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**Memorandum**

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Wilderness Research Center  
University of Idaho  
Moscow, Idaho 83844  
208-885-5779  
FAX: 208-885-6226

DATE: November 30, 1994  
TO: John Hendee  
FROM: Jeff Yeo *JH*  
SUBJECT: recent research proposals for Taylor Ranch

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Attached is Kirk Lohman's and Pat Heglund's recent SBOE proposal to conduct avian research in riparian communities in FCRNRW. Their research protocols mesh well with my ongoing ecological monitoring. Kirk also is preparing a proposal (submitted to IWRI) to study limnology of lakes in the Bighorn Crags. He intends to sample the same lakes that Chuck Peterson is studying for amphibian populations (funded by Boise Intermtn Sta. & Leopold Institute).

Also, I noted your recent letter to Earl Bennett, ID Geological Survey, concerning Reed Lewis' proposal to map the geology in the central portion of FCRNRW. Have you heard anything back on that?

*Jeff - This is a good proposal,  
if SBOE doesn't look probable  
the Forest Service might be interested.  
Kirk's proposal on lakes might fit  
into the Waterfall Creek Monitoring transect  
if he looks at Fox or Tenace Lakes.  
I asked Mo to put their proposal  
in our files.  
Keep me posted.*

*John*

*cc Kirk Lohman*

# COVER SHEET FOR SPECIFIC RESEARCH GRANT PROPOSALS

State Board of Education

SBOE PROPOSAL NUMBER: (to be assigned by SBOE)		AMOUNT REQUESTED:     \$34,871	
FIELD CODE NUMBER(S):     10 (see list)		FIELD CODE NAME(s):     Ecology (see list)	
SPECIFIC PROJECT FOCUS:     Biological Sciences:   Water-related			
PROJECT START DATE:     April 1, 1995		PROJECT END DATE:     March 31, 1996	
NAME OF INSTITUTION: University of Idaho		DEPARTMENT: Fish and Wildlife Resources	
ADDRESS:                   Moscow, Idaho   83844			
			PI PHONE NUMBER: 208-885-7203
TITLE OF PROPOSED PROJECT:     Avian use of riparian areas in the Big Creek drainage of the Frank Church-River of No Return Wilderness, Idaho			
NAME:		TITLE:	
SIGNATURE:			
PRINCIPAL INVESTIGATOR	Kirk Lohman	Asst. Professor	<i>Kirk Lohman</i>
CO-PRINCIPAL INVESTIGATOR	Patricia J. Heglund	Affiliate Asst. Professor	<i>Patricia Heglund</i>
CO-PRINCIPAL INVESTIGATOR			
CO-PRINCIPAL INVESTIGATOR			
NAME:		SIGNATURE:	
RESEARCH OFFICER		<i>Ernest D. Cobles</i>	

**ELIGIBILITY REQUIREMENT SHEET**

The following information must be completed in full to comply with Specific Research Grant Program Eligibility Requirements. One sheet must be completed by the Principal Investigator and each Co-Principal Investigator.

Name and title of Principal Investigator or Co-Principal Investigator: Kirk Lohman, Assistant Professor of Riparian Ecology

I. Are you a full-time, tenure-track faculty member? Yes X No           II. Date Employed by Idaho's System of Higher Education 12 / 6 / 93  
(mo) (day) (yr)

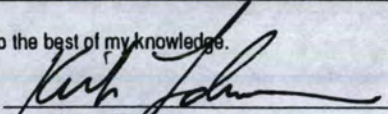
III. List any previous SBOE Specific Research Grant Awards:

SBOE Grant Number	Year Received	Project Title
None		

IV. List ALL Federal Agency competitive grants received in the last 10 years: (If additional space is needed continue on the reverse of this page.)

Source of Support (Granting Agency)	Project Title	Amount of Award	Period Covered by Award (Ex. 1/1/90 to 6/30/91)	Award Number
None			/ / to / /	
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			/ / to / /	

I certify that all information contained on this sheet is true and correct to the best of my knowledge.

  
 \_\_\_\_\_  
 Investigator Signature

**ELIGIBILITY REQUIREMENT SHEET**

The following information must be completed in full to comply with Specific Research Grant Program Eligibility Requirements. One sheet must be completed by the Principal Investigator and each Co-Principal Investigator.

Name and title of Principal Investigator or Co-Principal Investigator: Patricia J. Heglund

I. Are you a full-time, tenure-track faculty member? Yes  No

II. Date Employed by Idaho's System of Higher Education 8 29 194  
(mo) (day) (yr)

III. List any previous SBOE Specific Research Grant Awards:

SBOE Grant Number	Year Received	Project Title
None		

IV. List ALL Federal Agency competitive grants received in the last 10 years: (If additional space is needed continue on the reverse of this page.)

Source of Support (Granting Agency)	Project Title	Amount of Award	Period Covered by Award (Ex. 1/1/90 to 6/30/91)	Award Number
National Fish & Wildlife Foundation	Land monitoring on private lands (ID)	\$28,000	1 / 1 94 to 12 / 31 / 94	#94-230
			/ / to / /	
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I certify that all information contained on this sheet is true and correct to the best of my knowledge.

