Attachment III: Project Narratives for Sage-grouse Research in North Dakota

Project Narrative I

State: North Dakota
Project Number:
Grant Amendment No.
Study No.:

Study Title: Nesting and Brood-rearing Habitat Selection of Greater Sage-grouse and Associated Survival of Hens and Broods in North Dakota.

Justification and Need:

Populations of greater sage-grouse (*Centrocercus urophasianus*) have substantially declined throughout a majority if the species range (Connelly and Braun 1997, Schroeder et al. 1999, 2004). There has also been a corresponding decline in sage habitat quantity and quality, and the sage-grouse populations have declined in response to a pattern of land use changes that have reduced and degraded sagebrush ecosystems (Hemstrom et al. 2002).

Sage-grouse are native to sagebrush steppe, and their distribution closely follows that of sagebrush. Approximately 10-20% of western sagebrush steppe has been converted, and most remaining habitat has been modified by grazing, development, or non-native plants. Sage-grouse populations have also declined throughout their range, prompting them to be listed as a Priority Level 1 Species of Special Concern in both North and South Dakota. This listing level recommends immediate research and conservation actions. Current levels of concern about the status and health of greater sage-grouse populations in North Dakota mirror those about the species across it's range of distribution, and are based on concerns for the long-term conservation of the species and the sagebrush habitats on which it depends (Wambolt et al. 2002, Schroeder et al. 2004). More importantly, concerns have led to petitioning the U.S. Fish and Wildlife Service to protect sage-grouse populations under the Endangered Species Act. Listing would have significant impacts on federal and private land management practices.

North Dakota is on the eastern edge of the range of distribution for both sage-grouse and sagebrush habitats. Recent research has shown that sagebrush-dependent species on the fringe of sagebrush distribution may not utilize habitats in as predictable a manner as those same species in the core of sagebrush steppe ecosystem (Smith 2003, Lewis 2004). Moreover, little is known about the specific habitat use patterns and seasonal movements/distribution of sage-grouse in North Dakota. Data on seasonal habitat use and needs and seasonal population shifts/movements are required for informed management decisions concerning sage-grouse in North Dakota.

Objectives:

1. Determine and quantify nesting and brood-rearing habitat selection of radio-marked greater sage-grouse in North Dakota.

2. Estimate survival of radio-marked male and female sage-grouse in southwestern North Dakota. We will investigate the cause of mortalities.

3. Estimate nest success of radio-marked female sage-grouse on North Dakota study sites to evaluate the cause and timing of nest failures (e.g., predation, abandonment, etc.).

4. Estimate brood survival of radio-marked female sage-grouse that nest successfully in western North Dakota. The cause(s) of brood/chick mortality will be investigated.

Expected Results and Benefits:

We will develop findings of the study into management recommendations that benefit state and federal (e.g., BLM, USFS) wildlife and habitat management agencies charged with management of greater sage-grouse and their habitats. This research will provide information on sage-grouse natural history at the edge of its range; an area where the basic ecology of the species has not been studied

Information collected will improve knowledge about the patterns of use and habitat need of sage-grouse in western North Dakota, as well as population information (e.g. survival, reproductive success) critical for sound management of greater sage-grouse. These data will compliment Geographical Information System (GIS) data layers that will enable land and wildlife managers to develop site specific management recommendations concerning sage-grouse and sagebrush-steppe habitats in North Dakota.

If resource biologists are to effectively manage lands for sage-grouse, they must know what habitats are used for the various seasonal life-history needs (mating, nesting, brood-rearing, wintering). This information will enhance management efforts not only for greater sage-grouse, but for all sagebrush dependent wildlife.

Procedures and Methods:

Marking and Monitoring Birds

Rocket netting, night spotlighting, and drift fence traps on strutting grounds will be used to capture and radio-mark sage-grouse within study sites. Captured birds will be sexed, aged, weighed and fitted with aluminum, numbered leg bands. Males and females will be fitted with necklace-type, 2-stage radio transmitters (as those made by Advanced Telemetry Systems, Isanti, MN). Transmitters will be fitted with mortality switches and will have an expected life of 12-36 months. Transmitters will have a confirmed range of 1-2 miles on the ground and 5-6 miles from an aircraft. Field crews will locate marked birds twice a week in spring and summer from the trap date through August to: (1) obtain precise estimates of survival, nest success, and chick survival to 30 days of age and (2) characterize nesting, brood-rearing and summer habitats. Additionally, a smaller sample of radio-marked males (10-15 birds) will be monitored to determine habitat use and survival

We will locate birds bi-weekly using aerial flights and ground reconnaissance to characterize habitats used by grouse in fall and winter (Phase II Objective 1). Bird locations will be recorded using a GPS and mapped in a GIS. Chicks in broods will be counted after hatching and again every 5-7 days until the brood reaches 30 days of age (broods mix after 30 days and individual broods become too difficult to identify). We will monitor nests using temperature probes attached to camouflaged data loggers to minimize human nest disturbance.

