Project: Development of a baseline inventory and long-term ecological monitoring program for Taylor Ranch Research Station

Investigators: Edward O. Garton, Bruce Wiersma, Dale Bruns, Jim Akenson, Holly Akenson, Pat Hayward

Funding Sources: Wilderness Research Center, EG&G, U. S. Forest Service

Progress: Taylor Ranch, nestled in the middle of the largest wilderness in the contiguous United States offers unique opportunities to monitor long-term changes in the environment. Such data has many potential uses: comparisons of relatively pristine conditions to disturbed ones outside the Wilderness, elucidating natural long-term fluctuations in populations and productivity, and identifying ongoing trends resulting from changes in climate or other global factors. Questions concerning ecosystem stability can not be answered without long-term studies. Even scientists conducting short-term (2-4 year) research in the Wilderness will find such long-term data bases helpful in placing their results within a larger context. Development of this data base will help attract a wide range of outside researchers.

During 1988, we began laying groundwork for several aspects of a baseline data network and ecological monitoring system. In June, we made a broad reconnaissance in search of potential vegetation, bird, and small mammal censusing plots. In addition, we conducted a preliminary small mammal live-trapping trial to help determine species composition and population size. During the fall, we delineated vegetation cover types, elevation zones, and aspects on map overlays for the Taylor Ranch vicinity. Once computerized, these data bases will be useful in determining landscape patterns. Even in their present form, however, scientists can use them to help select sampling plots.

During the coming year, we will develop sampling methods to characterize vegetation structure and monitor vegetation productivity, as well as to monitor insect, bird, and mammal populations. By the summer of 1989, we hope to run preliminary trials to test the efficiency and effectiveness of these methods.

With the help of EG&G's Idaho National Engineering Laboratory, Taylor Ranch is purchasing a continuous monitoring system for meteorological conditions and air quality. Once the equipment is installed in the winter and spring of 1989, Taylor Ranch will become part of a global network of stations monitoring air quality and climate.

Prospectus For

A Long-Term Wilderness Ecosystem Research and Monitoring System for the Frank Church River of No Return Wilderness (FCRNRW)

By

John C. Hendee, Director
University of Idaho Wilderness Research Center (UI-WRC)
Moscow, Idaho 83843
Tele: 208-885-2267
FAX: 208-885-2268

And

Jeff Yeo, Scientist/Manager,
Taylor Ranch Wilderness Field Station/UI-WRC

The Frank Church -- River of No Return Wilderness (FC-RNRW) is one of the largest in the National Wilderness Preservation System (2.3 million acres) and includes some of the wildest and most remote country in the continuous US. Because of its size and remoteness, the FC-RNRW provides outstanding opportunities for long-term monitoring of wilderness values and baseline conditions. Following is a proposal for establishing a Long Term Wilderness Values and Ecosystem Research and Monitoring System in the Frank Church -- River of No Return Wilderness.

The vision for this program includes data from established collection points wilderness wide, data from past, present and future research studies wilderness wide with comprehensive data collection in one pristine watershed serving as a baseline reference area. The heart of the wilderness values and ecosystem monitoring effort will be a data management system that can provide accurate and timely summary information and analysis, tied to locations in the wilderness. Thus, over time changes in wilderness values and baseline environmental ecosystem conditions can be surveyed for purposes of management evaluation, global change assessment, analysis of ecosystem processes and baseline comparisons with roaded areas. The monitoring system may be especially useful in providing information useful in ecosystem management.

Direction for Data Collection:

Clearing defined research questions or needs for information will guide collection and use of the data. The need for information and research questions

will be developed respectively by an executive steering committee and science steering committee.

A key need is for monitoring information on the values or attributes of wilderness so the effectiveness of management can be evaluated. The values and attributes include (1) air quality;(2) water quality;(3) noise;(4) extent of recreation use;(5) recreation impacts;(6) solitude (maybe indexed by 3, 4, and 5; (7) naturalness -- of plant communities, animal populations, fire regimes, presence of exotics; and (8) cultural sites.

The baseline data collected to assess the above values and attributes will also be useful in addressing changes in wilderness elsewhere, i.e., global change assessment, forest and range health, health of terrestrial species -- especially sensitive and vulnerable species including amphibians, frogs, passerine birds and others.

Water Fall Creek: Reference area for concentrated, baseline data collection.

The Waterfall Creek drainage includes about 40 square miles (25,000 acres) in the northeastern portion of the FCRNRW and contains habitats representing the range of terrestrial and aquatic communities found within the Wilderness. Waterfall Creek drains from a dozen lakes on the west slope of the Bighorn Crags into the Middle Fork of the Salmon River. Though remote, the area is used by wilderness recreationists at lower elevations along the Middle Fork of the Salmon River and around some high elevation lakes which have trail access, but much of the drainage has no trails and is little used. An outfitter maintains a hunting camp in the South Fork of Waterfall Creek during the fall. The drainage can be reached by trail from a landing strip at the University of Idaho Taylor Ranch Wilderness Field Station, about eight miles to the west on Big Creek, or from the Crags campground trailhead, about ten miles to the east on the other side of the Bighorn Crags.