*Patricia J. Heglund*  
Investigator Signature

## Table of Contents

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## Project Summary

We propose to investigate habitat use of riparian vegetation by breeding birds within the Big Creek drainage of the Frank Church-River of No Return Wilderness to determine factors influencing species abundance, habitat selection, nest success, and nest predation. The results of this work will provide basic information on avian use of riparian ecosystems and serve as a reference for assessing the effects of disturbance in riparian ecosystems affected by grazing, timber harvest, or other land use practices. Our objectives are: 1) to quantify and compare the vegetational differences of north and south-facing riparian areas in relation to the adjacent uplands; 2) to determine avian use of riparian habitat in relation to aspect, vegetation composition and vegetation structure; and 3) to measure nest success and nest depredation rates among ground and shrub-nesting species in relation to distance from the stream channel.

Plots will be established along six streams in the Big Creek drainage during the breeding season of riparian avifauna (May-July). Birds will be censused within each 40 ha plot every 10 days. Nest searches will also be conducted on each plot. Artificial nests will be used to estimate nest predation rates within plots and along transects that run perpendicular to the riparian zone to gauge differences in nest predation with distance from the stream. The composition, structure, and density of riparian vegetation will be measured within plots and at nest site locations to determine the vegetational characteristics that are associated with bird use.

We expect this research to contribute to a growing body of knowledge concerning the importance of riparian habitats to breeding birds. By determining bird use of riparian vegetation in an area that is relatively undisturbed by land use practices, our work should provide a reference for studies that assess the impact of land use practices on riparian bird assemblages. In addition, we hope to identify the essential features of riparian vegetation that make it attractive habitat for avian species.

### **Results From Prior SBOE Support**

The principal investigators have had no prior SBOE support.

**Avian use of riparian areas in the Big Creek drainage  
of the Frank Church-River of No Return Wilderness, Idaho**

Kirk Lohman

Department of Fish and Wildlife Resources

Department of Range Resources

University of Idaho, Moscow, ID 83844

and

Patricia J. Heglund

Department of Biological Sciences

University of Idaho, Moscow, ID 83844



## Introduction

Sixty percent of neotropical migratory landbirds in Idaho are associated with riparian areas (Saab and Groves 1992). Although these areas constitute less than one percent of western landscapes, they have the most species-rich avifauna in the western United States and are critical not only for breeding habitat, but also as migration and wintering habitat (Dobkin 1992, Knopf and Samson 1994; Knopf et al. 1988). Riparian ecosystems have been the focus of conflicting land use interests in the West, where the extent of riparian vegetation has declined dramatically and large tracts of remaining riparian habitat have been disturbed or altered.

The effects of disturbance on the distribution and abundance of riparian bird assemblages have been investigated in a number of studies (Croonquist and Brooks 1991, Stauffer and Best 1980). These have included work examining the impacts of grazing (Bull and Skovlin 1982, Knopf et al. 1988, Medin and Clary 1989, Sedgwick and Knopf 1987, 1991; Schulz and Leininger 1991), timber harvest (Dobkin and Wilcox 1986, Triquet et al. 1990) and recreation (Blakesley and Reese 1988). There have been no long-term studies characterizing avian assemblages and their population fluctuations, however, in undisturbed riparian habitats in Idaho. Areas like the Frank Church-River of No Return Wilderness in central Idaho provide an excellent opportunity for identifying the use of undisturbed riparian habitats by breeding bird assemblages. Such information may prove invaluable for making comparisons between breeding bird use of altered and unaltered riparian habitats.

This study would serve as a pilot for a long-term program addressing structure and function in montane riparian ecosystems. We propose to investigate habitat use of riparian vegetation by breeding birds within the Big Creek drainage of the Frank Church-River of No Return Wilderness to determine factors influencing species abundance, habitat selection, nest success, and nest predation. The results of this work will provide basic information on avian use of riparian ecosystems and serve as a reference for assessing the effects of disturbance in riparian ecosystems affected by grazing, timber harvest, or other land use practices.

## Objectives

Our objectives are:

- 1) to quantify and compare the vegetational differences of north and south-facing riparian areas in relation to the adjacent uplands;
- 2) to determine avian use of riparian habitat in relation to aspect, vegetation composition and vegetation structure;
- 3) to measure nest success and nest depredation rates among ground and shrub-nesting species in relation to distance from the stream channel.

## Study Area

This study will be conducted in the Big Creek drainage of the Frank Church-River of No Return Wilderness. Field work will be based out of the Taylor Ranch Wilderness Field Station which is located at the lower end of Big Creek and is administered by the University of Idaho College of Forestry, Wildlife and Range Sciences. Big Creek flows through a steep canyon from west to east, from Profile Gap to its confluence with the Middle Fork of the Salmon River. Along its length, tributaries enter Big Creek from the north and south. The riparian zones of these north and south-flowing creeks contrast sharply, particularly in the lower end of Big Creek. Those on the drier south-facing slopes are generally narrower and clearly demarcated from upland vegetation dominated by shrub-steppe communities. The lateral boundaries of riparian zones on north-facing slopes are often much more difficult to delineate, because they blend into Douglas fir-dominated upland forests. One goal of this study is to compare avian assemblages in north and south-facing riparian zones and determine the effects of these morphological differences. Tributaries on both north and south sides of Big Creek have high gradients and riparian zones that are best characterized as V-canyon forms (Platts et al. 1987). Because there are significant changes in elevation along these streams, we expect to see variation in avian use of riparian habitat along longitudinal stream gradients.

