IDAHO DEPARTMENT OF FISH AND GAME

Cal Groen, Director

Project W-160-R-34

Progress Report

Idaho ruffed grouse male

UPLAND GAME BIRD ECOLOGY

Study II: Population Characteristics and Habitat Use of Exploited Forest Grouse Populations

July 1, 2006 to June 30, 2007

By:

Jack Connelly
Principal Wildlife Research Biologist

David Musil
Senior Wildlife Research Biologist

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STATEWIDE WILDLIFE RESEARCH

STATE:	Idaho	**JOB TITLE:**	Upland Game Bird Ecology
PROJECT:	W-160-R-34		
SUBPROJECT:		**STUDY NAME:**	Population Characteristics and
STUDY:	II		Habitat Use of Exploited
JOBS:	1-2		Forest Grouse Populations

PERIOD COVERED: July 1, 2006 to June 30, 2007

POPULATION CHARACTERISTICS AND HABITAT USE OF EXPLOITED FOREST GROUSE POPULATIONS

Abstract

Forest grouse (dusky grouse [*Dendragapus obscurus*], ruffed grouse [*Bonasa umbellus*], and spruce grouse [*Falcipennis canadensis*]), are increasing in popularity among gamebird hunters in Idaho. Unfortunately, abundance, population trends, and harvest rates are largely unknown in the state. To properly manage these gamebirds, reliable survey techniques need to be developed, tested, and implemented. Currently, no standardized routes are monitored before the hunting season to track population trends or predict available harvest. Harvest rates, distribution, and affects on populations is unknown for forest grouse in Idaho. This study will continue until all 3 forest grouse species have been researched to determine survey techniques and harvest rates.

JOB 1. FOREST GROUSE SURVEY TECHNIQUES

Abstract

A pilot project was started in 2007, focusing on ruffed grouse in the Squaw Creek drainage of the Boise National Forest. Drumming males (n = 6) were captured with a modified walk-in trap. Density of drumming males was determined with 12 line transects (4.5 males/km^2) and 2 roadside surveys (6.5 males/km^2). Males averaged 559 ± 41 g at capture, 175 ± 57 m from capture site, and 22.7 ± 11.2 ha home range sizes during mid-May through August. A proposal will be completed to provide a long-range plan for researching forest grouse survey techniques.

Recommendations

1. Complete proposal for developing survey techniques of forest grouse.
2. Conduct field research.
3. Provide completion report.
4. Publish results in a peer reviewed journal.

Introduction

As forest grouse become more popular as a hunted game species, determining accurate population levels is critical for proper management. Currently, Idaho relies on incidental pre-hunting season observations by biologists and conservation officers to estimate population trend and to forecast harvest opportunity for hunters. Eastern states with ruffed grouse monitor population trends with spring drumming counts and assume a 1:1 male to female ratio. This estimate is prior to nesting and does not reflect summer weather affecting chick survival. Occasionally, Idaho has monitored drumming routes but these have not been consistent or standardized. No standardized surveys have been conducted in Idaho for dusky or spruce grouse.

Thompson et al. (1998) and Eberhardt and Simmons (1987) describe a double sampling approach to calibrate inexpensive indices with expensive census methods. Total counts with intensive searching and flushing have been used for researching dusky grouse (Zwickel and Bendell 2004) but are not feasible as a management tool to estimate populations over large areas.

For ruffed grouse, traditional drumming counts have been conducted along roadsides (Petraborg et al. 1953, Dorney et al. 1958). Road systems are limited in Idaho due to steep landscapes and poor distribution. Logging roads that are available often become impassible with vehicles after deadfalls and thinning operations block passage. Higher elevations in dusky and spruce grouse habitat lack adequate roads altogether. Therefore, 1 route rarely can encompass enough habitat to adequately survey for all 3 forest grouse species in a population. Survey techniques need to be developed, tested, and implemented throughout Idaho for each forest grouse species.

