IDAHO

DEPARTMENT OF FISH AND GAME

Rod Sando, Director

Project W-168-C-17

Progress Report

WILDLIFE RESTORATION COORDINATION

Study I, Job 1: Wildlife Research Coordination

July 1, 1999 to June 30, 2000

Prepared By:

Wayne Melquist
State Nongame Wildlife Manager

April 2001

Boise, Idaho

Findings in this report are preliminary in nature and not for publication without permission of the Director of the Idaho Department of Fish and Game.

TABLE OF CONTENTS

PROGRESS REPORT
STATEWIDE WILDLIFE RESEARCH

STATE: Idaho **PROJECT TITLE:** Wildlife Restoration Coordination
PROJECT NO.: W-168-C-17
STUDY NO.: I
JOB: 1

PERIOD COVERED: July 1, 1999 to June 30, 2000

STATEWIDE

Federal Aid in Wildlife Restoration coordination responsibilities were shifted following the retirement of the previous Federal Aid coordinator. The new coordinator attended the Basic Grants Management course, attended the annual Federal Aid meeting, and met with Federal Aid staff from the Region 1 Fish and Wildlife Service office in Portland, Oregon. Project coordination was maintained for all wildlife projects including study plan development, document preparation, report editing, submitting project reports, and budget preparation. Federal Aid coordination was provided for all wildlife research, management, and land development projects.

OBJECTIVES

1. To coordinate the activities of the Pittman-Robertson Program in Idaho by facilitating project planning and providing administrative support for all Pittman-Robertson-funded projects.
2. To coordinate the activities of the Pittman-Robertson Program with other Department of Fish and Game activities.
3. To provide a liaison between the Department and the Division of Federal Aid for the Pittman-Robertson Program.

RESULTS AND FINDINGS

I assumed Federal Aid Coordination responsibilities from John Beecham following his retirement. I attended the Region 1 Federal Aid Coordinator's Meeting in Lake Tahoe, Nevada, from 1-5 November 1999. From 28 February to 3 March 2000, I attended the Federal Aid Basic Grants Management Course at the National Conservation Training Center in Shepherdstown, West Virginia. On 29 June 2000, Bill Hutchinson and I flew to Portland, Oregon, to meet with Federal Aid staff at the Region 1 office. New Federal Aid policies and procedures were discussed, as was the Section 6 program.

Project documentation, budgets, and reports, were completed for each field project. In order to ensure compliance with eligible activities under the Federal Aid in Wildlife Restoration Program, Wildlife Program budgets were adjusted so that no personnel are entirely on Federal Aid funds. This will permit staff to charge a license budget and work on activities not identified in the Project

Statement or on ineligible activities. A general summary of the activities of the research biologists during the year follows. In the future, these research summaries will not be included in the Wildlife Restoration Coordination Report. Instead, they will be reported elsewhere.

PROGRESS REPORT
STATEWIDE WILDLIFE RESEARCH

STATE: Idaho **SUBPROJECT**: Elk Ecology
PROJECT NO.: W-160-R-27
SUBPROJECT NO: 31
STUDY NO.: II-IV

PERIOD COVERED: July 1, 1999 to June 30, 2000

ELK ECOLOGY

Study II: Optimum Yield of Elk

Job No. 1: The effect of harvest on elk population size and composition in Idaho

Since 1992 we have attempted to evaluate the effects of different cow elk (*Cervus elaphus*) harvest rates and elk densities on population growth and recruitment rates. Using controlled hunts we established antlerless elk harvest rate targets of 2-5% in 3 game management units (GMUs) (controls), 6-10% in 4 GMUs (low harvest), and 14-30% in 4 other GMUs (high harvest). Estimated harvest rates of antlerless elk in 1997 in control and low harvest rate GMUs were close to target harvest rates, but they were substantially lower than target rates in 3 of 4 high harvest rate GMUs. In 1998 antlerless-only controlled-hunt permits were not available for GMUs 12 and 28 (low harvest targets) and GMU 20 (control target), and permits were substantially reduced in GMU 10A (high harvest rate target). These changes in permits make direct evaluation of the effects of different harvest rates on elk populations difficult to determine. Future direction of this project is dependent upon the outcome of the statewide data analysis (Study No. III).

Study III: Statewide Elk Data Analysis

Job No. 1: Analysis of statewide elk population and habitat datasets

To address the relationship between environmental variables and broad-scale patterns of elk population dynamics in Idaho, we analyzed 12 years (1987-1998) of aerial survey data collected in Game Management Units (GMUs) across the state. We identified and described broad-scale (>1,000 km^2) patterns of elk recruitment, determined the relationship between recruitment patterns and environmental variables, and developed a model that best explained variation in calf:cow ratios. Harvest-adjusted calf:cow ratios followed a normal distribution with 73% of GMUs between 25 and 40 calves:100 cows. Average ratios in southern Idaho GMUs were significantly higher than the rest of the state, and those in central Idaho GMUs were significantly lower. Four factors (forest productivity, soil-canopy, warm-dry climates, fire) explained 93% of the variance among 16 environmental variables. Elk recruitment during the study period was greatest in areas of low forest productivity, non-batholith soils, and high mature bull (≥5 points on each side) densities (r^2=0.313). High values of forest productivity occurred in areas with increased precipitation and net

primary productivity, indicating potentially high vegetative growth rates and dense overstory. Low elk recruitment in these areas may be a result of reduced ground and shrub layer production, resulting in decreased forage quantity, quality, or both.

Study IV: Factors Influencing Elk Calf Recruitment

Job No. 1: Pregnancy rates and condition of cow elk

As part of a larger effort to determine the factors responsible for poor or declining elk recruitment, we evaluated the body condition and pregnancy status of adult (>2 years old) cow elk on contrasting study areas in north-central Idaho. Funding was inadequate to capture and evaluate cow elk as was done in 1997 and 1998. Therefore, we relied on samples collected by hunters during the 1997, 1998, and 1999 hunting seasons. Though pregnancy rate ranged from 82% to 92%, we saw no significant difference in age, estimated weight, or condition (KFI) for cow elk harvested in the Elk City Zone from 1997 to 1999. Selenium levels in liver samples declined from 1.29 μg/g to 0.38 μg/g during this time. During 1999, pregnant cows were younger (7.9 vs. 10.8 years), in better condition (100 vs. 75 KFI), and had higher liver selenium levels (0.417 vs. 0.296 μg/g) than nonpregnant cows harvested after 1 November in the Elk City Zone. Lactation rates were approximately equal (57% vs. 50%) between the 2 groups. We continue to be plagued by small sample sizes in the McCall Zone, making interpretation difficult. Nevertheless, McCall Zone animals were younger (5 vs. 8 years) and in better condition (127 vs. 80 KFI) during fall 1999 than during previous sample years. Pregnancy rates remained high. During 1998 and 1999, the Department did not offer cow permits in the Lolo Zone. To collect pregnancy information, we collected fecal pellets from free-ranging cow elk in February and March. The steroid metabolite levels were determined to assess pregnancy rates. These data are being evaluated currently.