Local habitat information (e.g., sagebrush canopy, grass and forb height/density, bare ground) will be collected at systematic-random points throughout the study sites and at sage-grouse nests, brood locations and wintering sites using standardized vegetation monitoring methods. Vegetation at random points and at sage-grouse locations will be used to characterize habitat use in all seasons. Vital rates (e.g., survival estimates and nest success) will be analyzed using established fate and Cormack-Jolly-Seber models (season-, sex- and age- specific). Chick survival will be estimated by observing brood size up to 30 days post-hatching that are associated with radio-collared hens.

Habitat Characterization and Sampling

Habitat sampling will be conducted at all nest sites of greater sage-grouse and from random points selected from the locations of male and female with brood radio-marked birds. Habitat analysis will determine which habitat types, plant associations, and structural/physiographic characteristics of the landscape are important for sage-grouse during nesting and brood rearing periods. A modified Robel pole will be used to measure horizontal density (visual obstruction) of vegetation (Robel et al. 1970; Higgins and Barker 1982). Additionally, Daubenmire cover class estimates will be used to quantify vertical cover characteristics

Effective leaf and maximum vegetation height will be measured within a 30-cm radius of the Robel pole to the nearest cm (Higgins and Barker 1982). Vegetative height measurements will be made at each station (n=10) along the transect. The maximum crown diameter will be measured on at least 10 sagebrush plants per transect. Percent bare ground and canopy cover will be estimated or measured by live intercept techniques.

Plant collections of unidentified species will be made for later identification in the herbarium at SDSU in Brookings. Data will be collected on soil type or associations, land use treatments, and topography characteristics. Dr. Gary Larson, plant collections curator at SDSU will assist with taxonomic identification procedures, etc.

This study will be conducted through a contract with the Department of Wildlife and Fisheries Sciences at South Dakota State University. All data will be summarized in annual progress reports. Final project survey data analyses will be made available in a completion report, which may be a thesis, and will be made available for use by the scientific community as well as the general public. Investigators will also present results at professional meetings as appropriate. All of the techniques and procedures to be used in this project are accepted by the scientific community.

Study Duration:

January 1, 2005 – December 31, 2007

Schedule of Work

Fiscal Year	Work to be conducted
FY 05	Capture, radio-mark, and locate sage-grouse; collect habitat use data; prepare progress report
FY 06	Capture, radio-mark, and locate sage-grouse; collect habitat use data; prepare progress report

FY 07 Complete data collection and analysis, construct management recommendations; prepare final report (MS thesis)
FY 08 Complete publication and dissemination of research findings

Estimated Costs:

Item	FY05	FY06	FY07	FY08	Total
Grad. Student Stipend	7,100.00	15,000.00	8,000.00	0	30,100.00
Technicians (1-2)	8,000.00	9,000.00	2,000.00	0	19,000.00
Principal Investigator	0	0	0	0	-
Travel and Per Diem	2,700.00	6,200.00	1,000.00	0	9,900.00
Telephone and Photocopying	300.00	500.00	1,000.00	200.00	2,000.00
Equipment and Miscellaneous (radios and tracking equip.)	5,000.00	4,000.00	0	0	9,000.00
Aircraft Time (radio-tracking)	2,500.00	5,000.00	2,500.00		10,000.00
Publication	0	0	0	2,000.00	2,000.00
Mileage	2,500.00	5,000.00	1,000.00	0	8,500.00
Subtotal	28,100.00	44,700.00	15,500.00	2,200.00	90,500.00
Indirect 26%	7,306.00	11,622.00	4,030.00	572.00	23,530.00
Tuition Remission	750.00	1,500.00	1,500.00	0	3,750.00
Total Cash	36,156.00	57,822.00	21,030.00	2,772.00	100,450.00
Project Totals	**36,156.00**	**57,822.00**	**21,030.00**	**2,772.00**	**117,780.00**

This study will be funded by a grant to South Dakota State University from the North Dakota Game and Fish Department. A portion of the cost will be funded through grants from the Bureau of Land Management and the United States Forest Service.

Location of Work:

This work will be conducted primarily in Bowman, Slope, and Golden Valley counties of southwestern North Dakota. Some additional field work may involve tracking North Dakota radioed birds that may move across state lines into adjacent areas of Montana and/or South Dakota.

Technical Personnel:

Project personnel will include Jerry Kobriger, Upland Game Management Supervisor, North Dakota Game and Fish Department, and Dr. Kent C. Jensen, Department of Wildlife and Fisheries Sciences, South Dakota State University. A graduate research assistant (M.S. Thesis student) and seasonal field technicians as needed will also be used to complete the study. Dr. Kent C. Jensen will act as Principle Investigator, SDSU, Box 2140B, Brookings, SD 57007, Phone: (605) 688-6121, Fax: (605) 688-4515.