We propose establishing a long-term wilderness ecosystem research and monitoring program in the Waterfall Creek drainage. We envision a cooperative program with many partners integrating several objectives: national research and monitoring agenda concerned with external threats and stimuli on ecosystem processes (e.g., global warming, pollution, ozone thinning); research and monitoring agenda addressing local perturbations and ecosystem processes (e.g., drought, fire, insects, disease, recreation); and wilderness management environmental baseline issues (e.g., recreation impacts, non-native species invasions, natural fire regimes and recovery, forest and ecosystem health).

The research and monitoring program would include compilation of long-term records of flora and fauna in natural habitats, measures of the physical and

chemical environments in which they occur, their response to external (global) change, local perturbations and in some cases management interventions such as recreation restrictions and hunting regulations.

Such an effort can be most efficiently accomplished through cooperative partnerships involving several federal agencies such as the Forest Service, National Biological Service, BLM, Fish and Wildlife Service; state agencies such as Idaho Fish and Game; and universities. By appropriate use of students taking wilderness field classes to collect data, costs will be reduced as the next generation of wilderness managers and scientists are trained. The proposed cooperative program will benefit from the 25 year record of research and on-going studies staged from Taylor Ranch (summarized in Hendee et. al. 1993), and specific reports and publications cited at the end of this prospectus.

Despite ambitious goals for contributing to national research agenda for global change assessment, basic science on ecological processes and wilderness and ecosystem management, all efforts in the program will respect the letter and spirit of Forest Service wilderness policies and the "vision for science and education" in the FCRNRW (Yeo et al 1993).

THE STUDY AREA:

Waterfall Creek includes significant vertical relief, rising from 2700 feet on the Middle Fork of the Salmon River to almost 10,000 feet at Aggipah Mountain. Vegetation transitions from native bunchgrass and Ponderosa pine at lower elevations to Douglas fir, then to sub-alpine fir and Engelman spruce with pockets of limber pine at high elevations below alpine tundra, scree, and rocky crags. Lodgepole pine and aspen intermix with climax trees where fires have occurred, particularly along the South Fork of Waterfall Creek.

Large mammals (mountain goats, bighorn sheep, moose, elk, mule deer, white-tailed deer, black bear, cougar, bobcat, wolverine, and coyotes) inhabit the drainage year round with large ungulate herds wintering on the bunchgrass ranges along the Middle Fork. At least 135 species of birds are known to seasonally inhabit the area as probably do several species of bats, five species of snakes and an unknown number of species of small and medium sized mammals. The 20-year study of cougar by Maurice Hornocker and his colleagues included the drainage.

Waterfall Creek has at least seven tributaries, all first and second order streams. A dozen lakes occur in the drainage with most lying at higher elevations. Terrace Lakes and Barking Fox Lake are situated along the Waterfall Creek trail and receive moderate recreation use. Idaho Department of Fish and game has stocked a few of the lakes. A study of amphibian populations associated with lakes in the Bighorn Crags and amphibian population response to fish stocking was initiated in 1994 by Chuck Peterson et. al. (1995) from Idaho State University, with support from the Taylor Ranch Wilderness Field Station and funding from the Leopold Wilderness Research Institute. The drainage has been geologically mapped by Idaho Geological Survey.

A very important characteristic of the Waterfall Creek drainage is its remoteness and pristine qualities. The drainage has never been grazed by livestock and has outstanding native bunch grass range lands serving as winter range for healthy populations of large mammals. Wolves are scheduled for release 15 miles from the drainage during winter 1995.

RESEARCH AND MONITORING OBJECTIVES:

Several broad objectives will drive the cooperative research and monitoring. They embrace interests in global change, basic science, ecological processes, ecosystem management, and wilderness use and management. The following objectives are broad at this stage but can be refined to meet the more specific interests of cooperators.

1. To establish baselines and a long-term record of change and natural processes along an elevational and topographical gradient in a nearly pristine wilderness watershed.

2. To record the distribution, extent and connectedness of vegetation communities and their change over time in response to long-term climatic change, local perturbations such as fire, insects and disease and consequent effects on local populations of mammals, birds, amphibians and reptiles.

3. To determine and monitor the extent of human use of wilderness habitats, its impacts, and changes in use and impacts in response to local perturbations of flora and fluctuations in fauna.

4. To monitor invasion of non-native species and determine their impact on indigenous plant communities, ecological diversity, native species population viability and genetic makeup.

DATA COLLECTION STRATEGY AND METHODS:

Research methods and data collection protocols will be selected by teams of scientists representing the interests of cooperators, and taking advantage of funding for specific studies. A continuing strategy will be to use students taking wilderness field ecology classes and student interns from Taylor Ranch to collect data every summer.

Graduate students under direction of their major professors may be available for data collection during other seasons. The program will be staged from the Taylor Ranch Wilderness Field Station. University of Idaho will be the repository for long-term data storage. A panel of senior scientists in relevant disciplines will guide the overall project.

SELECTED HABITATS AND POTENTIAL RESEARCH STUDIES:

Following are some specific kinds of studies for which there is interest and opportunity.

Lakes: -- meta-population analysis of amphibian populations in response to fish stocking, recreational impacts on surrounding vegetation and water quality, limnology, atmospheric depositions.

Riparian Communities: -- Extension of the Minshall et. Al (1994) on-going research on stream community responses to natural perturbations; extension of Peterson's amphibian research (spotted frogs and tailed frogs are both found in Waterfall Creek and both are C-2 listed species); natural dynamics of pristine riparian systems for comparison with riparian systems grazed by livestock; riparian bird communities, including Neotropical migrants, establishing baselines for comparison with decline in migratory bird populations outside wilderness.

