

Resources for the Future, Inc.

1616 P Street, N.W., Washington, D.C. 20036

APPLICATION FOR GRANT

Please answer all questions and type your replies. Be sure to obtain the signature of an official authorized to sign for the organization, as requested on the last page of this form.

Date February 26, 1987

PART I Plan and budget

Name of organization applying for grant College of Forestry, Wildlife and Range Sciences

Address University of Idaho, Moscow, Idaho 83843

Name of person in charge of project Dr. Joseph J. Ulliman

Present position Professor of Forest Resources

Address University of Idaho, Moscow, Idaho 83843

Office telephone number (208)885-7209

Title of Project Development of Multiresource Inventory Techniques and Methodology Using

Remote Sensing and a Geographic Information System for Planning, Monitoring and Management of Wilderness Areas

Total amount of request \$27,602

Period covered by project July 1, 1987--June 30, 1988

Name of responsible financial officer Gerald R. Reynolds, Controller

Address University of Idaho, Moscow, Idaho 83843

Attach details of the plan in a description not to exceed 1,000 words (not including the bibliography). The description should include the following:

Specific aims of the proposed work

Significance of the project and why its results may be important

Details of the procedure to be followed, giving the general approach and research methods to be used

Facilities available

PLEASE REMEMBER TO SIGN AND DATE FORMS AND MAIL ONE COPY TO:

Small Grants Program, Resources for the Future, 1616 P Street, N.W., Washington, D.C. 20036

Budget amount requested from Resources for the Future, Inc., for the twelve-month period July 1, 1987
 through June 30, 1988 (Use a separate sheet for each year of grant.)

(Includes personnel benefits
 of 23.5% for faculty & staff
 & 11.0% for GA and IH)
Budget amount

Personnel (names and title or position, percentage of total time)	Budget amount
Joseph J. Ulliman, Principal Investigator (9.3%)	4,562
James J. Akenson, Manager, Taylor Ranch (8.3%)	1,748
Panel of Disciplinary Specialists (approx. 15 @4 hrs. each)	1,482
Graduate Assistant (GA) (50%)	7,811
Irregular Help (IH) (Inventory & digitizing crews, ~800 hrs.)	4,440
Facilities and equipment	None
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Materials and supplies : remote sensing imagery, maps, sampling photography, mylar, pens	3,000
Travel (include purpose) : round trip to Taylor Ranch	550
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Other expenses (including publication expenses): GIS minicomputer time, photocopy work, telephone and publication cost	1,500
Overhead (10%)	2,509
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Total	27,602

List previous and current support from all sources, including any received from the applicant's own institution, for this project or for similar projects.

Source of support	Title of project	Period of support	Amount
USDA-Forest Service	Caribou and Grizzly Bear Habitat Mapping	1983-1984	14,355
USDA-Forest Service & Univ. of Idaho	GIS Evaluation of Wildlife Habitat	1984-1985	6,800
NASA	Training Site Delineation for Thematic Mapper Simulator/Forestry Project	1982	14,238
NY Zoological Soc.,	Mountain Lion Ecology	1965-1972	150,000
Smithsonian Institute	& Predator-Prey Study	1984-1987	50,000
Natl. Geographic Soc.	Prehistoric Settlement & Subsistence Patterns	1984-1985	20,000
USDA Forest Service	Ecology of the Bobcat	1981-1985	225,000
USDI Fish & Wlf Soc.	in River of No Return Wilderness		
Natl. Wlf Federation	Bighorn Sheep Compe-	1985-1986	10,000
Wilderness Research Center	tation on Winter Range		
McIntire-Stennis & Wilderness Research Center	Identification & Eval. of Indicators to Monitor Wilderness Conditions	1984-1986	20,000
			Total 567,393

(OVER)

McIntire-Stennis & Wilderness Research Center	Assessing the Impacts of Recreationists on Pristine Wilderness Conditions	1984-1986	10,000
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ID Fish & Game (non- game fund), USDA Forest Service, Wild- erness Research Center & Natl. Bluebird Soc.	Habitat of Boreal Owls in Central Idaho	1984-87	47,000
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PART II Personal Information See attached Curriculum Vitae for J. Ulliman

(Applicant may submit up-to-date resumes of all personnel taking part in the project in place of the personal information requested below.)

Following for James J. Akenson, Manager, Taylor Ranch

Submit biographical material on all professional personnel, including:

Education (List all schools attended beyond the high school level, including dates attended, institution, major field(s) of study, and degree.)