## Methods

Three north-facing streams and three south-facing streams will be selected for this study. A single plot at a predetermined, standardized elevation will be established on each stream based on similarities in prior disturbance, vegetation, parent material, and stream width. Each plot will be used for detailed investigations regarding vegetation composition, vegetation structure, and avifauna. Field work will coincide with the breeding season of riparian avifauna in the Taylor Ranch area (roughly, May through mid-July).

### *Bird Observations*

To compare the composition, distribution and abundance of birds among study sites, breeding birds will be censused repeatedly on each study plot by the fixed radius, point-count method (Ralph et al. 1993). Plots will be 40 ha and a minimum width of 200 m. Birds will be censused using 10-minute point counts located 200 m apart and a minimum of 100 m in from the edge of the plot boundary. Twelve, 50 m fixed radius point-counts will be conducted per plot. Points will be established using permanent markers. Censuses will be conducted 3 times during the field season; approximately every ten days. Counts will begin after the dawn chorus, approximately one-half hour after sunrise, and end on or before 10:30 am.

Nest searches provide a direct measurement of nest success (Ralph et al. 1993) and will be conducted on each plot. Measurement of associated vegetation allows an identification of important habitat characteristics associated with successful nests and information on the habitat requirements of individual species (Ralph et al. 1993). Nest finding is labor-intensive because all species differ in nest placement and behaviors near the nest (Ralph et al. 1993). Nest plots and searches will follow the protocol outlined in Martin and Geupel (1993) with the exception that one observer will be responsible for 3 nest plots and plots will be searched every four days throughout the breeding season. Nest searches will begin in May and focus on locating females. Intensive nest searches will be conducted on days not scheduled for point-count surveys. For each nest located and measured, a random site will be selected from within the plot and its

vegetation measured. Data from nest searches will be incorporated into the Breeding Bird Research and Monitoring Database on file at Montana Cooperative Wildlife Research Unit, Missoula, Montana.

To ensure an adequate sample size for an evaluation of avian nest depredation rates in relation to distance from the stream, artificial nests will be used. A 400 m transect will be randomly selected and placed perpendicular (east-west) to each stream. Elevations of the six transects will be held constant. Artificial nests will consist of Japanese quail (*Coturnix coturnix*) eggs and small (10.5 cm wide, 5 cm deep) wicker baskets used by aviculturalists. Three eggs per nest will be used. A nest will be considered depredated if at least one egg in the nest is damaged in any manner or is missing.

A single 50 m<sup>2</sup> artificial nest plot will be randomly located north or south of the transect in each of eight consecutive 50 m longitudinal sections. Three artificial nests will be randomly placed within the plot. The number of artificial nests within nest plots and longitudinal sections will be held constant to control for density effects (Tinbergen et al. 1967, Sugden and Beyersbergen 1986). All six transects will be located at the same elevation to control for altitudinal effects on avifaunal and predator concentrations. Placement of nests, eggs and number of visits will follow the method described by Donaldson-Burger (1988). Each nest will be checked every four days to determine its status (Mayfield 1975). Experimental trials will be conducted twice during the breeding season.

### *Vegetation*

The presence or absence of many neotropical landbirds in riparian habitats is often strongly related to the complexity and density of vegetation structure, especially in the shrub and herb layer. Alternatively, Knopf and Samson (1994) suggests that vegetation composition plays an important role in avian species composition. Measurement of vegetational variables will be conducted at three different scales. Vegetation at the nest site, including the plant containing the nest and the 5 m surrounding the nest, will be measured following the protocol outlined in James

and Shugart (1970) and modified in Ralph et al. (1993). Vegetation at the nest site will be measured immediately following nest termination. Vegetation measurements made immediately surrounding a nest can provide information on microhabitat associations among species (Ralph et al. 1993, Martin and Geupel 1993).

Additional vegetation will be measured within 11.3 m of the nest following the protocol outlined in Martin and Geupel (1993). The entire plot will be characterized by measuring vegetation at regular points throughout the plot. Condition of all standing and dead trees (snags) will be determined following the method of Mannan (1977).

### *Statistical analyses*

Vegetation classification will follow two-way indicator species analysis (TWINSPAN; Hill et al. 1975). Relationships between bird species and vegetation will be examined using gradient analysis (DECORANA; Hill 1979, Hill and Gauch 1980, Gauch 1982, Jackson and Somers 1987, Peet et al. 1988). Elevational differences and differences between north facing and south facing riparian vegetation and landbird assemblages will be examined using ANOVA (Snedecor and Cochran 1980). A G-test of homogeneity will be used to detect differences in predation rates with increasing nest location distance from the stream channel (Sokal and Rolf 1981).