Forest and Range Communities:-- fragmentation from natural disturbance (fire, insect and disease); community accumulation of carbon in response to fire suppression; flora and fauna community succession following fire; forest, range and ecosystem health; primary productivity; soil chemistry and organic matters; biodiversity measures.

Non-Native Plant Invasion, Succession and Displacement. -- spotted knapweed, yellow starthistle, reseeding of one burn.

Recreation Use and Impacts. --extent and type of recreation use at concentration points (lakes, trails and hunting/outfitter camps); extent of recreation impacts and monitoring of sites; response of impacted sites to recovery strategies.

Cultural Resources. -- documenting historical evidence of Sheepeater Indian ecosystem use along the elevation/topographical gradients.

Wildlife -- large mammal forage utilization, competition, predator-prey relations, natural regulation of populations.

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MONITORING PLAN FOR RUNNING CREEK RANCH SELWAY-BITTERROOT WILDERNESS

HORNOCKER WILDLIFE INSTITUTE

written by Tony Wright January 1997

INTRODUCTION

Running Creek Ranch is ideally suited to serve as headquarters for a well-funded research program that investigates the workings of an intact wilderness ecosystem in the Northern Rockies. We plan to carry out both applied and "pure" (knowledge for the sake of knowledge) research. Applied research will probably deal mostly with assessing the effects of anthropogenic environmental stresses both inside and outside the wilderness. While unpredictable in its course, the value of pure research to the advancement of science and technology has been demonstrated time and time again. A key element of both the applied and pure parts our research scheme will be a long-term monitoring program.

The goal of the monitoring program is to create a data base representative of the biological and physical environment of the Selway River drainage that will enable us to:

1) compare the impacts of environmental stresses (local, regional, and global) in and out of the wilderness.

2) better understand how the ecosystem funtions, and how quickly it changes.

3) track the abundance of species of special concern.

4) interface with all other on-going research projects at RCR and provide a long-term perspective to aid in analysis of data and verification of hypotheses.

In terms of pure science the **BIG QUESTION** we seek to answer at RCR is: How stable is this wilderness ecosystem. Are the plants and animals a fine-tuned association of co-adapted species uniquely evolved in place for a particular drainage system or mountain range, or are they an assemblage of survivor species with enough mobility or genetic diversity to adapt to an always rapidly changing environment and recently thrown together by the vagaries of history?

SITE

The Selway-Bitterroot Wilderness meets as well as any area in the lower 48 United States the characteristics of a priority long-term monitoring site outlined by the National

Science Foundation at the Woods Hole conferencein 1978. Because nature is functioning here with little intentional interference from mankind, it can serve as a control which we compare to human-altered landscapes.

The focus of our activity will be the Selway River drainage within 20 km of Running Creek Ranch. All of this area except for the headwaters of Running Creek lie within the Selway-Bitterroot Wilderness. Running Creek itself will be the main focus of our aquatic monitoring.

DATA COLLECTION, STORAGE, AND DISSEMINATION

We will use state of the art GPS equipment to locate permanent plots. Detailed documentation of all plot locations and methodologies will be compiled so that the program will proceed smoothly as personel change. All data will be stored as computer files at RCR and at H.W.I. headquarters in Moscow. We should consider making files available over the internet.

COLLABORATION

Because of the inter-disciplinary nature of our monitoring we must seek advice and possibly collaboration from enthusiastic, intellectually curious sientists in a variety of specialties. Hopefully we can form an advisory board that meets periodically, say every 3rd year, to review results. Perhaps some of these people will be interested in direct collaboration, which should be encouraged. We should offer these people transportation to the site with other expenses paid and perhaps some compensation. We will seek opinions on what variables to measure and what standard protocols should be followed to make the data useful when compared to other monitoring sites. Recommended disciplines for the advisory board are: Forest Ecology, Range Ecology, Aquatic Ecology, Invertebrate Zoology, Wildlife Ecology, and Earth Sciences. Where pre-existing nation-wide monitoring schemes, such as the Monitoring Avian Productivity and Survivorship program, are in place and meet our needs, we should strongly consider joining them.

We should encourage input from personnel at USFS forest sciences laboratories. However, local management people tend to be poorly educated, poorly motivated, incurious, and interested only in bureaucratic obstruction. We should avoid them as much as possible.

SELECTING VARIABLES

After receiving input from the advisory board we will select variables for measurement and draw up detailed protocols and a schedule. A tentative list of variables is shown in Table 1.

ANALYSIS OF DATA

Data will be summarized yearly with brief comments on possible trends along with suggestions for new variables or modification of protocols. Every 5 years a detailed analysis will be compiled with statistical analyses and hypotheses for future verification.

FIRST YEAR BUDGET

First meeting of Advisory Committee	5,000
1 permanent full-time employee (works on historical research DEC-FEB)	*26,000
1 seasonal employee June-Aug	*4,000
Transportation and equipment	10,000
Institutional overhead	5,000
	50,000

*inculdes benefits

Table 1. Possible variables for long-term monitoring at Running Creek Ranch.

