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Water Resources Series No. 54

INVENTORY OF
WATER RESOURCES RESEARCH
AT THE
UNIVERSITY OF WYOMING
FISCAL YEAR 1975

Leslie K. Perry

January 1975

Research on which this paper is based was funded in part by a grant from the Office of Water Research and Technology, U.S. Department of the Interior, under Public Law 88-379, the Water Resources Research Act of 1964, acting through the Wyoming Water Resources Research Institute.

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INTRODUCTION

The following pages contain a summary of water resources research in progress at the University of Wyoming. To obtain this information, letters of inquiry were sent to all departments on campus. Although all projects mentioned in the replies have been included in this report, there is undoubtedly some additional research which has been overlooked. However, this inventory will be updated each year and should be more complete with each issue.

The research currently being funded or conducted by WyoWRRI is listed first, followed by projects underway elsewhere on campus. A brief description of outstanding research facilities at the University of Wyoming and a list of researchers and faculty involved in water resources research are also included.

RESEARCH IN PROGRESS AT THE
WATER RESOURCES RESEARCH INSTITUTE

A. OWRT

1. Annual Allotment - Agreement Number 14-31-0001-4051

- a. Project Title: Legal Aspects of Water Resource Planning
(p. 10)

Project I.D. Numbers: OWRT: A-003-WYO, UW: 8496,
FCST: VI-E

Status: To be completed June 1975

Principal Investigator: George Gould, Law

Graduate Students: Douglas Hickey and Daniel Riggs

- b. Project Title: The Movement of Snowmelt Water Through
Small Plant-Soil Systems in the Medicine
Bow Mountains, Wyoming (p. 11)

Project I.D. Numbers: OWRT: A-011-WYO, UW: 8492,
FCST: II-1

Status: To be completed June 1975

Principal Investigators: Dennis H. Knight, Botany
A. Tyrone Harrison, Botany

Graduate Student: Linda Wallace

- c. Project Title: Estimating Evapotranspiration in the Platte
River Basin of Wyoming (p. 12)

Project I.D. Numbers: OWRT: A-014-WYO, UW: 8495,
FCST: II-D

Status: To be completed June 1975

Principal Investigator: Larry O. Pochop, Agricultural
Engineering

Graduate Student: Richard Vanklaveren

d. Project Title: Development of a Sub-Alpine Mountain Basin
Runoff Model (p. 13)

Project I.D. Numbers: OWRT: A-015-WYO, UW: 8498,
FCST: II-A

Status: To be completed June 1975

Principal Investigator: Tsong C. Wei, WRRRI

Graduate Student: Frank Yeamans

e. Project Title: Survey of Existing Water Quality Information
of the North Platte River (p. 14)

Project I.D. Numbers: OWRT: A-016-WYO, UW: 8491,
FCST: VII-C

Status: To be completed June 1975

Principal Investigator: Robert D. Kerr, WRRRI

Graduate Student: Frank D. Rinehart

f. Project Title: Application of a Continuous Growth Economic
Simulation Model to a Discrete Growth
Economy (p. 15)

Project I.D. Numbers: OWRT: A-017-WYO, UW: 8494,
FCST: VI-B

Status: To be completed June 1975

Principal Investigator: Clynn Phillips, WRRRI

g. Project Title: Hydrology of Madison Formation and Its
Potential Use for Water Supply for Energy
Development (p. 16)

Project I.D. Numbers: OWRT: A-019-WYO, UW: 8500,
FCST: II-F

Status: To be completed June 1975

Principal Investigator: Peter W. Huntoon, WRRRI and Geology

Graduate Student: Don Lundy

2. OWRT Matching Grants

Project Title: Model for Determining Evaporation From
Wind Compacted Snowdrifts Under Oasis
Conditions (p. 17)

Project I.D. Numbers: OWRT: B-021-WYO, UW: 8457,
FCST: II-D

Agreement Number: 14-31-0001-4142

Status: To be completed July 1975

Principal Investigator: Paul A. Rechard, Hydrology, WRII

Student Assistant: Ray Masters

3. OWRT Title II Grants

a. Project Title: A Study to Develop Hydrologic and Economic
Systems Models for Wyoming's Platte River
Basin (p. 18)

Project I.D. Numbers: OWRT: C-4351, UW: 7740B, 8449,
FCST: VI

Agreement Number: 14-31-0001-9063

Status: To be completed June 1975

Principal Investigators: Paul A. Rechard, Hydrology, WRII
Clynn Phillips, Economics, WRII

b. Project Title: Stream Channel Modification to Maximize
Available Trout Habitat Under Low Flow
Conditions (p. 19)

Project I.D. Numbers: OWRT: C-5238, UW: 8454, FCST: VIII-I

Agreement Number: 14-31-0001-4216

Status: To be completed August 1975

Principal Investigators: Thomas A. Wesche, Aquatic Biology,
WRII
Paul A. Rechard, Hydrology, WRII

Graduate Students: Craig Cooper and Dudley Reiser

B. National Weather Service

Project Title: Development of Precipitation Model and
Observation Network Design Criteria for
Mountainous Areas in the Rocky Mountain Region
of the United States (p. 20)

Project I.D. Numbers: NWS: 4-36724, UW: 8422,
FCST: II-B and VII-A

Status: To be completed June 1975

Principal Investigators: Paul A. Rechar, Hydrology, WRII
Tsong C. Wei, WRII
Verne E. Smith, Hydrology, WRII
G. Fred Doll, Statistics, WRII

C. Wyoming State Agency Contracts

1. Project Title: Computerized Wyoming Water Resource
Data System (p. 21)

Project I.D. Numbers: UW: 7740A, FCST: VII

Contracting Agency: State Engineer - Water Planning Program

Status: To be completed June 1977

Principal Investigator: Verne E. Smith, Hydrology, WRII

2. Project Title: Salinity and Turbidity Study - Shoshone
River (p. 22)

Project I.D. Numbers: UW: 7740C, FCST: V

Contracting Agencies: Department of Environmental Quality,
State Engineer

Status: To be completed May 1974

Principal Investigator: Robert Kerr, Water Quality, WRII

3. Project Title: Snowmobiling in Wyoming: A Study of
Private and Commercial Use Trends (p.23)

Project I.D. Numbers: UW: 6915, FCST: VI

Contracting Agency: Wyoming Recreation Commission

Status: To be completed June 1975

Principal Investigator: Clynn Phillips, Economics, WRII

4. Project Title: Hunting and Fish Values in Wyoming: 1975
(p. 24)

Project I.D. Numbers: UW: 6916, FCST: VI

Contracting Agency: Wyoming Game and Fish Commission

Status: To be completed June 1976

Principal Investigator: Clynn Phillips, Economics, WRRRI

5. Project Title: Big Game Harvest Survey in Wyoming, 1974
(p. 25)

Project I.D. Numbers: UW: 7765, FCST: VI

Contracting Agency: Wyoming Game and Fish Commission

Status: To be completed June 1975

Principal Investigator: G. Fred Doll, Statistics, WRRRI

6. Project Title: Potential Recharge by Ephemeral Streams
and Overland Flow to the Madison Aquifer
Along the Eastern Slope of the Big Horn
Mountains and Along the Northern Slope
of the Laramie Range (p. 26)

Project I.D. Numbers: UW: 7741, FCST: II-F

Contracting Agency: State Engineer

Status: To be completed June 1976

Principal Investigator: Peter W. Huntoon, Geology and WRRRI

7. Project Title: Geomorphology of Ephemeral Channels in
the Powder River Basin of Wyoming (p. 27)

Project I.D. Numbers: UW: 7742, FCST: II-E

Contracting Agency: State Engineer - Water Planning Program

Status: To be completed July 1976

Principal Investigator: Gerald E. Mueller, Geography

Graduate Student: Theodore Apley

8. Project Title: An Economic Assessment of Present and Future Public Investment Issues in Wyoming (p. 28)

Project I.D. Numbers: UW: 7560, FCST: VI-C

Contracting Agency: DEPAD

Status: To be completed January 1975

Principal Investigator: Clynn Phillips, Economics, WRRRI

Graduate Student: Gerald Thompson

D. U.S. Forest Service

1. Project Title: Present Conditions of the Aquatic Biota and Abiota of the Little Powder River in Thunder Basin National Grassland, Wyoming (p. 29)

Project I.D. Numbers: USFS: 16-416-CA, UW: 8541,
FCST: V

Status: To be completed February 1975

Principal Investigators: Thomas A. Wesche, Aquatic Biology, WRRRI and Robert D. Kerr, Water Quality, WRRRI

Graduate Student: Duaina Baldrige

2. Project Title: Pilot Study on the Effects of Strip Mining of Coal on Shallow Ground Water Aquifers in the Eastern Powder River Basin of Wyoming (p. 30)

Project I.D. Numbers: USFS: 16-420-CA, UW: 8542,
FCST: V

Status: To be completed July 1975

Principal Investigators: Peter W. Huntoon, Geology and WRRRI
Paul A. Rechar, Hydrology, WRRRI

Graduate Student: Michael Penz

E. Industry

1. ARCo

- a. Project Title: Environmental Monitoring of Black Thunder Site (p. 31)

Project I.D. Numbers: ARCo: SCCL-84, UW: 8128, FCST: V

Status: To be completed September 1975

Principal Investigator: Paul A. Rechar, Hydrology, WRRI

- b. Project Title: Hydrologic Baseline Study - Coal Creek Lease (p. 32)

Project I.D. Numbers: UW: 6527, FCST: V

Status: To be completed August 1975

Principal Investigator: Paul A. Rechar, Hydrology, WRRI

2. AMAX

Project Title: Environmental Monitoring of Belle Ayr Mines (p. 33)

Project I.D. Numbers: UW: 6526, FCST: V

Status: To be completed September 1975

Principal Investigators: Paul A. Rechar, Hydrology, WRRI
Robert D. Kerr, Water Quality, WRRI
Thomas Wesche, Aquatic Biology, WRRI
John Adams, Microbiology

F. U.S. Bureau of Reclamation

Project Title: The Sensitivity of Ecosystem Components in the Medicine Bow Mountains to Winter Precipitation Management - Phase I (p. 34)

Project I.D. Numbers: USBR: 14-06-D-7198, UW: 8164,
FCST: VI-G

Status: To be completed February 1975

Principal Investigators: Dennis H. Knight, Botany and
Six Co-Principal Investigators