The research of Rachel Cook (Ash), a University of Idaho graduate student, is also part of this project. Abstracts from her work follow:

Chapter 1: Validation of nutritional condition indices for Rocky Mountain elk

We assessed and calibrated indices of nutritional condition for live and dead Rocky Mountain elk (*Cervus elaphus nelsoni*). Live animal indices included serum and urine chemistry, a body condition score (BCS), ultrasonography of subcutaneous fat and muscle, bioelectrical impedance analysis (BIA), and body mass. Dead animal indices included marrow fat, kidney fat, and several carcass scoring methods. Forty-three captive-raised cows (1.5 to 7 years old) were divided into 3 seasonal groups (September, December, and March) and were maintained on different nutritional levels to induce a wide range of condition. All were placed on identical diets 7 days prior to sampling to eliminate short-term nutritional effects. Cows were euthanized and homogenized for chemical analysis of fat, protein, water, and ash content. Estimates of fat and gross energy (GE) were compared to each of the condition indicators using regression analysis, with age and season as covariates. Thyroxin (T_4) and Insulin-like Growth Factor (IGF-1) exhibited significant seasonal effects and mandible marrow fat had a significant age effect. Nearly all serum and urine indices, bone marrow indices, and BIA were either poorly correlated with condition or exhibited highly nonlinear relations, restricting their value to a narrow range of condition. In contrast, BCS and subcutaneous fat depth were the best predictors of fat and GE for live animals ($r^2 > 0.87$, $P < 0.001$);

kidney fat and carcass/muscle scores were the best predictors for dead animals ($r^2 > 0.77$, $P < 0.001$); and IGF-1 and T_4 were the only useful serum and urine predictors ($r^2 > 0.54$, $P < 0.001$). Six wild cows were used to assess suitability of condition-index models for free-ranging elk. Although the range of condition for wild elk was limited, there was no difference in the ability of models to predict fat and GE between wild and captive cows. These results will enhance assessment of nutritional condition of free-ranging elk using practical and affordable techniques that were previously untested in elk.

Chapter 2: Nutritional influences on breeding dynamics in elk

The role of nutrition on the reproductive endocrinology of wild ungulates is poorly understood, even though nutrition-induced hormonal changes may contribute to declining productivity in free-ranging populations. We tested the effects of summer/fall nutrition on reproduction in cow elk (*Cervus elaphus nelsoni*) by subjecting captive (n = 30) animals to three forage quality treatments and monitoring pregnancy and fecal progestagen (P_4) excretion before, during, and after the breeding season. Digestible energy (DE) for high treatment cows was maintained at 2.95 kcal/g, while DE for medium and low treatments was gradually reduced to 2.6 kcal/g and 2.25 kcal/g by the end of the breeding season (all feed was offered ad libitum). Based on fecal radioimmunoassays and visual observations, 90%, 90%, and 10% of the cows in the high, medium, and low nutritional treatments bred. Nutritional restriction delayed breeding, with females in the medium and low treatments breeding an average of 8 and 28 days later than those in the high treatment. Pre-estrous progestagen levels did not differ with respect to breeding success, but cows in the low and medium nutritional treatments excreted significantly higher progestagen concentrations prior to breeding than animals in the high nutritional treatment. Treatment level failed to affect overall progestagen concentrations during pregnancy, but progestagen concentrations were positively correlated to animal condition (as measured by ultrasound and body mass) during three of seven weeks post conception. Cows that did not breed failed to exhibit estrous behavior, and hormonal excretion profiles confirmed that these cows failed to ovulate. These results suggested that inadequate summer/fall nutrition reduces pregnancy rates by preventing estrus and ovulation, rather than by preventing embryo implantation or by inducing early embryonic mortality.

Job No. 2: Calf mortality causes and rates

Elk recruitment must replace losses of adults to hunting and other factors to allow stability or growth of elk herds. Therefore, we are investigating causes of variation in calf mortality, including the effects of predation on calves by black bear (*Ursus americanus*) and mountain lion (*Felis concolor*). During the report period we monitored survival and determined causes of death of radio-collared elk calves captured in 1999 and 2000 in parts of Game Management Units (GMUs) 10 (North Fork of the Clearwater River), 12 (Lochsa River), and 15 (South Fork of the Clearwater River). In fall 1999 we initiated an increased bag limit of 2 black bear (*Ursus americanus*) and 2 mountain lion (*Felis concolor*) per year in the Lochsa study area and eliminated legal harvest of black bear and mountain lion in part of the South Fork study area. The North Fork and a portion of the South Fork serve as comparison areas. Determining condition of calves, which may influence survival rates and predisposition to predation, necessitates accurately aging calves at capture. Thus, we are developing aging criteria using data from known-aged calves from captive herds. Annual survival rates of wild calves captured in 1999 were 0.08 ± 0.08 (SE) on the North Fork, 0.22 ± 0.11 on the Lochsa, and

0.72 ± 0.10 on the South Fork. Survival rates of calves captured in 2000 to 1 August were 0.59 ± 0.13 on the North Fork, 0.53 ± 0.13 on the Lochsa, and 0.75 ± 0.10 on the South Fork. Predation by black bears and mountain lions continue to be primary sources of mortality. We observed 0.94 black bears/flying hour on the Lochsa and North Fork and 0.24 black bears/flying hour on the South Fork during 2000 calf capture operations. Across combined road and trail routes, black bear visitation rates in 1999 were 36% and 30% for the Lochsa/North Fork and South Fork, respectively. Of the black bears harvested during fall 1999 and spring 2000, 10 of 119 on the Lochsa/North Fork study area and 8 of 22 on the South Fork had been marked via tetracycline-laced baits. During February 1999 we conducted an aerial survey of mountain lions on the Lochsa. Estimates of 8.6 mountain lions/100 km^2, or 4.8 "adult" mountain lions/100 km^2 were obtained, but should be considered cautiously due to large confidence intervals. During 2000 South Fork elk and white-tailed deer (*Odocoilius virginianus*) populations were surveyed and included 945 ± 156 (90% confidence interval) elk, a calf:cow ratio of 25 ± 6.8 and a deer index of 1223 ± 229.