Objectives

1. Develop survey techniques for each of the 3 forest grouse.
2. Determine abundance, distribution, and habitat use by forest grouse throughout Idaho.

Pilot Project

Ruffed grouse have not been studied in Idaho since Stauffer (1983) and have not been captured by state employees since a transplant project (pers. comm. Randy Smith – IDFG) during the late 1980s in southeastern Idaho. Ruffed grouse have not been radio-marked in Idaho. Therefore, a pilot project was started during spring 2007 to test the feasibility of conducting double sampling surveys for drumming ruffed grouse and practice our abilities to capture, mark, and track radio-marked birds.

Study Area

Second Fork Squaw Creek is within the Boise National Forest in Gem County of west-central Idaho. The study area is dominated by ponderosa pine (*Pinus ponderosa*) with patches of quaking aspen (*Populus tremuloides*), and open areas are dominated by sagebrush (*Artemisia tridentata*) and antelope bitterbrush (*Purshia tridentata*). Riparian zones are dominated by currants (*Ribes* spp.), chokecherry (*Prunus virginiana*) and hawthorn (*Crataegus* spp.). The study area has a west-southwest aspect and elevation ranges 1,160-1,524 m. Two main gravel

roads, Forest Service (FS) 653 and FS 626, provide access to the Second Fork and Sage Hen Reservoir drainages, respectively. Many 2-track logging roads intersect the main roads.

Methods

Line transects (Buckland et al. 2001) were established at random points and placed in random directions with drumming counts conducted for 5 minutes every 100 m (11 observation points/1,000m line). Azimuths were recorded for the direction toward the drumming sound. Roadside surveys were established on the 2 main roads (FS 626 and FS 653) and drumming counts conducted approximately every 800 m with 5-minute listening periods.

We used a walk-in trap with similar dimensions to Gullion (1965) but constructed ours of plastic drain pipe (Figure 1) rather than a wooden frame wrapped in hardware cloth. Traps were constructed and deployed on active drumming logs found during line transect and roadside surveys. Traps were checked 2/day, by 1000 and 2100 hrs. Battery powered 12 g necklace radio transmitters (Advanced Telemetry Systems, Isanti, Minnesota, USA) were attached to captured males and leg banded with size 10 aluminum butt-end bands (National Band & Tag, Newport, Kentucky, USA). Birds were also weighed with 1,000 g spring scales. Telemetry was conducted with a 3-element collapsible Yagi antenna and locations determined by visual observation, flushes, or circling the location within a 30-50 m radius.

Results

Ruffed grouse drumming surveys were established on 12 line transects and 2 roadsides (Figure 2). Three line transects were intentionally run along creek drainages (#15, #70, #88) rather than at random directions so as to stratify sampling. Transect #131 was established too late to be sampled during the drumming season. Two roadside surveys were conducted on 2 separate roads (FS 653, FS 626). Roadside survey FS 653 appears to not follow a road for points 6-9 in Figure 2, but this 1985 quadrangle map does not depict the current road system. Also, 4 additional observation points were originally placed before point 1 for FS 653, but due to the distracting noise from Second Fork Squaw Creek, these were abandoned. Assuming drumming males can be heard up to 200 m (Gullion 1966, Zimmerman and Gutierrez 2007), we estimated ruffed grouse density to be 4.5 and 6.5 drumming males/km^2 for line transects and roadside surveys, respectively (Table 1).

Eight walk-in traps were used to capture 6 drumming male ruffed grouse which averaged 559 ± 41 g (Table 2) and took 12.7 trap days/captured bird. Grouse were relocated at least twice a week and averaged 175 ± 57 m from capture site with an average home range (minimum convex polygon) of 22.7 ± 11.2 ha (Table 2, Figure 3). There was no relationship either between grouse weight and linear distance from capture site (R^2 = 0.087, Figure 4) or between grouse weight and home range size (R^2 = 0.072, Figure 5), but sample sizes are small. During July, males R0005 and R0007 made multiple movements across Second Fork Squaw Creek (Figure 3) and stayed there for 3-4 days at a time before returning to the side they were captured on in May. Male R0004 was depredated 23 August, apparently by an avian predator.