G. National Park Service

1. Project Title: Economic Impact Study of a National Park Service Proposal in the Sawtooth Area of Idaho (p. 35)

Project I.D. Numbers: NPS: CX-9000-3-0145, UW: 8348,
FCST: VI

Status: To be completed December 1974

Principal Investigator: Clynn Phillips, Economics, WRRRI

Other Professional Staff: Sheryl Ferguson

2. Project Title: A Study of Backcountry Use in Grand Teton National Park (p. 36)

Project I.D. Numbers: UW: 8325, FCST: VI

Status: To be completed June 1975

Principal Investigator: Clynn Phillips, Economics, WRRRI

Graduate Student: Blair Wolfley

H. Environmental Resources Center, CSU

Project Title: Development of a Colorado River-Great Basin Regional Framework for Water Research (p. 37)

Project I.D. Numbers: ERC: X-138, UW: 6561, FCST: VI-B

Status: To be completed March 1975

Principal Investigators: Paul A. Rechar, Hydrology, WRRRI
Robert D. Kerr, Water Quality, WRRRI

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>Office of Water Research and Technology</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No:</p> <p style="text-align: center;">and/or</p> <p>Control No: A-003-WYO</p>						
<p>TITLE OF PROJECT:</p> <p>LEGAL ASPECTS OF WATER RESOURCE PLANNING</p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%; border: none;">School or Division</td> <td style="width: 30%; border: none;">Department</td> </tr> <tr> <td style="border: none;">George Gould Assistant Professor</td> <td style="border: none;">College of Law</td> <td style="border: none;"></td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	George Gould Assistant Professor	College of Law	
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Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Including Laramie, Wyoming 82071 Zip Code.	Start Date: July 1972 End Date: June 1975 Annual Funding: \$10,576						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>The proposed research plan involves research into several areas of water law to determine what the law presently provides, how this affects water resource planning, what the law should be, and how changes, if any, should be implemented. The general emphasis of the research will be on appropriation doctrine statutes, with specific emphasis on Wyoming. Specific areas of consideration will include: a) legal aspects of interbasin diversions in Wyoming; b) an examination of institutional and legal processes through which wildlife, recreation, and other environmental interest groups can effectively influence decision making in water planning and allocation; c) a consideration of the legal problems involved in using Federal reservoirs for state purposes; d) an examination of the law pertaining to underground and surface water pollution, with the emphasis on private remedies for appropriators adversely affected by such pollution; 3) an examination of State-Federal relations where a Federal project is interstate in character (i.e. interstate reservoirs), with the emphasis on particular problems of the Yellowtail project in Wyoming and Montana.</p> <p>FCST: VI-E</p> <p>Graduate Students: Douglas Hickey and Daniel Riggs</p>							

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NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY: Office of Water Research and Technology	AGENCY'S NUMBER(S): Contract No: and/or Control No: A-011-WYO									
TITLE OF PROJECT: THE MOVEMENT OF SNOWMELT WATER THROUGH SMALL PLANT-SOIL SYSTEMS IN THE MEDICINE BOW MOUNTAINS, WYOMING										
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">PRINCIPAL INVESTIGATOR, ASSOCIATES</th> <th style="text-align: left; border-bottom: 1px solid black;">School or Division</th> <th style="text-align: left; border-bottom: 1px solid black;">Department</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Dr. Dennis H. Knight Associate Professor</td> <td style="padding: 5px;">Arts and Sciences</td> <td style="padding: 5px;">Botany</td> </tr> <tr> <td style="padding: 5px;">Dr. A. Tyrone Harrison Assistant Professor</td> <td style="padding: 5px;">Arts and Sciences</td> <td style="padding: 5px;">Botany</td> </tr> </tbody> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Dr. Dennis H. Knight Associate Professor	Arts and Sciences	Botany	Dr. A. Tyrone Harrison Assistant Professor	Arts and Sciences	Botany
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<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p style="text-indent: 40px;">This research program will study the movement of snowmelt water through quarter-acre plots dominated by lodgepole pine. The vegetation will be described in terms of biomass, tree density, cover, and leaf area. Run-on, run-off, infiltration, interception, and transpiration will be measured as accurately as possible. Tree water status will be followed with the pressure bomb, stomatal porometer, and a device for measuring the velocity of the xylem stream. The quantity and quality of infiltration water will be evaluated using a series of simple, buried lysimeters. After initial measurements are achieved, experimental treatments will include adding additional water, modifying canopy structure, and fertilization.</p>										
<p>FCST: II-I</p> <p>Graduate Student: Linda Wallace</p>										

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NOTICE OF RESEARCH PROJECT

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<p>TITLE OF PROJECT:</p> <p>ESTIMATING EVAPOTRANSPIRATION IN THE PLATTE RIVER BASIN OF WYOMING</p>							
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Name and Address: Wyoming Water Resources Research Institute Including P.O. Box 3067, University Station Zip Code. Laramie, Wyoming 82071	Start Date: July 1972 End Date: June 1975 Annual Funding: \$10,000						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>Objectives:</p> <ol style="list-style-type: none"> 1. Develop models for estimating evapotranspiration under dryland and forest vegetative conditions within the basin; 2. Investigate the amount of transpiration from phreatophytes within the basin; 3. Test existing models and develop new models for the estimation of potential evapotranspiration on a short-term (weekly or daily) basis. <p>The procedure to be developed for estimating actual evapotranspiration will consider not only potential evapotranspiration, but also the effects of incomplete vegetative covering of the ground surface and of the decrease in soil moisture levels. A computer program will be developed which will calculate the short-term potential evapotranspiration, estimate the actual evapotranspiration, and keep account of the soil moisture content. Large quantities of resource data, including daily temperatures and precipitation, are available for selected locations and will be used as a basis for initial estimates. The estimates of evapotranspiration will be checked against measured values such as those from lysimeters. The extent and type of phreatophyte vegetation along the major rivers in the basin will be surveyed and the water use by this vegetation will be estimated.</p> <p>Key Words: Evapotranspiration Hydrologic Cycle Model Studies Meteorology Phreatophytes</p> <p>FCST: II-D</p> <p>Graduate Student: Richard W. Vanklaveren</p>							

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NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY: Office of Water Research and Technology	AGENCY'S NUMBER(S): Contract No: and/or Control No: A-015-WY0						
TITLE OF PROJECT: DEVELOPMENT OF A SUB-ALPINE MOUNTAIN BASIN RUNOFF MODEL							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%; border: none;">School or Division</td> <td style="width: 30%; border: none;">Department</td> </tr> <tr> <td style="border: none;">Tsong C. Wei Research Engineer</td> <td style="border: none;">Water Resources Research Institute</td> <td style="border: none;"></td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Tsong C. Wei Research Engineer	Water Resources Research Institute	
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SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress) <p>The streamflow in sub-alpine mountain basins consists mainly of water released by snowmelt. Processes of runoff from rainfall and snowmelt differ from one another due to the difference in the affecting factors. Since most of the hydrologic models used today consider precipitation only in the form of rainfall, application of these models to the sub-alpine mountain basin cannot be expected to produce satisfactory results.</p> <p>In this project a snowmelt runoff model will be developed as an independent subroutine and will be connected to one of the most commonly used existing hydrologic models. The model will be tested for the data collected in the Nash Fork watershed in the Snowy Range Mountains of southeastern Wyoming and applied in the simulation of Platte River Basin streamflow. The model will provide a useful means for the estimation of stream runoff in Wyoming, as well as other parts of the United States where snowmelt runoff is important.</p>							
<p>FCST: II-A</p> <p>Graduate Student: Frank Yeamans</p>							

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<p>TITLE OF PROJECT: SURVEY OF EXISTING WATER QUALITY INFORMATION OF THE NORTH PLATTE RIVER</p>							
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:						
Name and Address: Wyoming Water Resources Research Institute P. O. Box 3067, University Station Including Laramie, Wyoming 82071 Zip Code.	Start Date: June 1973 End Date: June 1975 Annual Funding: \$8,000						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>Existing water quality information on the North Platte River will be gathered as a preliminary step to developing a predictive model of chemical quality of the North Platte River as it flows within the confines of the Wyoming borders. The feasibility of formulating this predictive model of chemical quality will be determined. If more data are required to formulate this model, a list of these desired data will be projected.</p> <p>FCST: VII-C</p> <p>Graduate Student: Frank D. Rinehart</p>							

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SIE NO.
GUW-3240-1

NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>Office of Water Research and Technology</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: and/or Control No: A-017-WYO</p>						
<p>TITLE OF PROJECT:</p> <p>APPLICATION OF A CONTINUOUS GROWTH ECONOMIC SIMULATION MODEL TO A DISCRETE GROWTH ECONOMY: AN ADAPTATION OF THE TVA REGIONAL SIMULATION MODEL TO WYOMING'S PLATTE RIVER BASIN</p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%; border: none;">School or Division</td> <td style="width: 30%; border: none;">Department</td> </tr> <tr> <td style="border: none;">Dr. Clynn Phillips Associate Director</td> <td style="border: none;">Water Resources Research Institute</td> <td style="border: none;"></td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Dr. Clynn Phillips Associate Director	Water Resources Research Institute	
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:						
Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Including Laramie, Wyoming 82071 Zip Code.	Start Date: July 1973 End Date: June 1975 Annual Funding: \$11,361						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>The regional economic simulation model developed by TVA will be adapted to Wyoming's Platte River Basin. At present, the TVA model assumes the local economy responds to the same market pressures operating on the national economy and is tied to the national economy via a fixed market share of the national economy. The Platte River Basin economy is heavily dependent upon extractive resource industries. Growth of these industries is more closely tied to resource supply potentials rather than national demand trends. The primary work effort of this study will be concerned with an examination and modification, where appropriate, of the TVA model so that it can be adapted to the Platte River Basin economy.</p>							
<p>FCST: VI-B</p>							

