Appendix I
2006 Baseline Survey Protocols and WDFW Response Letter

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State of Washington
Department of Fish and Wildlife
South Central Region – Ellensburg District Office, 201 North Pearl, Ellensburg, WA 98926
Phone: (509) 925-1013, Fax (509) 925-4702

March 8, 2006

Chris Taylor
Director of Development
Horizon Wind Energy LLC
53 SW Yamhill Street
Portland, OR 97204

Subject: Whiskey Ridge Wind Power Project - Draft Protocol for Wildlife and Habitat Surveys

Dear Chris:

We have completed our review of the Whiskey Ridge Project Wildlife and Habitat Survey protocol. I apologize that this has taken so long to reply to your request. In general the protocol is satisfactory and we agree with how the overall strategy addresses the particular needs of this site. We do have some requests for modifications to the sensitive species surveys and sage grouse surveys, which I have detailed below.

Sensitive Species Surveys – Shrub-steppe Obligates
Generally we agree that proposed May 1st- June 15th time period for surveys is appropriate. However, at present we are expecting a cooler, later spring which could affect breeding timing. WEST, Inc. should consider local conditions and make adjustments to the timing as appropriate. For sage sparrows and sage thrashers in particular, surveys should be conducted between the hours of 1 hour before sunrise to 2 to 3 hours after sunrise - depending on the temperature. We recommend surveys be repeated at least once at each location, however repeating the surveys two or more times would be better.

Sage Grouse Surveys
WDFW requests that Horizon include helicopter surveys for sage grouse leks in the protocol. Locations of lek sites are somewhat predictable based on vegetation. Leks can consist of several males, which with favorable lighting and a bit of good fortune, can be quite visible. Surveys should be done between March 15th and April 15th, ½ hour before sunrise to 2 hours after sunrise. We request that WEST, Inc. stay in contact the US Army Yakima Training Center (YTC) biologists this spring to determine when the male attendance at the large YTC leks is peaking. We expect that would be the best time to do the aerial searches with the greatest likelihood of detection.

Sage grouse brood surveys, should be done during June through mid-July. Our data indicate that median hatch dates on the YTC range between the last week in April and 3rd week in May and the median date is around the second week of May. In late July, and definitely by 1 August, the hens and broods begin to form fall flocks. At that time, the chicks are difficult to distinguish from adults when in large flocks. Our experience has been that finding broods is difficult. Hens with broods occupy a variety of habitats and they are highly dispersed across the landscape. In some western states where sage-grouse numbers are still high, brood surveys have been effective in late summer where the birds congregate near agricultural fields. In Washington, we do not have such high numbers of birds.

Thank you for the opportunity to review the protocol.

Sincerely,

Brent D. Renfrow
District Habitat Biologist

Cc: Ted Clausing, WDFW
Edd Bracken, WDFW
Perry Harvester, WDFW

Protocol for Wildlife and Habitat Surveys for the Whiskey Ridge Wind Power Project, Kittitas County, Washington

DRAFT

February 2006

Prepared for:

Whiskey Ridge Power Partners LLC.

Prepared by:

WEST Inc.
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Introduction

Whiskey Ridge Power Partners LLC. is evaluating the feasibility of expanding wind power development in Kittitas County, Washington (Figure 1). The Whiskey Ridge Project will be adjacent to the existing Wild Horse Wind Power Project and is proposed to include approximately 22 turbines with capacity to produce approximately 44 megawatts (MW). To predict project impacts on wildlife, Whiskey Ridge Power Partners LLC. has contracted with Western Ecosystems Technology, Inc. (WEST) to develop and implement a survey protocol for wildlife surveys in the project area. The following protocol contains an outline of the proposed studies. This protocol has been developed based on our experience with wildlife-wind turbine interactions at projects throughout the U.S.

Overview of the Baseline Studies

The principal objectives of the baseline study for this proposed wind project are to: (1) document raptor nest density and location; (2) describe occurrence of any federal and state threatened, endangered, proposed, candidate, or sensitive-status fauna or flora and their potential habitat that may be affected by the project; (3) describe habitat types/ecotones in the general project area; (4) estimate any potential impacts to habitat and wildlife that could result from the construction and operation of the proposed wind energy project, and (5) identify potential project design and/or mitigation measures that could reduce negative impacts.