Discussion

Density of drumming male ruffed grouse in our study area appears to be similar to low cycles in British Columbia (Davies and Bergerud 1988) and within the ranges, but slightly lower than average to those across North America (Rusch et al. 2000). Our drumming counts are likely biased low, though, because peak drumming activity had passed before all the transects could be surveyed.

Gullion (1965) averaged 3.2 trap days/captured bird which is substantially less than our 12.7 trap days/captured bird. This is likely due to our late-season trapping effort when males are less aggressive. Captured ruffed grouse remained docile during confinement in our new trap design. Only 1 male was slightly scalped. Two birds lost considerable body contour feathers and retrices during extraction from the trap. Overall, the new design performed well and was easier to manufacture than the traditional style. The new traps are bulky to transport, though, and do not collapse for easier transport and storage. Internal temperatures can become problematic if ambient temperatures are high and the trap is in direct sunlight. Though we did not experience any precipitation during trapping, the plastic covering should provide adequate shelter during inclement weather for trapping earlier in the spring.

July was hot and dry and may be the reason 2 males crossed drainages to be on northwest facing slopes instead of southwest. Consequently, these 2 males had the largest home ranges. Very few berries were produced due to the near drought conditions and will possibly affect survival and movements this fall and winter.

JOB 2. FOREST GROUSE HARVEST.

Abstract

A research proposal will be developed to determine forest grouse harvest rates, seasonal distribution of harvest, and factors affecting abundance of populations available for fall harvest in Idaho.

Introduction

Historically, the forest grouse hunting season length in Idaho was conservative (mid-September to end of November). During the 1980s, the seasons gradually increased to the current length started in 1990 (1 Sep-31 Dec). It is unknown if this has had an affect on the harvest of hens with broods but has been speculated as the cause for reductions in populations of ruffed grouse in areas close to urban centers. The daily bag and possession limits have been held constant at 4 birds/day, 8 birds in possession in the aggregate. It is unknown if the 3 species of forest grouse in Idaho are affected by this harvest strategy. Devers et al. (2007) present a thorough review of effects of harvest on forest grouse, mainly ruffed grouse and dusky grouse, and found equivocal evidence. Hunting may be compensatory up to a certain point, then become additive but depends on several factors including landscape attributes and hunter behavior. A research proposal will be developed to determine forest grouse harvest rates, seasonal distribution of harvest, and factors affecting abundance to predict fall harvest in Idaho.

Objectives

1. Determine forest grouse harvest rates for each species in Idaho.
2. Determine forest grouse harvest distribution throughout the hunting season.
3. Determine factors affecting fall harvest.

Proposed Procedures

Harvest Rates.--Hunters will be surveyed in the field with roving censuses, wing barrels, check stations, and telephone surveys to determine hours/bird harvested, birds/hunter, and hunter days for each forest grouse species. Currently, effort is not separated among the 3 species. Therefore, it is unknown if bag limits are too high for one species or is being under-utilized when compared with the population estimates determined in Job 1.

Harvest Distribution.--Currently, forest grouse are managed as a group with a 4-month hunting season, 4 bird daily bag limit, and 8 in possession in the aggregate. It is unknown whether harvest differs throughout the season among the 3 species. With radio-marked and leg-banded birds, date of harvest will be determined. Also, habitat use and landscape features (road density) within home ranges will be used to assess the vulnerability of the harvested birds.

Harvest Prediction.--Population trends are determined after the hunting season is under way from comments from the general public at big game check stations, from wing barrels, and from telephone surveys after the season closes. No standardized routes are monitored before the hunting season to track trends or predict available harvest as are done for pheasants (*Phasianus colchicus*), greater sage-grouse (*Centrocercus urophasianus*), and chukars (*Alectorus chukar*). Harvest may be estimated if population levels determined in Job 1 can be correlated with the subsequent fall harvest.