Job No. 3: Predation Effects On Elk Calf Recruitment

The objective of this study is to determine the effects of predation on elk recruitment in north-central Idaho. In spring 2000 we initiated an effort to manipulate black bear and mountain lion densities on a portion of each study area. Our goal is to reduce predator density by about 50% on a portion of GMU 12 using sport harvest. Concurrently, we have closed the black bear and mountain lion harvest seasons on a portion of GMU 15 so predator densities can increase. Monitoring predator densities; elk calf survival, condition, and causes of mortality; alternate prey abundance; and habitat condition on treatment and control areas will provide insight into the effects of predation on elk recruitment.

Technical Meetings and Training (M. W. Gratson)

Purpose	Location	Date
Clearwater Elk Initiative Adaptive Management Workshop	Moscow	July
Animal Restraint and Immobilization Training	Lewiston	July
Wildlife Managers Meeting	Kamiah	July
Statewide Biologists Meeting	Idaho Falls	Aug
Non-enforcement Training	Lewiston	Sep
Tri-state Elk Research Coordination	Lewiston	Oct
Elk research – Idaho Venison Council	Moscow	Nov
Clearwater Region Big Game Regulations	Lewiston	Dec
Clearwater Elk Initiative Monitoring	Lewiston	Dec
Clearwater Elk Initiative Monitoring	Lewiston	Jan
Sportsmans Group	Moscow	Jan

Purpose	Location	Date
NW Section The Wildlife Society Meeting	Post Falls	Feb
Non-enforcement Training	Lewiston	April
Animal Restraint and Immobilization Training	Lewiston	May
First Aid/Red Cross Training	Lewiston	May

Reports, Publications, Reviews, and Presentations

Gratson, M. W., P. Zager, J. Unsworth, and L. Kuck. (in prep.) Road closures and elk survival in north-central Idaho. Journal of Wildlife Management 00:000-000.

Gratson, M. W., B. Johnson, and W. Wall. (in review). Modifying aerial survey models for other aircraft. Journal of Wildlife Management 00:000-000.

Cook, R. C., J. G. Cook, D. L. Murray, P. Zager, B. K. Johnson, and M. W. Gratson. (in review). Validation of nutritional conditional indices for Rocky Mountain elk. Journal of Wildlife Management 00:000-000.

Gratson, M. W., and C. Whitman. (in press). Characteristics of Idaho elk hunters relative to road access on public lands. Wildlife Society Bulletin 28:000-000.

Gratson, M. W., and C. Whitman. 2000. Road closures and density and success of elk hunters in Idaho. Wildlife Society Bulletin 28:302-310.

Gratson, M. W., and P. Zager. 2000. Elk ecology. Study IV. Factors influencing elk calf recruitment. Job No. 1: Pregnancy rates and condition of cow elk. Job No. 2: Calf mortality causes and rates. Job No. 3: Predation effects on elk calf recruitment. Federal Aid in Wildlife Restoration, Job Progress Report, Project W-160-R-26. Idaho Department of Fish and Game, Boise.

Bomar, L., E. O. Garton, J. M. Scott, P. Zager, and M. W. Gratson. 2000. Elk ecology. Study III. Statewide elk data analyses. Job No. 1: Analysis of statewide elk population and habitat datasets. Federal Aid in Wildlife Restoration, Job Progress Report, Project W-160-R-26. Idaho Department of Fish and Game, Boise.

Gratson, M. W. 2000 (oral presentation). Relevance of predator-prey relationships to managing Idaho's Fish and Game. Wildlife Management Class Lecture, University of Idaho, Moscow, Idaho.

Gratson, M. W. 2000 (oral presentation). Adaptive management of cow elk harvest rates. Wildlife Management Class Lecture, University of Idaho, Moscow, Idaho.

Gratson, M. W. (manuscript review). Can white-tailed deer populations be managed at the landscape scale using traditional hunter harvest? Proceedings of a symposium: Perspectives of scale in ungulate ecology and management, Nelson, B.C.

Meetings and Presentations (Pete Zager)

Date	Purpose	Location
July	Clearwater Elk Initiative meeting	Moscow
	Biologists' meeting (backcountry elk)	Kamiah
	Rachel Ash (Cook) committee meeting	Lewiston
August	Dennis Murray re IDFG/UI coordination	Lewiston
	IDFG biologists' meeting	Island Park
	Predator/prey meeting with Commissioner	Island Park
September	John Theberg wolf presentation	Moscow
October	Tri-state elk coordination meeting	Walla Walla
November	Elk Recruitment Project presentation for Dr. Roth	Moscow
	Prepared column for Moscow newspaper	Lewiston
	Caribou Steering Committee meeting	Spokane
December	Clearwater Region big game meeting	Myrtle
	Potlatch Corporation re cooperative projects	Lewiston
	IMCTC	Spokane
January	Clearwater Elk Initiative meeting	Moscow
	Clearwater Elk Initiative meeting	Lewiston
	Class presentation for Dick Shew (WSU)	Pullman
February	Open house for deer/elk regulations	Orofino
	Open house for deer/elk regulations	Lewiston
	CERT meeting	Orofino
	L.S. Mills presentation (lynx)	Moscow
March	Wildlife Ecology class (UI) re Elk Recruitment Project	Moscow
	The Wildlife Society meeting	Post Falls
April	Clearwater Elk Initiative meeting	Moscow

Date	Purpose	Location
	Met with UI faculty candidates (x4)	Moscow
	Hells Canyon BHS meeting	Clarkston
	Wildlife Staff meeting	Lewiston
	Enforcement training	Lewiston
May	Western Black Bear Workshop presentation	Coos Bay
	Drug training	Myrtle
	First Aid and CPR training	Lewiston
June	Clearwater Elk Initiative meeting	Lewiston

Manuscripts Reviewed

Biological Conservation
Journal of Wildlife Management
Northwest Science
Ursus

Also served as an Associate Editor for the 10th International Association for Bear Research and Management proceedings. Chair of the Association's publications committee.