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY: Office of Water Research and Technology</p>	<p>AGENCY'S NUMBER(S): Contract No: and/or Control No: A-019-WYO</p>						
<p>TITLE OF PROJECT: HYDROLOGY OF MADISON FORMATION AND ITS POTENTIAL USE FOR WATER SUPPLY FOR ENERGY DEVELOPMENT</p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%;">School or Division</td> <td style="width: 30%;">Department</td> </tr> <tr> <td>Dr. Peter W. Huntoon Principal Hydrogeologist</td> <td>Water Resources Research Institute</td> <td></td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Dr. Peter W. Huntoon Principal Hydrogeologist	Water Resources Research Institute	
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:						
Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Including Laramie, Wyoming 82071 Zip Code.	Start Date: July 1974 End Date: June 1975 Annual Funding: \$10,000						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>The study as proposed is of a reconnaissance nature and much of the information regarding aquifer characteristics and geologic controls of recharge will be, of necessity, synthesized from the available hydrologic and geologic literature. Other significant sources of data will be state, Federal, and private organizations.</p> <p>Specific objectives of the study will be identification of the structural and stratigraphic control of recharge zones, preparation of potentiometric maps of the aquifer or portions of it, determination of gross transmissivity data where available, and estimation of the current natural recharge rate.</p> <p>Where geologic mapping is inadequate, ERTS and high altitude aircraft photography will be used to identify gross structural and stratigraphic relationships. Limited field reconnaissance of recharge zones will be undertaken as warranted.</p> <p>Once the necessary data are assembled, rates of recharge along the flanks of the mountains will be calculated using a variety of quantitative techniques. Simplistic estimations are feasible by applying the Darcy equation to cross-sections of the aquifer at specific locations where transmissivity data are available. Providing adequate data are available that allow delineation of gross aquifer characteristics, a 2-dimensional model will be developed for the Madison aquifer that can be used to generate recharge data on a regional scale. Such an approach appears to be feasible because the lateral dimensions of the aquifer are several orders of magnitude greater than the aquifer thickness. Even with poor transmissivity data, an order of magnitude estimate for the regional recharge is possible, providing potentiometric data are in reasonable accord with natural conditions in the basin.</p> <p>FCST: II-F</p> <p>Graduate Student: Don Lundy</p>							

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GUW-4033

NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY: Office of Water Research and Technology</p>	<p>AGENCY'S NUMBER(S): Contract No: and/or Control No: B-021-WYO</p>
<p>TITLE OF PROJECT: MODEL FOR DETERMINING EVAPORATION FROM WIND COMPACTED SNOWDRIFTS UNDER OASIS CONDITIONS</p>	
<p>PRINCIPAL INVESTIGATOR, ASSOCIATES Paul A. Rechard Director</p>	<p>School or Division Water Resources Research Institute</p> <p>Department</p>
<p>RECIPIENT INSTITUTION: Name and Address: Wyoming Water Resources Research Institute P. O. Box 3067, University Station Laramie, Wyoming 82071 Including Zip Code.</p>	<p>PERIOD FOR THIS NRP: Start Date: July 1973 End Date: July 1975 Annual Funding: \$9,550 - Federal \$9,550 - State</p>
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>From results of other research, there appears to be no question as to the physical capability of capturing snow in drifts behind snow fences. However, the economic utilization of the snowdrifts requires that the resultant increase in water supply be obtained at a reasonable cost. This requires the determination of the amount of water that would result from the melting of the drift.</p> <p>Runoff and infiltration are the beneficial uses of the increased water supply. If the evaporation and sublimation, the non-beneficial losses from the drift, could be determined, it would be possible to quantify the beneficial factors.</p> <p>The specific objective of this study is to observe the climatological parameters that influence evaporation and to test the hypothesis that the existing models for computing evaporation cannot be used for snowdrift evapo-sublimation determination, and if the hypothesis is correct, to develop a model.</p> <p>FCST: II-D</p> <p>Student Assistant: Ray Masters</p>	

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>Office of Water Research and Technology</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No:</p> <p style="text-align: center;">and/or</p> <p>Control No: C-4351</p>															
<p>TITLE OF PROJECT:</p> <p>A STUDY TO DEVELOP HYDROLOGIC AND ECONOMIC SYSTEMS MODELS FOR WYOMING'S PLATTE RIVER BASIN</p>																
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Zip Code.	Annual Funding: \$ 8,000-University															
	\$60,000-State															
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>Using known hydrologic modeling techniques, a digital hydrologic model of the North Platte River Basin will be developed. Because of the individual characteristics of any river basin, the necessary coefficients and variables must be determined, thereby necessitating considerable investigation, data development and research. The model will then be utilized to indicate impacts of various techniques for augmenting the water supply in the Platte River Basin. It will also be used to indicate areas of needed research for refining the model. The output from the hydrologic model will provide an input function for the economic model.</p> <p>A simulation economic model defining mathematically the relationships that exist between selected economic parameters will be developed. Evaluation of a water development alternative by this type of model is achieved by measuring the net economic activity that is expected to result from expansion of those activities which are identified by the hydrologic model as receiving or utilizing the water made available. The series of tests of alternatives will serve a two-fold purpose: 1) to evaluate the absolute and relative feasibility of various development alternatives, and 2) to test the applicability of the new standards promulgated by the Water Resources Council.</p> <p>Key Words: Hydrology, Models, Economic Evaluation, Simulation Model</p>																
<p>FCST: VI</p>																

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NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY:		AGENCY'S NUMBER(S):	
Office of Water Research and Technology		Contract No: and/or Control No: C-5238	
TITLE OF PROJECT: STREAM CHANNEL MODIFICATION TO MAXIMIZE AVAILABLE TROUT HABITAT UNDER LOW FLOW CONDITIONS			
PRINCIPAL INVESTIGATOR, ASSOCIATES		School or Division	Department
Paul A. Recharð, Director		Water Resources Research Institute	
Thomas A. Wesche Research Biologist		Water Resources Research Institute	
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
Name and Address:	Wyoming Water Resources Research Institute P.O. Box 3067, University Station Laramie, Wyoming 82071	Start Date:	September 1973
Including Zip Code.		End Date:	August 1975
		Annual Funding:	\$69,500-Federal \$ 3,500-University
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>The objective of the proposed research is to determine the feasibility of stream channel modification to improve trout habitat in streams having extended periods of flow insufficient to sustain a desirable trout population. For adequate trout production suitable areas must be available for spawning, rearing, resting and food production. Due to prior water commitments sufficient flow is often unavailable in western streams for natural channel configurations to provide the necessary habitat types. The emphasis of the research will be to develop techniques to maximize the amount of usable habitat available to a trout population under such low flow conditions.</p> <p>Key Words: Aquatic Environment, Channel Modification, Fishery Management, Geomorphology, Hydrology, Minimum Flow, Trout Habitat</p>			
FCST: VII-I			
Graduate Students: Craig Cooper Dudley Reiser			

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NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY: National Weather Service	AGENCY'S NUMBER(S): Contract No: 4-36724 and/or Control No: 8422										
TITLE OF PROJECT: DEVELOPMENT OF PRECIPITATION MODEL AND OBSERVATION NETWORK DESIGN CRITERIA FOR MOUNTAINOUS AREAS IN THE ROCKY MOUNTAIN REGION OF THE UNITED STATES											
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:40%;">PRINCIPAL INVESTIGATOR, ASSOCIATES</th> <th style="width:30%;">School or Division</th> <th style="width:30%;">Department</th> </tr> </thead> <tbody> <tr> <td>Paul A. Rechar, Director</td> <td rowspan="5" style="text-align: center; vertical-align: top;">Water Resources Research Institute</td> <td rowspan="5"></td> </tr> <tr> <td>Tsong C. Wei, Research Engineer</td> </tr> <tr> <td>Verne E. Smith, Research Engineer</td> </tr> <tr> <td>G. Fred Doll, Research Associate</td> </tr> <tr> <td>E. Bruce Jones, Consultant</td> </tr> </tbody> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Paul A. Rechar, Director	Water Resources Research Institute		Tsong C. Wei, Research Engineer	Verne E. Smith, Research Engineer	G. Fred Doll, Research Associate	E. Bruce Jones, Consultant
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:										
Name and Address: Wyoming Water Resources Research Institute Including P.O. Box 3067, University Station Zip Code. Laramie, Wyoming 82071	Start Date: June 1974 End Date: June 1975 Annual Funding: \$30,700										
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress) <p>The objectives of this study are to establish a dense observation network in the mountain region of the Snowy Range in Wyoming to collect and analyze precipitation data under various orographic conditions, to develop a model for estimating point precipitation under different topographic conditions and areal amount, and to utilize the precipitation model to statistically establish observation network design criteria for mountainous areas.</p> <p><u>Scope of Work:</u> In support of and as the U.S. contribution to a World Meteorological Organization (WMO)/CIMO gage comparison project, it is proposed to add one Russian gage to each of two existing research sites in Wyoming. The additional gages required for comparison purposes at each site are already installed and functioning as part of previous research efforts.</p> <p>The entire project is to be structured in such a manner so that at the conclusion of one year's effort meaningful results and recommendations can be made by the investigators in the following areas:</p> <ol style="list-style-type: none"> a) Comparisons and evaluations of six gage configurations (i.e. Russian, Wyoming, free-swinging, rigid shielded, unshielded, and groundtruth) from the Pole Mtn. and Science Camp research sites for winter 1974-75. Data should include precipitation, wind, and temperature, by storm. b) Recommendations on network design criteria for mountainous areas. c) Recommendations and/or procedures to improve estimates of areal distribution of precipitation in mountainous areas. <p>FCST: II-B and VII-A</p>											

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SUPPORTING AGENCY:		AGENCY'S NUMBER(S):	
Office of Water Planning, Wyoming State Engineer's Office		Contract No: and/or Control No: 7740A	
TITLE OF PROJECT:			
COMPUTERIZED WYOMING WATER RESOURCE DATA SYSTEM			
PRINCIPAL INVESTIGATOR, ASSOCIATES		School or Division	Department
Verne E. Smith Research Engineer		Water Resources Research Institute	
Paul A. Recharð Director		Water Resources Research Institute	
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
Name and Address:	Wyoming Water Resources Research Institute	Start Date:	July 1974
Including Zip Code.	P.O. Box 3067, University Station Laramie, Wyoming 82071	End Date:	June 1977
		Annual Funding:	\$29,400
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>Water resource data from all known sources are being collected, stored in a computer file, and edited. Programs to massage the data for various kinds of analyses are being prepared, and the system is being documented for potential users.</p>			
<p>FCST: VII</p>			