### **Significance of Research**

There are no studies that quantify avian assemblages and their reproductive success in relatively undisturbed riparian habitats in the Northern Rockies. We expect the results of this research to contribute to a growing body of knowledge concerning the importance of riparian habitats to breeding birds. By determining bird use of riparian vegetation in an area that is relatively undisturbed by land use practices, our work should provide a reference for comparison with studies that are assessing the impact of cattle grazing and timber harvest on the distribution and abundance of riparian bird assemblages. In addition, we hope to identify the essential features of riparian vegetation that make it attractive habitat for avian species.

Previous work has reported that bird species richness in riparian habitats is enhanced by the greater structural complexity of vegetation in riparian areas surrounded by shrub-steppe, grassland, and desert (Anderson and Ohmart 1977, Bull and Skovlin 1982, Knopf 1985), but that such effects are much weaker when the surrounding uplands are forested (Salt 1957). In contrast, riparian habitats within forested uplands may allow for greater richness or abundance by maximizing patch size or width.

Riparian areas that grade into forest may also provide breeding birds with greater protection from nest predators than riparian habitats that lie adjacent to shrub-steppe, grassland, or desert vegetation. In addition, birds nesting in riparian areas may be more vulnerable to depredation than nests located in larger patches of adjacent forest or shrub-steppe habitat. Our examination of nest depredation rates in relation to distance from the stream channel will provide much needed information on the vulnerability of nests in riparian habitats.

Birds that are directly and negatively affected by livestock grazing in riparian areas are species that nest or forage in dense shrub or herbaceous ground layers (Dobkin 1992). Species such as Nashville and MacGillivray's Warblers, Common Yellowthroat, and Lazuli Bunting have been strongly affected by changes in riparian vegetation structure resulting from livestock grazing (Mosconi and Hutto 1982). By examining nest success of several species, we will be able to determine whether relatively undisturbed, montane riparian habitats in central Idaho have the potential to serve as population sources or sinks. These data will also contribute critical information to our currently limited knowledge of the life histories and reproductive success of several species. Most importantly, when combined with data from geographic information systems (GIS), a determination of source or sink populations for certain species in central Idaho will assist resource managers in making land management decisions on local, state-wide, and regional levels.

## Bibliography

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## **KIRK LOHMAN**

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### **EDUCATION**

Ph.D., 1988, Fisheries and Wildlife, University of Missouri  
J.D., 1980, University of Missouri  
B.A., 1975, Biology (Zoology), University of Missouri

### **EMPLOYMENT**

1993-Present: Assistant Professor of Riparian Ecology, College of Forestry, Wildlife, and Range Sciences, University of Idaho, Moscow, ID.

1992-1993: Senior Ecologist, RD Ecological Research Associates, Anchorage, AK.

1991-1992: Visiting Assistant Professor, Department of Natural Resources Management and Engineering, University of Connecticut, Storrs, CT.

1989-1991: Postdoctoral Research Fellow, Department of Biology, Montana State University, Bozeman, MT.

Spring 1989: Instructor, School of Forestry, Fisheries, and Wildlife, University of Missouri, Columbia, MO.

1984-1988: Graduate Research Assistant, School of Forestry, Fisheries, and Wildlife, University of Missouri, Columbia, MO.

1983-1984: Graduate Teaching Assistant, Division of Biological Sciences, University of Missouri, Columbia, MO.

1981-1983: Assistant Attorney General, Environmental Resources Division, Missouri Attorney General's Office, Jefferson City, MO.

## **COLLEGE TEACHING EXPERIENCE**

University of Idaho (1994)

Riparian Ecology  
Wildland Field Ecology

University of Connecticut (1991-1992)

Stream Ecology  
Fish Ecology

University of Missouri (1983-1989)

Limnology  
Animal Population Dynamics (laboratory)  
Fisheries Management (laboratory)  
General Biology (laboratory)

## **RESEARCH PROJECTS**

1994-1995: Distribution and abundance of tailed frogs, *Ascaphus truei*, in relation to environmental conditions in headwater streams.

1989-1991: The effects of nutrient enrichment on the production of benthic algae, macroinvertebrates, and young-of-the-year salmonids in the Clark Fork River (with John C. Priscu and Robert White).

1984-1988: The effects of point and nonpoint source nutrient enrichment on algal growth and water quality in Ozark streams (with John R. Jones)

1987: A limnological survey of Costa Rican lakes (with John R. Jones).

1985: Limnological characteristics of lakes in the Pokhara and Kathmandu valleys, Nepal (with John R. Jones).

## **PROFESSIONAL SOCIETIES**

American Fisheries Society  
North American Benthological Society  
American Society of Limnology and Oceanography  
International Association for Theoretical and Applied Limnology  
Missouri Bar Association

## HONORS AND AWARDS

National Academy of Sciences Young Investigator Program on Agricultural Impacts on Water Quality in Latvia and Lithuania, 1994  
Graduate Student Teaching Award (Fisheries and Wildlife), 1988  
Superior Graduate Student Achievement Award (Fisheries), 1988  
University of Missouri School of Law Award for Environmental Law, 1980  
University of Missouri School of Law Award for Land Use Law, 1980  
University of Missouri School of Law Award for Local Government Law, 1980

## DISSERTATION

Nutrient sources and the influence of nutrients on periphyton in northern Ozark Border streams.