Reports and publications

Bomar, L.K., E.O. Garton, P. Zager, M.W. Gratson, and J.M. Scott. 200-. Broad-scale patterns of elk recruitment and habitat quality in Idaho. (in press).

Bomar, L.K., E.O. Garton, J.M. Scott, P. Zager, and M.W. Gratson. 2000. Elk ecology. Study III: Statewide elk data analysis. Fed. Aid Wildl. Restor., Job Prog. Rep., Proj. W-160-R-26. Idaho Dep. of Fish and Game, Boise.

Cook, R.C., J.G. Cook, D.L. Murray, P. Zager, B.K. Johnson, and M.W. Gratson. 200-. Validation of nutritional indices for Rocky Mountain elk. (submitted).

Cook, R.C., D.L. Murray, J.G. Cook, P. Zager, and S.L. Monfort. 200-. Nutritional influences on breeding dynamics in elk. (submitted).

Gove, N. E., J. R. Skalski, and P. Zager. 200-. Statistical models for population reconstruction using age-at-harvest data. (revised and resubmitted)

Gratson, M. W., and P. Zager. 1999. (Lochsa) elk ecology. Study II. Optimum yield of elk. The effect of harvest on elk population size and composition in Idaho. Fed. Aid Wildl. Restor., Job Prog. Rep., Proj. W-160-R-25. Idaho Dep. of Fish and Game, Boise.

Gratson, M. W., and P. Zager. 2000. Elk ecology. Study IV. Factors influencing elk calf recruitment. Fed. Aid Wildl. Restor., Job Prog. Rep., Proj. W-160-R-26. Idaho Dep. of Fish and Game, Boise.

Hayes, S. G., D. J. Leptich, E. O. Garton, and P. Zager. 200-. Sexual segregation and seasonal habitat selection of elk in northern Idaho. (draft).

Hayes, S. G., Leptich, D. J., and P. Zager. 200-. Proximate factors affecting bull elk mortality in northern Idaho. (revised and resubmitted).

Reese, K.P., P.J. Nelle, and P. Zager. 1999. Movements, habitat use, and survival of mountain quail (*Oreortyx pictus*) during fall and winter in west-central Idaho. Prepared for Idaho Department of Fish and Game and the Bureau of Land Management.

Reese, K.P., P.J. Nelle, and P. Zager. 2000. Fall/winter mountain quail ecology. Fed. Aid Wildl. Restor., Job Compl. Rep., Proj. W-160-R-26. Idaho Dep. of Fish and Game, Boise.

Secord, M., P. Zager, and D. Pletscher. 1999. The influence of temporal and spatial factors on clearcut use by white-tailed deer in northern Idaho. West. J. Appl. For. 14:177-182.

Skovlin, J., P. Zager, and B. Johnson. 200-. Habitat requirements and evaluations. *in* J. W. Thomas and D. Toweill (eds.). Elk of North America: ecology and management. 2nd ed. Stackpole Books, Harrisburg, Pa. (in press).

Tomson, S., K. Foresman, and P. Zager. 1999. Pine marten ecology. Fed. Aid Wildl. Restor., Job Compl. Rep., Proj. W-160-R-26., Subproj. 46. Idaho Dept. Fish and Game, Boise.

PROGRESS REPORT
STATEWIDE WILDLIFE RESEARCH

STATE: Idaho **SUBPROJECT:** Mule Deer Ecology
PROJECT NO.: W-160-R-27
SUBPROJECT NO.: 35
STUDY NO.: I-II

PERIOD COVERED: July 1, 1999 to June 30, 2000

MULE DEER ECOLOGY

Study I: Winter Fawn Survival

This research will result in improved monitoring of mule deer populations and will provide wildlife managers with the information needed to accurately communicate herd condition to sportsmen. It will also enable managers to detect population changes when they occur and make timely decisions regarding optimal rates of doe harvest.

Study II: Study Plan Implementation

Mule deer fawns were captured and radio-collared on 9 study areas across central and southern Idaho during December-January 1998-1999 (n = 226) and December-January 1999-2000 (n = 214). The overall fawn survival rate from 17 December 1998 through 31 May 1999 was 0.644 (SE = 0.037) and from 13 December 1999 through 12 May 2000 was 0.57 (SE = 0.036). Survival rates varied among study areas in 1998-1999 (χ^2 = 14.178, df = 8, P = 0.077) and 1999-2000 (χ^2 = 41.167, df = 8, $P < 0.001$) but not sexes (χ^2 = 0.012, df = 1, P = 0.912) and (χ^2 = 0.020, df = 1, P = 0.889), respectively. Seventy fawns died during the 1998-1999 winter: 22 coyote kills, 15 mountain lion kills, 4 other predator kills (bobcat, dog, wolf), 19 winter malnutrition deaths, and 10 died from other causes (reservoir, road-killed, unknown). Seventy-five fawns died during the 1999-2000 winter: 25 coyote kills, 15 mountain lion kills, 2 other predator kills (bobcat, unknown predator), 16 winter malnutrition deaths, and 17 died from other causes (train, road-killed, unknown). Fawn size and condition were assessed at the time of capture by measuring mass (kg), chest girth (cm), and hind foot length (cm). Pooled data from 1998-1999 and 1999-2000 (n = 414) indicate that fawns surviving the winter were heavier than fawns that died (F = 28.22, df = 1, $P < 0.001$), male fawns were larger than female fawns (F = 54.75, df = 1, $P < 0.001$), fawn mass varied among the 9 study areas (F = 8.86, df = 8, $P < 0.001$), and fawns were heavier in 1998-1999 than in 1999-2000 (F = 39.65, df = 1, P < 0.001). The simplest model which effectively explained fawn survival (χ^2 = 58.408, df = 10, P < 0.001) included sex, mass, and study areas.