1. Eastern Oregon State College, La Grande, OR 1975-1979
Degree: B.S. Community Service--Environmental Studies

2. Oregon State University, Corvallis, OR 1979-1985
Degree: M.S. Resource Geography

Experience (List all activities--employment, military service, etc. -- since college.)

1. Research Associate and Manager, Taylor Ranch Field Station--Wilderness Research Center, University of Idaho, Moscow, ID. 8/82-present.

2. Wilderness Planner, Bureau of Land Management, Baker, OR. 4/81-3/82.

3. Field Research Biologist, USFS Range & Wildlife Habitat Lab, Baker, OR. 8/80-4/81.

4. Land Use Planning Cartographer, Lynn Steiger & Associates, La Grande, OR. 9/78-9/79.

Honors (List any special honors, awards, scholarships, or fellowships held.)

Selected publications (List published books or articles and any significant research the applicant has done that has not resulted in publication. Applicant may submit a few short articles or papers, but no books, please.)

A Management Plan for Harris Park. South Fork of the Walla Walla River, Umatilla County, Oregon. M.S. Thesis, University of Oregon. 1982. 54 pp.

PART III Conditions

Please read carefully before applying for grant.

Tax-exempt status Grants will be made to tax-exempt institutions only.

Expenditure of grants Grants are to be used exclusively for the purposes stated in the letter of grant notification that will be issued by Resources for the Future, Inc., upon its approval of the grant application.

Revocation and reversion of grants

Any grant may be revoked in part or in whole at any time by Resources for the Future, Inc.

If a grant is revoked, Resources for the Future, Inc., will have no obligation to make any further payment, and the grantee, on request, must return the balance of the grant, less payment for commitments already fulfilled.

Grantees must return to Resources for the Future, Inc., any unexpended balance of the grant not required for the purposes of the grant or not spent during the term of the grant.

Grants will revert to Resources for the Future, Inc., if the grantee's institution loses its tax-exempt status.

Publication of research and copyright Although not a condition of the grant, Resources for the Future, Inc., requests the privilege of considering for publication those manuscripts resulting from research supported by any grant received as a result of this application. If a publisher other than Resources for the Future, Inc., is selected by the grantee, appropriate acknowledgment of the support received from Resources for the Future, Inc., is required. Because of Resources for the Future's tax-exempt status and its desire to further the public interest, the applicant cannot receive any private financial gain from any work supported by any grant received as a result of this application.

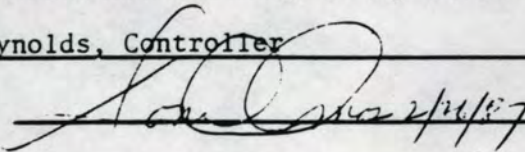
Commitment Every grant is made with the understanding that Resources for the Future, Inc., has no obligation to provide any additional support for the grantee.

Other terms and conditions Grants will be subject to such other terms and conditions as may be required by Resources for the Future, Inc., and set forth in its letter of grant notification.

Name of organization University of Idaho

Name and title of an official authorized to sign for organization _____

Gerald R. Reynolds, Controller

Official's signature  _____

DEVELOPMENT OF MULTIRESOURCE INVENTORY TECHNIQUES AND ANALYSIS METHODOLOGY
USING REMOTE SENSING AND A GEOGRAPHIC INFORMATION SYSTEM FOR
PLANNING, MONITORING AND MANAGEMENT OF WILDERNESS AREAS

Significance and Importance of Project

Wilderness is truly a resource for the future and just since the passage of the Wilderness Act of 1964, more than 89 million acres have been congressionally designated such. But even in that time, many of these areas have been severely impacted through either overuse or lack of management due to insufficient knowledge of the resource and lack of funding. Yet the legislative mandate to federal agencies for planning, monitoring and management of these areas or resources within them is clear: The National Environmental Policy Act of 1969 (PL91-190); the Endangered Species Act of 1973 (PL93-205); the Sikes Act of 1960; National Forest Management Act of 1976 (PL94-588); Clean Air Act Amendments of 1977 and 1987; and Water Quality Criteria established by the EPA Committee in 1972, 1977 and 1986.

Too much has been invested in the Wilderness resource to allow degradation of the very naturalness these preserves were created to protect. Management is required to minimize and modify negative impacts to preserve the natural conditions. It is difficult to do this, however, without basic knowledge of the total resource and its condition and a means of analysis and planning for effective management (Krumpe and McLaughlin, 1986; Stankey et al., 1985). We know of no effort utilizing cost-effective and state-of-the-art techniques to inventory, monitor and analyze the wilderness ecosystem to gain a comprehensive understanding of this natural system.

