



Data Quality Standards for Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve and City of Rocks National Reserve

Data Quality Standard Version 1.0

Natural Resource Report NPS/UCBN/NRR—2017/XXX



ON THE COVER

Greater sage-grouse on lek, provided by NPS.

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Natural Resource Report NPS/UCBN/NRR—2017/XXX

Jeffrey J. Lonneker¹ and Courtney J. Conway Ph.D.²

¹National Park Service
Upper Columbia Basin Network
Inventory and Monitoring Program
105 E. Second St, Suite 6
Moscow, ID 83843

²U.S. Geological Survey, Idaho Cooperative Fish & Wildlife Research Unit
Department of Fish and Wildlife Sciences
University of Idaho
875 Perimeter Drive MS 1141
Moscow, ID 83844-1141

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Introduction

The purpose of this report is to document the standards, used by the Upper Columbia Basin Network (UCBN) for activities related to the collection, processing, storage, analysis, and publication of monitoring data as described in the UCBN Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve (CRMO) and City of Rocks National Reserve (CIRO) (Conway, et al. 2018). The policies and procedures documented in this quality-assurance plan for these activities complement the quality-assurance plans for other monitoring activities conducted by the UCBN and supplement the National Inventory & Monitoring Division Quality Management Plan (*Citation to be added later*). The plan also serves as a guide for all UCBN personnel who are involved in protocol/program activities and as a resource for identifying memoranda, publications, and other literature that describe associated techniques and requirements in more detail.

Protocol Overview

The mission of the National Park Service (NPS) is “to conserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment of this and future generations” (National Park Service 1999). To uphold this goal, the Director of the NPS approved the Natural Resource Challenge to encourage national parks to focus on the preservation of the nation’s natural heritage through science, natural resource inventories, and expanded resource monitoring (National Park Service 1999). Through the Natural Resource Challenge, 270 parks in the national park system were organized into 32 inventory and monitoring (I&M) networks, each tasked with designing and implementing a “vital signs” monitoring program for the respective constituent parks (Fancy, Gross and Carter 2009).

The Upper Columbia Basin Network (UCBN) has identified priority NPS vital signs: indicators of ecosystem health that represent a broad suite of ecological phenomena operating across multiple temporal and spatial scales (Garrett, et al. 2007). UCBN intends to develop a balanced and integrated suite of vital signs that meet the needs of current park management, and address unanticipated management questions in the future. To this end, greater sage-grouse represent an important umbrella species that are indicative of the health of sagebrush-steppe ecosystems and will have their population demographics monitored at both CRMO and CIRO.

Sagebrush (*Artemisia* spp.)-steppe vegetation comprises >90% of vegetated portions of Craters of the Moon National Monument and Preserve (CRMO) and >50% of the land cover at City of Rocks National Reserve (CIRO), much of which is greater sage-grouse (*Centrocercus urophasianus*) habitat. At CRMO, many leks are in the Idaho Department of Fish and Game (IDFG) statewide lek database that occur within or in close proximity to the boundary of CRMO. Three active leks occur adjacent to the Castle Rocks unit of CIRO. Investigators from the University of Idaho (UI) and National Park Service (NPS) collaborated to develop a strategy and protocol for long-term monitoring of greater sage-grouse in and immediately adjacent to CRMO and CIRO. An explicit objective of the field methods for this protocol was compatibility with annual lek counts coordinated by the Idaho Department of Fish and Game (IDFG), because data collected from this NPS protocol was designed to augment (not duplicate or replace) those data already collected by IDFG and other agency partners.

This greater sage-grouse monitoring protocol is intended for CRMO and CIRO. The protocol expands upon the current IDFG sage-grouse lek count guidelines (IDFG 2016; Appendix IV), providing additional clarifications where needed and some modifications that were necessary to ensure that surveyors could implement/follow all of the guidelines. The protocol provides additional guidance regarding 6 issues: 1) the frequency with which to visit unoccupied leks along lek routes, 2) revising lek routes so that all routes can be effectively surveyed without violating provisions in the IDFG guidelines, 3) clarification of methods to improve detection of new, unknown, and satellite leks along existing lek routes, 4) instructions for periodically counting leks that are not along lek routes, 5) an optional probabilistic sampling framework for area-based sampling that would provide unbiased estimates of grouse abundance within CRMO and CIRO, and 6) data management.

Protocol Activities and Modules

Data are collected or derived as a part of the Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve and City of Rocks National Reserve (Conway, et al. 2018) as two concurrent efforts in eight different activities or modules (Table 1).

Table 1. Protocol activity matrix for survey activities associated with existing lek routes and listening points described within Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve and City of Rocks National Reserve (Conway, et al. 2018).

