Klondike IIIa (Phase 2) Wind Power Project
Wildlife Monitoring Year One Summary
August 2008–August 2009

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November 13, 2009

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1.0 INTRODUCTION

1.1 Wind Project Description

Klondike III Wind Project (Project), located in Sherman County, Oregon is a wind-powered electric generating plant with an average electric generating capacity of approximately 125 megawatts (MW) and a peak generating capacity of not more than 375 MW (OEFSC, 2007). It was developed and is operated by Klondike Wind Power III LLC (Iberdrola Renewables, originally PPM Energy) of Portland, Oregon. There are two phases, referred to simply as Klondike III (Phase 1) and Klondike IIIa (Phase 2), both permitted by the State of Oregon through the Energy Facility Siting Council (EFSC) process. Klondike Wind Power III LLC received a Site Certificate from the EFSC through the Oregon Department of Energy on June 30, 2006 and a Site Certificate for Klondike IIIa (KIIIa) on November 16, 2007. Klondike III Phase 1 was commissioned and fully operational in October, 2007 and consists of 122 turbines. Of these 122 turbines, 80 are 1.5 MW GE turbines and 42 are Siemens 2.3 MW turbines. Phase 2 consists of 51, 1.5 MW turbines and was commissioned and fully operational June 21, 2008. The MW listed is a nameplate capacity and does not reflect actual production. Wildlife monitoring is required for each phase. KIIIa (Phase 2) is the subject of this annual wildlife monitoring report. The Klondike III Phase 1 annual wildlife monitoring report for the period October 2007–October 2008 was submitted to Iberdrola Renewables in April 2009 (Gritski et al., 2009).

1.2 Post-construction Wildlife Monitoring Study

This first annual report summarizes methods and results of the first year of the two-year avian and bat monitoring study for the Klondike IIIa Wind Project since the Project started operations in late June 2008. It includes:

- Wildlife fatality monitoring including reporting of all casualties (carcasses, feather spots, body parts) found, results of Carcass Removal and Searcher Efficiency Trials, and estimated fatalities per MW in the eight categories (7 avian, 1 bat) as described in the Wildlife Monitoring and Mitigation Plan (WMMP, page A-5) filed under the EFSC site certificate (OEFSC, 2007).
- Raptor nest surveys in 2008
- Avian use surveys

Wildlife fatality monitoring results include all casualties found at the Project from August 11, 2008 through August 15, 2009 including all incidental finds, casualties found during the initial "clean-up search" conducted August 11, 2008, and casualties found during the first four seasons of formal monitoring conducted from fall season 2008 through summer season 2009. Previously unidentified or unconfirmed specimens were examined after the end of the first year of monitoring to determine species where possible. Wildlife fatality estimates included in this report were summarized from data collected during the first year of a two-year monitoring study and, therefore, are considered preliminary.

2.0 METHODS

Wildlife monitoring study protocol methods are available in detail in the Klondike III Wildlife Monitoring and Mitigation Plan (Attachment A of the Final Order on Amendment #3 of the Site Certificate for the Klondike III Wind Project, dated November 16, 2007; OEFSC, 2007). Those methods are summarized in this section and include Carcasses Searches, Carcass Removal Trials, Searcher Efficiency Trials, Incidentals and Raptor Nest Monitoring.

2.1 Carcass Searches

The carcass searching consists of a sampling of the 51 Phase 2 turbines searched during the first year of monitoring (Figure 1). Of the 51 1.5 MW turbines, 17 of these turbines were searched during year one (33.3%). The 1.5 MW turbines had a square search plot of approximately 240 meters (m) on each side centered on the turbine (120 m from the turbine base in all directions). The effective area searched was calculated using ArcView 9.2 and the sample size of the total searched area was adjusted to reflect the effective search area. For year one turbines, the effective area searched for the 1.5 MW turbines was 39.13% of the total searchable area for the project. Fatality estimates used this correction factor and discussion of observed fatalities per turbine also used this correction factor.

Personnel trained in proper search techniques ("the searchers") conducted the carcass searches by walking parallel transects within the search plots. Transects were set at 6 meter intervals. The searchers walked at a rate of approximately 45 to 60 meters per minute along each transect, searching both sides out to three meters for casualties. Search pace varied by searcher and in different habitat types.

2.1.1 Search Schedule

Search periods were divided into two primary intervals—searches were conducted twice a month during spring and fall migration periods, and once a month during summer and winter seasons. Dates for these search periods and actual dates that searches began are shown in Table 1. Due to inclement weather during some seasons, actual search intervals were longer than planned search intervals.

Table 1. Standardized carcass search periods at Klondike IIIa Wind Project 2008–2009.

Season	Search Period	Search Conducted	# of Searches
Clean-up	August 11, 2008	August 11, 2008	1
Fall	August 16, 2008 to October 31, 2008 August 10, 2009 to August 15, 2009	August 25, 2008 September 12, 2008 September 29, 2008 October 13, 2008 August 10, 2009	5
Winter	November 1, 2008–March 15, 2009	November 12, 2008 December 11, 2008 January 12, 2009 February 16, 2009	4
Spring	March 16, 2009 to May 14, 2009	March 16, 2009 April 1, 2009 April 15, 2009 May 4, 2009	4
Summer	May 15, 2009 to August 9, 2009	May 15, 2009 June 15, 2009 July 15, 2009	3

2.1.2 Search Protocol and Data Collection

For all searches, the field staff recorded the condition of each carcass found, using the following condition categories:

- Intact – A carcass that is completely intact, is not badly decomposed, and shows no sign of being fed upon by a predator or scavenger.
- Scavenged – An entire carcass, which shows signs of being fed upon by a predator or scavenger, or a portion(s) of a carcass in one location (e.g., wings, skeletal remains, legs, pieces of skin, etc.).
- Feather Spot – Ten or more feathers or three or more primaries (the outermost 9 – 12 wing feathers) at one location indicating predation or scavenging.
- Dismembered – A carcass in two or more pieces, not readily attributed to scavengers. May not include all parts of the carcass.

Avian casualties were assigned to a taxonomic group. The basic definitions of the taxonomic groups which were found are as follows:

- Dove – Any member of the order of Columbiformes.
- Galliformes – Any gallinaceous bird. These included gray partridge and ring-necked pheasant on the study.
- Passerine – Any member of the order of Passeriformes, or perching birds.
- Raptor – Any diurnal or nocturnal bird of prey belonging to the orders of Falconiformes or Strigiformes. This includes falcons, hawks and owls (USFWS 2002).
- Waterfowl – Any member of the order of Anseriformes which includes all ducks and geese.

All carcasses found were labeled with a unique number, bagged and frozen for future reference and possible necropsy. A freezer tag with pertinent information for each carcass was inserted with the bagged specimen. All casualties located were photographed as found and plotted on a detailed map of the study area. For each carcass found, searchers recorded species, sex, and age when possible, date and time collected, location (distance and direction from turbine), condition (as detailed above), and any comments relevant to cause of death. All carcasses were collected and stored in accordance with appropriate Oregon Department of Fish and Wildlife (ODFW) and U.S. Fish and Wildlife Service (USFWS) collection and salvage permits obtained by NWC prior to field activities.