## PUBLICATIONS

- Lohman, K., Jones, J.R., and B.D. Perkins. 1992. Effects of nutrient enrichment and flood frequency on periphyton biomass in northern Ozark streams. *Canadian Journal of Fisheries and Aquatic Sciences* 49:1198-1205.
- Lohman, K., and J.C. Priscu. 1992. Physiological indicators of nutrient deficiency in *Cladophora* in the Clark Fork of the Columbia River, Montana. *Journal of Phycology* 28:443-448.
- Lohman, K., Jones, J.R., and C. Baysinger-Daniel. 1991. Experimental evidence for nitrogen limitation in a northern Ozark stream. *Journal of the North American Benthological Society* 10:14-23.
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## **TECHNICAL REPORTS**

- Lohman, K., Priscu, J.C., Kangatharalingam, N., Wang, L., and R.G. White. 1992. Nutrient enrichment effects on the growth of benthic algae, macroinvertebrates, and young-of-the-year salmonids in experimental troughs. Annual report to the Soap and Detergent Association and Stone Container Corporation.
- Lohman, K., and J.C. Priscu. 1991. Nutrient enrichment and the development of nuisance algal growth in the upper Clark Fork. Annual report to the Soap and Detergent Association and Stone Container Corporation.
- Lohman, K., and J.R. Jones. 1988. Factors affecting water chemistry and algal biomass in Missouri Ozark streams: a review. Prepared for the Missouri Department of Natural Resources.

## **PAPERS IN PREPARATION**

- Lohman, K., and J.R. Jones. Influences of row crop agriculture and livestock grazing on stream energetics and nutrient dynamics. To be submitted to the Journal of Environmental Quality.
- Lohman, K., Wang, L., Priscu, J.C., and R.G. White. Effects of experimental nutrient enrichment on benthic algae, macroinvertebrates, and young-of-the-year cutthroat trout (*Onchorhynchus clarki*). To be submitted to the Canadian Journal of Fisheries and Aquatic Sciences.
- Lohman, K. Small municipal sewage treatment plants and stream water quality in the Ozarks. To be submitted to the Transactions of the Missouri Academy of Science.
- Heglund, P.J., Jones, J.R., and K. Lohman. Experimental evidence for nutrient limitation in 15 subarctic lakes: nitrogen, phosphorus, and the regulation of trophic levels. To be submitted to the Canadian Journal of Fisheries and Aquatic Sciences.

## **PROFESSIONAL PRESENTATIONS**

- Lohman, K. 1993. Sources and effects of nutrient enrichment in streams. College of Forestry, Wildlife, and Range Sciences, University of Idaho, Moscow, ID, May 1993.
- Lohman, K. 1992. Impact of causeways and oil development activities on anadromous fishes in the Beaufort Sea, Alaska. Fish and Wildlife Management Committee, North Slope Borough, Barrow, AK, October 1992.

- Lohman, K. 1990. Effects of nutrient enrichment on stream water quality. Department of Biology, Montana State University, Bozeman, MT, February 1990.
- Lohman, K. 1989. Water pollution enforcement from a government attorney's perspective. Wildlife Forum, Montana State University, Bozeman, MT, October 1989.
- Lohman, K., and J.R. Jones. 1989. Comparative magnitude of point and nonpoint source effects on water quality in some Ozark streams. Watershed Committee of the Ozarks Conference, Springfield, MO, June 1989.
- Lohman, K., and J.R. Jones. 1989. Temporal changes in periphyton biomass in relation to ambient nutrient concentrations and flood frequency. North American Benthological Society, Guelph, Ontario, May 1989.
- Lohman, K. 1988. Sources and effects of nutrient enrichment in Ozark Border streams. School of Forestry, Fisheries and Wildlife Seminar Series, University of Missouri, Columbia, MO, March 1988.
- Lohman, K., and J.R. Jones. 1988. Land use effects on water quality: empirical and experimental evidence for nutrient limitation in Ozark Border streams. Missouri Forest, Fish, and Wildlife Conference, Columbia, MO, January 1988.
- Lohman, K., Jones, J.R., Knowlton, M.F., Swar, D.B., Pamperl, M.A., and B.J. Brazos. 1987. Pre- and postmonsoon limnological characteristics of lakes in the Pokhara and Kathmandu valleys, Nepal. SIL Congress, Hamilton, New Zealand, February 1987.
- Lohman, K., and J.R. Jones. 1986. Experimental evidence for nutrient limitation of periphyton in an Ozark stream. North American Benthological Society, Lawrence, KS, May 1986.
- Lohman, K., Jones, J.R., and M.M. Smart. 1985. Water quality-land use relationships in rural Missouri. Conference on Perspectives on Nonpoint Source Pollution, Kansas City, MO, May 1985.