Activity		Description
Site Recon, Establishment, and Maintenance		
1	Existing Lek Route Surveys	Revisiting established lek routes to count grouse at occupied leks, historically occupied leks or sites suspected but as of yet undetermined.
2	Listening Point Establishment	Establishing points along existing lek routes that fall ≥ 1 km from the nearest known lek observation point.
Field Observations		
3	Sampling Event Data Collection	Date, start time, end time, route ID, weather, location (latitude / longitude WGS84 decimal degrees) is collected at each stop along established lek routes.
4	Existing Lek Route Data Collection	At each stop along existing lek routes, the number of male, female and unknown sex grouse will be counted. These data are collected along with a unique lek identifier and any identifier given by cooperating agency (e.g., state fish and game agency).
5	Listening Point Data Collection	The same data will be collected as in the existing lek route events. Number of male, female and unknown sex grouse will be counted along with unique listening point identifier will be documented.
6	Aerial Surveys	Aerial transects will be flown down the center of rows of 1-km ² polygons searching for leks. Whether leks are observed or not, the following data will be collected for each 1-km ² polygon: date, start time, end time, lek ID, weather, location (latitude / longitude WGS84 decimal degree), and number of male, female, and unknown sex grouse.
Sensor Data		
7	Temperature	NIST approved thermometer will be used to record ambient outside temperature at time of survey.

Sampling Design

Table 2. Activity-level sample design matrix for Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve and City of Rocks National Reserve (Conway, et al. 2018).

Activity		Sampling Design	Revisit Design
Field Observations			
1,3,4,7	Existing Lek Routes	- <u>Targeted</u>: Existing lek routes have been surveyed for decades by NPS and other agencies. These lek routes will be maintained so historical data can be used for long-term trend analysis. Existing lek routes which have more than 10 known leks or are longer than 20 km in length will be subdivided into shorter routes. Routes longer than this take too much time and will lead to incomplete routes. - Currently, there are 6 routes which contain 96 known leks within 5 km of CRMO. There is currently 1 route with 6 known leks within 5 km of CIRO.	Revisit every 1 year
5,7	Listening Point Survey	- <u>Targeted</u>: Sites along existing lek routes that fall greater than 1 km from the nearest observation post will have a listening point established so that new and unknown leks can be located during surveys.	Revisit every 1 year
6	Aerial Survey	- <u>Targeted</u>: The 2 parks (and a 5-km buffer) were divided up into 1-km squares using a fishnet technique. Aerial surveys will be flown along the rows of cells to sample known/unknown leks in areas of the parks that are not along existing lek routes. Each cell will be documented even if there are no leks observed. The specific cells to be flown will be decided by researchers and cooperating agencies.	Revisit every 5 years

Data Quality Objectives

Data quality values and standards for implementation are provided in Table 3 through 6.

Table 3. Data Quality Values (DQVs) for Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve and City of Rocks National Reserve (Conway, et al. 2018).

Data Quality Value	Definition	Protocol Considerations
Intrinsic Data Quality		
Accuracy	Measurements reflect the true value of the parameter being observed. This applies to measures (count, direction, position) or classes (species, types, or categories).	Accuracy of class data is achieved by training field crew personnel in all standard operating procedures and basic sage-grouse identification at the beginning of each field season as well as by using expert resources, such as sage-grouse experts, when available. Special care is taken to ensure crews are trained to differentiate male from female grouse and look-alike species that may occur in the area. Personnel need to be trained to accurately identify sage-grouse vocalizations.
Representativeness	Measurements represent conditions at the time of sampling. Combined with accuracy, this leads to repeatable data collection.	Representativeness is achieved by conducting 'listening point surveys' along lek routes where no known leks have been previously identified. Rather than driving from known lek to known lek, stopping and listening / looking for displaying grouse will be valuable in identifying unknown leks but also in providing true 'absence' data to the overall dataset.
Contextual Data Quality		
Comparability	The degree to which data can be compared among sample locations, data sources, or periods of time.	Data comparability is ensured through time, even when sensors, instruments, and staff change occur by following the guidelines laid out in the SOPs for staff training and field methods.
Timeliness / Currency	How recent the data need to be considered valid for their intended use. Data represents conditions and/or is available and in a format for use at the appropriate time in the decision-making process.	Certification of data occurs on an annual basis. Where certified data cannot be provided for resource management decisions in a timely manner, requirements for provisional use of data are defined and documented prior to data dissemination and use.
Completeness	All data/ measures required to evaluate accuracy and representativeness are present; incomplete data sets (either at a location, across sampling locations, or over time) lose utility or relevance. Data records contain values as planned across the period of record.	Surveys can be time intensive. Due to this, a schema has been developed for varying staffing levels and staff availability. At a minimum, established lek routes will be surveyed annually. Undetermined leks on each lek route will be surveyed every year for 5 consecutive years. Unoccupied leks on each lek route will be surveyed every other year. Historic (but unoccupied) leks on lek routes will be surveyed at least every 10 years. Aerial surveys will be conducted every 5 years.
Representational Data Quality		
Consistent Representation	Use of standard definitions when describing data quality or resource quality based on data.	The Data Processing Level of all data will be tracked using the nomenclature described in "Certification Guidelines for Inventory and Monitoring Data Products" (National Park Service 2016).
Data Accessibility		
Secure	Access to data, products, and systems limited to appropriate audiences.	No protected data will be collected as part of this protocol.

