing airplanes can be used for surveys*

Data Submission, and Reporting:

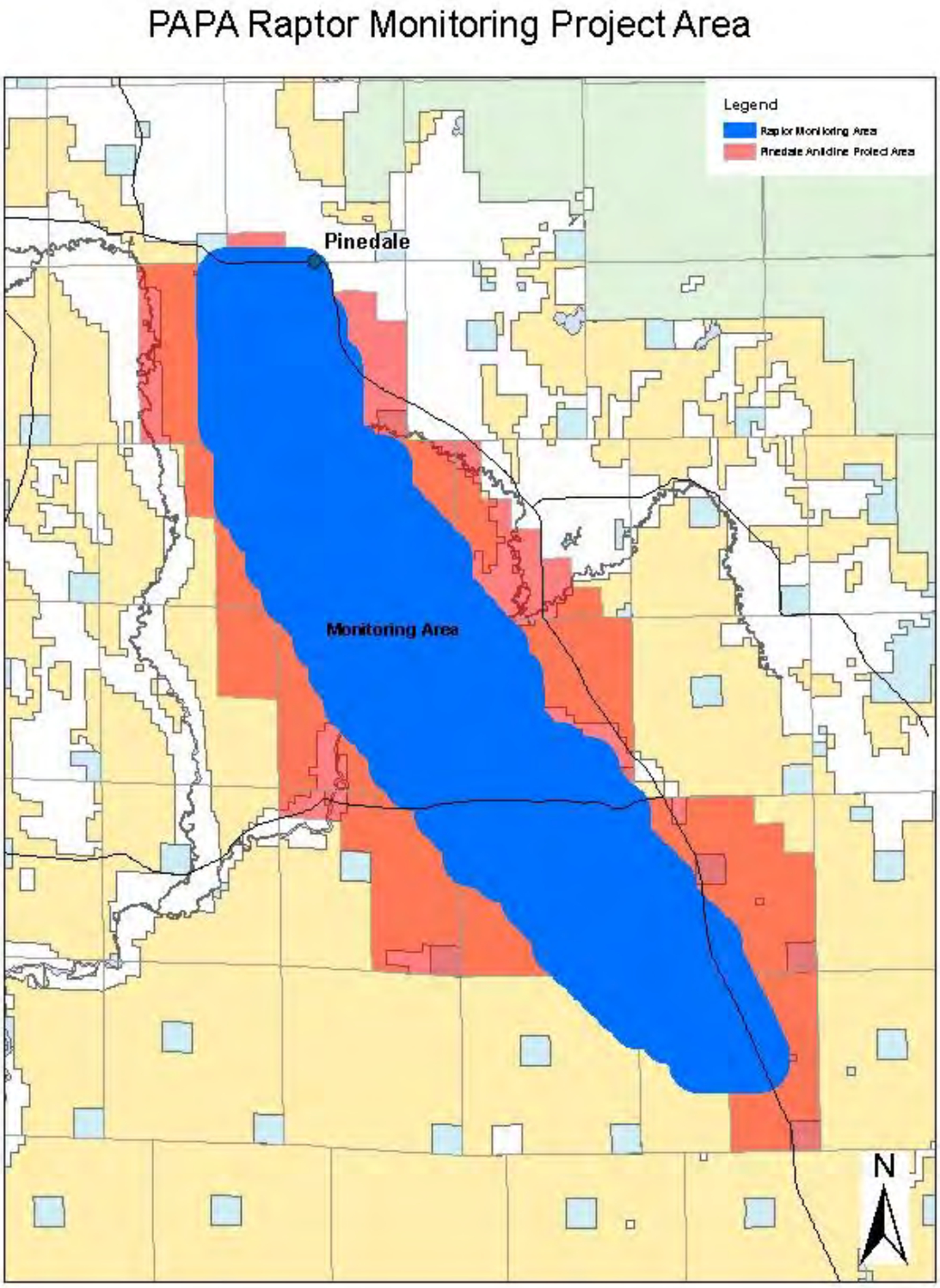
- *Data will be submitted as collected to the PAPO database.*
- *Data will be collected in accordance with BLM Pinedale Field Office (PFO) Raptor Burrowing Owl and Bald Eagle Monitoring Protocol.*
- *All horizontal position data will be collected and reported in NAD 83, Zone 12, Universal Transverse Mercator (UTM).*
- *Preliminary reports will be submitted no later than 30 days after completion of each objective.*
- *The Draft Annual Nest report will be submitted to the BLM on or before **September 30, 2010**. The Final Annual Nest report will be submitted to the BLM on or before **October 30, 2010**.*

- *The Draft Annual Winter Roost Report will be submitted to the BLM on or before* ***February 15, 2011****. The Final Winter Roost Report will be submitted to the BLM on or before* ***March 30, 2011****.*
- *Invoices will be submitted to the PAPO and accompanied with a brief status report.*

2012 Monitoring

WGFD contracting process allows for existing contracts to be renewed for up to 2 additional years. The raptor monitoring contract with Hayden-Wing Associates LLC was renewed for 2012. Monitoring of nests in 2012 was modified to include only the PAPA Core and Potential development areas plus a 1 mile buffer. All ferruginous hawk and eagle nests are monitored throughout the entire PAPA and a 1 mile buffer (2011 monitoring area). Bald Eagle Winter Roosts monitoring was discontinued for 2012-13. Monitoring methods and reporting for raptors is similar to 2011.

Raptor Monitoring 2012 Survey Project Area Map



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