These objectives can be addressed by a combination of data collected at the proposed project site and from baseline and post-construction monitoring data collected at other wind power sites. A baseline and impact assessment report will be produced from these studies that will describe survey methods, data collection, results of statistical analyses, and will assess impacts of the project. The baseline study report may also provide information that can be used to design a post construction (operational) monitoring study as appropriate.

The Whiskey Ridge study will consist of the following components: 1) raptor nest surveys, 2) Federal and State sensitive wildlife and wildlife habitat surveys, 3) rare plant surveys, 4) vegetation and habitat mapping, 5) sage grouse surveys, 6) bat echolocation surveys and 7) general wildlife observations. Avian use surveys are not planned for the Whiskey Ridge Project because these surveys were conducted at the Wild Horse Project (WEST 2003; see Figure 2) which is immediately adjacent to the proposed Whiskey Ridge Project and no differences are expected for impact predictions.

Methods

Habitat Mapping

Vegetation in the Project area will be mapped according to "habitat types," which are considered to be the generally recognizable assemblages of plant species that occur in a pattern across the landscape. Habitat types will be determined based on visual assessment of dominant plant species. Commercially available black and white high-resolution digital aerial photography will be used for the habitat mapping. The habitat types will be mapped during the spring or summer of 2006. Initially, the roads in and around the Project area will be driven in order to correlate habitat types with the signature (color, shading, texture) on the aerial photos. Each habitat type

will then be mapped based on either visual observation of the habitat from a road or high point, or by walking the boundaries of the habitat. Due to the scale of the aerial photos used, fine-scale intermingling in transition areas and small inclusions of one habitat type within another will not be shown. Available literature on the vegetative communities of eastern Washington may also be consulted during development of the habitat map. The mapped boundaries of each habitat type will be digitized using ArcView™. This methodology is similar to what was done for the Wild Horse Project, with the Washington Department of Fish and Wildlife's (WDFW) approval.

Rare Plant Surveys

A list of rare plants with potential to occur in the general project area will be compiled, based on agency database searches and the results of the Wild Horse studies.

During the Wild Horse rare plant surveys, no federally-listed 'Endangered', 'Threatened', 'Proposed' or 'Candidate' plant species were found, nor were any Washington state-listed 'Endangered', 'Threatened', or 'Sensitive' plant species found in the survey area. One Washington State 'Review' plant species was found, the hedgehog cactus (*Pediocactus simpsonii*). This species is listed in Review Group 1, meaning more research is needed before assigning a more definitive status.

Rare plant surveys will be conducted by trained botanists during peak flowering and/or fruiting periods when target species are best identified. Study corridors will include proposed facilities and a 164-ft (50-m) buffer. During the survey, botanists will follow meandering transects, effectively zigzagging back and forth across the survey corridor. Botanists will maintain a list of all vascular plants encountered, and will make informal collections of unknown species for later identification using *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973). Additional information collected will include general plant associations, land use patterns, unusual habitats, and photographs of habitat types and representative individual plants.

Raptor Nest Surveys

We will search for raptor, corvid, and large bird nests within the Project area and a 2-mile buffer; however, much of the 28.5 mi^2 (73.9 km^2) Whiskey Ridge Project area was already searched for the Wildhorse Project (Figure 1). We do not anticipate that the previously searched area will need to be searched again, so approximately 6.9mi^2 (17.9 km^2) of the northern part of the Whiskey Ridge Project area will be surveyed for raptor nests (Figure 1).

Surveys will be conducted from a helicopter. Search paths will be recorded with a real-time differentially-corrected Trimble Trimflight III Global Positioning System (GPS) at 5-second intervals; coordinates as Universal Transverse Mercator, UTM, NAD27. In addition to raptor nests, we will also record sage grouse observations (leks and flushed birds).

Raptor nest surveys will be scheduled in spring just prior to tree leaf-out when most raptor species are incubating eggs or brooding young, and nests are still visible in deciduous habitats. Nest searches will be conducted in habitats such as cottonwood, ponderosa pine, tall shrubs, and cliffs or rocky outcrops suitable for most above-ground nesting species. The helicopter will be flown at an altitude of tree top level to approximately 250' (76m) above the ground during surveys. If a nest is observed the helicopter will be moved to a position where nest status and

species present can be determined. Efforts will be made to minimize disturbance to breeding raptors, including keeping the helicopter a maximum distance from the nest at which the species could be identified. Those distances may depend upon nest location and wind conditions. Nests detected from the air may also be surveyed from the ground to verify nest status or species. Data recorded for each nest location will include species occupying the nest, nest status (inactive, bird incubating, young present, eggs present, adult present, unknown or other), nest substrate (pine, oak, cottonwood, juniper, shrub, rocky outcrop, cliff or power line), number of young present, time and date of observation, and the nest location (recorded with both a handheld GPS and the differentially-corrected helicopter unit).