Meetings and Presentations

Month	Meeting	Location
July	Biologist Meeting	Kamiah
Aug	Biologist Meeting	Island Park
Sept	Commission Meeting	Boise
Oct	Presentation at Hunter Ed. Class	Caldwell
Nov	Training Presentation	Nampa
Jan	Biologist Meeting	Boise
Jan	Public Meeting	Nampa
Feb	Rules Planning	Boise
Mar	Wildlife Society	Post Falls
Mar	Hunter Report Meeting	Boise
Apr	Brownlee Staff Meeting	Brownlee
May	Deer Presentation	Nampa
May	Deer Presentation	Nampa

Reports, Publications, Articles

Cooper, A., and J. W. Unsworth. 2000. Study I: Harvest and Population Modeling. Job Completion Report, Project W-160-R-23. Idaho Dept. Fish and Game, Boise.

Miyasaki, H. M., M. A. Hurley, and J. W. Unsworth. 2000. Study 1: Winter Fawn Survival. Study II: Mule Deer Data Base. Job Progress Report, Project W-160-R-27. Idaho Dept. Fish and Game, Boise.

PROGRESS REPORT
STATEWIDE WILDLIFE RESEARCH

STATE: Idaho **SUBPROJECT:** Upland Game Ecology
PROJECT NO: W-160-R-27
SUBPROJECT NO.: 47
STUDY: I and III

PERIOD COVERED: July 1, 1999 to June 30, 2000

UPLAND GAME ECOLOGY

Study I: Pheasant Response to Intensive Habitat Management

Several sections in Gooding County were mapped using hand-held global positioning system units. This project was stopped when Study II was started. The previous research biologist retired in December 1999, and the position was not refilled until March 2000.

Study III: Effectiveness of Transplanting Pheasants as a Management Tool

Job 1: Hunter Harvest of Pen-Reared and Wild Pheasants In Idaho

ABSTRACT

During the 1999 pheasant hunting season (16 October-30 November), 143 pen-reared male ring-necked pheasants were released (30 radio marked) on 4 tracts (1,679 ha) of public land in south-central Idaho. Of the 26 fates known for radio-marked birds, 19 (73%) roosters were harvested, 5 (19%) were killed by predators, and 2 (8%) survived. Fifty-nine (41%) of all the released birds were known to be harvested. Nineteen (32%) of the known harvested birds were radio-marked. Field interviews of 103 hunters showed a harvest effort of 0.64∀0.56 pen-reared birds/hour and 0.50±0.55 wild birds/hour harvested on the tracts (mean±95% confidence interval). A combined success of 1.15±0.76 birds/hour and 0.49±0.24 birds/hunter occurred for the 10-day sampling period on the tracts. Data analysis is continuing on this project.

Job 2: Survival of Pen-Reared and Wild Pheasants Translocated Into Idaho

ABSTRACT

One hundred forty-nine (117 hens, 32 roosters) wild pheasants and 991 (742 hens, 249 roosters) game farm pheasants were released into Idaho to augment low resident populations. Monitoring of radio-marked birds (200 hens, 29 roosters) for April-June 2000, showed 61% wild hen, 25% wild rooster, 2% game farm hen, and 0% game farm rooster survival. Most (88%) of the game farm hen mortalities occurred during the first month after release compared to 46% for the wild hens. All

(100%) of the game farm roosters died during the first month after release while 55% of the wild rooster mortalities occurred during that time. Data analysis is continuing on this project.

Presentations

Musil, D. D. 2000. Efficacy of augmenting low populations of pheasants with wild transplants and game farm stock. June 3rd Meeting of Upper Snake and Magic Valley Pheasant Advisory Group. Pocatello, ID.

Musil, D. D. 2000. Efficacy of augmenting low populations of pheasants with wild transplants and game farm stock. June 7th Idaho Fish & Game Habitat Manager Meeting. Red River Wildlife Management Area, ID.

Musil, D. D. 2000. Efficacy of augmenting low populations of pheasants with wild transplants and game farm stock. Sept. 12 Pheasants Forever Meeting - Idaho Falls Chapter. Idaho Falls, ID.

Publications

Musil, D. D. 2000. Study III: Effectiveness of transplanting pheasants as a management tool. Idaho Dept. Fish and Game Proj. W-160-R-26. Job Progress Rep. Boise, Idaho.

PROGRESS REPORT
STATEWIDE WILDLIFE RESEARCH

STATE: Idaho **SUBPROJECT:** Southeast Mule Deer Ecology
PROJECT NO.: W-160-R-27
SUBPROJECT NO.: 51
STUDY NO.: I-II

PERIOD COVERED: July 1, 1999 to June 30, 2000

SOUTHEAST MULE DEER ECOLOGY

Study I: Influence of predators on mule deer populations

Coyotes were removed from the 4 treatment areas (Units 55, 57, 73A, and 73 Elkhorn) by helicopter gunning in winters 1997, 1998, 1999, and 2000 (Table 4). Flights continued until less than 1 coyote was killed per hour flown. Additional trapping effort was maintained through July in 1999 and 2000. Nontreatment areas included Units 54, 56, 71, and 73 Malad, in which coyote removal was minimal.

Coyote scat transects have been delineated in eight control and treatment areas (80 in each area). In 1998, 66 transects were completed in the summer and 80 were completed in the fall. The summer index was lower in Units 73 and 73A (0.071) than in Unit 56 (0.116). The fall survey index, however, showed the opposite trend with Unit 73A higher (0.183) than Unit 56 (0.124). Coyote transects were completed in all study units in 1999 and 2000. A total of 407 transects were completed in 1999 and 250 to date in 2000. Analysis of coyote density is ongoing at the Predator Ecology Lab in Logan, UT.

Lagomorph spotlight transects and small mammal trapping transects were completed during the summer of each year. Highest catch rates (primarily *Peromyscus maniculatus*) were in the low elevation sagebrush type in 1998. Small mammal catch rates (primarily *Peromyscus maniculatus*) were significantly lower in the low elevation transects in 1999. This pattern persists into 2000, with 50% of the transects completed. Lagomorph populations are increasing across the study area, especially in the *Lepus* species.