2.2 Carcass Removal Trials

The objective of the carcass removal (or "persistence") trials is to estimate the average length of time avian and bat carcasses remain in the search area before being removed by scavengers or reach a deteriorated condition where the ability to detect the animal is not possible, and is inclusive of other influences on carcass persistence. Estimates of carcass removal rates are used to adjust carcass counts for removal bias. "Carcass removal" is the disappearance of a carcass from the search area. "Carcass persistence" is the mirror image of this, the persistence of a carcass in the search area in spite of potential scavenging. For consistency with terminology used for regional wind project wildlife fatality monitoring studies, collectively these are referred to as "removal" or removal/persistence trials in this report; analysis of each was not conducted separately.

The trials were conducted within each of the seasons defined above (Table 1) during the study. Trials were spread throughout the year to incorporate the effects of varying weather, farming practices, and scavenger densities. The WMMP (page A-3) states that for each season one trial will be conducted resulting in at least 10 small and 10 large placed. Each trial used 20 carcasses: 10 small bird carcasses and 10 large bird carcasses were distributed

spatially throughout the Project. This resulted in 10 small and 10 large birds placed per season for a total of 80 trials for the year (40 small and 40 large).

Trial carcasses were marked discreetly for recognition by searchers and other personnel to ensure that these carcasses would not be confused with actual turbine mortalities. Trial carcasses were left at the location until the end of the carcass removal trial. Trials lasted for 35 days and were checked every day for the first four days and again on day 7, day 10, day 14, day 21, day 28, and day 35. At the end of the 35-day trial period, any remaining birds and feathers were removed. Birds were placed in all available habitat groups and in three different exposure classes; fully exposed, partially hidden, and fully hidden. This data was used to determine scavenging rates based on statistical methods presented below.

Two size classes, "large" (raptor size) and "small" (songbird size) were used to simulate fatalities. Native species were used whenever possible, but due to their limited availability, non-native species were also used. Small brown game bird chicks were used as surrogates for bat fatalities.

2.3 Searcher Efficiency Trials

Searcher efficiency (SEEF) trials were conducted during turbine plot searches to determine the probability of a searcher detecting a carcass known to be present. A Project biologist placed carcasses at random times and locations on search plots for searchers to detect. These were blind trials, meaning that the searcher did not know of the trial prior to searching that plot and each searcher was independent of other searchers, due to the fact that searchers did not discuss their results while the trial was on-going, but waited until searches were completed. A trial is considered a single animal and the result is either a find or a miss by the searcher. Treatment of this data is discussed below in statistical methods. The Project biologist removed the SEEF carcasses immediately following each day's trials to prevent attracting scavengers to the site.

Searcher efficiency trials were conducted on the fatality monitoring search plots in both grassland/shrub-steppe and cultivated agriculture habitat types. Searcher efficiency was estimated by season and carcass size. Estimates of searcher efficiency were used to adjust observed fatalities for detection bias.

Searcher efficiency trials were conducted in each season as defined above (Table 1), during the fatality monitoring year. Trials were spread throughout the year to incorporate the effects of seasonal variations in weather, farming practices, and vegetative cover. Each set of trials consisted of a variable number of carcasses so that the searchers did not know the total number of trial carcasses being used in any given trial. For each trial set, both small bird and large bird carcasses were used. For the year, 64 large bird carcasses were placed and 69 small bird carcasses for a total of 133 trials. The WMMP (page A-4) requires a minimum of 100 total carcasses per year. Additional trials were used during the first year to allow for more thorough analysis (reduce the potential confidence interval range and thus, make the estimates more precise).

On the day of a fatality monitoring search but before the beginning of the search, efficiency trial carcasses were placed at random locations within areas to be searched. Carcasses were randomly placed in a variety of postures to simulate a range of conditions. Birds were placed: 1) in an exposed posture (thrown over the shoulder), 2) hidden to simulate a crippled bird, and 3) partially hidden.

In order to ensure that SEEF trial carcasses were not mistaken for actual turbine casualties, each trial bird used as a SEEF carcass was discreetly marked so that it could be correctly identified as an efficiency trial carcass after it was found. The number and location of the efficiency trial carcasses found during the carcass search was recorded. The number of efficiency trial carcasses available for detection during each trial, e.g., not removed by scavengers, was determined immediately after the trial by the person responsible for distributing the carcasses. If a scavenger removed the carcass the trial was not used as it was not possible to determine if the bird was available for detection or not.

SEEF rates were estimated separately for two sizes classes, large and small. Native species were used whenever possible, but due to their limited availability, non-native species were also used. Small carcasses (e.g., non-native species such as European starling, house sparrow, juvenile quail, and juvenile ringed-necked pheasants, and native passerine species such as horned lark) were used to represent small birds such as passerines. Large carcasses (e.g. adult ring-necked pheasants, rock pigeons, chukars, and mallards were used to simulate large birds such as raptors, game birds, and waterfowl. Due to lack of available bat carcasses, small brown game bird chicks were used as surrogates for bats.

2.4 Incidentals

"Incidentals" are defined as bird and bat casualties found in non-search areas (e.g., near a turbine but not included in the search plot area) or found when the scheduled searches are not being conducted.

Avian or bat casualties found in search plots by Iberdrola Renewables (IBR) maintenance personnel and others not conducting the formal searches were left undisturbed, recorded using the incident report form, and reported to the Project biologist. These casualties were left on-site, unless the animal was found alive and injured. By leaving the casualty on a search plot, researchers could determine if that casualty was found by searchers during the next scheduled search or had been removed by scavengers or not detected during searcher efforts on the plot. ODFW and USFWS permits included allowances for the collection and transport of injured animals discovered during Project activities. The specific permit compliance protocol for the handling and reporting of injured or dead birds and bats is included in the Klondike III Wildlife Monitoring and Mitigation Plan. Further details on IBR Klondike III Wind Project Wildlife Reporting and Handling System can be found in the Klondike III Wildlife Monitoring and Mitigation Plan (OEFSC, 2007).

2.5 Statistical Methods for Estimating Fatalities

2.5.1 Removal Trials

Large and small bird carcasses were placed onsite and monitored for length of persistence (see specific details in the WMMP, pages A-3 and A-8 and Section 2.2 of this report). Estimates of the probability that a carcass will not be removed in the interval between searches are used to adjust carcass counts for removal bias. Removal includes removal by predation, scavenging, farm practices, wind, or decomposition. In most fatality monitoring efforts, it is assumed that carcass removal occurs at a constant rate that is not dependent on the time since death. This simplifying assumption allows us to estimate fatality when search intervals exceed one day.

The length of time a carcass remains in the study area before it is removed is typically modeled as an exponentially distributed random variable. The probability that a carcass is

not removed during an interval of length I can be approximated as

$r_{ijk} = \sum_{d=1}^{I} \exp(-(d-0.5)/t)/I$, the average probability of persisting given its death might have occurred on any day (d) in the interval.