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SUPPORTING AGENCY: Office of Water Planning, Wyoming State Engineer's Office		AGENCY'S NUMBER(S): Contract No: and/or Control No: 7740C	
TITLE OF PROJECT: SALINITY AND TURBIDITY STUDY - SHOSHONE			
PRINCIPAL INVESTIGATOR, ASSOCIATES Robert D. Kerr Research Engineer		School or Division Water Resources Research Institute	
Department			
RECIPIENT INSTITUTION: Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Laramie, Wyoming 82071 Including Zip Code.		PERIOD FOR THIS NRP: Start Date: May 1973 End Date: May 1974 Annual Funding: \$29,500	
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>A complete assessment of the natural and manmade sources of high salinity waste water presently entering the Shoshone River via the tributary streams, ponds, and canals will be made as a field study and reported in final form as recommendations for improvement of waste water return flows.</p> <p>Work on this field study will be coordinated with the irrigation district representatives operating in the Shoshone River area, oil producing companies in the drainage area, and other interested commercial and industrial entities.</p> <p>This study will be prepared and submitted to Mr. Arthur Williamson, Director, Sanitary Engineering Services, Wyoming Department of Health and Social Services. Periodic review sessions are scheduled to coordinate the overall efforts.</p> <p>Field samples will be tested for water quality parameters in a testing facility to be located in Powell (Community College).</p> <p>Funds from other interested parties could be incorporated in the budget categories of sample testing and lab facilities.</p>			
FCST: V			

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY: Wyoming Recreation Commission</p>	<p>AGENCY'S NUMBER(S): Contract No: and/or Control No: 6915</p>						
<p>TITLE OF PROJECT: SNOWMOBILING IN WYOMING: A STUDY OF PRIVATE AND COMMERCIAL USE TRENDS</p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%; border: none;">School or Division</td> <td style="width: 30%; border: none;">Department</td> </tr> <tr> <td style="border: none;">Clynn Phillips Associate Director</td> <td style="border: none;">Water Resources Research Institute</td> <td style="border: none;"></td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Clynn Phillips Associate Director	Water Resources Research Institute	
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Clynn Phillips Associate Director	Water Resources Research Institute						
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:						
Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Including Laramie, Wyoming 82071 Zip Code.	Start Date: September 1974 End Date: June 1975 Annual Funding: \$18,104						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>The purpose of this study is to determine the extent of both private and commercial snowmobiling in the state and to identify area and facility developments needed to safely accommodate growing use trends and to enhance the business opportunities for commercial snowmobiling. A more specific statement of objectives is as follows:</p> <ol style="list-style-type: none"> 1. Develop use patterns and user trends for resident snowmobilers including: <ol style="list-style-type: none"> a. resident participation rates b. area use preferences c. expenditure patterns 2. Determine the extent of commercial snowmobiling activities in the state and identify investment and market factors critical to the financial success of these businesses including: <ol style="list-style-type: none"> a. investment requirements b. operating expenses c. physical resource requirements d. market problems and potentials 							
<p>FCST: VI</p>							

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<p>SUPPORTING AGENCY: Wyoming Game and Fish Commission</p>	<p>AGENCY'S NUMBER(S): Contract No: and/or Control No: 6916</p>						
<p>TITLE OF PROJECT: HUNTING AND FISHING VALUES IN WYOMING: 1975</p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%; border: none;">School or Division</td> <td style="width: 30%; border: none;">Department</td> </tr> <tr> <td style="border: none;">Clynn Phillips Associate Director</td> <td style="border: none;">Water Resources Research Institute</td> <td style="border: none;"></td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Clynn Phillips Associate Director	Water Resources Research Institute	
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Clynn Phillips Associate Director	Water Resources Research Institute						
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:						
Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Laramie, Wyoming 82071	Start Date: October 1974 End Date: June 1976						
Including Zip Code.	Annual Funding: \$94,212						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>This study will be divided into two phases. The first phase will be devoted to a determination of attitudes and motivations relative to hunting and fishing. The objectives of this phase will be: 1) to determine the primary values sought by hunters and fishermen when they take to the field, and 2) to determine the importance of wildlife in activities other than hunting and fishing.</p> <p>While expenditure amounts are not presumed to represent the total value of wildlife resources, expenditure data are a good indicator of the claim wildlife has on the supporting natural resources. Therefore, the second phase of the project will focus on an update of hunting and fishing expenditures.</p>							
<p>FCST: VI</p>							

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SUPPORTING AGENCY: Wyoming Game and Fish Commission		AGENCY'S NUMBER(S): Contract No: and/or Control No: 7765	
TITLE OF PROJECT: BIG GAME HARVEST SURVEY IN WYOMING, 1974			
PRINCIPAL INVESTIGATOR, ASSOCIATES G. Fred Doll Research Associate		School or Division Water Resources Research Institute	Department
RECIPIENT INSTITUTION: Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Including Laramie, Wyoming 82071 Zip Code.		PERIOD FOR THIS NRP: Start Date: July 1974 End Date: June 1975 Annual Funding:	
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress) Various sampling schemes will be used to develop annual estimates of hunting pressure and harvest in Wyoming for some 360 antelope, deer, elk, and bear hunting areas. The estimates will be derived from data obtained from mail surveys in which hunters are asked to fill out and return questionnaires.			
FCST: VI			

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NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY: Wyoming State Engineer's Office		AGENCY'S NUMBER(S): Contract No: and/or Control No: 7741	
TITLE OF PROJECT: POTENTIAL RECHARGE BY EPHEMERAL STREAMS AND OVERLAND FLOW TO THE MADISON AQUIFER ALONG THE EASTERN SLOPE OF THE BIG HORN MOUNTAINS AND ALONG THE NORTHERN SLOPE OF THE LARAMIE RANGE			
PRINCIPAL INVESTIGATOR, ASSOCIATES Peter W. Huntoon Hydrogeologist		School or Division Water Resources Research Institute	
Department			
RECIPIENT INSTITUTION: Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Laramie, Wyoming 82071 Including Zip Code.		PERIOD FOR THIS NRP: Start Date: September 1974 End Date: June 1976 Annual Funding: \$26,000	
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>Ground water is under consideration for industrial uses in Wyoming's Powder River Basin. The question of how much ground water can be withdrawn perennially for industry must be answered. Insufficient data are now available; therefore, a research program must be established for determining recharge rates to the ground water reservoirs. The intent of this project is to investigate potential recharge to ground water reservoirs and to develop a methodology for estimating perennial availability of ground water at specific locations. The recharge areas to be investigated are the Big Horn Mountain Range and the northern part of the Laramie Mountain Range.</p> <p>A significant part of the research will be to measure or to calculate the flow of ephemeral streams and overland flow across formation outcrops in recharge areas, and to determine the loss of surface water to the ground water reservoir. Data from relevant existing reports, records, and ongoing studies will be analyzed and utilized.</p>			
FCST: II-F			

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NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY: Water Planning Program, Wyoming State Engineer's Office		AGENCY'S NUMBER(S): Contract No: and/or Control No: 7742	
TITLE OF PROJECT: GEOMORPHOLOGY OF EPHEMERAL CHANNELS IN THE POWDER RIVER BASIN OF WYOMING			
PRINCIPAL INVESTIGATOR, ASSOCIATES Gerald E. Mueller Assistant Professor		School or Division Arts and Sciences	Department Geography
RECIPIENT INSTITUTION: Name and Address: College of Arts and Sciences P.O. Box 3435, University Station Including University of Wyoming Zip Code. Laramie, Wyoming 82071		PERIOD FOR THIS NRP: Start Date: September 1974 End Date: July 1976 Annual Funding: \$7,500	
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress) This study will investigate the utility of geomorphologic parameters to estimate long-term mean annual discharge of ephemeral streams in the Powder River Basin of Wyoming.			
FCST: II-E			

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>Department of Economic Planning and Development Wyoming State Government</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: and/or Control No: 7560</p>						
<p>TITLE OF PROJECT:</p> <p>AN ECONOMIC ASSESSMENT OF PRESENT AND FUTURE PUBLIC INVESTMENT ISSUES IN WYOMING</p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%; border: none;">School or Division</td> <td style="width: 30%; border: none;">Department</td> </tr> <tr> <td style="border: none;">Dr. Clynn Phillips Associate Director</td> <td style="border: none;">Water Resources Research Institute</td> <td style="border: none;"></td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Dr. Clynn Phillips Associate Director	Water Resources Research Institute	
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:						
Name and Address: Wyoming Water Resources Research Institute Including P.O. Box 3067, University Station Zip Code. Laramie, Wyoming 82071	Start Date: September 1973 End Date: January 1975 Annual Funding: \$50,000						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>In anticipation of state responsibility for some type of land use planning program, this study was initiated to identify economic requirements and economic issues that will surface as land use planning programs are implemented. One aspect of the study will examine the data required to develop an efficient and effective land use planning program. A second aspect will concern the identification of potential economic effects of land use planning and the identification of programs and policies that would provide for the control of these effects.</p>							
<p>FCST: VI-C</p> <p>Graduate Student: Gerald Thompson</p>							

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>Rocky Mountain Forest and Range Experiment Station U.S. Forest Service</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: 16-416-CA and/or Control No:</p>									
<p>TITLE OF PROJECT:</p> <p>PRESENT CONDITIONS OF THE AQUATIC BIOTA AND ABIOTA OF THE LITTLE POWDER RIVER IN THUNDER BASIN NATIONAL GRASSLAND, WYOMING</p>										
<table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</th> <th style="text-align: left; border: none;">School or Division</th> <th style="text-align: left; border: none;">Department</th> </tr> </thead> <tbody> <tr> <td style="border: none;">Thomas A. Wesche Research Biologist</td> <td style="border: none;">Water Resources Research Institute</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;">Robert D. Kerr Research Engineer</td> <td style="border: none;">Water Resources Research Institute</td> <td style="border: none;"></td> </tr> </tbody> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Thomas A. Wesche Research Biologist	Water Resources Research Institute		Robert D. Kerr Research Engineer	Water Resources Research Institute	
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Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Including Laramie, Wyoming 82071 Zip Code.	Start Date: March 1974 End Date: February 1975 Annual Funding: \$8,000-Federal \$3,388-University									
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>There is increasing state, regional, and national interest in the development of the sub-bituminous coal deposits underlying the Powder River Basin of Wyoming. A portion of these deposits lies on the Thunder Basin National Grassland, administered by the U.S. Forest Service. At present, the primary use of land in this area is agriculture. In the future, however, such use will probably change as resource development through strip mining increases. As land use changes, so will the terrestrial and aquatic environment of the area. So that suitable baseline data will be available to better evaluate postdevelopment reclamation alternatives, it is necessary to inventory the presently existing environment and to monitor the changes which occur as development proceeds.</p> <p>The specific objective of this study is to properly evaluate the effects of coal development on the existing aquatic biota and abiota of an area. It is first necessary to inventory predevelopment conditions. The short term (1974) objective of this proposal is to inventory the native benthic fauna, fish populations, and water chemistry of that portion of the Little Powder River which flows through the north section of the Thunder Basin National Grassland in Campbell County, Wyoming.</p> <p>FCST: V</p> <p>Graduate Student: Duaina Baldrige</p>										