Mountain lion season structure in the liberal harvest units was changed from a liberal female quota system in 1997-1998 to a general season in 1998-1999, then back to a liberal quota in 1999-2000. Female quota in the conservative harvest units has remained unchanged since 1997. Six mountain lions were radio-collared in Units 56 and 73A in 1998. An additional 5 mountain lions were radio-collared in 1999 and 2 in 2000. Both the mountain lion removal and track index information suggest a reduction in the mountain lion numbers in the liberal hunt units at least for 1999. Snow conditions limited the number of quadrants completed in 2000. Age structure data obtained from removed mountain lion also suggest a high harvest rate in the liberal hunt units.

Aerial composition surveys were completed in all study units during December and early January. The results show little pattern of fawn:doe ratios related to control or treatment units, with the exception of 73A in 1999. Aerial population surveys were conducted in April using the methodology outlined in Unsworth et al. (1994). Winter ranges were surveyed completely to provide comparable data to previous surveys.

Mule deer were captured using drive netting or net gunning at sites uniformly distributed across the major winter ranges in Units 56 and 73A. Capture operations were completed in January. Newborn fawns were captured between June3-18, 2000.

Blood samples were drawn from 95 adult does, 12 yearling does, and 4 female fawns in 1998. Blood serum was tested for pregnancy, nutritional serum profile, and disease profile. Pregnancy results from 1998 confirmed high pregnancy rates; 98% of 2.5+-year-old and 83% of 1.5-year-old does were pregnant. None of the fawns were pregnant. Blood samples were draw from 57 adult does and 11 yearling does in four units across the study area (Units 54, 56, 71, and 73A) in 1999. Pregnancy rates were 91% for 2.5+-year-old does and 100% for yearlings. Nutritional and disease panels are completed for 1999 and 2000, but results are not yet compiled. Blood sampling was expanded to all southern Idaho regions in 2000 with 301 samples drawn from does and fawns. Pregnancy results from 108 adult deer indicated 90% pregnancy rates for 2.5+ old does and 47% for yearling does. June fawn-at-heel ratios have remained high for the past three years. In 73A ratios were 164 fawns:100 does, 171:100, and 162:100 for 1998, 1999, and 2000, respectively. In Unit 56 ratios were162 fawns:100 does, 176:100 and 183:100 for the same 3 years.

Mortality of newborn fawns was again lower in Unit 73A (30%) than 56 (56%) at time of publication. The mortality of newborn fawns attributed to coyotes was lower in Unit 73A (3%, $n = 1$) than Unit 56 (13%, $n = 4$). Mountain lion-caused mortality was also lower in Unit 73A (3%, $n = 1$) than Unit 56 (16%, $n = 5$). Contrary to previous years, deaths of newborn fawns are continuing into September, including coyote-caused deaths in both units. In winter 2000 the mortality of 6-month-old fawns was different between the two units (17% in 73A and 53% in 56). Annual adult survival was high for all 3 years of the study, 87-98% in Unit 56 and 91-97% in Unit 73A. Adult mortality in 1999 was caused completely by mountain lions, accounting for 13% in Unit 56 and 3% in Unit 73A. Adult mortality patterns were different in 2000, 2% mortality in Unit 56 and 9% in Unit 73A including 2 kills by coyotes.

The work this year shows some result of coyote and mountain lion removal on the newborn fawns and 6-month-old fawns. The high pregnancy rates (especially in yearling does) and high fetal rates in both areas indicate deer are on a high nutritional plain. The winter was mild across the study areas.

Study II: Influence of habitat quality and composition changes to productivity and recruitment of mule deer

Population data information has been gathered from the wildlife managers concerning the population direction of deer, elk, bears, coyotes, and mountain lions for the past 30 years in Regions 4-7. GIS layers of population direction by unit have been produced for each species. NALC multi-spectral satellite images have been processed with NDVI ratio to remove error and cloud cover, representing

1972 and 1990 ground cover. NALC coverage was selected using Pheno-Calc program to determine correct dates and weather conditions to compare different phenological years. Ground truthing of the satellite images will continue through next year. USGS maps were used to produce three soil-vegetation maps using Bureau of Land Management (BLM) soil survey for Bannock, Onidea, and Franklin Counties. This will allow three dates in which to produce a change map. The satellite images are the base for the rest of the analysis.

The 1970s information has been obtained from Soil Vegetation Inventory Method (SVIM), an experiment done by BLM in 1977. Maps have been produced using SVIM data for 19 quads around the Malad area. Pictures have been reprinted of different estimated vegetation plots in 1977, and have been revisited. Orthoquads will be obtained of the entire area and compared to current information.

Grazing allotments from BLM and ICBEMP were obtained for the state of Idaho and are currently being corrected for use in this study. Information has been added to show the number of animals, the dates the animals were let onto the land, and the dates removed. Fire data has been collected from 1939 to 2000 of all wildfires, prescribed burns, and chemical burns on BLM lands. Other coverages that will be added to the acquisition map will include big game units, winter ranges, and town locations that have been produced by Idaho Fish and Game. Acquisition of maps has begun and will progress throughout the coming year.

Meetings and Presentations

Month	Meeting or Presentation	Location
July	Meeting with Predator Ecology Personnel	Pocatello
July	GIS resource modeling workshop	Pocatello
July	SE Mule Deer Foundation research update	Pocatello
August	Presentation to Idaho Goes Wild, Safari Club	Pocatello
August	Biologist meeting and presentation	Island Park
August	Wildlife Services Meeting with Craig Maycock	Pocatello
September	Funding meeting with BLM	Pocatello
September	Wildlife Services and IDFG Coordination Meeting	Boise
October	Meeting with Predator Ecology Personnel	Logan
November	Safari Club Predator Management Meeting	Pocatello
December	Annual meeting with Wildlife Services	Pocatello
December	Wildlife Technician Training and Instruction	Nampa
December	Aspen/Fire meeting with BLM	Pocatello
March	Wildlife Society Meeting	Post Falls

Month	Meeting or Presentation	Location
April	GIS Conference at ISU	Pocatello
April	BLM SVIM Data Coordination Meeting	Pocatello
May	Meeting with Wildlife Services	Pocatello
May	Regional Meeting	Soda Springs

Publications

Hurley, M. A., and J. W. Unsworth. 1999. Southeast Mule Deer Ecology, Study I: Influence of predators on mule deer populations. Job Progress Report, Project W-160-R-25. Idaho Dept. Fish and Game, Boise. 13 pp.