Discipline			
Forest Ecology	Range Ecology	Aquatic Ecology	Landscape Ecology
Snag creation and attrition	Pre-winter biomass	Hydrology of RC discharge sediment loads	Collection and archiving of available data in GIS
Landscape scale forest health	Plant phenology	Water temperature	Permanent photo points
Hard mast production	Soft mast production	Ice conditions	
	Distribution of exotic plants		
	Brush transects and photo points		
	Exclosure vegetation plots		

Discipline(cont.)				
Wildlife				
Invertebrates	Fish	Other wildlife	Climate	Earth Sciences
Pollinating insects	Movements in RC	Avian point counts	Temperature and precip at RC	Landslide mapping
Insects feeding on exotic plants	Downstream survival of steelhead salmon	MAPS program	Snow pack crusting water content	
Aquatic inverts in RC		Small mammal populations		
in RC		Amphibian populations		
		Species of special concern populations		
		Elk and deer demographics		
		Carnivore scent posts		

University of Idaho

August 28, 1996

Proposal for a Consortium for Wilderness Ecosystem Research and Monitoring in the Frank Church - River of No Return Wilderness (FC-RNRW)

BY

John C. Hendee, Director
Wilderness Research Center
University of Idaho
Telephone: 208-885-2267
FAX: 208-885-2268
E-Mail: hendeejo@uidaho.edu

With

Bill Burbridge, Director, Biophyicla Reources, USFS, R-4, Ogden
Liz Close, Wilderness Coordinator, USFS, R-1, Missoula
Dave Parsons, Director, Aldo Leopold Wilderness Research Institute, Missoula
George Matejko, Supervisor, Salmon-Challis Nationa Forests
Ken Wotring, Wilderness Coordinator, FC-RNRW

Goals of the Consortium: To cooperate and coordinate in using the FC - RNRW wilderness to benchmark change; based on scientific and administrative studies that use minimum necessary tools and methodologies to compile essential data; resulting in a critical mass of wilderness ecosystem research and monitoring that will attract prominent scientists; and be an educational demonstration for wilderness stewards and others.

I. Objectives:
- A. To compile long-term, integrated, baseline data;
- B. That measures wilderness values and attributes of naturalness and solitude;
- C. Suitable for :
  - (1) Understanding external and internal influences on wilderness conditions;
  - (2) Understanding natural ecosystem processes to support long-term management; address forest and range health of all wild lands; and habitat, wildlife and exotic species issues;
  - (3) Address wilderness management issues;
  - (4) Understand the interactions between natural resource conditions, human experiences and impacts.

II. Logical Partners in the Consortium:
- A. Principal partners are those organizations with legal, managerial or public program responsibilities in FC-RNRW (FS, UI, IFG, Leopold Inst., NBS);
- B. Cooperating partners are those organizations collaborating in consortium ecosystem research and monitoring studies;
- C. Affiliate partners are those organizations with interest in the work of the consortium and resulting data.

USFS R-4; R-1; Intermountain Forest and Range Experiment Station (INT)
Idaho Fish and Game
Aldo Leopold Wilderness Research Institute
University of Idaho Wilderness Research Center
NBS - Idaho Cooperative F&W Research Unit
National Biological Service - IWAES and Paired Ecosystem Studies
Bureau of Land Management
Ag Research Service - NW Water Research Center
Idaho Water Resources Research Institute (IWRRI)
Idaho Department of Environmental Quality
US Environmental Protection Association
Other interested parties, e.g., Nature Conservancy, National Marine Fisheries Service, etc.

III. Elements of Cooperation:
- A. Consortium of partner institutions contributing advice, direction and financial or in-kind support towards agreed upon projects and activities;

B. Direction, guidance and feedback through an Executive Steering Committee representing the principal partners having substantial legal responsibility and financial investment in the consortium;
C. Periodic reports of baseline measures and other study data;
D. Sharing of pertinent information for the consortium data base from each partner institution's activity (e.g., trends in big game surveys, fish counts, hunting permits, wilderness visitation data, progress summaries from studies, etc.), consider hard copy and electronic data access.
E. Coordinate information needs to respond to timely issues as they evolve.

IV. Organization, Direction and Management:
A. Leadership by an Executive Steering Committee (ESC) consisting of selected executive leaders for principal partner institutions;
B. ESC to be co-chaired by the key land management and research officials, i.e., Regional Forester; Dean of Forestry, Wildlife, and Range Sciences-University of Idaho; Director Intermountain Experimental Station;
C. Other Executive Steering Committee members:
FC-RNRW Administrator, Director Leopold Institute, Director UI-Wilderness Research Center, NBS - Fish and Wildlife Cooperative Research Unit; Idaho Fish and Game.
D. ESC duties would be to:
(1) Define information needs;
(2) Provide strategic direction, with advice from a Scientific Steering Committee;
(3) Provide and coordinate funding as available, cooperate in joint funding proposals;
(4) Meet at least annually to consider findings and provide feedback.

V. Scientific Steering Committee (SSC):
A. Consisting of principal scientists and selected manages from the consortium partners and others based on interest and information needs;
B. Co-chaired by prominent scientific and management leader(s) in appropriate fields;
C. SSC Duties:
(1) Advise ESC on research/monitoring needs, methods, priorities, locations, data system and data collection;
(2) Solicit and peer review RFPs;
(3) Advise on quality control considerations in all elements of consortium activity.