## **PATRICIA JOANNE HEGLUND**

436 Morton Street  
Moscow, Idaho 83843  
208-885-2665  
208-883-8027

E-mail: pheglund@osprey.csrv.uidaho.edu

### **EDUCATION**

Ph.D. 1992. Fisheries and Wildlife, University of Missouri, Columbia, Missouri.  
M.S. 1988. Fisheries and Wildlife, University of Missouri, Columbia, Missouri.  
B.S. 1979. Wildlife, University of Minnesota, St. Paul, Minnesota.

### **AREAS OF EXPERTISE**

Wetland ecology, avian ecology, waterfowl ecology, conservation biology, and endangered species.

### **EMPLOYMENT**

March 1994-present: Affiliate Assistant Professor/Visiting Assistant Professor,  
Department of Biological Sciences, University of Idaho, Moscow, Idaho.

March 1994-present: Affiliate Assistant Professor, Department of Fish and Wildlife  
Resources, University of Idaho, Moscow, Idaho.

January 1994-present: President and Senior Ecologist, Turnstone Ecological Research  
Associates, Ltd., Moscow, Idaho.

November-December 1993: Research Biologist (Wildlife), National Biological Survey,  
Alaska Fish and Wildlife Research Center, Anchorage Alaska.

1988-1993: Research Biologist (Wildlife), U.S. Fish and Wildlife Service, Alaska Fish and  
Wildlife Research Center, Anchorage Alaska

1989-1990: Teaching Assistant/Instructor, School of Natural Resources, University of  
Missouri, Columbia, Missouri.

1984-1988: Graduate Research Assistant, School of Natural Resources, University of  
Missouri, Columbia, Missouri.



- 1982-1984: Project Leader and Biological Technician, U.S. Fish and Wildlife Service, Ecological Services, Anchorage, Alaska.
- 1981-1982: Fish and Game Technician III, Alaska Department of Fish and Game, Limnology Section, Fisheries Research and Enhancement Division, Soldotna, Alaska.
- 1981: Biological Technician, U.S. Forest Service, Tongass National Forest, Wrangell, Alaska.
- 1980-1981: Biologist, U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Adak and Amchitka Islands, Alaska.
- 1977-1980: Museum Assistant, James Ford Bell Museum of Natural History, University of Minnesota, Minneapolis, Minnesota.
- 1976: Undergraduate Teaching Assistant, German Department, University of Minnesota, Minneapolis, Minnesota.

## **GRANTS**

- 1994-1995: Landbird monitoring (ID) on private lands. National Fish and Wildlife Foundation and Potlatch Corporation. \$28,000.
- 1994-1995: Status of Pacific loons in Canada. Canadian Wildlife Service. \$1,000.
- 1984-1988: Wetland types and their use by aquatic birds in the Yukon Flats NWR. US Fish and Wildlife Service. \$50,000.

## **LANGUAGES, SPECIAL SKILLS, MANAGEMENT TRAINING**

- German, fluent
- Russian, minimal conversation
- American Sign Language, marginally fluent
- Private Pilot's License, issued April 13, 1989
- National Wetlands Inventory Workshop, March 1984, Anchorage, Alaska
- SAS Programming, August 1986, Columbia Missouri
- Supervisory Training, April 1989, Columbia, Missouri
- GIS Application Workshop, August 1990, Columbia, Missouri
- Civil Rights Training, November 1992, Anchorage, Alaska
- Prevention and Awareness of Sexual Harassment Training, January 1993, Anchorage, Alaska
- Total Quality Management Training, May 1993, Anchorage, Alaska

## AWARDS

National Academy of Sciences Young Investigator Program on Agricultural Impacts on Water Quality in Latvia and Lithuania, 1994  
Performance Award, U.S. Fish and Wildlife Service, Anchorage, Alaska, 1993  
Performance Award, U.S. Fish and Wildlife Service, Anchorage, Alaska, 1992  
Academic Enrichment Honors Program, University of Minnesota, St. Paul, MN, 1979

## PROFESSIONAL AFFILIATIONS

Society of Wetland Scientists  
The Wildlife Society  
Society of Conservation Biology  
Ecological Society of America  
American Ornithologists Union

## PUBLICATIONS

Heglund, P.J. 1994. Range extensions of vascular plants from the Yukon Flats Region of Alaska. *Canadian Field-Naturalist*. *In Press*.

Heglund, P.J., J.R. Jones, L.H. Fredrickson, and M.S. Kaiser. 1994. Use of boreal forested wetlands by Pacific loons (*Gavia pacifica* Lawrence) and horned grebes (*Poeliceps auritus* L.): relations with limnological characteristics. *Hydrobiologia* 279/280:171-183.

Pearce, J.P., P.J. Heglund, J. Hupp, M.R. Petersen, and A. Degtyarev. 1994. The spectacled eider on the Indigirka River Delta, Sahka, Russia. IWRB Threatened Waterfowl Research Group Newsletter 5:10-11.