Hurley, M. A., and J. W. Unsworth. 1999. Southeast Mule Deer Ecology, Study I: Influence of habitat quality and composition changes to productivity and recruitment of mule deer. Job Progress Report, Project W-160-R-25. Idaho Dept. Fish and Game, Boise. 8 pp.

PROGRESS REPORT
STATEWIDE WILDLIFE RESEARCH

STATE: Idaho **SUBPROJECT:** Upland Bird Ecology
PROJECT NO: W-16O-R-27
SUBPROJECT NO.: 53
STUDY NO.: I-III

PERIOD COVERED: July 1, 1999 to June 30, 2000

UPLAND BIRD ECOLOGY

Study I. Sage Grouse Habitat and Population Trends in Southern Idaho

Because of personnel and budget constraints, work on this study was limited during the fiscal year. Activities during FY 2000 were confined to cooperating with the U.S. Forest Service, Bureau of Land Management (BLM), U.S. Air Force, and Utah State University in an assessment of sage grouse populations and sagebrush rangeland on and near the Curlew National Grasslands (CNG) and in eastern Owyhee County. In the Curlew area breeding populations showed distinct declines in the early 1980s, with more severe declines during the early 1990s. Twenty-three percent of the CNG and 32% of BLM land remain in 11-25% sagebrush canopy cover and, thus, may provide suitable nesting and early brood-rearing habitat for sage grouse. However, this is likely an overestimate of good nesting and brood cover available to grouse, because the herbaceous understory was not considered in habitat classification.

In 1999 the Idaho Department of Fish and Game and the University of Idaho began preliminary fieldwork in Owyhee County to document seasonal movements and habitat use of sage grouse. During the last two field seasons, 9 new leks were identified within the study area. Of these, 6 occurred on dry lakebeds, 1 was in a crested wheatgrass seeding, and 2 were in low sagebrush along ridges. The new leks ranged from 1 to 19 males and the average size was <12 males. No quantitative assessments were made of habitat within this study area, but habitat evaluations will be conducted during the next field season. Generally, higher elevation breeding habitat on the southern portion of the study area appeared in better ecological condition with a healthy herbaceous understory compared to the more xeric northern portion of the study area. The entire study is being conducted in some of the better remaining sage grouse habitat within Owyhee County (Lou Nelson, personal communication), although highly fragmented sagebrush rangeland lies immediately to the north and east of the study area. Documenting sage grouse seasonal ranges, movements, and productivity in these fragmented habitats would provide a more complete and useful assessment of sage grouse populations and habitats in Owyhee County.

During FY 2000 the Department and BLM initiated a long-term project to assess sage population and habitat changes in the state. Data compilation and analysis was scheduled to begin in early FY 2001.

Study II: Mortality Patterns of Juvenile Sage Grouse

Based on available data throughout the species' range and documented habitat changes in Idaho, many sage grouse population declines may be due to low juvenile survival associated with decreasing quantity and quality of brood-rearing habitat. During 1997 and 1998 mortality patterns were documented for both sexes of juvenile sage grouse and compared between a relatively xeric habitat dominated by Wyoming big sagebrush (*A. t. wyomingensis*) and a more moist habitat characterized by mountain big sagebrush (*A. t. vaseyana*). Fieldwork began in summer 1997. Twenty-one juveniles and 3 adult hens were captured by night-lighting on summer range and equipped with radio-transmitters. Survival to the breeding season was relatively high for birds marked in sagebrush/agriculture lowlands. Survival for juvenile males (85%) was similar to that of juvenile females (86%). Predation was the most common cause of death of juvenile and adult sage grouse during the 1997-1998 field season. Avian predators more commonly preyed on juveniles than did mammalian predators, while adult deaths were more evenly split between the two predator types. Accidental deaths due to powerline collisions also accounted for a relatively high percentage of juvenile deaths. Seventy percent of juvenile females returned to their natal range during summer 1998 while only 10% of the males did so.

During 1999 we began assessing survival of sage grouse chicks between the ages of 1 day and 8 weeks. The 1999 field season was a pilot study to develop and refine marking and capturing techniques. Satisfactory techniques were developed and about 75% of chicks died before reaching 3 weeks of age (n = 31).

Chick survival research continued through the 2000 field season. Sample sizes of chicks were increased, but survival patterns were very similar to those documented during 1999 with <30% of the radio-marked chicks surviving to three weeks of age.

Study III: Sage Grouse Response to Exploitation

Since the mid-1980s sage grouse seasons have been liberalized in many areas. Idaho, Montana, Wyoming, and Colorado generally held seasons that were $\geq$30 days in length with bag limits of 3 birds/day. By 1996, following widespread population declines, seasons again were established more conservatively and areas in both Colorado and Idaho were closed to sage grouse hunting. Although some information is available on the response of sage grouse to exploitation, there is little empirical evidence documenting the effect of hunting on sage grouse populations. Thus, we initiated efforts to document effects of different exploitation rates on survival of sage grouse and began a meta-analysis of existing sage grouse data to better understand sage grouse mortality, including hunting.

For the last 5 years we documented population changes in areas closed to hunting and compared these changes to population trends in areas with light (1 bird bag limit, 1 week season) and moderate (2 bird bag limit, 2 week season) hunting. These data are now being analyzed.

Reports

Apa, A. D. 1998. Habitat use and movements of sympatric sage and Columbian sharp-tailed grouse in southeastern Idaho. Ph.D. dissertation, University of Idaho, Moscow. 199 pp.

Edelmann, F. B., M. J. Ulliman, M. J. Wisdom, K. P. Reese, and J. W. Connelly. 1998. Assessing habitat quality using population fitness parameters: a remote sensing/GIS based habitat-explicit model for sage grouse. Idaho For., Wildl., and Range Exp. Sta. Bull. Tech. Bull. 25. 33 pp.

Connelly, J. W., M. W. Gratson, and K. P. Reese. 1998. Sharp-tailed grouse species account. Birds of N. A. Species Account No. 354. The Birds of North America Inc., Philadelphia, PA. 20 pp.

Nelle, P. 1998. The long-term effect of fire on sage grouse nesting and brood-rearing habitats on the upper Snake River Plain. M.S. thesis. University of Idaho, Moscow. 85 pp.