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Figure 1. Walk-in trap used to capture ruffed grouse in Idaho, 2007.

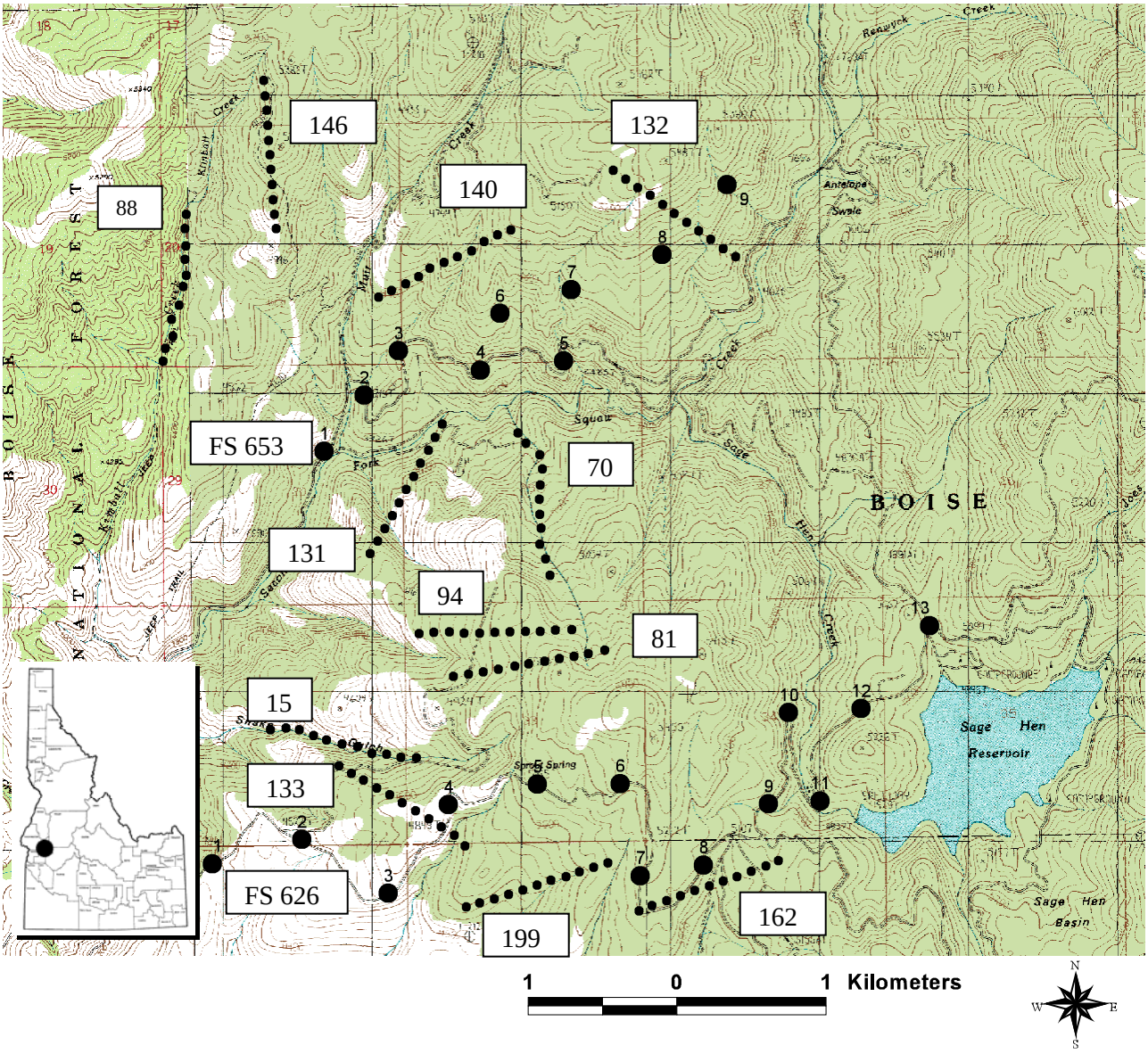


Figure 2. Locations of 12 line transects (small dots on 1,000 m line) and 2 roadside survey (large dots on Forest Service roads) observation points for surveying drumming ruffed grouse in Idaho, 2007. Line transects labeled with route number, roadside surveys labeled with road number (FS) and observation points.