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<p>SUPPORTING AGENCY:</p> <p>U.S. Forest Service Seam Program</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: 16-420-CA and/or Control No:</p>									
<p>TITLE OF PROJECT:</p> <p>PILOT STUDY ON THE EFFECTS OF STRIP MINING OF COAL ON SHALLOW GROUND WATER AQUIFERS IN THE EASTERN POWDER RIVER BASIN OF WYOMING</p>										
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</th> <th style="text-align: left; border-bottom: none;">School or Division</th> <th style="text-align: left; border-bottom: none;">Department</th> </tr> </thead> <tbody> <tr> <td style="border-top: none;">Peter W. Huntoon Hydrogeologist</td> <td style="border-top: none;">Water Resources Research Institute</td> <td style="border-top: none;"></td> </tr> <tr> <td style="border-top: none;">Paul A. Recharð Director</td> <td style="border-top: none;">Water Resources Research Institute</td> <td style="border-top: none;"></td> </tr> </tbody> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Peter W. Huntoon Hydrogeologist	Water Resources Research Institute		Paul A. Recharð Director	Water Resources Research Institute	
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:									
Name and Address: Wyoming Water Resources Research Institute Including P.O. Box 3067, University Station Zip Code. Laramie, Wyoming 82071	Start Date: May 1974 End Date: July 1975 Annual Funding: \$12,000-Federal \$ 6,600-University									
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>Disruption of aquifers by surface mining may be of unique and special significance along the Wyodak outcrop because of the great thickness of the coal beds which are themselves the primary source of shallow ground water. Domestic and stock water supplies may be affected, as well as impoundments and surface streams that now are also of considerable recreational value. The University of Wyoming and the Rocky Mountain Forest and Range Experiment Station are interested in cooperating in a research study to determine the ultimate significance of the disruption of aquifers and to provide a basis for the design of measures to minimize undesirable effects.</p> <p>The specific objectives of this study are to:</p> <ol style="list-style-type: none"> 1. Determine the degree of interconnection between overburden material and existing aquifers. 2. Postulate feasibility of recharging ground water through diversion of surface flows into minepits. 										
<p>FCST: V</p> <p>Graduate Student: Michael Penz</p>										

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<p>SUPPORTING AGENCY: Atlantic Richfield Company</p>	<p>AGENCY'S NUMBER(S): Contract No: SCCL-84 and/or Control No: 8128</p>
<p>TITLE OF PROJECT: ENVIRONMENTAL MONITORING OF BLACK THUNDER SITE</p>	
<p>PRINCIPAL INVESTIGATOR, ASSOCIATES Paul A. Recharad Director</p>	<p>School or Division Water Resources Research Institute</p> <p>Department</p>
<p>RECIPIENT INSTITUTION: Name and Address: Wyoming Water Resources Research Institute Including P.O. Box 3067, University Station Zip Code. Laramie, Wyoming 82071</p>	<p>PERIOD FOR THIS NRP: Start Date: October 1974 End Date: September 1975 Annual Funding: \$38,500</p>
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p style="text-align: center; margin-top: 20px;">Under this project the Water Resources Research Institute will monitor the hydrologic and water quality aspects of the environment of the Black Thunder Site.</p> <p style="margin-top: 100px;">FCST: V</p>	

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<p>SUPPORTING AGENCY: Atlantic Richfield Company</p>	<p>AGENCY'S NUMBER(S): Contract No: and/or Control No: 6527</p>						
<p>TITLE OF PROJECT: HYDROLOGIC BASELINE STUDY - COAL CREEK LEASE</p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%; border: none;">School or Division</td> <td style="width: 30%; border: none;">Department</td> </tr> <tr> <td style="border: none;">Paul A. Rechard Director</td> <td style="border: none;">Water Resources Research Institute</td> <td style="border: none;"></td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Paul A. Rechard Director	Water Resources Research Institute	
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:						
Name and Address: Wyoming Water Resources Research Institute P.O. Box 3067, University Station Including Laramie, Wyoming 82071 Zip Code.	Start Date: September 1974 End Date: August 1975 Annual Funding: \$39,200						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>In this study the investigators propose to determine the hydrologic conditions of Coal Creek drainage, a tributary of the Belle Fourche River, prior to any development of the lease. Three continuous recording streamflow gaging stations will be installed on Coal Creek. The gages will be a combination of a one-foot Parshall flume to record small flows and a concrete control section with a stilling well to record flood flows. At each gage a remote recording thermograph will be installed to measure water temperature.</p> <p>Coal Creek and its major tributaries will be surveyed to establish permanent cross sections above and below the lease area. These sections will be permanently marked with suitable bench marks. In addition, the profile of the stream will be surveyed to indicate the thalweg meander pattern, the bed and bank material, and cross section and 500 m intervals.</p> <p>At each gage and at other points to be selected, water samples will be obtained periodically for organic and inorganic chemical analyses, microbiological analyses, and sediment analyses. Continuous precipitation records will be obtained at least at two points in the lease area and at one point in the drainage basin of Coal Creek upstream of the lease; the gages will be shielded by Wyoming shields.</p> <p>Sufficient wells will be drilled in the lease area to define the ground water level in each water bearing zone in the overburden, the alluvium, the coal and below the coal. Pump tests will be conducted at each well to determine the hydraulic parameters of hydraulic conductivity and storage coefficient.</p> <p>Water level recorders will be installed on each well to obtain continuous records of the piezometric surface. Water quality of the water from each well will be determined by analyzing the samples for organic and inorganic chemical constituents, trace elements and bacteria.</p> <p>FCST: V</p>							

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SUPPORTING AGENCY:		AGENCY'S NUMBER(S):	
AMAX Coal Company		Contract No: and/or Control No: 6526	
TITLE OF PROJECT:			
ENVIRONMENTAL MONITORING OF BELLE AYR MINES			
PRINCIPAL INVESTIGATOR, ASSOCIATES		School or Division	Department
Paul A. Rechar, Director		Water Resources Research Institute	
Robert D. Kerr, Research Engineer		Water Resources Research Institute	
Thomas A. Wesche, Research Biologist		Water Resources Research Institute	
John C. Adams, Assistant Professor		College of Agriculture	Microbiology
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
Name and Address:	Wyoming Water Resources Research Institute	Start Date:	
Including Zip Code.	P.O. Box 3067, University Station Laramie, Wyoming 82071	End Date:	August 1975
		Annual Funding:	\$16,876.70
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>This project is a continuation of the environmental monitoring of hydrologic, climatologic, water quality, and aquatic biology aspects of the AMAX Belle Ayr mines.</p>			
FCST: V			

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SUPPORTING AGENCY:		AGENCY'S NUMBER(S):	
U.S. Bureau of Reclamation		Contract No: 14-06-D-7198 and/or Control No:	
TITLE OF PROJECT:			
SENSITIVITY OF ECOSYSTEM COMPONENTS IN THE MEDICINE BOW MOUNTAINS TO WINTER PRECIPITATION MANAGEMENT			
PRINCIPAL INVESTIGATOR, ASSOCIATES		School or Division	Department
Dennis H. Knight Associate Professor		Arts and Sciences	Botany
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
Name and Address:	College of Arts and Sciences P.O. Box 3435, University Station University of Wyoming Laramie, Wyoming 82071	Start Date:	End Date: February 1975
Including Zip Code.		Annual Funding:	\$58,500
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>Precipitation management is a rather new way of modifying ecosystems, and consequently little is known about the potential secondary changes that may occur where rainfall or snowfall is increased over a period of years. Ecosystems have developed checks and balances for a particular environment, and if that environment is changed by man, the system changes. The basic question is: How will an ecosystem change if the winter precipitation is increased by cloud seeding? This study will provide information on certain key processes and components of the ecosystems in the Medicine Bow Mountains of Wyoming. The objectives are: to provide a base line for evaluating ecological changes that might occur with cloud seeding, to determine relationships between high elevation herbaceous plant communities and their abiotic environmental regime prior to cloud seeding, to monitor elk movements in relation to precipitation, particularly snow accumulation, on the Medicine Bow Range, to determine the patterns of use in each season, and to evaluate how the animals might be affected, if at all, by precipitation management.</p>			
FCST: VI-G			

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<p>SUPPORTING AGENCY:</p> <p>U.S. Department of the Interior National Park Service</p>	<p>AGENCY'S NUMBER(S): Contract No: CX-9000-3-0145 and/or Control No:</p>								
<p>TITLE OF PROJECT: ECONOMIC IMPACT STUDY OF A NATIONAL PARK SERVICE PROPOSAL IN THE SAWTOOTH AREA OF IDAHO</p>									
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PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department							
Dr. Clynn Phillips Associate Director	Water Resources Research Institute								
<table style="width: 100%; border: none;"> <tr> <td style="width: 60%; border: none;">RECIPIENT INSTITUTION:</td> <td style="width: 40%; border: none;">PERIOD FOR THIS NRP:</td> </tr> <tr> <td style="border: none;">Name and Address: Wyoming Water Resources Research Institute</td> <td style="border: none;">Start Date: June 1973</td> </tr> <tr> <td style="border: none;">Including Zip Code. P.O. Box 3067, University Station</td> <td style="border: none;">End Date: December 1974</td> </tr> <tr> <td style="border: none;">Laramie, Wyoming 82071</td> <td style="border: none;">Annual Funding: \$25,000</td> </tr> </table>		RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:	Name and Address: Wyoming Water Resources Research Institute	Start Date: June 1973	Including Zip Code. P.O. Box 3067, University Station	End Date: December 1974	Laramie, Wyoming 82071	Annual Funding: \$25,000
RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:								
Name and Address: Wyoming Water Resources Research Institute	Start Date: June 1973								
Including Zip Code. P.O. Box 3067, University Station	End Date: December 1974								
Laramie, Wyoming 82071	Annual Funding: \$25,000								
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>Congress directed the National Park Service to study the area generally included in the Sawtooth National Recreation Area for possible designation and development as a national park. As a part of this greater effort, this study is concerned with the possible economic effects that will occur if the area is designated as a national park. Economic base and input-output analyses constitute the approach being used to determine these impacts.</p>									
<p>FCST: VI</p>									