Sensitive, Threatened, and Endangered Species

Current listings of federal and state endangered, threatened, and special status species will be obtained through relevant government agencies. Information regarding habitat requirements and documented or suspected occurrence of listed species in the project vicinity will be obtained from government agencies, non-governmental organizations, local consultants familiar with the project area, species specialists, and from on-site field surveys. A review of published literature on endangered, threatened, and special status species in the project area also will be conducted to determine habitat requirements and potential for occurrence in the project area. The following agencies and organizations will be contacted:

- U.S. Fish and Wildlife Service (USFWS)
- Washington Natural Heritage Program (WNHP)
- Washington Department of Fish and Wildlife (WDFW)

The USFWS will provide a list of federal endangered, threatened, proposed and candidate species, and designated critical habitat potentially occurring in the project vicinity.

The WNHP maintains a database on rare plants, high quality wetland ecosystems, and high quality terrestrial ecosystems in the state of Washington. The WNHP will conduct a search of the database for records of occurrence in the vicinity of the project area and provided a list of species and habitats with accompanying species information.

The WDFW Species of Concern list will be reviewed, and any species potentially occurring in the project area will be included in the analysis for possible impacts from the project. Furthermore, a request will be made to WDFW for a database search for known priority habitats and species occurring within the project and within a 3-mile radius of the project.

The USFWS lists 30 wildlife species as threatened or endangered within the state of Washington. Of these, 6 are terrestrial wildlife species and occur within Kittitas County including marbled murrelet, northern spotted owl, grizzly bear, bald eagle, gray wolf, and Canada lynx. Of these 6, only the bald eagle is likely to occur within the vicinity of the Whiskey Ridge site (Erickson et al. 2003). Furthermore, the State of Washington lists 36 threatened or endangered wildlife species. Of these, the ferruginous hawk (*Buteo regalis*) and greater sage-grouse (*Centrocercus urophasianus*) are the only species recently documented to occur in the vicinity of the Whiskey Ridge site (Erickson et al. 2003a).

Several Washington State Candidate species were observed within or near the project area during the Wild Horse studies. However, reported frequency of observations, particularly for avian species, indicates that the species may be occasional migrants through the project area. Four State Candidate species were observed and documented to occur within the project area. Two avian species, sage sparrow (*Amphispiza belli*) and sage thrasher (*Oreoscoptes montanus*), were observed with significant frequency, and the black-tailed jack rabbit (*Lepus californicus*) (1 observation) and white-tailed jack rabbit (*L. townsendii*) (6 individuals) were also observed. Sage grouse scat was observed near Whiskey Dick Mountain. Burrowing owls were not observed during the Wild Horse studies, but have potential to occur.

Sensitive species surveys will focus on shrub-steppe obligate species such as sage sparrow, sage thrasher, burrowing owl, sage grouse, white-tailed and black-tailed jackrabbits. Areas within 305 meters (1000 feet) of the centerline of the proposed turbine corridors, new roads, substations, and transmission lines will be surveyed for special status/sensitive wildlife twice between May 1 and June 15th 2006. Surveys will consist of walking transects spaced approximately 50 meters apart, and will be conducted from dawn to no later than 1:00 PM with wind speeds not consistently exceeding 15 MPH. All sage grouse and sage grouse scat will be recorded as to location and condition. All observations will be recorded using GPS and/or 1:24,000 scale topographic maps and later mapped using GIS. Notes on habitat and condition will also be recorded. Observations of other wildife such as amphibians, reptiles, small mammals, and raptors will also be recorded.