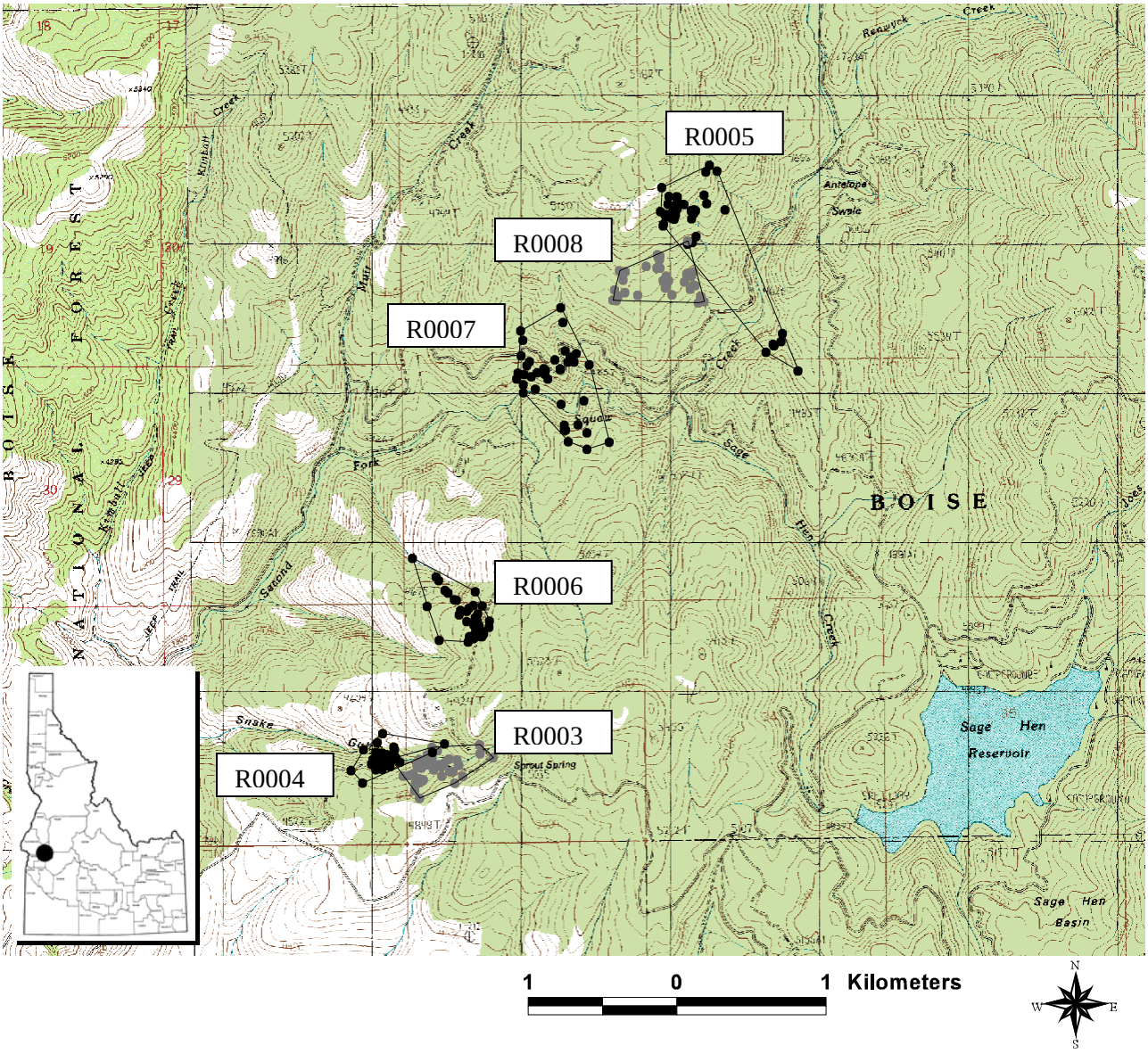


Figure 3. Male ruffed grouse locations mid-May through August, 2007, Idaho. Locations are enclosed by minimum convex polygon home ranges and labeled by band numbers.