Related Federal Projects:

The research will be contracted with South Dakota State University and will not involve the direct expenditure of other federal funds or in-kind contributions.

Floodplains and Wetlands:

The activities proposed in this study do not include construction in or alteration of any flood plain or wetland.

Endangered Species or Threatened Species:

Species considered: bald eagle, whooping crane, Topeka shiner, Eskimo curlew, piping plover, interior least tern, American burying beetle, gray wolf, pallid sturgeon, black-footed ferret, and Ute ladies-tresses.

This study only involves the collection and analysis of information that will not impact any of the species considered.

Environmental Assessment:

This study is a research project that is directly related to the conservation of wildlife resources in North Dakota that does not involve habitat destruction. This study is not expected to impact any threatened or endangered species. Animal capture and marking protocols and animal handling and disposal will meet all guidelines of the Animal Welfare Committee at South Dakota State University. This study also does not include the introduction of contaminants or introduction of organisms not indigenous to the affected ecosystem. Therefore, this study qualified as a categorical exclusion from the NEPA process as described in the Federal Register, Vol. 62, No. 11, Page 2375, Section 1.4(B)1, dated January 16, 1997. The exceptions to the application of this categorical exclusion were considered by this agency and were found to be not applicable to this study.

Prime and Unique Farmlands:

This research study will not involve any soil disturbing activities, therefore, this project will have no impact on any prime or unique farmlands.

Historical and Cultural Resources:

This is a wildlife research project that does not involve soil disturbance activities, and therefore has been exempted from review by the North Dakota State Historic Preservation Officer (SHPO) as described in Item 212 of the memorandum of Agreement with the SHPO dated 30 June 1987.

Environmental Justice (Executive Order 12898):

This project only involves the collection of wildlife population and habitat data and will have no impact whatsoever on environmental justice issues.

Invasive Species (Executive Order 13112):

This project only involves the collection of wildlife population and habitat data and will not promote the introduction or spread of invasive species.

Literature Cited:

Connelly, J.W., and C.E. Braun. 1997. Long-term changes in sage-grouse (*Centrocercus urophasianus*) populations in western North America. Wildlife Biology. 3:229-234.

Hemstrom, M.A., M.J. Wisdom, M.M. Rowland, B.C. Wales, W.J. Hann, and R.A. Gravenmier. 2002. Sagebrush-steppe vegetation dynamics and potential for restoration in the interior Columbia Basin, USA. Conservation Biology 16:1243-1255.

Higgins, K.F. and W.T. Barker. 1982. Changes in vegetation structure in seeded nesting cover in the Prairie Pothole Region. U.S. Fish and Wildlife Service Special Sci. Report. Wildlife No. 242. 26 pp.

Lewis, A.R. 2004. Sagebrush steppe habitats and their associated bird species on South Dakota, North Dakota, and Wyoming: Life on the edge of the sagebrush ecosystem. PhD Dissertation, South Dakota State University, Brookings, SD. 126pp.

Robel, R.J., J.N. Briggs, A.D. Dayton and L.C. Hulbert. 1970. Relationships between visual obstruction measurements and weight of grassland vegetation. J. Range Management 23:295-298.

Schroeder, M.A., J.R. Young, and C.E. Braun. 1999. Sage-grouse (*Centrocercus urophasianus*). A. Poole and F. Gill, eds., The birds of North America, No. 425. The Academy of Natural Sciences, Philadelphia, PA.

Schroeder, M. A., C.L. Aldridge, A.D. Apa, J.R. Bohne, C.E. Braun, S.D. Bunnell, J.W. Connelly, P.A. Deibert, S.C. Gardner, M.A. Hilliard, G.D. Kobriger, S.M. Mcadam, C.W. McCarthy, J.J. McCarthy, D.L. Mitchell, E.V. Rickerson, and S.J. Stiver. 2004. Distribution of sage-grouse in North America. Condor 106:363-376.

Smith, J. 2003. Greater sage-grouse on the edge of their range: leks and surrounding landscapes in the Dakotas. M.S. Thesis, South Dakota State University, Brookings, SD. 213pp.

Wambolt, C.L., A.J. Harp, B.L. Welch, N. Shaw, J.W. Connelly, K.P. Reese, C.E. Braun, D.A. Klebenow, E.D. McArthur, J.G. Thompson, L.A. Torell, and J.A. Tanaka. 2002. Conservation of greater sage-grouse on public lands in the western U.S.: implications of recovery and management policies. Policy Analysis Center for Western Public Lands, Policy Paper SG-02-02, Caldwell, ID.