VI. Scope and Integration:
A. Information needs and clearly defined questions will guide data collection.

B. Possible baseline drainage: Proposed for consideration is Intensive Data Collection focused in one major, "baseline drainage" that contains most wilderness attributes (such as Waterfall Creek), to provide a reference point for studies and data from other locations in the wilderness complex, and for comparison with monitoring efforts such as IWAES, and other paired ecosystems, studies such as in Reynolds Creek, Rush Creek, other wilderness areas, etc.

C. Continuation of data sites: Supplemental data collection locations will be used as necessary to complete a continuum of desired information on wilderness attributes (e.g. collect anadromous fisheries data from Rush Creek since Waterfall Creek does not have them; location of atmospheric monitoring station at Taylor Ranch or Rush Peak Lookout if not allowed in Waterfall Creek, or Salmon Forest lichen study monitoring site).

D. All relevant studies in the wilderness will be integrated into the data system -- through design of a flexible, data management/GIS system, study reporting requirements and feedback, peer review, etc.

VII. Examples of Information Needs/Data Collection:

A. Wilderness Values/Attributes including (but not limited to) the following:

(1) Air quality (chemical and visibility)

(2) Water quality, bio-chemical and turbidity of lakes and streams

(3) Noise -- natural background and introduced

(4) Recreation

a) Extent (type, length, season, purpose)

b) Recreation impacts

(5) Solitude (maybe an index from 3 and 4)

(6) Naturalness

a) Plant committees/habitats (aquatic, riparian, terrestrial)

b) animal populations: (aquatic, terrestrial, avian)

c) Disturbance regimes (fire, flood, wind, avalanche, insects, disease)

d) Exotics (species, rate of spread, ecological trajectories)

(7) Cultural sites

(8) Meteorology: temperature, precipitation, wind, solar radiation, etc.

(9) Other topics to be defined.

VIII. Priority Actions:

A. Meeting and commitment by proposed co-chairs and members of Executive Steering Committee (ESC) and ESC members.

B. Develop strategic framework, vision and organization for planning.

(1) Solicit partner institutions - letter from co-chairs of ESC

(2) Convene and change Executive Steering Committee

(3) Convene and appoint Scientific Steering Committee
(4) Develope financial plan and budget
(5) Develope funding initiative.
(6) Write institutional cooperative agreements

C. Develop a Research and Monitoring Strategic Plan addressing priorities identified by ESC (with advice of SSC).
(1) Study and data collection locations (visit candidate areas);
(2) Data collection needs, priorities, methods, guiding questions;
(3) Coordination with Wilderness Management (fire, recreation, hunting, fish, outfitters);
(4) Opportunities to integrate related studies in FC-RNRW and elsewhere;
(5) Criteria for data management systems;
(6) Financial requirements and strategy.

IX. Implement Essential Action as Resources are Available and as Directed by ESC - For Example:
A. Host FC-RNRW research and monitoring workshop for:
(1) Presentation and review of past, on-going and potential research and monitoring in FC-RNRW;
(2) Complete development of a research and monitoring agenda for FC-RNRW;
(3) Develop specific proposals.
B. Develop a data management system.
C. Arrange to extend and integrate on-going studies into the baseline system: Yeo's terrestrial monitoring, Minshall's riparian studies, Peterson's amphibian studies, Peek's habitat utilization and succession studies, Krumpe's campsite inventory and impact studies, BYU lichen study, etc.
D. Design and establish a wilderness attribute monitoring system and begin data collection.

X. Proposed Roles of UI-Wilderness Research Center
A. A principal partner in the consortium.
B. Provide access to University framework:
(1) For conducting research and monitoring program (faculty and graduate research assistants under faculty supervision);
(2) Seasonal work by faculty;
(3) Publishing and peer review of results;
(4) Potential to maintain long-term data system;
(5) Facilitate external funding.
C. Use of Taylor Ranch Wilderness Field Station as staging area for fieldwork as appropriate.
D. Hands on work: writing plans, convening workshops, arranging field trips, communicating results, soliciting and peer review of RFP's, etc.
E. National and international communication and coordination with scientific community.

---------- Forwarded message ----------
Date: Mon, 18 Jun 2001 20:18:46 -0600 (MDT)
From: Greg Hayward <ghay@uwyo.edu>
To: lgouldjr@fs.fed.us, chescock@fs.fed.us, fgordon@fs.fed.us
Cc: wmelquis@idfg.state.id.us, wharris@idfg.state.id.us,
roger_rosentreter@blm.gov, trishheekin@moscow.com,
tayranch@uidaho.edu, ghayward01@fs.fed.us
Subject: Report -- Chamberlain owl nest locations

Payette Biologists,

Thanks to all of you for your help arranging the logistics for our trip into Chamberlain. The family and I flew into Chamberlain on Thursday 7 June to collect tissue samples as part of the cooperative boreal owl project involving state and federal agencies from Alaska to southern Colorado. We spent a long week checking nest boxes and former nesting areas to locate and capture owls for tissue samples.

The attached document reports the results of our survey of Chamberlain in 2001 and 1998 as well as indicating the geographic location of previously located owl nests. Please call or write if you have questions regarding the informal report.