Heglund, P.J. 1992. Patterns of wetland use among aquatic birds in the interior boreal forest region of Alaska. Ph.D. dissertation. University of Missouri, Columbia, Missouri. 394 pp.

Heglund, P.J. 1988. Relations between water bird use and the limnological characteristics of wetlands on Yukon Flats National Wildlife Refuge, Alaska. M.S. thesis. University of Missouri, Columbia, Missouri. 179 pp.

Heglund, P.J., and D.H. Rosenberg. 1986. Water bird use of the Stikine River estuary and adjacent wetlands. U.S. Fish and Wildlife Service, Special Studies. Unpublished report. Anchorage, Alaska. 103 pp.

## **PAPERS IN PREPARATION**

Heglund, P.J., and L.H. Fredrickson. A wetland continuum. For submission to the Canadian Journal of Botany.

Heglund, P.J., and J.R. Jones. The limnological features of 126 lakes and ponds in the boreal forest region of Alaska. For submission to the Canadian Journal of Fisheries and Aquatic Sciences.

Heglund, P.J., J.R. Jones, and K. Lohman. Experimental evidence for nutrient limitation in 15 boreal wetlands: nitrogen, phosphorus, and the regulation of lake trophic status. For submission to the Canadian Journal of Fisheries and Aquatic Sciences.

Heglund, P.J., and D.H. Rosenberg. Riparian landbird associations and vegetation communities of the lower Stikine River, Alaska. For submission to Northwest Science.

## **PROFESSIONAL PRESENTATIONS**

### **Invited Presentations**

Society of Wetland Scientists and American Society of Limnology and Oceanography, joint annual meeting, Edmonton, Alberta, May 1993. "Patterns of wetland use among an assemblage of aquatic birds in the boreal forest region of Alaska."

University of Washington, School of Fisheries and School of Forestry and Wildlife, Seattle, Washington, November 1991. "Relations among aquatic bird populations and the limnological characteristics of boreal forest wetlands: a population modeling approach."

Paxtuxent Wildlife Research Center, Laurel, Maryland, July 1991. "A modeling approach to estimating aquatic bird abundance."

Montana State University Wildlife Seminar Series, Bozeman, Montana, April 1990. "A conceptual model density-independent habitat selection."

### **Contributed Presentations**

Seaduck Workshop, Anchorage, Alaska, 1992. "Wetland type selection by white-winged scoters on the Yukon Flats, Alaska."

Symposium on Aquatic Birds in the Trophic Web of Lakes, Fredrickton, New Brunswick, August 1991. "Use of forested wetlands by Pacific loons and horned grebes: a population modeling approach."

Alaska Migratory Waterfowl Workshop, Anchorage, Alaska, January 1990. Session chair  
- Waterfowl habitat.

Midwest Fish and Wildlife Conference, Minneapolis, Minnesota, January 1989.  
"Waterbird use in relation to wetland hydrochemical features."

Gaylord Laboratory Annual Review, Puxico, Missouri, January 1988. "The effects of fire  
on boreal forested wetlands."

Alaska Migratory Bird Conference, Anchorage, Alaska, February 1985. "Waterbird use of  
the Stikine River delta and adjacent wetlands."

**SUMMARY PROPOSAL BUDGET**

(Follow instructions on pages 14-16 when completing this form.)

Name of Institution: **University of Idaho**

Name of Principal Investigator: **Kirk Lohman**

**A. SENIOR PERSONNEL:** (See page 16 for personnel definitions.)  
Name/Title

Rate of Pay                      No. of Months  
CAL    ACA    SUM                      Dollar Amount Requested

Kirk Lohman, Assistant Professor	\$858/wk			0.5	\$1,716
Patricia Heglund, Aff. Asst. Professor	\$858/wk			0.7	2,575
<b>SUBTOTAL:</b>					<b>\$4,291</b>

**B. OTHER PERSONNEL:** (See page 16 for personnel definitions.)  
Name/Title

Rate of Pay                      No. of Months  
CAL    ACA    SUM                      Dollar Amount Requested

Masters Student	\$833/mo	24			\$19,982
Irregular Help	\$1040/mo			2.5	2,600
<b>SUBTOTAL:</b>					<b>\$22,582</b>

**C. FRINGE BENEFITS:**

Rate of Pay (%)                      Salary Base                      Dollar Amount Requested

K. Lohman, P. Heglund (27.5%)	\$4,291	\$1180
Masters student (1%)	19,982	200
Irregular Help (13%)	2,600	338
<b>SUBTOTAL:</b>		<b>\$1,718</b>

**D. EQUIPMENT:** (List each item with a cost in excess of \$1000.00.)

Item/Description                      Dollar Amount Requested

<b>SUBTOTAL:</b>		

**E. TRAVEL:**

Dates of Travel                      No. of                      Total                      Transportation                      Lodging                      Per Diem                      Dollar Amount Requested  
(from/to)                      Persons                      Days

Summer 1995	4		8 round-trip flights			\$2,880
		150 person-days	\$10/day			1,500
		150 person-days		\$8/day		1,200