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NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY: Yellowstone Environmental Center University of Wyoming Grand Teton National Park National Park Service, Moose, Wyoming		AGENCY'S NUMBER(S): Contract No: and/or Control No: 8325
TITLE OF PROJECT: A STUDY OF BACKCOUNTRY USE IN GRAND TETON NATIONAL PARK		
PRINCIPAL INVESTIGATOR, ASSOCIATES Dr. Clynn Phillips Associate Director	School or Division Water Resources Research Institute	Department
RECIPIENT INSTITUTION: Name and Address: Wyoming Water Resources Research Institute Including P.O. Box 3067, University Station Zip Code. Laramie, Wyoming 82071	PERIOD FOR THIS NRP: Start Date: July 1974 End Date: September 1974 Annual Funding: \$8153	
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)		
<p>The general objective of this proposed study is to determine the number of back-country users by type, and to develop general activity profiles for these users.</p> <p>The following subobjectives are specified:</p> <ol style="list-style-type: none"> 1. To determine the number and type (day users, backpackers, horseback riders) of persons using the Grand Teton National Park Wilderness Area. 2. To estimate the spatial distribution of users over the wilderness area in relation to participation in selected wilderness activities. 3. To develop general activity profiles by user type, including length of stay, travel patterns within the area, recreation participation patterns and other information that will indicate resource use demands. 4. To identify problems encountered by users related to physical conditions of the area, user conflicts or management policies imposed on the users that detract from their experience. 5. To obtain general attitudinal and user preference information that will assist park officials in evaluating present management policies and/or will provide guidelines for the establishment of new wilderness use policies. <p>FCST: VI</p> <p>Graduate Student: Blair Wolfley</p>		

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>Environmental Resources Center Colorado State University</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: X-138 and/or Control No: 6561</p>									
<p>TITLE OF PROJECT:</p> <p>DEVELOPMENT OF A COLORADO RIVER-GREAT BASIN REGIONAL FRAMEWORK FOR WATER RESEARCH</p>										
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</th> <th style="text-align: left; border-bottom: none;">School or Division</th> <th style="text-align: left; border-bottom: none;">Department</th> </tr> </thead> <tbody> <tr> <td style="border-top: none;">Paul A. Rechar Director</td> <td style="border-top: none;">Water Resources Research Institute</td> <td style="border-top: none;"></td> </tr> <tr> <td style="border-top: none;">Robert D. Kerr Research Engineer</td> <td style="border-top: none;">Water Resources Research Institute</td> <td style="border-top: none;"></td> </tr> </tbody> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Paul A. Rechar Director	Water Resources Research Institute		Robert D. Kerr Research Engineer	Water Resources Research Institute	
PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department								
Paul A. Rechar Director	Water Resources Research Institute									
Robert D. Kerr Research Engineer	Water Resources Research Institute									
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:									
Name and Address: Wyoming Water Resources Research Institute Including P.O. Box 3067, University Station Zip Code. Laramie, Wyoming 82071	Start Date: April 1973 End Date: March 1975 Annual Funding: \$1,800-CSU									
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p style="margin-top: 20px;">This project is a regional analysis of water research problems and priorities for the Colorado River and Great Basin regions. State water resources research institutes, jointly with agencies of Federal, state, and local governments, consultants, water user organizations, and concerned citizens, are working to identify essential research needed before solutions to current and expected problems can be implemented.</p>										
<p>FCST: VI-B</p>										

RESEARCH IN PROGRESS ELSEWHERE
ON THE UNIVERSITY OF WYOMING CAMPUS

A. OWRT Title II Grant

Project Title: Economic Effects of High Irrigation Levels
on Alfalfa and Barley (p. 41)

Project I.D. Numbers: OWRT: C-5236, FCST: III-F

Agreement Number: 14-0001-4229

Status: To be completed December 1976

Principal Investigators: Richard T. Clark, Agricultural
Economics
Ronald H. Delaney, Plant Science
Robert Burman, Agricultural
Engineering

Graduate Student: James Sinclair

B. Agricultural Experiment Station, University of Wyoming

1. Project Title: Microbial Ecology of Water in Various
States of Pollution (p. 42)

Project I.D. Numbers: UW: Wy. 052-71, FCST: V-C

Status: To be completed June 1975

Principal Investigators: John C. Adams, Microbiology
Leroy R. Maki, Microbiology
Phyllis D. Bear, Microbiology

2. Project Title: Climatic Patterns for Agriculture (p. 43)

Project I.D. Number: FCST: II-A

Status: To be completed July 1977

Principal Investigators: Larry O. Pochop, Agricultural
Engineering
Clarence F. Becker, Agricultural
Engineering

3. Project Title: Criteria for Water Planning (p. 44)
Project I.D. Number: FCST: VI-C
Status: To be completed June 1975
Principal Investigator: Richard T. Clark, Agricultural
Economics
4. Project Title: Potential Effect of Precipitation
Augmentation on Environmental Factors (p. 45)
Project I.D. Number: FCST: III-F
Status: To be completed July 1975
Principal Investigator: Larry O. Pochop, Agricultural
Engineering
5. Project Title: Sugar Beet Mulch Tillage (p. 46)
Project I.D. Number: FCST: III-F
Status: To be completed July 1976
Principal Investigators: K. James Fornstrom, Agricultural
Engineering
Clarence F. Becker, Agricultural
Engineering

C. State of Wyoming

1. Project Title: A Study of Range Condition Classes and
Methods of Range Improvement in Wyoming
(p. 47)
Project I.D. Numbers: UW: W.S. 760, FCST: II
Status: Continuing
Principal Investigator: Alan A. Beetle, Plant Science
2. Project Title: Soil-Water Regime and Production of Seeded
and Interseeded Pastures (p. 48)
Project I.D. Numbers: UW: Wyo. 70-72, FCST: II-G
Status: To be completed 1977
Principal Investigator: Robert L. Lang, Range Management

D. MacIntyre-Stennis Federal Grant

Project Title: Variation in and Ecology of Aspen (p. 49)

Project I.D. Numbers: UW: W.S. 940, FCST: II-I

Status: To be completed 1976

Principal Investigator: Alan A. Beetle, Plant Science

E. National Science Foundation

1. Project Title: Meteorological and Hydrologic Characteristics of the Shortgrass Ecosystem (p. 50)

Project I.D. Numbers: NSF: NCS-13-2, FCST: II

Status: To be completed June 1975

Principal Investigators: Clarence F. Becker, Agricultural
Engineering
Robert D. Burman, Agricultural
Engineering
Larry O. Pochop, Agricultural
Engineering

2. Project Title: Controls on the Chemical Composition of Surface Waters in the Absaroka Mountains, Wyoming and Teels Marsh, Nevada (p. 51)

Project I.D. Number: FCST: II-K

Status: To be completed October 1975

Principal Investigator: James I. Drever, Geology

F. No Outside Funding

Project Title: Pilot Study on the Use of Electromagnetic Radiation (X-Band) for Sterilizing Drinking Water (p. 52)

Project I.D. Number: FCST: V-F

Status: Continuing

Principal Investigators: Clifford D. Ferris, Electrical
Engineering
A. Duane Anderson, Pharmacy

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>Office of Water Research and Technology</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: C-5236</p> <p style="text-align: center;">and/or</p> <p>Control No:</p>
<p>TITLE OF PROJECT:</p> <p>ECONOMIC EFFECTS OF HIGH IRRIGATION LEVELS ON ALFALFA AND BARLEY</p>	
<p>PRINCIPAL INVESTIGATOR, ASSOCIATES School or Division Department</p> <p>Richard T. Clark, Assistant Professor, Agriculture, Agricultural Economics Ronald H. Delaney, Assistant Professor, Agriculture, Plant Science Robert D. Burman, Professor, Agriculture, Agricultural Engineering</p>	
<p>RECIPIENT INSTITUTION:</p> <p>Name and Address: University of Wyoming Including Laramie, Wyoming 82071 Zip Code.</p>	<p>PERIOD FOR THIS NRP:</p> <p>Start Date: January 1974 End Date: December 1976</p> <p>ANNUAL FUNDING: \$108,767 Federal 38,743 State</p>
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>Surface irrigation is often characterized by low efficiencies resulting in high water application. Overirrigation appears to cause losses that are not obvious to farmers, e.g. reduced crop quality and yields, and higher fertilization and drainage costs. The problem is to determine the extent of such losses and to estimate whether or not reduced losses via improved irrigation efficiency and drainage are economically feasible.</p> <p>Specific objectives are to estimate effects of overirrigation on: 1) yield and quality of alfalfa and barley; 2) alfalfa persistence; 3) nutrient movements in soil profile and needs for fertilization; 4) drainage requirements; and 5) salt balance in the soil-water profile. Information from specific objectives will be subjected to economic analysis to answer the delineated problem.</p> <p>Field studies will use five irrigation levels on barley and alfalfa. Procedures include: water scheduling techniques, <u>in vitro</u> digestibility and protein analysis, monitoring chemical content of irrigation, drain, and deep percolating waters and soil columns, computer programs for determining drain spacing, measurement of relative growth rates and leaf area indexes, group interview techniques, and marginal economic analyses.</p> <p>Research will contribute towards understanding interactions between water quality and irrigation return flows, economic evaluation of water scheduling, reducing user conflicts, and estimating water demand.</p> <p>Field data for one summer have been collected and are being analyzed.</p>	
<p>FCST: III-F</p> <p>Graduate Student: James Sinclair</p>	