After the week at Chamberlain, Pat and I would hypothesize that a breeding population of boreal owls no longer exists south of the Salmon, north of Big Creek, in the River of No Return. Based on our observations from the air and the ground, we suspect that foraging habitat is not sufficient to support enough boreal owls to form an interacting, breeding population. During our studies in the 1980's we documented that boreal owls in the region have extremely large home ranges and relatively low productivity (see Hayward et al. 1993). Fires in 2000 combined with the fires during the past 15 years have removed a great deal of foraging habitat. Although overstory trees remain in many areas after the 2000 fires, the understory was removed under much of the canopy. We question whether significant small mammal populations survived the winter of 2000/2001. If we are correct in our hypothesis, however, a breeding population of boreal

owls may develop in the basin prior to regeneration of mature and old forest in areas that experienced stand replacement disturbance if understory development elsewhere promotes significant red-backed vole populations. I suspect this sort of event occurred regularly in the past. For instance, a large portion of Colorado experienced spruce beetle in the 1700's. Depending on the abundance of subalpine fir, this disturbance, (or in combination with fire) may have lead to local extinction of boreal owl populations for extended periods. Our monitoring in the Burgdorff area suggests boreal owls are still breeding in that area although at densities significantly less than in the early 1990's.

In addition to the paucity of small forest owls located during our work at Chamberlain (during a week in 1998 we located nests of 4 saw-whet owls, 1 boreal owl, and 1 pygmy owl) we thought you might be interested in a couple other observations:

1) The goshawk nest occupied in 1998 along the Big Creek/Chamberlain trail (UTM n 5021500, UTM e 640400) was active when checked on 10 June 2001.

2) Although we located no boreal owls, Pat did see an American Marten (a predator that plays a similar role to the boreal in the subalpine forest).

3) Woodpeckers (as expected) were common. However, we didn't observe any pileated woodpeckers. Normally we would see and hear several during a week at Chamberlain. [We kept a list of birds and other animals (including a boreal toad) observed during the week if you are interested].

4) Although Ponderosa Pine is adapted to survive fire, many of the largest ponderosa (over 1 meter in diameter) in Chamberlain Basin were consumed in the 2000 fires. We were surprised by the fire pattern in relation to large ponderosa pines. In some areas, fire toppled large ponderosa pine immediately adjacent to lodgepole pine that survived the disturbance. On several of the Ponderosa pine/Douglas-fir slopes near the guard station where boreal owls nested in the past, most cavity supporting trees were consumed as were virtually all the large

snags. We didn't observe a single large cavity in one slope that supported boreal owl nests in 1980, 1985, 1986, and 1987.

We bored several large ponderosa pine on one slope and located evidence of past fire in trees that were 250-500 years old. Most of the ponderosa pine on this slope were killed by the 2000 fire.

Thanks again for all your support this year and in the past. Furthermore, please pass on my thanks to the other folks on the forest who have supported our cooperative efort.

Cheers,

Greg

P.S. To open the enclosed documents you may need to move them out of your email program and onto your hard drive and then open through Word with the Open command. The file with the longer name is a Word for Mac file and the other a Word 97 doc.

Boreal Owl Nest Site Locations in the Frank Church -- River of No Return Wilderness from 1980-2001: Report To The Payette National Forest

Gregory D. Hayward
and
Patricia H. Hayward
University of Wyoming
Laramie, WY 82071
307-766-2839

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BACKGROUND

In 1979 Dr. Edward O. Garton and Greg Hayward began an investigation of habitat use and resource partitioning among owls in the Idaho Primitive Area. That investigation lead to the first report of a nesting population of boreal owls in the western United States and subsequently to the only long-term ecological investigation of boreal owls in North America (Hayward and Garton 1983, Hayward and Garton 1988, Hayward et al. 1987, Hayward et al. 1993). Field studies examining the habitat use and ecology of boreal owls in the River of No Return Wilderness extended from 1984 through 1988 with field crews using Forest Service facilities at Chamberlain Basin, Cold Meadows, and Hot Springs Meadows from January through August in most years. Following the intensive studies in the River of No Return Wilderness, the Rocky Mountain Station, Payette National Forest, and University of Idaho established a monitoring system on managed forest lands north of McCall in 1987 and have continued the monitoring each year (see reports on file with Floyd Gordon, Forest Biologist, Payette National Forest). Building upon the monitoring work established on the Payette National Forest and similar efforts on other National Forests we have sought to expand understanding of boreal owl ecology at a broader geographic scale. Our current studies focus on patterns of habitat use at a landscape scale, comparative demography of boreal owls in different environments, and genetic structure and movements of boreal owls in North America.

As part of the work on genetic structure and movements we have been gathering tissue samples from owls from sites extending from Alaska to southern Colorado (Fig 1). Sample sites differ in the degree to which they are separated by distance or barriers to dispersal. Our most complete sample (over 50 samples from adult boreal owls) comes from the managed lands near Burgdorff on the Payette National Forest. Chamberlain Basin represents a unique sample site because it is very close to the Burgdorff sample site but separated by very unfavorable habitat. Therefore tissue samples from Chamberlain would add a great deal to the investigation. Unfortunately, during studies of boreals in the River of No Return in the 1980's, tissue samples were not collected. To fill this gap, we attempted to collect tissue samples from Chamberlain in 1998 and again this year.