Data from carcass removal trials for each size class in each season were fit to an interval-censored parametric failure time model, with carcass persistence time modeled as a function of size and season and their interaction. Using alpha=0.15, size, season and their interaction (χ^2_3=11.17, p=0.01) were found to significantly affect average persistence time. Average persistence times and 90% confidence limits for the two size classes in each season are given in the results section Bootstrapped samples were fit to an interval-censored parametric failure time model, with size and season and their interaction as explanatory variables.

2.5.2 Searcher Efficiency Trials

Estimates of the probability that a carcass will be detected by an observer during a search (searcher efficiency) are used to adjust carcass counts for observer bias. The failure of an observer to detect a carcass that is on the search plot may be due to its size or color, or time since death, as well as conditions in its immediate vicinity, such as vegetation density, shade, weather, etc. In most mortality monitoring efforts, because we cannot measure time since death, it is assumed that a carcass' observability is constant over the period of the search interval.

Data from searcher efficiency trials were fit to a logistic regression model, with odds of observing a carcass modeled as a function of size and season and their interaction. Using alpha=0.15, there was a marginally significant effect of the interaction of size with season (χ^2_3 = 7.57, p=0.0558). Bootstrapped samples were fit to logistic regression models with size, season and their interaction as explanatory variables.

2.5.3 Fatality Estimates

The annual estimated fatality rate is reported as an estimate of (assumed wind project related) collision-induced bird and bat fatalities in eight primary categories as defined under the monitoring plan (OEFSC, 2007; page A-5): 1) all birds, 2) small birds, 3) large birds, 4) raptors, 5) grassland birds, 6) nocturnal migrants, 7) State Sensitive Species listed under OAR 635-100-0040, and 8) bats. Grassland birds are defined as all native bird species that rely on grassland habitat and are either resident species, occurring year round, or species that nest in the area, excluding horned lark, burrowing owl, and northern harrier (OEFSC, 2007; page A-10). Small birds are defined as any bird under nine niches in total length and large birds are defined as any bird greater than nine inches in total length. This measurement is consistent with previous reports (Kronner et al., 2008, Gritski et al., 2008).

All carcasses located within areas surveyed, regardless of species, were recorded and if a different cause of death was not apparent, the fatality was attributed to Project operation, consistent with the approach commonly used at other regional fatality studies. The total number of avian and bat carcasses found were adjusted with removal and searcher efficiency bias trial data to determine the fatality estimate.

As specified in the monitoring and mitigation plan (OEFSC, 2007; page A-7) estimates were calculated using the Schoenfeld method. The Schoenfeld estimator was used in analyses for the Klondike II wind project (NWC and WEST, 2007) and the Stateline wind project

(Erickson et al., 2004). For comparison, an estimator used by Huso was also calculated. The estimator proposed by Huso (*in review*) has been used in the Big Horn (Kronner et al., 2008) and Leaning Juniper (Gritski et al., 2008) wildlife monitoring post-construction studies. Huso (*in review*) has shown the Schoenfeld estimator to be strongly biased under some conditions, but to have relatively little bias under others. In general, the Schoenfeld estimator is comparable to the Huso estimator when search intervals are long (monthly) and carcass persistence times are short (days), conditions that generally prevailed in this study. Where differences in the two estimators occurred, the Schoenfeld estimator was used for comparisons to thresholds set forth in OEFSC, 2007. For methods on how the Schoenfeld estimator is calculated refer to OEFSC, 2007. Huso methods are outlined below.
In this analysis, a bootstrap sample of carcass persistence data for each size and season combination was drawn and average carcass persistence time for each size in each season was estimated from it. A bootstrap sample of the searcher efficiency data for each size and season was drawn and searcher efficiency for each size in each season was estimated from it. These estimates were merged with the casualty data and adjusted estimates of fatality calculated for each animal using the following equation: $\frac{c_{ijk}}{\widehat{p}_{jk} * \widehat{r}_{jk} * \hat{e}_{jk}} = \hat{f}_{ijk}$

Where:

c_{ijk} is the observed number of carcasses in the k^{th} size class at the i^{th} turbine during the j^{th} search

$\hat{f}_{ijk}$ is the estimated fatality in the k^{th} size class that occurred at the i^{th} turbine during the j^{th} search

$\hat{p}_{jk}$ is the estimated probability that a carcass in the k^{th} size class that is on the ground during the j^{th} search will actually be seen by the observer

$\hat{r}_{jk}$ is the probability than an individual bird or bat that died during the interval preceding the j^{th} search will not be removed by scavengers

$\hat{e}_{jk}$ is the effective interval, i.e. the ratio of the length of time before 99% of carcasses can be expected to be removed to the search interval

$\hat{p}_{jk}$ was estimated through searcher efficiency trials with estimates given above. $\hat{r}_{jk}$ is a function of the average carcass persistence time, estimated through carcass persistence trials, and the length of the interval preceding the j^{th} search. $\hat{r}_{jk}$, $\hat{e}_{jk}$ and $\hat{p}_{jk}$ are assumed not to differ among turbines, but differ with season (i.e. search *j*) and carcass size (*k*).

For each turbine size, the estimate of the annual per turbine fatality were calculated as $\hat{f} = \frac{\sum_{i=1}^{17}\sum_{j=1}^{n_i}\sum_{k=1}^{2}\hat{f}_{ijk}}{t}$ where n_i is the number of searches carried out at turbine *i*, *i*= 1, …, 17, and *t* is the effective number of turbines searched (19.96 of 51 1.5MW GE turbines). The per turbine estimate and confidence limits were multiplied by 51, to give total annual fatality estimates (Cochran, 1977).

No closed form solution is available for the variance of this estimator, so 90% confidence intervals of this estimate were calculated by bootstrapping (Manly, 1997) as described above.

These estimates were summed across all turbines, then divided by the effective number of turbines searched (19.96 of the 51 1.5 MW GE turbines) to give annual per turbine fatality rate. Per turbine estimates were multiplied by the total number of turbines in the respective size class to give total site fatality and divided by their respective megawatt label to give per MW fatality. A bootstrapped 90% confidence interval on annual per turbine fatality was achieved by repeating this process 1000 times and reporting the central 90% limits of the resulting distribution.

2.6 Raptor Nest Monitoring

Raptor nest surveys were conducted in spring/summer 2008 at the Klondike III/IIIa wind project including both Phase 1 and Phase 2 areas. The objective of raptor nest surveys is to estimate the size of the local breeding populations of tree or other above-ground-nesting raptor species in the vicinity of the facility and to determine whether operation of the facility ultimately results in a reduction of nesting activity or nesting success in the local populations of the following raptor species: Swainson's hawk, golden eagle, and ferruginous hawk. These were the primary target species for the 2008 aerial and ground-based surveys; other species observed nesting or assumed nesting (such as American kestrel) were also recorded as encountered incidentally while searching for nests of the three target species. As specified on page A-11 of the WMMP, data from the 2008 survey year will be combined with data from the 2012 survey year and analysis conducted to determine whether a reduction in either nesting success or nest use has occurred in the vicinity (2 miles) of Klondike III/IIIa facility (this is inclusive of Phase 1 and Phase 2). This assessment will factor in information regarding populations of these species in the region as detailed in the WMMP (page A-11).