**\$4,580**

F. Participant Support Costs:		Dollar Amount Requested
1. Stipends		
2. Travel (other than listed in section E)		
3. Subsistence		
4. Other		
<b>SUBTOTAL:</b>		0
G. Other Direct Costs:		Dollar Amount Requested
1. Materials and Supplies		900
2. Publication Costs/Page Charges		800
3. Consultant Services (Include Travel Expenses)		
4. Computer Services		
5. Subcontracts		
6. Other		
<b>SUBTOTAL:</b>		\$1,700
<b>H. Total Costs: (Add subtotals, sections A through G)</b>		<b>\$34,871</b>
<b>I. Amount Requested:</b>		<b>\$34,871</b>
Principal Investigator's Signature: <i>Patricia J. Hegner</i>		Date: <i>October 31, 1994</i>

*Patricia J. Hegner*

*10/31/94*

## Budget Explanation Page

### **A,B, &C. Salaries, Wages and Fringe Benefits:**

*Kirk Lohman:* Two weeks of summer salary to cover time spent at Taylor Ranch to assist graduate student in initiating field work, data analysis, report writing.

*Patricia Heglund:* Three weeks salary to cover time spent at Taylor Ranch to assist graduate student in initiating field work, data analysis, report writing.

*Masters Student:* Two years of financial support to cover field work, data analysis, and thesis writing.

*Irregular Help:* Two and a half months wages and benefits for a field technician to assist the master's student in data collection at Taylor Ranch.

### **E. Travel**

*Travel from Moscow to Taylor Ranch:* Access to Taylor Ranch is limited to charter flights from either Moscow or Cascade. We have budgeted for 8 round-trip flights from Moscow during the summer field season in 1995. These would include 2 trips each for K. Lohman, P. Heglund, the masters student, and the field technician.

*Lodging at Taylor Ranch:* Lodging at Taylor Ranch is \$10/day. The masters student and field technician will both spend roughly 60 days at Taylor Ranch during the field season. P. Heglund will spend 20 days and K. Lohman will spend 10 days at Taylor Ranch.

*Meals for personnel while at Taylor Ranch:* Rate calculated based on time spent at Taylor Ranch as described above.

**G. Other Direct Costs**

*Materials and supplies:* This includes binoculars, vegetation sampling equipment, copying, and telephone charges.

*Publication costs:* Cost of one 8-page manuscript estimated at \$100/page.



**CURRENT AND PENDING SUPPORT**

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of the proposal.

I. Name of Investigator	Source of Support	Project Title	Award Amount (or Annual Rate)	Period Covered by Award	Person-Months or % of Effort Committed to the Project			Location of Research
					ACAD	SUMM	CAL YR	
Kirk Lohman								
A. <i>Current Support</i> List. If none, report none.	Univ. of Idaho Res. Office	Stream Amphibians	\$5,778	7/1/94 - 6/30/95		0.7		Moscow, Idaho
B. <i>Proposals Pending</i> 1. List this proposal	SBOE	Avian Use of Riparian Zones	\$34,871	4/1/95 - 3/31/96		0.5		Moscow, Idaho Taylor Ranch
2. Other pending proposals, including renewal applications. If none, report none.	Potlatch USFS	Amphibians Starthistle	\$26,750 \$39,226	1/1/95 5/31/96 1/1/95 - 12/31/96		0.7 0.7		Moscow, Idaho Moscow/Grangeville, ID
3. Proposals planned to be submitted in near future. If none, report none.	None							
II. Name of co-principal investigator and/or faculty associate. A. _____ B. _____								
III. Transfer of Support If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.								
IV. Other agencies to which this proposal has been/will be submitted.	Nat. Fish & Wildlife Foundation							

USE ADDITIONAL SHEETS AS NECESSARY

**CURRENT AND PENDING SUPPORT**

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of the proposal.

I. Name of Investigator	Source of Support	Project Title	Award Amount (or Annual Rate)	Period Covered by Award	Person-Months or % of Effort Committed to the Project			Location of Research
					ACAD	SUMM	CAL YR	
Patricia Heglund								
A. <i>Current Support</i> List. If none, report none.	NFWF	Landbirds	\$28,000	1/1/94 - 12/31/94			2	Moscow, Idaho
B. <i>Proposals Pending</i> 1. List this proposal	SBOE	Avian Use of Riparian Areas	\$34,871	4/1/95 - 3/31/96		0.7		Moscow, Idaho Taylor Ranch
2. Other pending proposals, including renewal applications. If none, report none.								
3. Proposals planned to be submitted in near future. If none, report none.	None							
II. Name of co-principal investigator and/or faculty associate. A. _____ B. _____								
III. Transfer of Support If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.								
IV. Other agencies to which this proposal has been/will be submitted.	Nat. Fish & Wildlife Foundation							

USE ADDITIONAL SHEETS AS NECESSARY

### **Facilities and Equipment**

This project would make extensive use of the Taylor Ranch Wilderness Research Station administered by the Wilderness Research Center and the University of Idaho College of Forestry, Wildlife and Range Sciences. Taylor Ranch can provide lodging, as well as laboratory space, necessary for completing the field component of this study.