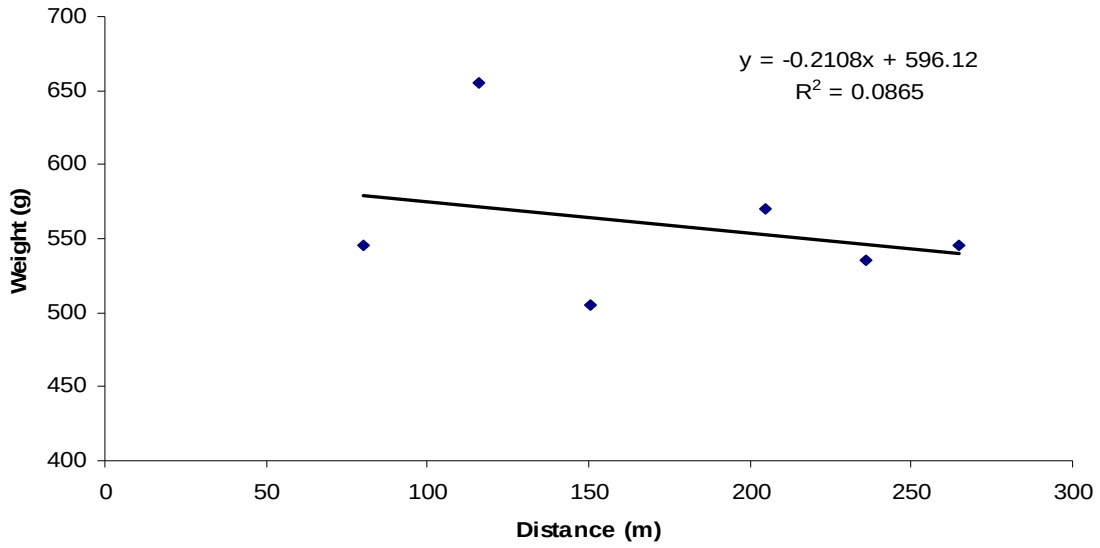


Figure 4. Relationship between weight at capture and average distance moved from capture site (drumming log) mid-May through August, for 6 ruffed grouse males captured in Idaho, 2007.