The 2007 nest survey year data and supplemental notes for the 2006 or earlier nesting years were reviewed and used for planning the 2008 monitoring. Only one nest site surveyed in 2007 was not part of the 2008 aerial survey buffer; this was due to a slight change in the two-mile survey buffer of planned vs. actual turbine locations.

On May 9, 2008, an aerial survey was conducted within the Klondike III site boundary (including both Phase 1 and Phase 2) and a 2-mile buffer around turbines to determine nest occupancy (Figure 2 of Gritski et al. 2009), as per the WMMP, page A-11. The survey was conducted by an experienced helicopter pilot and wildlife biologist. All appropriate nesting areas including trees, rock formations, and power lines were investigated by air to provide complete coverage of the Project areas to the extent possible. Areas immediately surrounding houses were not surveyed to avoid human or livestock disturbances and areas near operating wind turbines were not flown due to safety reasons. In addition to the aerial survey, while biologists were on site conducting other wildlife monitoring, several nests were checked for raptors in flight or incubating.

All potential and confirmed raptor nests were recorded, regardless of activity status. Determination of nest status (active, inactive, unknown) was made using a combination of visual clues such as adult behavior, presence of eggs or young, presence or absence of whitewash (excrement), or supplemental observational data from the ground-based surveys. Inactive nests (without sign of current year's use) were assessed as to the type of bird that may have used the nest previously. Large stick nests, potentially used by golden eagles or ferruginous hawk were recorded. Stick nests that appeared to have been constructed and/or used in the past by common ravens (not a species of concern), were conservatively included in "Inactive" status. All nest locations were recorded using a hand-held Global Positioning System (GPS) receiver, typically with an accuracy of 8 meters while stationary.

Follow-up surveys to determine nesting success were conducted from the ground within the leased land boundary during the period from May 31 through June 18. All active or unconfirmed activity status nests found during the aerial survey were checked, where feasible. Nests were monitored a minimum of one time as specified in the WMMP, but most were checked two or more times. For areas not leased by Iberdrola and where access permission was not likely (due to other wind lease arrangements or feasibility), nests were checked with spotting scopes and binoculars from public roads. In addition, a second aerial survey was conducted on July 23 in areas not able to be checked through ground surveys to check the final status of nests not viewable from public roads as well as to check nests within the leased land boundary that were challenging to monitor from the ground-based vantage points.

Data was managed in an Excel spreadsheet and in ArcMap version 9.3 GIS. Analysis for potential impacts from operating Klondike III turbines will be conducted after the second year of monitoring in 2012.

2.7 Avian Use Surveys

In addition to standardized fatality searches, avian use surveys were conducted during each fatality monitoring search throughout the year. The purpose of recording avian use while conducting the fatality monitoring, as specified in the WMMP (page A-12), is to identify additional avian species that may not have been listed in the original baseline survey report. In addition, these point count surveys may provide a basis on which to evaluate, in general terms, whether the species with the highest fatality numbers are also the most common species at the site during the monitoring study year.

Observers recorded birds detected in a ten-minute period at approximately one-third of the turbines (6 plots) within the fatality monitoring sample plot, using standard variable circular-plot point count survey methods (Reynolds et al., 1980). In all, for the monitoring year there were 90 avian surveys conducted.

3.0 RESULTS

This section summarizes the results of Klondike IIIa Wind Project wildlife monitoring for the period August 11, 2008 through August 15, 2009. This is a summary of data collected through the first year of a two-year study and, therefore, fatality estimate results are considered preliminary until two complete years of data are available.

3.1 Summary of Findings Prior to Formal Monitoring

3.1.1 Clean-up Search

As stated above, the clean-up search was performed to clear the search plot area of casualties before formal monitoring was initiated. During the clean-up search conducted on August 11, 2008, 1 casualty was found: 1 hoary bat.

3.2 Standardized Scheduled Searches and Incidentals

3.2.1 Scheduled Searches

Between the first standardized scheduled search on August 16, 2008 and the last on August 15, 2009 a total of 12 casualties were found during 16 standardized scheduled searches (Table 2), 10 birds and 2 bats. Horned larks comprised the highest percentage of fatalities

found during scheduled searches (30.0%). A total of 7 avian species and 1 bat species were found during scheduled searches, with one additional avian fatality that could not be identified to species as of this report (1 unidentified sparrow).

Passerines comprised the largest number of observed avian fatalities for the first year of monitoring (6), followed by galliformes (2), doves (1), and waterfowl (1) (Table 3). All bird species found are listed in Table 2. All bats found were identified as hoary bats and both were found during fall season scheduled searches. All casualties were fatalities (no live or injured birds or bats). Details of all casualties are found in Appendix A.

Table 2. Summary of avian and bat species and percent composition of all fatalities found at the Klondike IIIa Wind Project during monitoring year one, 2008–2009.

Listed by highest to lowest % search composition (second column)	**Total Found During Scheduled Searches**	**% Composition**	**Total Including Incidentals***	**% Composition Including Incidentals**
		Avian Species		
horned lark	3	30.0	3	30.0
chukar	1	10.0	1	10.0
northern pintail	1	10.0	1	10.0
ring-necked pheasant (*n*)	1	10.0	1	10.0
rock pigeon (*n*)	1	10.0	1	10.0
unidentified sparrow	1	10.0	1	10.0
western tanager	1	10.0	1	10.0
white-crowned sparrow	1	10.0	1	10.0
Avian Subtotal	**10**	**100.00**	**10**	**100.00**
		Bat Species		
hoary bat	2	100.0	3	100.00
Bat Subtotal	**2**	**100.00**	**3**	**100.00**

* Includes both scheduled search findings and incidental observations (including clean-up search)
n = a non-native species

Table 3. Cumulative list of all wildlife casualties found during the first four seasons of formal monitoring at the Klondike IIIa Wind Project, listed by taxonomic group.

Taxa Group	**# of Fatalities Fall**	**# of Fatalities Winter**	**# of Fatalities Spring**	**# of Fatalities Summer**	**# of Fatalities Monitoring Year One***
Raptor	0	0	0	0	0

Taxa Group	# of Fatalities Fall	# of Fatalities Winter	# of Fatalities Spring	# of Fatalities Summer	# of Fatalities Monitoring Year One*
Galliform	2	0	0	0	2
Passerine	1	2	1	2	6
Dove	1	0	0	0	1
Waterfowl	1	0	0	0	1
Bats	2	0	0	0	2
Total	**6**	**2**	**3**	**1**	**12**

*This table does not include fatalities found incidentally or during clean-up searches (August 11, 2008) prior to the start of formal monitoring on August 16, 2008.