Connelly, J. W., K. P. Reese, R. A. Fischer, and W. L. Wakkinen. 2000. Effects of fire on a sage grouse breeding population in southeastern Idaho. Wildl. Soc. Bull. 28:90-96

Connelly, J. W., A. D. Apa, R. B. Smith, and K. P. Reese. 2000. Hunting and predation as mortality factors of adult sage grouse in Idaho. Wildl. Biol. 6:233-238.

Leonard, K. M., K. P. Reese, and J. W. Connelly. 2000. Distribution, movements, and habitats of sage grouse on the upper Snake River Plain of Idaho: changes from the 1950s to the 1990s. Wildl. Biol. 6: in press.

Nelle, P., K. P. Reese, and J. W. Connelly. 2000. The long-term effect of fire on sage grouse habitat. J. Range Manage. 53:586-591.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to Manage sage grouse populations and their habitats. Wildl. Soc. Bull. 28: in press.

Meetings and Presentations

Connelly, J. W. 1999. A review of sage grouse ecology. Presented at the Upper Snake Local Working Group Meeting. Mud Lake, ID. April 26.

Connelly, J. W., A. D. Apa, R. B. Smith, and K. P. Reese. 1999. Hunting and predation as mortality factors of adult sage grouse in Idaho. International Grouse Symposium. Rovaniemi, Finland. September 13-17.

Connelly, J. W., A. D. Apa, R. B. Smith, and K. P. Reese. 1999. Hunting and predation mortality factors of adult sage grouse in Idaho. Presented at the Upper Snake Local Working Group Meeting. Mud Lake, ID. September 2.

Leonard, K. M., K. P. Reese, and J. W. Connelly. 1999. Distribution, movements, and habitats of sage grouse on the upper Snake River Plain of Idaho: changes from the 1950s to the 1990s. International Grouse Symposium. Rovaniemi, Finland. September 13-17.

Lucia, M., K. P. Reese, and J. W. Connelly. 1999. Mortality of juvenile sage grouse in southeastern Idaho. Presented at the annual meeting of the Idaho Chapter of The Wildlife Society. Boise, ID. March 10-13.

Connelly, J. W. 2000. Dogma and gamebird management. Lecture presented at the University of Idaho, Moscow. April 26.

Submitted by:

Wayne Melquist
Wayne Melquist
Nongame Wildlife Manager

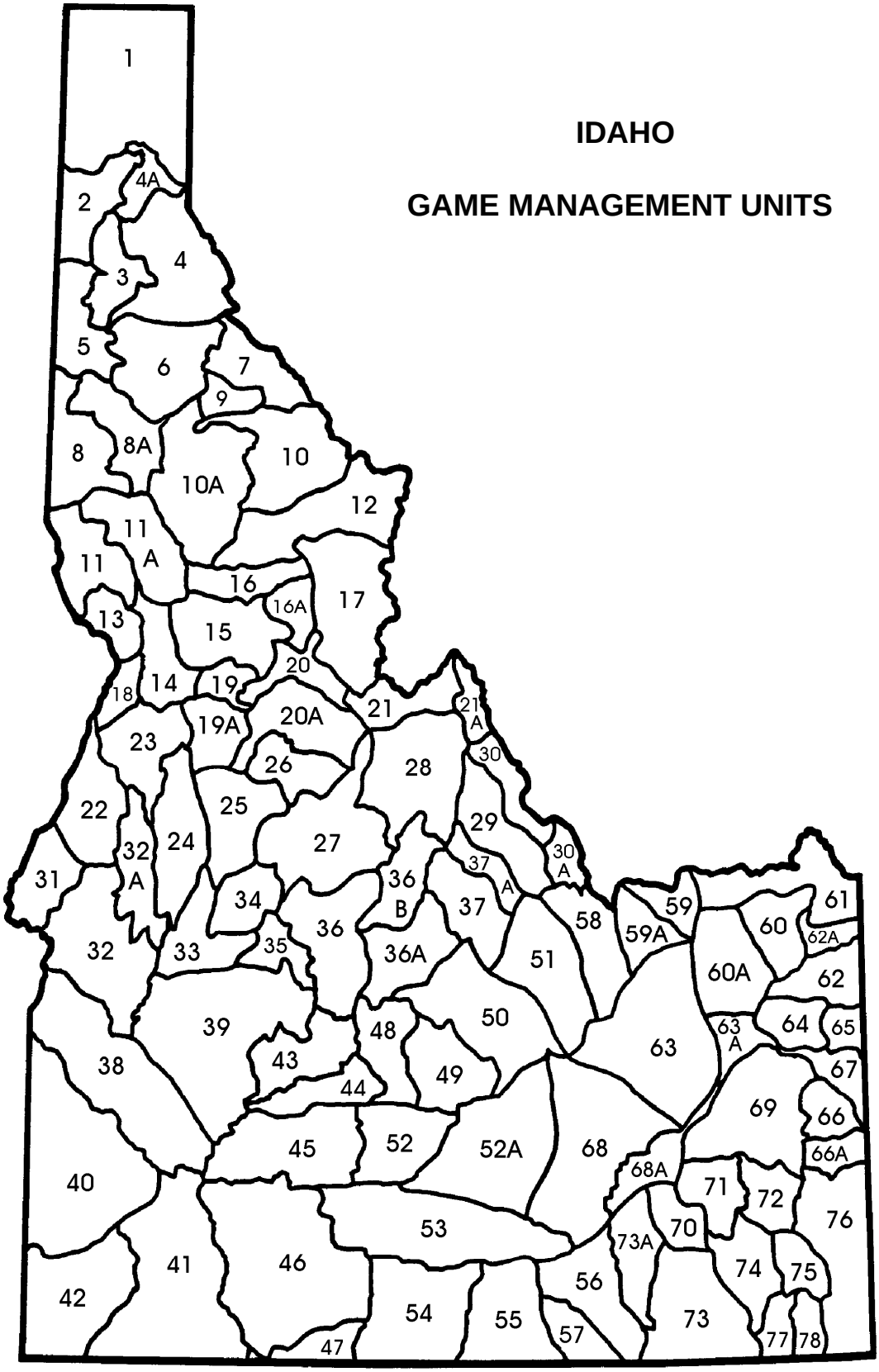
Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Steven M. Huffaker
Steven M. Huffaker, 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.