Objectives

We propose a project wherein we will develop multiresource inventory techniques (Lund, 1986; McClure et al., 1979) using remote sensing, and

analysis methodology using a geographic information system to portray the interrelationships of terrestrial and aquatic ecosystems within a wilderness area. The techniques and methodology would provide scientists and managers a means by which basic information may be gathered and subsequently analyzed at reasonable expense for future investigations of natural systems and their components and for planning and management to maintain or enhance natural diversity and protect wilderness values (Bell and Atterbury, 1983; Hart et al., 1985; Abula and Nyquist, 1987). Such would be applicable to any wilderness area or natural preserve in the world. This project will provide the base data and a test of the methodology for examining a much larger area in future work. Modeling and simulation of possible alternatives of management will be undertaken with this base.

Methodology

Specifically we would proceed as follows:

1. Establish a panel of interdisciplinary resource personnel to define needs (Scott, et al., 1981). Within the College of Forestry, Wildlife and Range Sciences we have nearly all the discipline specialists represented: ecology, sociology, forestry, fisheries, wildlife, soils, hydrology, range, water and air quality, wilderness, fire, pathology, entomology, statistics and sampling, planning, and remote sensing. The following specialties from other colleges will also be represented: geomorphology, geographic information systems, and archeology.
2. Derive the following specifics from the panel:
 - a. The inventory attributes needed in each of the above specialty areas (e.g. Merigliano and Krumpke, 1985 and 1986).
 - b. The resolution level for the attributes.
 - c. The format for multilevel disciplinary data.

- d. The grid system to which the multiple planes will be registered in the GIS system.
 - e. The output products desired from analysis of the data by GIS manipulation.
3. A wilderness presents many more operational and practical problems for inventory than other lands, problems which have not been thoroughly investigated before. The panel will assist in defining multistage inventory and sampling techniques which are statistically valid but also practical and cost-effective for rugged, inaccessible terrain. This will include defining the type of remote sensing imagery.
 4. Using existing and acquired remote sensing, map, survey and descriptive data, do a multistage inventory of the Cabin, Cliff, Cougar, and Goat Creek watersheds (~33,000 acres) around the Wilderness Research Center field station at Taylor Ranch. There are 3 lakes, an elevation range from 3,900' to 9,000' and a variety of ecosystems within this area.
 5. Interpret remote sensing data for many of the desired attributes and gather ground truth data through subsamples (Brass et al., 1983; Befort and Ulliman, 1985). Transfer the results to 1:24,000 scale maps.
 6. Digitize each plane of data for entry into the GIS. Existing data, including Digital Elevation Model topographic data will be entered also.
 7. Develop combinations of attributes and analyze data for possible alternatives of strategy in wilderness management.
 8. Publish the results of this development through the RFF, the College Experiment Station, and refereed journal as deemed most appropriate.

Facilities

The University of Idaho is in a unique position to do this project, having in its possession the only wilderness research center in the country with field station (Taylor Ranch) located in a wilderness, the Big Creek drainage of the Frank Church-River of No Return Wilderness. The site is being considered for a Biosphere Reserve and a study site for the EPA monitoring network for baseline environmental monitoring of airborne pollution. There are 3.8 million acres of wilderness extant around this area within Idaho.

The Taylor Ranch consists of living quarters, a field laboratory, an airstrip to augment aerial reconnaissance and provide access, pack horses and mules to support on-ground logistics, and professional staff to carry out field investigations. The laboratory is equipped with a U.S. Weather Service station, an IBM PC computer, an herbarium, a small mammal collection, and field equipment.

The Taylor Ranch has functioned as the field headquarters for a variety of ecological investigations, providing a foundation for producing the interdisciplinary resource matrices applicable to the proposed study. Past research has been conducted on owl habitat partitioning (Hayward, 1983), big game utilization of different vegetation types in winter (Claar, 1973), ecological studies of cougar and bobcat (Hornocker, 1969, 1970; Seidensticker, 1973; Kohler, in progress), behavioral relationships of deer, elk and bighorn sheep in winter (Akenson, in progress), primitive area stream ecology (Buttner and Falter, 1977), and settlement and subsistence patterns of indigenous peoples (Hartung, 1978). Many more studies would develop if basic resource data were available.

The College of Forestry, Wildlife and Range Sciences has a remote sensing center with personnel and equipment for obtaining and analyzing remote sensing imagery. There are two GIS systems on campus and a proposal for obtaining another one for the college.

Bibliography

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