3.2.2 Nocturnal Migrants

Species that were found during the spring and fall migration season scheduled searches that did not breed or winter on the Project were classified under nocturnal migrants. A total of 2 avian fatalities were classified as nocturnal migrants, comprising 2 species. Species included western tanager and white-crowned sparrow. This list does not include fatalities found as incidentals or during clean-up searches as those fatalities are not included under the estimated annual fatalities.

3.2.3 Avian Groups of Concern

Under the monitoring plan established for Klondike III (OEFSC 2007), thresholds were set for several groups of avian species. These groups included raptors, raptor species of special concern, and State Sensitive species listed under OAR 635-100-0040, not including raptors which are covered under the raptor species of special concern. In addition to these categories, thresholds were also set for grassland avian species. This category includes all native species breeding in the area or residing year around that rely on grasslands, but excludes horned larks.

Grassland Birds
No birds in this category were identified during the first year of monitoring.

Raptors
No raptors were found during the first year of monitoring.

State Sensitive Species
No State listed avian species were found as fatalities during the first year of monitoring.

One species of State Sensitive mammal was found. Hoary bat is listed as a Sensitive-Vulnerable species. Two hoary bats were found during scheduled searches (Table 2).

3.2.4 Lit vs. Un-lit Turbines

As specified in the WMMP (page A-9), differences in observed nocturnal migrant and bat fatality rates for lit vs. un-lit turbines will be compared for the final report after the second year of monitoring. No analysis is being conducted at this time due to small sample size.

3.3 Carcass Removal Trials

Large birds had an average removal time ranging from slightly more than 11 days in the fall season to just over 19 days in spring season. Small birds had a greater range of average removal time and seasonal differences, ranging from almost 3 days in spring season to slightly more than 22 days in summer season. Small birds remained for the shortest period in the spring season, but large birds remained for the longest period in the same season. Small birds remained for the longest period in summer season. Bootstrapped average carcass removal times and 90% confidence limits are presented in Table 4.

Table 4. Bootstrapped average Carcass Removal times and 90% confidence limits during the first year of wildlife monitoring at Klondike IIIa Wind Project.

Season	N	tbar	Lower CI[1]	Upper CI
		Large Size		
Spring	10	19.04	12.00	31.90
Summer	10	13.73	6.25	26.55
Fall	10	11.47	6.38	19.65
Winter	10	16.52	7.91	35.01
		Small Size		
Spring	10	2.92	1.93	4.29
Summer	10	22.26	9.24	50.72
Fall	10	13.52	5.29	30.06
Winter	10	7.26	3.53	14.77

[1] lower and upper limits of the 90% confidence interval (CI)

3.4 Searcher Efficiency Trials

Searcher efficiency rates for large birds were the highest in the winter season with an average probability of detection of 82% and the lowest in the fall and summer seasons at 20% and 27%, respectively. For small birds there were minimal differences in probability of detection by season. The highest season of detection for small birds was spring season at 65% and the lowest seasons were summer and fall at 50% and 54%, respectively. Bootstrapped average probability of a searcher finding a carcass and 90% confidence limits for the two size classes in each season are given in Table 5.

Table 5. Bootstrapped Searcher Efficiency (SE) and 90% confidence limits during the first year of wildlife monitoring at Klondike IIIa Wind Project.

Season	# Found	# Placed	SE	Lower CI[1]	Upper CI
Large Size					
Spring	11	17	0.65	0.47	0.82
Summer	4	15	0.27	0.07	0.47
Fall	2	10	0.20	0.05	0.40
Winter	18	22	0.82	0.68	0.95
Small Size					
Spring	11	17	0.65	0.47	0.82
Summer	8	16	0.50	0.31	0.69
Fall	7	13	0.54	0.31	0.77
Winter	14	23	0.61	0.42	0.75

[1] lower and upper limits of the 90% confidence interval

3.5 Estimated Annual Fatality Rates

The total site fatality estimates, per turbine estimates, and per megawatt estimates and 90% confidence limits derived using the Schoenfeld estimator are presented in Table 6, and those derived using the Huso estimator for comparison are shown in Table 7. Because in this study, the search interval was long and carcass persistence times generally 2 weeks or less (except for small carcasses in summer and large carcasses in spring) estimates from the two estimators are similar. The particular combination of search interval and average carcass persistence times at this site generally satisfied the conditions under which the two estimators show little difference from one another.

During the study period 12 carcasses (10 birds and 2 bats) whose deaths were attributable to the turbines were found in the search plots. With such low numbers of found fatalities, fatality rates calculated with both estimators are considered to not be very precise.
As there were no raptors or grassland birds found, it was not possible to estimate fatalities for these groups at the site. There was insufficient sample size (n=2) to calculate rates of nocturnal migrants within a reasonable confidence interval. Thus, rates of nocturnal migrants were not calculated for this annual summary, but will be calculated for the final report (assuming a sufficient sample size is attained). There were no State Sensitive avian species found on scheduled searches. No group exceeded the threshold levels as outlined on page A-10 of the WMMP (OEFSC, 2007).

Table 6. Bootstrapped fatality estimates and 90% confidence intervals, derived using the *Schoenfeld Estimator*, for the first year of wildlife monitoring at Klondike IIIa Wind Project.

Categories[1]	# Found	Total Site Fatality Estimates		Estimates per Turbine		Estimates per MW	
		Estimate	90% Confidence Interval Range	Estimate	90% Confidence Interval Range	Estimate	90% Confidence Interval Range
All Birds	10	177.0	134.4–381.2	3.47	2.64–7.47	2.31	1.76–4.98
Small Birds	6	82.4	68.5–156.5	1.61	1.34–3.07	1.07	0.89–2.05
Large Birds	4	94.6	44.7–275.7	1.86	0.88–5.41	1.24	0.59–3.61
Bats	2	15.0	8.5–36.6	0.29	0.17–0.72	0.19	0.11–0.48

[1]As defined in OEFSC, 2007. There were too few carcasses found in these groups to consider these accurate estimates.

Table 7. Bootstrapped fatality estimates and 90% confidence intervals, derived using the *Huso Estimator*, for the first year of wildlife monitoring at Klondike IIIa Wind Project.

Categories[1]	# Found	Total Site Fatality Estimates		Estimates per Turbine		Estimates per MW	
		Estimate	90% Confidence Interval Range	Estimate	90% Confidence Interval Range	Estimate	90% Confidence Interval Range
All Birds	10	194.3	147.4–445.7	3.81	2.89–8.74	2.54	1.93–5.83
Small Birds	6	98.0	70.7–159.2	1.92	1.39–3.12	1.28	0.93–2.08
Large Birds	4	96.3	53.4–327.2	1.89	1.05–6.41	1.26	0.70–4.27
Bats	2	17.1	10.1–38.8	0.34	0.20–0.76	0.23	0.13–0.51

[1]As defined in OEFSC, 2007. There were too few carcasses found in these groups to consider these accurate estimates.