Sage Grouse Surveys

Sensitive species walking surveys will be used for documenting presence or absence of sage grouse using the Project area for nesting and brood-rearing. In addition to May and June surveys, two additional sage grouse surveys will be conducted in July and August. General assumptions are as follows: mid to late March is peak female attendance at leks, nesting and incubation is 3-4 weeks from peak, mean hatch date is around May 28-June 1, brood-rearing is approximately 10 weeks from hatch, and successful broods disperse around 600 meters during the brood-rearing period (Connelly et al. 2004). Weather patterns may shift these general dates by a few weeks.

Incidental/In-transit Observations

All wildlife species of concern and uncommon species observed while field observers are traveling between plots will be recorded on incidental/in-transit data sheets. Other incidental observations made during other surveys or visits to the sites also will be recorded. Data recorded with incidental observations will include GPS coordinates, observation number, date, time, species, number, sex/age class, height above ground, and habitat.

Bat Echolocation Studies

The vast majority of bat mortality documented at U.S. wind farms has occurred in late summer and early fall, a time period that corresponds with fall migration of tree bats (e.g., hoary bat, silver-haired bat) and dispersal from summer breeding areas to hibernacula for the other species. It is not known if the mortality is occurring to migrating individuals or bats conducting other activities during the migration period. Although bat mortality during the breeding season has been low at existing wind farms, most of these wind farms are in open habitats (e.g., agricultural fields, grassland, shrub steppe) and breeding bats may be more prone to collision at wind farms

constructed in or near bat foraging or roosting habitats, such as wetlands and forested areas. Because the Whiskey Ridge Project is located closer to the forest edge than the existing Wild Horse Project, we propose some echolocation surveys to evaluate bat activity in the project area.

Bats in the project area will be surveyed using ultrasonic sensors that detect bat echolocation calls. Bat detectors are widely used to index and compare habitat use by bats. The use of bat detectors for calculating an index to bat impacts has been used at several wind projects, and is currently being recommended by Bat Conservation International (E. Arnett pers. comm.) as a primary and economically feasible bat risk assessment tool. We propose to use Anabat® II bat detectors (Titley Electronics Pty Ltd., NSW, Australia). These detectors can easily be set up at multiple survey sites, do not require constant attention by the researcher, and are considered a valuable tool for comparing relative amounts of bat activity. Anabat® II detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are then translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. We will use a division ratio of 16 that lowers the frequencies of most bat species to less than 10 kHz, the upper limit for the Anabat® software. Bat echolocation detectors also detect other ultrasonic sounds made by insects, raindrops hitting vegetation, and other sources. We will use a sensitivity level of 5-7 (usually 6) to reduce interference from these other sources of ultrasonic noise.

The Anabat II detector will be coupled with a ZCAIM (zero crossings analysis interface module) recently introduced to the market by Titley Electronics. ZCAIMS use compact flash memory cards with large storage capacity, eliminating the need for large batteries and tape recorders. The Anabat II detector will be placed inside a plastic Tupperware® container and a hole will be cut in the side of the container for the microphone to extend through. The detectors will be placed so that the microphone is oriented in a vertical position.

We propose to use three Anabat® II detectors during the study. We propose to sample a minimum of 10 nights each in May, June, July, August and September from two detectors installed on met towers. For each sampling night, a pair of Anabat units will be located at a met tower, with one unit located 30-50 m above ground, and the 2nd approximately 10 feet above ground. Some flexibility in locating the detectors may be necessary, especially if elevating the detectors on existing met towers proves to be infeasible. A third detector will be rotated among different sampling locations, including some reference areas where higher bat call rates might be anticipated, such as around Basalt Spring, and at forest edges within and to the north of the site. Each detector will typically be left at a location for three to five consecutive nights before recovery of the systems for data download and refreshing batteries.

For this study, bat passes will be the units of activity. Except at isolated roost locations such as caves, the absolute abundance of bats cannot be determined in most cases, and bat pass data represent levels of bat activity rather than numbers of individuals. A pass is defined as a train of echolocation calls produced by an individual bat, and consists of a continuous series of $\geq$ 2 call notes with no pauses between call notes of > 1 second. The number of bat passes will be determined by downloading the calls from the ZCAIMS onto a computer and simply counting the number of echolocation passes recorded. Although it is possible to identify bat species by their echolocation calls, overlap in calls between species, variation in calls among individuals,

less than optimal call clarity on the recordings, and even differences in calls due to weather variations make unequivocal species identifications troublesome. There is significant debate even among experienced researchers on the accuracy of species identifications using bat detectors. Attempting to identify each call recorded to species is also extremely time consuming, and could take up to several hours for each detector-night. For these reasons, we believe that identifying each call recorded with bat detectors is cost prohibitive and beyond the scope of this study. The lack of any state or federally listed bats also reduces the need to identify each bat recorded during the study. However, the information will be stored so that it can be accessed in the future if the need arises.