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<p>SUPPORTING AGENCY:</p> <p>Agricultural Experiment Station, University of Wyoming</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: and/or W.S. No. Control No: Wy. 052-71</p>						
<p>TITLE OF PROJECT:</p> <p>MICROBIAL ECOLOGY OF WATER IN VARIOUS STATES OF POLLUTION</p>							
<table style="width: 100%; border: none;"> <tr> <td style="text-align: left;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="text-align: center;">School or Division</td> <td style="text-align: right;">Department</td> </tr> <tr> <td colspan="3"> <p>J. C. Adams - Assistant Professor, Division of Microbiology and Veterinary Medicine L. R. Maki - Associate Professor, Division of Microbiology and Veterinary Medicine P. O. Bear - Associate Professor, Division of Microbiology and Veterinary Medicine</p> </td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	<p>J. C. Adams - Assistant Professor, Division of Microbiology and Veterinary Medicine L. R. Maki - Associate Professor, Division of Microbiology and Veterinary Medicine P. O. Bear - Associate Professor, Division of Microbiology and Veterinary Medicine</p>		
PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department					
<p>J. C. Adams - Assistant Professor, Division of Microbiology and Veterinary Medicine L. R. Maki - Associate Professor, Division of Microbiology and Veterinary Medicine P. O. Bear - Associate Professor, Division of Microbiology and Veterinary Medicine</p>							
<p>RECIPIENT INSTITUTION:</p> <p>Name and Address: University of Wyoming Including Laramie, Wyoming 82071 Zip Code.</p>	<p>PERIOD FOR THIS NRP:</p> <p>Start Date: July 1970 End Date: June 1975 Annual Funding: \$18,000</p>						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>The objectives of this research are to identify and study the microbial populations in selected Wyoming waters and to determine how these populations are affected by man and animal pollutants. In addition, the microbial and mutagenic agents in different sewage disposal systems, storm water and irrigation runoff will be investigated. The microbial ecology of these water systems will be studied.</p> <p>Water samples will be obtained from selected locations. Microbial indicators of fecal pollution will be monitored and standard techniques will be employed to isolate, enumerate and identify the microbial populations.</p> <p>Storm water from Laramie and other selected sites will be added to bacterial cultures to see if any growth inhibitor is present. The presence of any chemical mutagen in storm water will be detected by adding water to cultures of mutant bacteria and observing for mutation to the prototrophic state.</p> <p>FCST: V-C</p>							

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SUPPORTING AGENCY:		AGENCY'S NUMBER(S):	
Agricultural Experiment Station, University of Wyoming		Contract No: and/or Control No:	
TITLE OF PROJECT:			
CLIMATIC PATTERNS FOR AGRICULTURE			
PRINCIPAL INVESTIGATOR, ASSOCIATES		School or Division	Department
Larry O. Pochop Associate Professor		Agriculture	Agricultural Engineering
Clarence F. Becker Department Head		Agriculture	Agricultural Engineering
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
Name and Address: Including Zip Code.	College of Agriculture University of Wyoming Laramie, Wyoming 82071	Start Date:	July 1972
		End Date:	July 1977
		Annual Funding:	\$7,766 FY74
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>The objectives of this project are to determine temporal and spatial patterns of climatic variables, reduce and summarize raw data to a form compatible for use in decision making, and develop models utilizing raw data for use in estimating parameters more difficult to measure.</p> <p>Attempts will be made to develop models for estimating parameters (e.g. solar radiation and vapor pressure), which are valuable for uses such as estimating evapotranspiration, from the more commonly measured parameters.</p>			
FCST: II-A			

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>Agricultural Experiment Station Division of Agricultural Economics WRR1</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: and/or Control No:</p>
<p>TITLE OF PROJECT:</p> <p>CRITERIA FOR WATER PLANNING</p>	
<p>PRINCIPAL INVESTIGATOR, ASSOCIATES School or Division Department</p> <p>R. T. Clark, Assistant Professor, Agriculture, Agricultural Economics</p>	
<p>RECIPIENT INSTITUTION:</p> <p>Name and Address: College of Agriculture University of Wyoming Laramie, Wyoming 82071</p> <p>Including Zip Code.</p>	<p>PERIOD FOR THIS NRP:</p> <p>Start Date: January 1970 End Date: June 1975</p> <p>Annual Funding:</p>
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p><u>Objective:</u> To examine reimbursement mechanisms for multiple purpose, multiple objective water resource projects sponsored at the state level.</p> <p><u>Approach:</u> The objective is to be accomplished by: a. identifying groups likely to benefit from selected water resource development projects proposed for Wyoming's North Platte River Basin; b. defining reimbursement mechanisms that might be utilized to incorporate beneficiary groups in project financing; c. specifying criteria by which reimbursement might be evaluated; and d. evaluating the possible reimbursement mechanisms on the basis of the specified criteria.</p> <p>FCST: VI-C</p>	

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NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY:		AGENCY'S NUMBER(S):	
Agricultural Experiment Station, University of Wyoming		Contract No: and/or Control No:	
TITLE OF PROJECT:			
POTENTIAL EFFECT OF PRECIPITATION AUGMENTATION ON ENVIRONMENTAL FACTORS			
PRINCIPAL INVESTIGATOR, ASSOCIATES		School or Division	Department
Larry O. Pochop Associate Professor		Agriculture	Agricultural Engineering
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
Name and Address:	College of Agriculture University of Wyoming Laramie, Wyoming 82071	Start Date:	July 1971
Including Zip Code.		End Date:	July 1975
		Annual Funding:	\$10,900 FY74
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>The objective of this project is to develop information important to decision making relative to the proper timing of precipitation augmentation for maximum hydrological and agricultural (and consequently socioeconomic) benefit to the Great Plains Area of Wyoming.</p>			
FCST: III-F			

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SUPPORTING AGENCY:		AGENCY'S NUMBER(S):	
Agricultural Experiment Station, University of Wyoming		Contract No: and/or Control No:	
TITLE OF PROJECT:			
SUGAR BEET MULCH TILLAGE			
PRINCIPAL INVESTIGATOR, ASSOCIATES		School or Division	Department
K. James Fornstrom Assistant Professor		Agriculture	Agricultural Engineering
Clarence F. Becker Department Head		Agriculture	Agricultural Engineering
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
Name and Address:	College of Agriculture University of Wyoming Laramie, Wyoming 82071	Start Date:	July 1972
Including Zip Code.		End Date:	July 1976
		Annual Funding:	\$28,000 FY74
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p>A surface mulch is being used to control wind erosion. The accepted constraint is that insufficient mulch exists from previous crops such as sugar beets, potatoes or corn harvested for silage. The system which has evolved consists of growing spring barley between the sugar beet rows until the beets are in the 6-8 leaf stage at which time the barley is cultivated out of the inter-row space. Wind erosion has been controlled with the mulch, while 25 - 60 percent of water requirement during the establishment period for growing the mulch is $\frac{1}{4}$ - $\frac{1}{2}$ inch more than for unmulched beets. This additional amount must be applied to ensure adequate stand establishment. The 1973 mulch yields were less than conventional yields due to the barley competition (barley was solid seeded and not adequately destroyed within the beet row). However, consideration of yield per planted acre favored the mulch system. The 1974 mulch was planted between the beet rows and no problem was encountered in removal when the beets had become established.</p>			
FCST: III-F			

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>State of Wyoming</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: and/or W.S. 760 Control No:</p>								
<p>TITLE OF PROJECT:</p> <p>A STUDY OF RANGE CONDITION CLASSES AND METHODS OF RANGE IMPROVEMENT IN WYOMING</p>									
<p>PRINCIPAL INVESTIGATOR, ASSOCIATES</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">School or Division</td> <td style="width: 60%; border: none;">Department</td> </tr> <tr> <td style="border: none;">Alan A. Beetle Professor</td> <td style="border: none;">Plant Science</td> </tr> </table>		School or Division	Department	Alan A. Beetle Professor	Plant Science				
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Alan A. Beetle Professor	Plant Science								
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Name and Address:	PERIOD FOR THIS NRP:								
University of Wyoming	Start Date: From 1952								
Laramie, Wyoming 82071	End Date:								
Including Zip Code.	Annual Funding:								
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>Objectives: 1. To determine range condition classes for various types of vegetation and whenever possible within individual allotments or other use units within the study area.</p> <p>2. To test various methods of range improvement such as pitting, seeding, and control of undesirable species.</p> <p>FCST: II</p>									

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NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>State of Wyoming</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: and/or Wyo. 70-72 Control No:</p>						
<p>TITLE OF PROJECT:</p> <p>SOIL-WATER REGIME AND PRODUCTION OF SEEDED AND INTERSEEDED PASTURES</p>							
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%; border: none;">PRINCIPAL INVESTIGATOR, ASSOCIATES</td> <td style="width: 30%; border: none;">School or Division</td> <td style="width: 30%; border: none;">Department</td> </tr> <tr> <td style="border: none;">Robert L. Lang Professor</td> <td style="border: none;">Agriculture</td> <td style="border: none;">Range Management</td> </tr> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	Robert L. Lang Professor	Agriculture	Range Management
PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department					
Robert L. Lang Professor	Agriculture	Range Management					
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RECIPIENT INSTITUTION:	PERIOD FOR THIS NRP:						
Name and Address: University of Wyoming Including Zip Code. Laramie, Wyoming 82071	Start Date: 1972 End Date: 1977 Annual Funding:						
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>The purpose of this project is to determine the soil-water relationship that exists in solid-seeded pastures, wide interseeded pastures, and narrowly interseeded pastures.</p> <p>FCST: II-G</p>							

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NCS-13-2

NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY: NSF - IBP through Colorado State University		AGENCY'S NUMBER(S): Contract No: and/or Control No:	
TITLE OF PROJECT: METEOROLOGICAL AND HYDROLOGIC CHARACTERISTICS OF THE SHORTGRASS ECOSYSTEM			
PRINCIPAL INVESTIGATOR, ASSOCIATES			
		School or Division	Department
C. F. Becker, Department Head		Agriculture	Agricultural Engineering
R. D. Burman, Professor		Agriculture	Agricultural Engineering
L. O. Pochop, Associate Professor		Agriculture	Agricultural Engineering
RECIPIENT INSTITUTION:		PERIOD FOR THIS NRP:	
Name and Address:	College of Agriculture	Start Date: July 1972	
Including Zip Code.	University of Wyoming Laramie, Wyoming 82071	End Date: June 1976	
		Annual Funding:	
SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)			
<p><u>Objectives:</u></p> <p>To measure the meteorological parameters necessary for abiotic descriptions of the grassland area. Seasonal variations in resistance values derived from combinations of evapotranspiration equations will be related to phenology and other biotic information by plant species. Alternative procedures for predicting evapotranspiration will be evaluated by comparison against a 10-foot diameter weighing lysimeter.</p> <p><u>Approach:</u></p> <p>Climatic data is being secured by an integrating data acquisition system located in northeastern Colorado on the Pawnee Site. The data are edited, compacted and summarized for use in energy balance and evapotranspiration calculations. Participants in the International Biological Program are furnished with meteorological data upon request.</p>			
FCST: II			

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FORM APPROVED
BOB NO. 105 R0002
EXPIRES 11/76

SIE NO.