3.6 Incidentals

No incidentals were found after the start of the formal monitoring period.

3.7 Raptor Nest Monitoring

Raptor nest monitoring results for the full Klondike III/IIIa project (inclusive of both Phase 1 and 2) were detailed in the Klondike III Annual Summary (Gritiski et al., 2009) and, therefore, not presented again in this report. Refer to Section 3.6, Figure 2, and Appendix B of Gritski et al., 2009 for full raptor nest monitoring results for Klondike III/IIIa. Nests in or near KIIIa and their 2008 activity status and outcome are summarized below. Nests are referred to by their Project nest record number and the species that occupied the nest during 2008 follows the nest number.

Raptor nests within the KIIIa Project boundary included:

- Project nest number 50; ferruginous hawk nest; fledged 1 young in 2008
- Project nest number 84; red-tailed hawk nest; fledged young (unknown number) in 2008

Raptor nests outside the KIIIa boundary, but within ½ mile of KIIIa turbines included:

- Project nest number 49; Swainson's hawk nest; fledged 1 young in 2008
- Project nest number 58; inactive in 2008 (Swainson's hawk seen flying)
- Project nest number 59; presumed inactive in 2008 (although appeared to have had some activity, close to nest 58)

3.8 Avian Use Surveys

During the 90 point-count surveys conducted over four seasons from August 14, 2008–August 6, 2009 there were a total of 368 individual bird detections comprised of 14 species (the same individuals may have been counted more than once; Table 8). Overall mean use (number of birds/10-minute survey) was highest in winter season (7.300), followed by spring (3.583), and summer (2.000) seasons, with the lowest use in fall season (1.500). The species with the highest overall mean use was horned lark (2.978); use for this species was highest in winter season (6.367). Common raven had the second highest mean use overall (0.267); use for this species was highest in spring season (0.417). Raptor use was highest in spring (0.542) and winter seasons (0.500). The raptor species with the highest overall use was rough-legged hawk (0.111) which was primarily observed in winter season (0.267).

Table 8. Relative abundance and mean use of species observed by season at Klondike IIIa Wind Project during avian use surveys from August 14, 2008–August 6, 2009.

Species/Group	Fall		Winter		Spring		Summer		Overall	
	# Birds[1]	Mean[2] Use	# Birds	Mean Use	# Birds	Mean Use	# Birds	Mean Use	# Birds	Mean Use
Raptors	**1**	**0.056**	**15**	**0.500**	**13**	**0.542**	**6**	**0.333**	**35**	**0.389**
northern harrier	*0*	*0.000*	*1*	*0.033*	*4*	*0.167*	*1*	*0.056*	*6*	*0.067*
Accipiters	*1*	*0.056*	*0*	*0.000*	*1*	*0.042*	*0*	*0.000*	*2*	*0.022*
Cooper's hawk	1	0.056	0	0.000	1	0.042	0	0.000	2	0.022
Buteos	*0*	*0.000*	*10*	*0.333*	*7*	*0.292*	*2*	*0.111*	*19*	*0.211*
Swainson's hawk	0	0.000	0	0.000	3	0.125	0	0.000	3	0.033
red-tailed hawk	0	0.000	2	0.067	2	0.083	2	0.111	6	0.067
rough-legged hawk	0	0.000	8	0.267	2	0.083	0	0.000	10	0.111
Eagles	*0*	*0.000*	*2*	*0.067*	*0*	*0.000*	*1*	*0.056*	*3*	*0.033*
golden eagle	0	0.000	2	0.067	0	0.000	1	0.056	3	0.033
Falcons	*0*	*0.000*	*2*	*0.067*	*1*	*0.042*	*2*	*0.111*	*5*	*0.056*
American kestrel	0	0.000	1	0.033	1	0.042	2	0.111	4	0.044
prairie falcon	0	0.000	1	0.033	0	0.000	0	0.000	1	0.011
Shorebirds	**0**	**0.000**	**0**	**0.000**	**3**	**0.125**	**0**	**0.000**	**3**	**0.033**
long-billed curlew	0	0.000	0	0.000	3	0.125	0	0.000	3	0.033
Passerines	**26**	**1.444**	**204**	**6.800**	**70**	**2.917**	**30**	**1.667**	**330**	**3.667**
Songbirds	*24*	*1.333*	*193*	*6.433*	*60*	*2.500*	*29*	*1.611*	*306*	*3.400*
European starling	0	0.000	0	0.000	2	0.083	0	0.000	2	0.022
horned lark	19	1.056	191	6.367	31	1.292	27	1.500	268	2.978
unidentified swallow	0	0.000	0	0.000	20	0.833	0	0.000	20	0.222
western kingbird	3	0.167	0	0.000	0	0.000	1	0.056	4	0.044
western meadowlark	2	0.111	2	0.067	7	0.292	1	0.056	12	0.133
Corvids	*2*	*0.111*	*11*	*0.367*	*10*	*0.417*	*1*	*0.056*	*24*	*0.267*
common raven	2	0.111	11	0.367	10	0.417	1	0.056	24	0.267
Total	**27**	**1.500**	**219**	**7.300**	**86**	**3.583**	**36**	**2.000**	**368**	**4.089**

Seasons:
Fall August 14, 2008–October 13, 2008 3 visits to 6 sites (18 surveys)

Table 8 Footnotes continued:
Winter November 12, 2008–March 12, 2009 5 visits to 6 sites (30 surveys)
Spring March 31, 2009–May 18, 2009 4 visits to 6 sites (24 surveys)
Summer June 16, 2009–August 6, 2009 3 visits to 6 sites (18 surveys)

[1] Number detected.
[2] Mean Use: mean number of individuals observed per 10-minute point count for each species or group provides an index of the magnitude of avian use, but it does not describe density.

The primary purposes of post-construction 10-minute point count surveys (as stated in the methods) were to identify additional species that may not have been listed in the original baseline study, and to evaluate, in general terms, whether the species with the highest fatality numbers are also the most common species at the site. A complete analysis of avian use will be done following year two of monitoring, but KIIIa avian fatalities and species observed during avian use surveys (pre- and post-construction) are summarized in Table 9. Baseline surveys from Klondike I are also presented in Table 9 due to the close proximity to Klondike IIIa and also because pre-construction avian use surveys were conducted for a full year at Klondike I versus one season at KIIIa (pre-construction).

Preliminary results from the first year show that to date, five of the fourteen species observed on post-construction KIIIa avian use surveys during four seasons were not observed during the one spring season of pre-construction surveys of KIIIa (Table 9; Mabee, et al. 2007). All but one of these species, however, (Cooper's hawk) were observed during the four seasons of pre-construction surveys at nearby Klondike I (Table 9). Three of the seven species of identified KIIIa fatalities found during the first year of monitoring were species that were observed during KIIIa pre-construction avian use surveys (horned lark, chukar, and ring-necked pheasant). Three species, northern pintail, rock pigeon, and western tanager, were not observed during any pre- or post- construction avian surveys at Klondike IIIa or Klondike I (Table 9). White-crowned sparrow was observed as a fatality at KIIIa, but only observed during pre-construction avian use surveys of Klondike I. Horned lark was the only species to have more than one fatality at KIIIa during the first year of monitoring; this was also the most common species detected during avian use surveys (Table 8).