The number of passes recorded per night will also be plotted over time so that relative abundance of bats across each study period can be determined. The mean number of bat passes per detector-night at the met towers and at the reference areas will be compared to existing data at other wind plants.

References

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Figure 1. Map of Whiskey Ridge project area with 2-mi project area buffer. The 2-mi buffered area around the Wild Horse Project is shown in grey and has previously been searched for raptor nests.

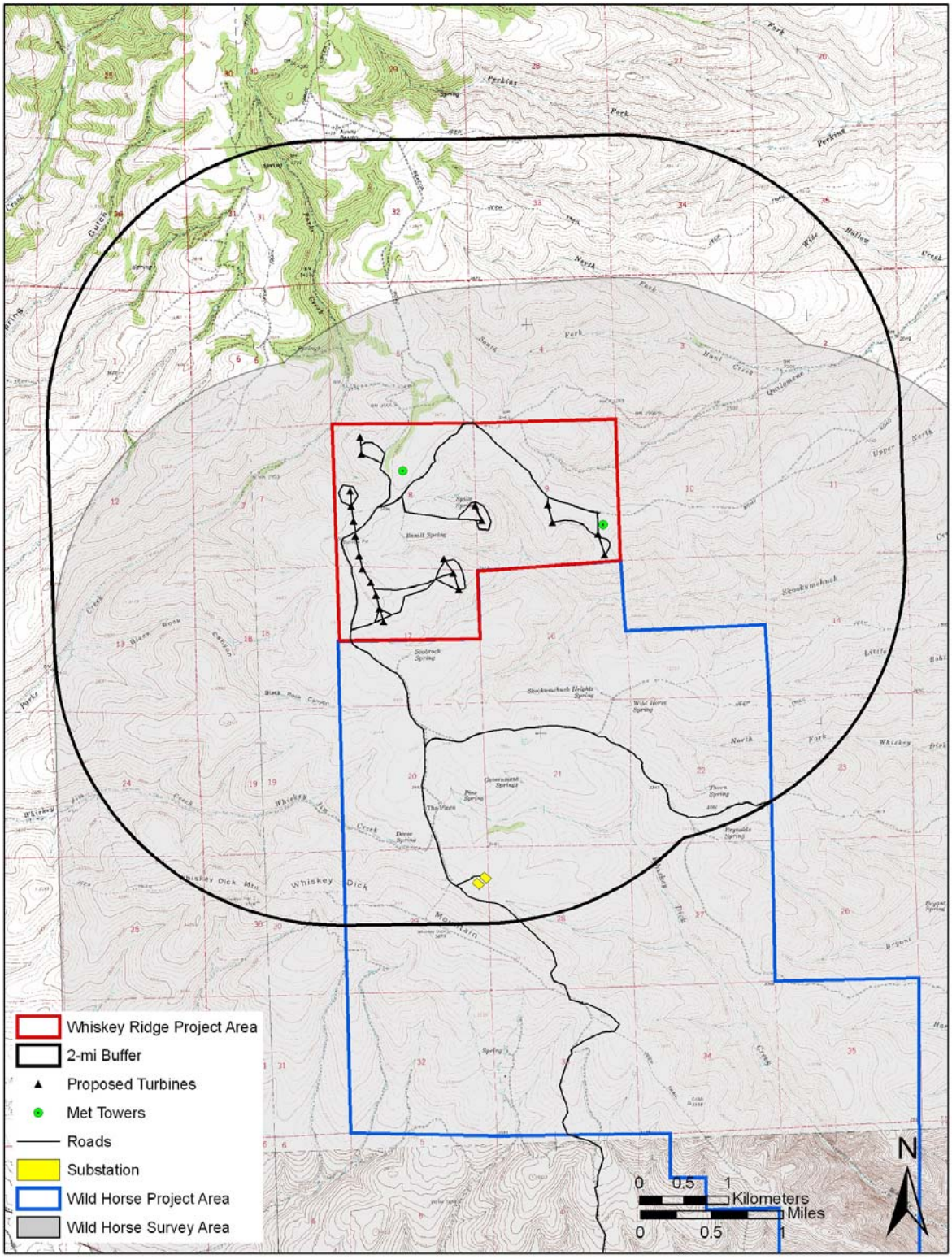
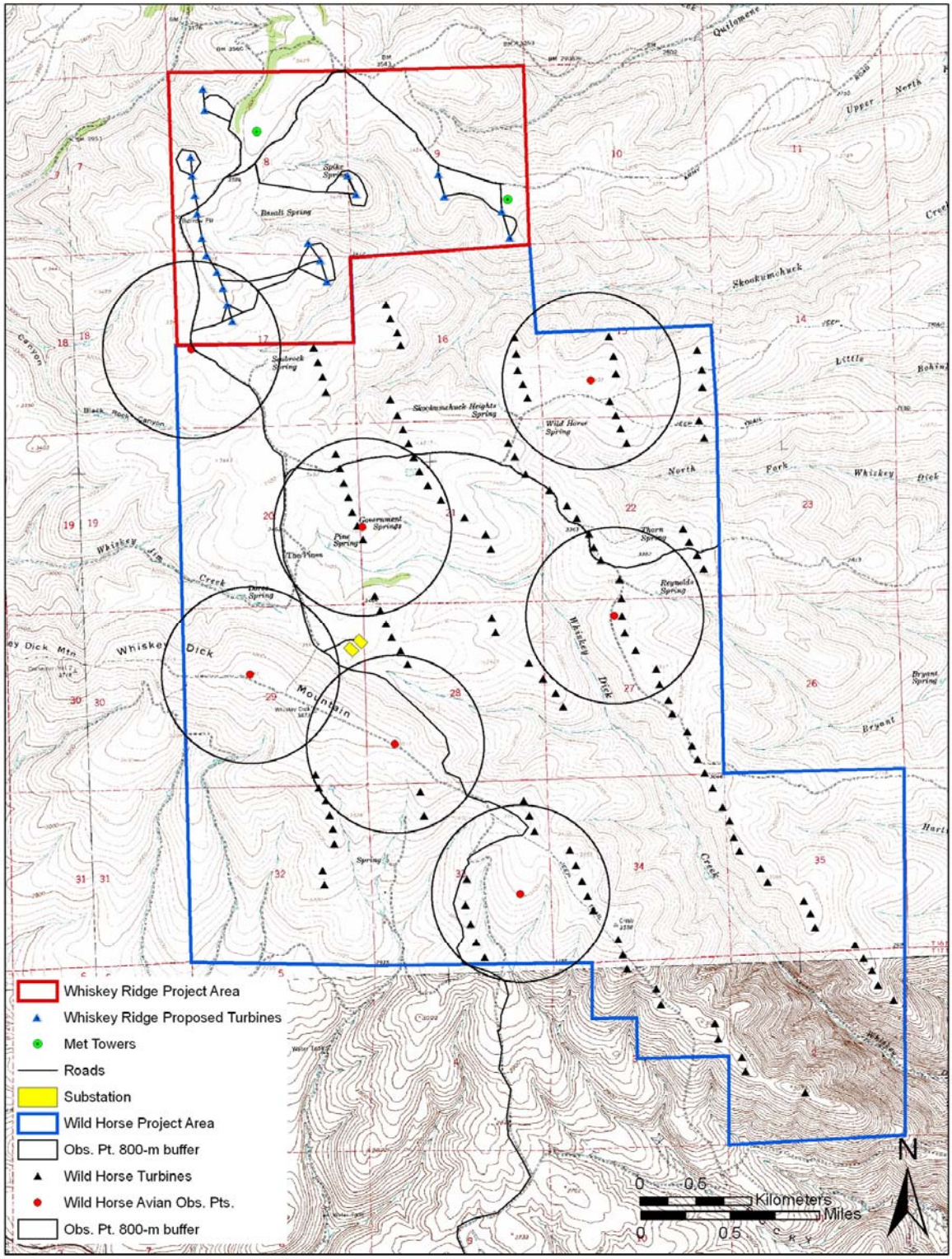
Figure 2. Location of Wild Horse Wind Power Project boundary and avian observation points in relation to the Whiskey Ridge Project area.