Below we provide a summary of field efforts at Chamberlain in 1998 and 2001. We also provide a table with the geographic location of nest sites located from 1980 (Table 1). We provide this last table because the Payette did not have a GIS available when earlier studies ended but we feel it is important to make these locations available for the Forest records.

Results From 1998 and 2001 Field Studies

Obtaining tissue samples from boreal owls is quite difficult because the owl is cryptic and occurs at low densities. Samples collected for our genetics study have come from sites with established nest box systems. Without nest boxes, trapping owls is extremely time and travel intensive. Therefore, collecting samples in the River of No Return Wilderness is especially difficult because of the limitations on travel and access to subalpine forests. However, in 1984 a small system of nest boxes was established at Chamberlain. In addition, through past research activities, we were familiar with over 100 natural cavities to check for nests.

Chamberlain Basin 1998.--We checked 48 nest boxes hung in Chamberlain Basin in 1984 and examined over 100 natural cavities for owl use. Monitoring began on 28 May and ended 4 June. Of

48 nest boxes, 5 were not in usable condition. Current use by wildlife included 3 saw-whet owl nests, 0 boreal owl nests, and 1 flying squirrel nest. Blood samples were obtained from 2 adult saw-whet females and 5 nestlings. The status of the saw-whet nests included: 1 nest with 5 eggs, 1 nest with 6 eggs, and 1 nest with 5 young.

We located one saw-whet owl nest, one pygmy owl nest, and one boreal owl nest in natural cavities. The boreal owl nest occupied a cavity about 20 m high in a leaning, rotten ponderosa pine snag on the first ridge immediately west of Chamberlain Guard Station (Flossie Hill) within 200 meters of a boreal owl nest site from 1984 and 300 m from a boreal owl nest from 1985. The condition of the nest tree prevented us from capturing the owls to obtain blood samples.

Chamberlain Basin 2001.--From 8 June through 14 June we checked the sites of 48 nest boxes hung in Chamberlain Basin in 1984 and examined natural cavities for owl use. Of 48 nest box sites, 21 were burned or the tree lost due to the 2000 fires, 3 were lost due to other causes, 1 unusable, 8 were empty, 13 had signs of pine squirrel (*Tamiasciurus hudsonicus*) or flying squirrel (*Glaucomys sabrinus*), and 3 had bricks indicating owl use prior to 2001 but after 1998. No owl use from 2001 was observed in any box although, in the past we often locate feathers or prey caches that suggest owl use.

We checked natural cavities in areas were owl nests had been located in the past. A majority of the natural cavities on several ponderosa pine/ Douglas-fir slopes had been lost in the 2000 fire because most snags were consumed. Few cavities were lost in aspen stands. We checked over 60 natural cavities but located no owls or evidence of owl use in 2001. The paucity of owl use was especially apparent because owl feathers were not found on the cavity entrance. In previous years we located owl feathers on many cavities.

We located an active goshawk nest at a site in the headwaters of lodgepole creek where goshawks had been observed in 1998 (see Table 1 for location). Goshawk activity had also been noted in this area in the mid 1980's. The nest occurred in a stand of Douglas-fir that had not burned although much of the forest in the drainage had burned.

LITERATURE CITED

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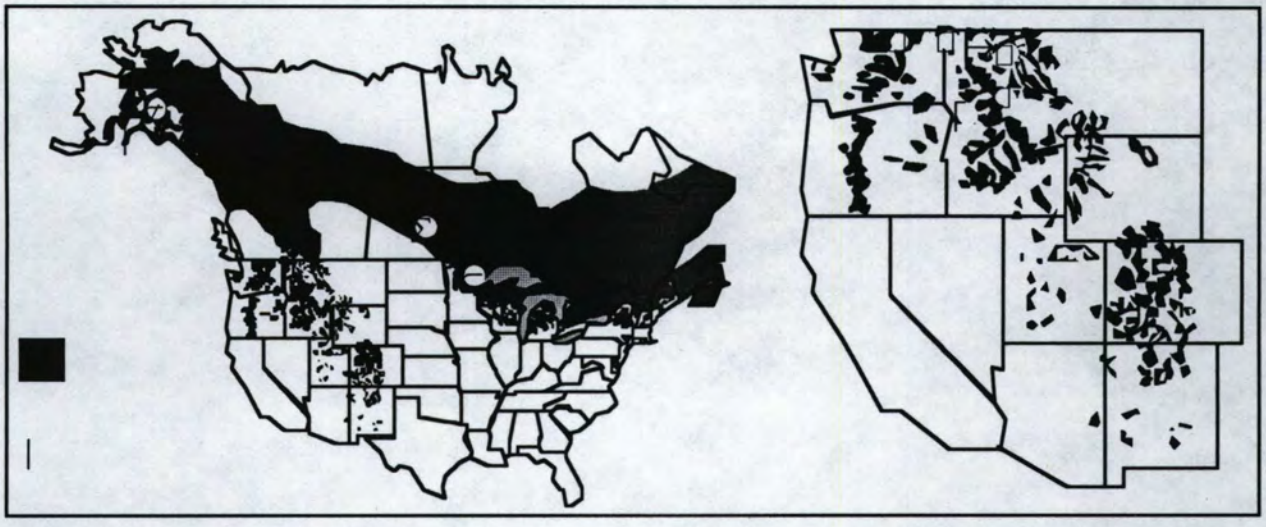

Figure 1. Potential metapopulation structure of boreal owl populations in North America. Subpopulations throughout the western U.S. exhibit patchy distribution whereas those in Canada and Alaska are largely continuous. Genetic distance is expected to reflect connectivity among populations. Tissue samples are being collected from populations throughout the species range in western North America.