Measurement Quality Objective and Performance Standards

Table 4. Measurement Quality Objectives for Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve and City of Rocks National Reserve (Conway, et al. 2018).

Measure / Quality Indicator		Quality Objective		
Site Location				
	Location Accuracy	Sample location within +/- 5m (as standard for Garmin GPS devices) of known lek, lek observation stop, or listening point.		
	Location Range	All WGS84 decimal degree locations associated with this protocol will fall in the following ranges Easting (X): >(-113) and <(-114) and Northing (Y): >42 and <43.		
Greater Sage-Grouse Demographic Measurements				
	Taxonomic resolution	Identification made to species level (see table 5, taxonomic standards).		
	Gender accuracy	99% accuracy, accounting for experience level of observers.		
	Individual Count	95% accuracy, accounting for experience level of observers and stationarity of birds. Higher values will lead to increased inaccuracy due to double counting and missed individuals.		
Environmental Measurements				
	Temperature	+/- 0.5° Celsius using NIST approved thermometer.		
	Wind Speed	Subjective / Categorical – Using Beaufort scale.		
		Beaufort Number	Wind Speed Indicators	Wind Speed (km/hr)
		0	Smoke rises vertically	< 2
		1	Wind direction shown by smoke drift	2 – 5
		2	Wind felt on face; leaves rustle	6 – 12
		3	Leaves and small twigs in constant motion	13 – 19
		4	Raises dust and loose paper; small branches are moved	20 – 29
		5	Small trees with leaves sway	30 – 38
	Precipitation	Subjective / Categorical – Using Breeding Bird Survey Sky Codes.		
		Sky Code	Description	
		0	Clear or few clouds	
		1	Partly cloudy (scattered clouds) or variable sky	
		2	Cloudy (broken) or overcast	
		3	Sandstorm or dust storm, or drifting or blowing snow	
	Cloud Cover	4	Fog or smoke or thick dust haze	
		5	Drizzle	
		6	Rain	
		7	Snow or sleet (rain and snow mixed)	
		8	Showers	
		9	Thunderstorms (with or without precipitation)	
Date / Time Measurements				
	Date	Exact date of survey will be noted.		
	Start Time	+/- 1 minute, dependent upon measurement device.		
	End Time	+/- 1 minute, dependent upon measurement device.		

Taxonomic Standards

Table 5. Taxonomic standards to be used for Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve and City of Rocks National Reserve (Conway, et al. 2018).

Activity		Standard to be Used	Reference / Authority
Collection of Observational Data			
4,5,6	Greater sage-grouse <i>Centrocercus urophasianus</i> (Bonaparte, 1827)	Scientific Publication	(American Ornithologists' Union 1983)
Reporting of Observational Data			
4,5,6	Greater sage-grouse <i>Centrocercus urophasianus</i> (Bonaparte, 1827)	Scientific Publication	(American Ornithologists' Union 1983)

Data Protection Standards

Table 6. Data protection standards for Greater Sage-Grouse monitoring in the Monitoring Protocol for Greater Sage-Grouse (*Centrocercus urophasianus*) at Craters of the Moon National Monument & Preserve and City of Rocks National Reserve (Conway, et al. 2018). With the exceptions noted, all data collected are to be made publicly available in a timely fashion.

Type of Data		Level of Protection	Rules for Dissemination
Resource Data and Information			
	Greater sage-grouse demographic information	Publicly available	No restrictions
Location Data and Information			
	Location of greater sage-grouse lek and observation point locations	Operationally protected	Coordinates provided upon request only. Relative position shown in reports.
Personally Identifiable Information			
	Non-NPS Staff Information	Operationally protected	Names will be provided upon request. First name and last initial will be shown in reports or other derived data.

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Natural Resource Stewardship and Science
1201 Oakridge Drive, Suite 150
Fort Collins, CO 80525

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