Table 9. Avian species found at Klondike IIIa and Klondike I Wind Projects during avian use surveys, and avian species found as fatalities during the first year of monitoring at Klondike IIIa Wind Project.

Species Common Name	**Scientific Name**	**Post-construction**		**Pre-construction**	
		KIIIa Fatality 2008-09	**KIIIa Avian Use** 2008–09	**KIIIa Avian Use**[1] 2007	**KI Avian Use**[2] 2001–02
American goldfinch	*Carduelis tristis*				*x*
American kestrel	*Falco sparverius*		*x*	*x*	*x*
American pipit	*Anthus rubescens*			*x*	*x*
American robin	*Turdus migratorius*				*x*
barn swallow	*Hirundo rustica*				*x*
black-billed magpie	*Pica hudsonia*				*x*
Brewer's blackbird	*Euphagus cyanocephalus*				*x*
Canada goose	*Branta canadensis*				*x*
chukar	*Alectoris chukar*	*x*		*x*	
cliff swallow	*Hirundo pyrrhonota*				*x*
common raven	*Corvus corax*		*x*	*x*	*x*
common yellowthroat	*Geothypis trichas*				*x*

Species Common Name	Scientific Name	Post-construction		Pre-construction	
		KIIIa Fatality 2008-09	KIIIa Avian Use 2008–09	KIIIa Avian Use[1] 2007	KI Avian Use[2] 2001–02
Cooper's hawk	*Accipiter cooperii*		x		
European starling	*Sturnus vulgaris*		x		x
ferruginous hawk	*Buteo regalis*				x
golden eagle	*Aquila chrysaetos*		x	x	x
grasshopper sparrow	*Ammodramus savannarum*			x	
great-blue heron	*Ardea herodias*				x
horned lark	*Eremophila alpestris*	x	x	x	x
house finch	*Carpodacus mexicanus*				x
killdeer	*Charadrius vociferus*				x
lark sparrow	*Chondestes grammacus*				x
loggerhead shrike	*Lanius ludovicianus*				x
long-billed curlew	*Numenius americanus*		x	x	x
mourning dove	*Zenaida macroura*				x
northern flicker	*Colaptes auratus*				x
northern harrier	*Circus cyaneus*		x	x	x
northern pintail	*Anas acuta*	x			
northern rough-winged swallow	*Stelgidopteryx serripennis*				x
prairie falcon	*Falco mexicanus*		x		x
red-winged blackbird	*Agelaius phoeniceus*				x
red-tailed hawk	*Buteo jamaicensis*		x	x	x
ring-necked pheasant	*Phasianus colchius*	x		x	x
rock pigeon	*Columba livia*	x			
rough-legged hawk	*Buteo lagopus*		x	x	x
Say's phoebe	*Sayornis saya*				x
spotted towhee	*Pipilo erythrophtalmus*				x
Swainson's hawk	*Buteo swainsoni*		x		x
Townsend's warbler	*Dendroica townsendi*				
tree swallow	*Tachycineta bicolor*				x
turkey vulture	*Cathartes aura*			x	
unidentified bird					x
unidentified blackbird				x	
unidentified buteo					x
unidentified eagle				x	
unidentified falcon				x	
unidentified finch					x
unidentified passerine				x	x
unidentified sparrow		x		x	x
unidentified swallow					x
violet-green swallow	*Tachycineta thalassina*				x
western kingbird	*Tyrannus verticalis*		x		x
western meadowlark	*Sturnella neglecta*		x	x	x
western tanager	*Piranga ludoviciana*	x			
white-crowned sparrow	*Zonotrichia leucophrys*	x			x

[1] Klondike IIIa pre-construction avian use surveys were conducted in one season, spring (March 21–May 10, 2007). For detailed methods see Mabee et al., 2007.

[2] Klondike I pre-construction avian use surveys were conducted at sites adjacent to Klondike IIIa during four seasons from April 2001–April 2002. For detailed methods see Johnson et al., 2002.

4.0 ACKNOWLEDGEMENTS

The authors would like to thank several NWC staff members who were crucial in preparing the details of this report. Brett Anderson produced the figures listed in this report. Miko Ruhlen helped to write sections of the report and also edited sections. In addition, Manuela Huso of EcoStats LLC conducted the analysis of fatality estimates for this report. We also thank NWC staff members who conducted the monitoring, particularly Charles Porter who managed field operations for this project.

5.0 REFERENCES

Cochran, William G. 1977. Sampling Techniques. Wiley Series in Probability and Mathematical Statistics. R. A. Bradley, J. S. Hunter, D. G. Kendall and G. S. Watson, eds. 3rd edition. John Wiley & Sons, New York, 428 pp.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003. Technical report submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Washington Stateline Technical Advisory Committee.

Gritski, B., K. Kronner, and S. Downes. 2008. Leaning Juniper Phase Wind Power Project, 2006–2008. Wildlife monitoring final report. Prepared for PacifiCorp Energy, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

Gritski, B., S. Downes, and K. Kronner. 2009. Klondike III (Phase 1) Wind Power Project wildlife monitoring year one summary October 2007–October 2009. Prepared for Iberdrola Renewables, Klondike Wind Power III LLC, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

Jain, A., P. Kerlinger, et al. 2007. Annual Report for the Maple Ridge Wind Power Project Postconstruction Bird and Bat Fatality Study - 2006. Syracuse, New York, PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project St: 76.

Johnson, G. D., W.P., Erickson, K. Bay, K. Kronner. 2002. Baseline ecological studies for the Klondike Wind Project, Sherman County, Oregon. Prepared for NorthWestern Wind Power. Prepared by WEST, Inc., Cheyenne, Wyoming and Northwest Wildlife Consultants, Inc., Pendleton, Oregon

Kronner, K., B. Gritski, and S. Downes. 2008. Big Horn Wind Power Project wildlife fatality monitoring study, 2006-2007. Report prepared for PPM Energy, Portland, Oregon and the Big Horn Project Technical Advisory Committee. Prepared by Northwest Wildlife Consultants, Inc. Goldendale, Washington.

Mabee, T.J., B.A. Cooper, C. Grinnell, and J. Bana. 2005. Baseline avian use at the proposed Klondike III Wind Power Project, Oregon, Winter 2004 – Spring 2005. Final report prepared for David Evans & Associates, Inc., Portland, Oregon.

Mabee, T.J., J. Barna, and B. Cooper. 2007. Baseline avian use at the proposed Klondike IIIa Wind Power Project, Oregon, spring 2007. Technical report prepared for David Evans & Associates, Inc., Portland Oregon and Klondike Wind Power III, LLC, Portland, Oregon. Prepared by ABR, Inc. Environmental Research & Services, Forest Grove, Oregon.