Table 1. Geographic coordinates of boreal and saw-whet owl and goshawk nests located in the River of No Return Wilderness from 1980-2001. Locations are expressed in UTM coordinates.

Species	Year	UTM north	UTM east
Boreal owl (Bo21)	1980	5027500	640300
Boreal owl (Bo22)	1980	5027400	640300
Boreal owl (Bo55)	1984	5026450	639550
Boreal owl (Bo58)	1984	5025450	639000
Boreal owl (Bo34)	1984	5027800	639100
Boreal owl (Bo64)	1984	5020400	661700
Boreal owl (Bo87)	1985	5026450	639500
Boreal owl (Bo86)	1985	5028800	638300
Boreal owl (Bo55)	1986	5027500	640200
Boreal owl (Bo95)	1986	5031100	641900
Boreal owl (Bo99)	1986	5028850	638300
Boreal owl (Bo133)	1987	5032700	641000
Boreal owl (Bo107)	1987	5029100	636300
Boreal owl (Bo105)	1987	5023600	639900
Boreal owl (Bo104)	1987	5024400	637900
Boreal owl (Bo117)	1987	5031400	641900
Boreal owl (Bo110)	1987	5029500	644400
Boreal owl (Bo115)	1987	5021500	640400
Boreal owl (Bo107)	1988	5035000	640300
Boreal owl (Bo135)	1988	5023950	640700
Boreal owl (Bo136)	1988	5026600	639500
Boreal owl (Bo137)	1998	5026450	639600
Saw-whet owl	1987	5026450	639500
Saw-whet owl	1987	5031400	641900
Saw-whet owl	1998	5032700	641000
Saw-whet owl	1998	5032700	641000
Saw-whet owl	1998	5025200	638700
Saw-whet owl	1998	5024700	638700
Screech owl	1986	5022200	636400
Pygmy owl	1998	5030100	641500
Northern goshawk	1998	5021500	640400
Northern goshawk	2001	5021500	640400

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Payette Biologists,

Thanks to all of you for your help arranging the logistics for our trip into Chamberlain. The family and I flew into Chamberlain on Thursday 7 June to collect tissue samples as part of the cooperative boreal owl project involving state and federal agencies from Alaska to southern Colorado. We spent a long week checking nest boxes and former nesting areas to locate and capture owls for tissue samples.

After the week at Chamberlain, Pat and I would hypothesize that a breeding population of boreal owls no longer exists south of the Salmon, north of Big Creek, in the River of No Return. Based on our observations from the air and the ground, we suspect that foraging habitat is not sufficient to support enough boreal owls to form an interacting, breeding population. During our studies in the 1980's we documented that boreal owls in the region have extremely large home ranges and relatively low productivity (see Hayward et al. 1993). Fires in 2000 combined with the fires during the past 15 years have removed a great deal of foraging habitat. Although overstory trees remain in many areas after the 2000 fires, the understory was removed under much of the canopy. We question whether significant small mammal populations survived the winter of 2000/2001. If we are correct in our hypothesis, however, a breeding population of boreal owls may develop in the basin prior to regeneration of mature and old forest in areas that experienced stand replacement disturbance if understory development elsewhere promotes significant red-backed vole populations. I suspect this sort of event occurred regularly in the past. For instance, a large portion of Colorado experienced spruce beetle in the 1700's. Depending on the abundance of subalpine fir, this disturbance, (or in combination with fire) may have lead to local extinction of boreal owl populations for extended periods. Our monitoring in the Burgdorff area suggests boreal owls are still breeding in that area although at densities significantly less than in the early 1990's.

In addition to the paucity of small forest owls located during our work at Chamberlain (during a week in 1998 we located nests of 4 saw-whet owls, 1 boreal owl, and 1 pygmy owl) we thought you might be interested in a couple other observations:

1) The goshawk nest occupied in 1998 along the Big Creek/Chamberlain trail (UTM n 5021500, UTM e 640400) was active when checked on 10 June 2001.

2) Although we located no boreal owls, Pat did see an American Marten (a predator that plays a similar role to the boreal in the subalpine forest).

3) Woodpeckers (as expected) were common. However, we didn't observe any pileated woodpeckers. Normally we would see and hear several during a week at Chamberlain. [We kept a list of birds and other animals (including a boreal toad) observed during the week if you are interested].

4) Although Ponderosa Pine is adapted to survive fire, many of the largest ponderosa (over 1 meter in diameter) in Chamberlain Basin were consumed in the 2000 fires. We were surprised by the fire pattern in relation to large ponderosa pines. In some areas, fire toppled large ponderosa pine immediately adjacent to lodgepole pine that survived the disturbance. On several of the Ponderosa pine/Douglas-fir slopes near the guard station where boreal owls nested in the past, most cavity supporting trees were consumed as were virtually all the large snags. We didn't observe a single large cavity in one slope that supported boreal owl nests in 1980, 1985, 1986, and 1987.

We bored several large ponderosa pine on one slope and located evidence of past fire in trees that were 250-500 years old. Most of the ponderosa pine on this slope were killed by the 2000 fire.