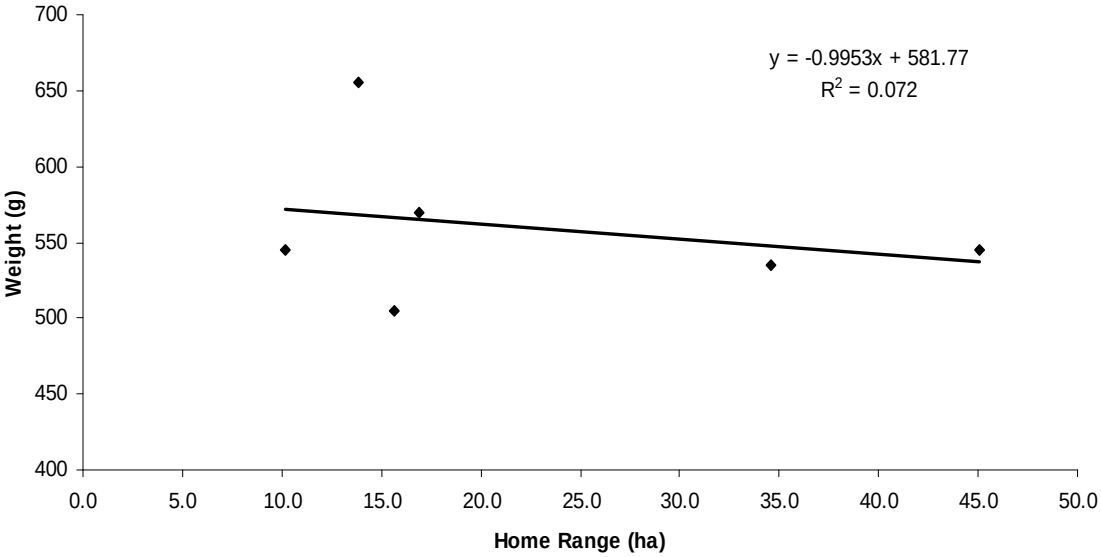


Figure 5. Relationship between weight at capture and home range (minimum convex polygon) for mid-May through August, for 6 ruffed grouse males captured in Idaho, 2007.

Table 1. Ruffed grouse drumming counts on line transects and roadside survey routes, Idaho, 2007.

Line Transect				Roadside		
Route	Date	Count		Route	Date	Count
15	24-May	2		FS 626	26-Apr	7
70	1-Jun	2		FS 626	23-May	4
81	23-May	0		FS 653	26-Apr	11
88	30-May	0		FS 653	22-May	4
94	24-May	1				
133	31-May	0				
132	8-May	2				
140	9-May	5				
146	25-Apr	10				
162	14-May	4				
199	15-May	0				
		26	Total birds[a]	18		
		11	Total surveys[b]	22		
		583	Area surveyed (ha) [c]	277		
		4.5	Birds/km[b]	6.5		

[a] Summation of maximum count for each roadside survey, i.e., FS 626 = 7 plus FS 653 = 11.
[b] Number of line transects, number of stops on the 2 roadside survey routes.
[c] Assuming a 200 m radius at each observation point. Line transect = 53.0 ha/transect. Roadside point = 12.6 ha/ point.

Table 2. Capture date, weight at capture, linear distance from capture site to locations, and home ranges for ruffed grouse in Idaho mid-May through August, 2007.

Band #	Capture date	Weight (g)	Distance (m)[a]	MCP (ha)[b]	Locations (*n*)
R0003	10 May	655	116 ± 28	13.8	53
R0004	10 May	545	80 ± 22	10.2	51
R0005	15 May	545	265 ± 106	45.1	50
R0006	15 May	505	151 ± 40	15.6	50
R0007	18 May	535	236 ± 47	34.6	42
R0008	31 May	570	205 ± 47	16.9	42
Overall[a]		559 ± 41	175 ± 57	22.7 ± 11.2	48 ± 4

[a] Mean ± 95% CI.
[b] Minimum convex polygon home range estimate.

Submitted by:

Jack Connelly
Principal Wildlife Research Biologist

David Musil
Senior Wildlife Research Biologist

Approved by:

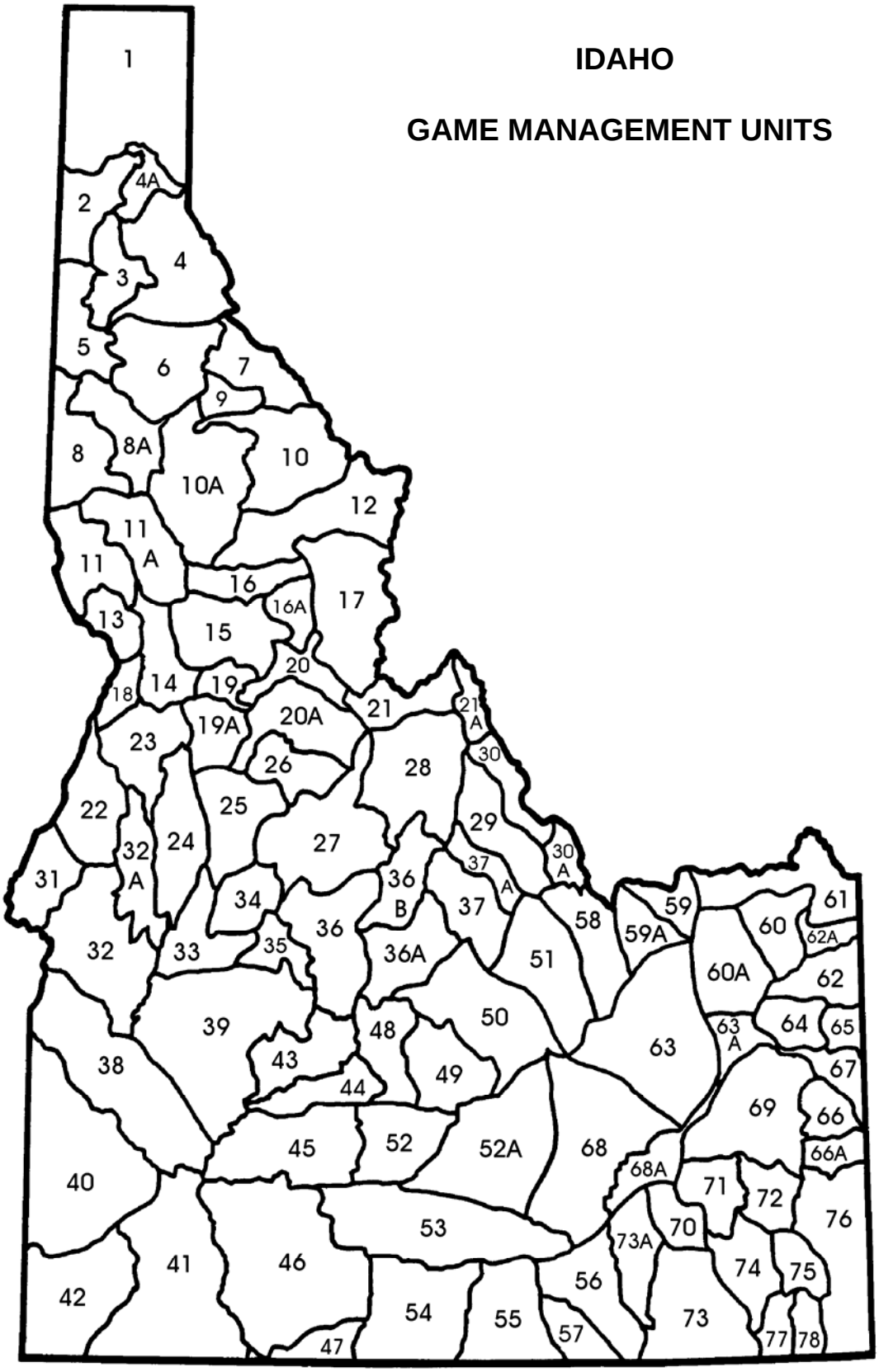
IDAHO DEPARTMENT OF FISH AND GAME

Dale E. Toweill
Wildlife Program Coordinator
Federal Aid Coordinator

James W. Unsworth, Chief
Bureau of Wildlife

IDAHO

GAME MANAGEMENT UNITS



FEDERAL AID IN WILDLIFE RESTORATION

The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sale of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program then allots the funds back to states through a formula based on each state's geographic area and the number of paid hunting license holders in the state. The Idaho Department of Fish and Game uses the funds to help restore, conserve, manage, and enhance wild birds and mammals for the public benefit. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes necessary to be responsible, ethical hunters. Seventy-five percent of the funds for this project are from Federal Aid. The other 25% comes from license-generated funds.