Manly, B.F. 1997. Randomization, Bootstrap, and Monte Carlo Methods in Biology. 2nd edition. Chapman and Hall, New York. 399 pp.

Mood, A., Graybill, F.A. and Boes, D.C. 1974. Introduction to the Theory of Statistics, 3rd edition, New York: McGraw-Hill.

Northwest Wildlife Consultants, Inc. (NWC) and WEST, Inc. 2007. Avian and bat monitoring report for the Klondike II Wind Power Project, Sherman County, Oregon. Prepared for PPM Energy, Portland, Oregon.

Oregon Energy Facility Siting Council (OEFSC). 2007. Final Order on Klondike III Amendment #3 – Attachment A. Klondike III Wind Project: Wildlife Monitoring and Mitigation Plan, November 16, 2007.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A Variable Circular-plot Method for Estimating Bird Numbers. Condor 82:309–313.

6.0 APPENDICES

Appendix A. Summary of wildlife casualties* found at Klondike IIIa Wind Project from August 11, 2008–August 15, 2009.

Species**	Date Found	Turbine	Condition	Notes
Casualties Found Prior To Scheduled Searches (1 bat)				
		Bats		
hoary bat	08/11/08	X-3	Intact	Clean-up search
Fall Season 2008 Casualties (5 birds, 2 bats)				
		Birds		
ring-necked pheasant	08/10/09	N-5	Scavenged	Scheduled search
chukar	09/15/08	BB-4	Feather spot	Scheduled search
western tanager	09/29/08	X-3	Scavenged	Scheduled search
northern pintail	09/30/08	N-4	Feather spot	Scheduled search
rock pigeon	10/14/08	AA-6	Feather spot	Scheduled search
		Bats		
hoary bat	09/12/08	X-4	Scavenged	Scheduled search
hoary bat	09/30/08	BB-2	Scavenged	Scheduled search
Winter Season 2008-2009 Casualties (2 birds, 0 bats)				
		Birds		
unidentified sparrow	11/12/08	U-4	Feather spot	Scheduled search
horned lark	02/17/09	AA-7	Intact	Scheduled search
Spring Season 2009 Casualties (1 bird, 0 bats)				
		Birds		
white-crowned sparrow	04/15/09	AA-6	Scavenged	Scheduled search
Summer Season 2009 Casualties (2 birds, 0 bats)				
		Birds		
horned lark	05/15/09	BB-1	Feather Spot	Scheduled search
horned lark	05/15/09	N-5	Scavenged	Scheduled search

* Includes all casualties found. All are attributable to the wind project operations in the absence of sufficient information to determine causes of death.

** Includes those identified to species and for those where species identification could not be confirmed, taxonomic group or other is used. Previously unidentified specimens were examined to determine species when possible. Changes have been incorporated into this table and supersede any species identification in previous reports.

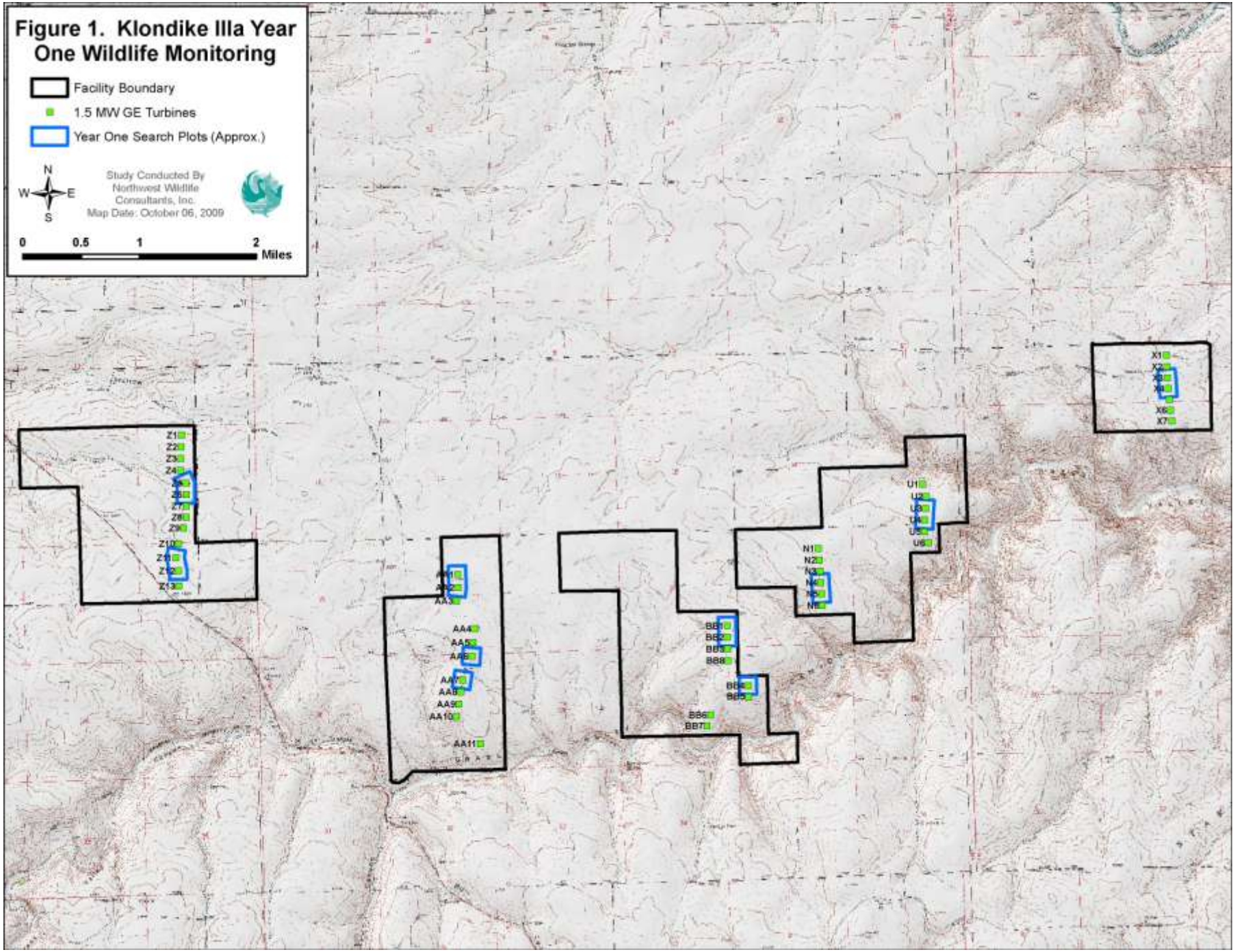
Figure 1. Klondike IIIa Year One Wildlife Monitoring
Facility Boundary
1.5 MW GE Turbines
Year One Search Plots (Approx.)
N
W
E
S
Study Conducted By
Northwest Wildlife
Consultants, Inc.
Map Date: October 06, 2009
0
0.5
1
2
Miles