NOTICE OF RESEARCH PROJECT

<p>SUPPORTING AGENCY:</p> <p>No outside funding</p>	<p>AGENCY'S NUMBER(S):</p> <p>Contract No: and/or Control No:</p>									
<p>TITLE OF PROJECT:</p> <p>PILOT STUDY ON THE USE OF ELECTROMAGNETIC RADIATION (X-BAND) FOR STERILIZING DRINKING WATER</p>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">PRINCIPAL INVESTIGATOR, ASSOCIATES</th> <th style="width: 30%;">School or Division</th> <th style="width: 30%;">Department</th> </tr> </thead> <tbody> <tr> <td>C. D. Ferris Professor</td> <td>Electrical Engineering</td> <td></td> </tr> <tr> <td>A. Duane Anderson Assistant Professor</td> <td>School of Pharmacy</td> <td></td> </tr> </tbody> </table>		PRINCIPAL INVESTIGATOR, ASSOCIATES	School or Division	Department	C. D. Ferris Professor	Electrical Engineering		A. Duane Anderson Assistant Professor	School of Pharmacy	
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<p>Name and Address: University of Wyoming Including Laramie, Wyoming 82071 Zip Code.</p>	<p>Start Date: End Date: Annual Funding:</p>									
<p>SUMMARY OF PROJECT: Be brief-200 word maximum: (Include Objective, Approach, Current Plans and/or Progress)</p> <p>This is a pilot study on the use of electromagnetic radiation (X-band) for sterilizing drinking water. Distilled water contaminated by common pathogens (<u>E. coli</u>, protozoans, thermophilic bacteria, etc.) is being used. The technique has been proven feasible and now the energy aspects with respect to the economics of treating water in this manner are being studied.</p> <p>FCST: V-F</p>										

OUTSTANDING RESEARCH FACILITIES
AT THE UNIVERSITY OF WYOMING

The archives at Coe Library contain a large number of collections in the general area of reclamation and water resources, including the personal files of several former Bureau of Reclamation chiefs. There are also numerous other collections which contain water-related materials.

The School of Pharmacy has available the following equipment: pH meter, microbalance, Sorvall RC2-B and Beckman L2-65B and T-21 centrifuges, liquid scintillation apparatus, gas chromatography apparatus, automatic titration apparatus, multiple absorbance recording spectrophotometer, infrared spectrophotometer, Isco gel electrophoresis apparatus and gel scanner. Also available are a proportional diluter with water purifying and conditioning capabilities and six 50 gallon stainless steel tanks.

The small animal facilities at the University of Wyoming meet all the requirements set up by N.I.H. in form A.N.H. 18H-11.

Facilities for water quality research are located on campus at the State Department of Agriculture's research unit. Standard water quality tests can be conducted, as well as analysis of water for biological oxygen demand, chemical oxygen demand, nitrogen, potassium, phosphates, etc.

The Department of Geology also has facilities for analysis of major, minor, and trace inorganic constituents of waters. Their laboratories are run by a skilled professional analytical chemist.

Facilities available at the Agricultural Engineering Division include: equipment and apparatus for measuring the hydraulic conductivity of soil; a portable micrometeorological laboratory which can measure and transfer to computer compatible magnetic tape data necessary for determining the vertical energy balance; miscellaneous instrumentation for measuring meteorological data, such as rain gauges, anemometers, hygrothermographs, temperature measurement devices, etc. Also available is the necessary recording equipment.

A remote sensing laboratory is located in the Department of Geology. Satellite imagery is being used for the study of agricultural and botanical features and their distribution, hydrologic studies, land use studies, and natural resources inventories.

The Department of Atmospheric Science has facilities for the study of cloud physics and weather modification.

The Statistics Laboratory conducts research in statistical theory and methodology and promotes and fosters the use of sound statistical methods in university research. Staff and facilities are maintained for statistical consulting aid, statistical numerical analysis and data processing, sample survey operation, and statistical design and analysis of surveys and experiments.

The S. H. Knight Science Camp in the Medicine Bow Mountains is the site of summer field and laboratory courses in aquatic botany and zoology. The camp is surrounded by a wide variety of biotic communities at altitudes ranging from 7,800 to 12,000 feet. Laboratory space is available for course work and research.

The Water Resources Research Institute maintains four outdoor observatories: Pole Mountain, Snowy Range, the sewage lagoons of the

City of Laramie, and Douglas Creek. At the Pole Mountain observatory snow transport phenomena and precipitation measurement are studied. An intensive installation of precipitation gaging supplies continuous data on precipitation. Other instruments measure temperature, humidity, wind, and radiation.

The Snowy Range observatory provides data supplementary to that on snow transport and precipitation gathered on Pole Mountain. Stream-flow gaging stations are also maintained, and the area is used for watershed modeling and testing.

Water quality observations are carried out at the sewage lagoons and comprehensive instrumentation is used to study evaporation from the water's surface.

A diversion structure and gaging station have been installed on Douglas Creek to study the effect of streamflow on trout habitat. Various stream improvement devices will be tested with the aim of consolidating low flows to improve trout fishery conditions.

The Water Resources Research Institute also has available portable equipment for streamflow, weather, and ground water observations.

A wealth of material on water law can be found at the Law Library located in the Fleming Law Building on campus. Here are available all the federal and state statutes. The federal statutes are included in the U.S. Code and the U.S. Code, Annotated, which contains supplemental material on pertinent court cases. In addition, Statutes at Large classifies laws according to topic. Also in the library are all reported cases from state (appellate level up) and federal courts. These are indexed for easy use. A listing of all regulations established by

governmental administrative agencies is contained in the Code of Federal Regulations.

Two looseleaf services, the "Environment Reporter" and the "Environmental Law Reporter," include general news items and legal cases relating to the environment. These are updated every two weeks.

The College of Law publishes the Land and Water Law Review, which is one of the few law journals to deal with these topics. Four hundred other law journals can also be found at the library.

On water laws specifically, the law library purchases every available treatise and at present has approximately 150 volumes on water law in this country and elsewhere.

BRIEF BIOGRAPHICAL LIST
OF RESEARCHERS

The following is a list of University of Wyoming faculty and staff engaged in water-related research:

Adams, John C. -- Assistant Professor, Microbiology

Specialties: Water Pollution Microbiology
Microbial Ecology

Anderson, A. Duane -- Assistant Professor, Pharmacy

Specialties: Environmental Toxicology
Cardiovascular Research

Anderson, Donald A. -- Professor, Statistics

Specialties: Experimental Design
Linear Models

Bear, Phyllis D. -- Associate Professor, Microbiology

Specialties: Bacterial and Viral Genetics

Becker, Clarence F. -- Department Head, Agricultural Engineering

Specialties: Meteorology
Statistics
Farm Mechanization

Beetle, Alan A. -- Professor, Range Management

Specialties: Mexican Grasses
Range Survey

Borgman, Leon E. -- Professor, Geology/Statistics

Specialties: Statistics
Earth Sciences
Oceanography

Bradley, Charles E. -- Professor, Business Administration

Specialties: Operations Management
Petroleum Resource Planning
Energy Planning Models

Burman, Robert D. -- Professor, Agricultural Engineering

Specialties: Water Requirements of Crops
Micro-Meteorology
Runoff Hydraulics

Champlin, Robert L. -- Associate Professor, Civil Engineering

Specialties: Environmental Engineering
Impact Analysis
Environmental Chemistry
Utility System Evaluation

Clark, Richard T. -- Assistant Professor, Agricultural Economics

Specialties: Resource Economics
Environmental Economics
Community and Rural Development

Delaney, Ron H. -- Assistant Professor, Plant Science

Specialties: Effects of Specific Environmental Factors
(Water, Temperature, and CO₂) on the Physiological
Criteria for Plant Growth
Improvement of Biological Efficiency in Plants

Doll, G. Fred -- Research Associate, Water Resources Research Institute

Specialties: Statistics
Computer Programming
Economics
Recreation

Drever, James I. -- Assistant Professor, Geology

Specialties: Oceanographic Sediments
Transportation of Heavy Metals in Surface Waters
and Their Deposition in Closed Basins
Geochemistry of Soil Formation

Evers, John F. -- Assistant Professor, Petroleum Engineering

Specialties: Evaluation of Fresh Water Aquifers
Transient Flow Tests
Numerical Simulation

Ferris, Clifford D. -- Professor, Electrical Engineering

Specialties: Use of Electromagnetic Radiation for Sterilization
of Drinking Water
Electrodes for Biological and Medical Use
Interaction of Non-ionizing Electromagnetic Radiation
with Living Systems

Fisser, H. G. -- Professor, Range Management

Specialties: Range Survey
Photo Interpretation and Remote Sensing

Fornstrom, K. James -- Assistant Professor, Agricultural Engineering

Specialties: Soil Tillage
Soil-Plant Environment
Machinery Systems Analysis
Timeliness of Machinery Operation

Foster, David H. -- Assistant Professor, Civil Engineering

Specialties: Environmental Engineering
Water and Wastewater Treatment
Water and Wastewater Microbiology with Emphasis
on Virology
Land Disposal of Wastewater and Sludges
Removal of Biological and Chemical Pollutants
by Adsorbents

Gould, George -- Assistant Professor, College of Law

Specialties: Water Law
Public Land

Gunn, Robert D. -- Associate Professor, Chemical Engineering

Specialties: Modeling of Underground Coal Gasification

Harrison, Tyrone -- Assistant Professor, Botany

Specialties: Plant Physiology
Ecology
Photosynthesis and Transpiration Behavior in
Grasslands and Forests

Hasfurther, Victor R. -- Assistant Professor, Civil Engineering

Specialties: Surface and Ground Water Hydrology
Evapotranspiration Waste Disposal Systems
Open Channel Hydraulics - Stream Channel Modifications

Hough, H. W. -- Associate Professor, Soil Science

Specialties: Soil Fertility
Management of Saline and Saline-Alkali Soils

Huntoon, Peter W. -- Principal Hydrogeologist, Water Resources Research
Institute; Assistant Professor, Geology

Specialties: Aquifer Mechanics
Ground Water Simulation Modeling
Karst Hydrology

Jennings, James W. -- Associate Professor, Petroleum Engineering

Specialties: Hydrographic Synthesis
Underground Coal Gasification
Reservoir Performance

Johnson, K. L. -- Associate Professor of Range Management and Extension
Range Management Specialist

Specialties: Range Survey
Watershed Management

Jubenville, Alan -- Assistant Professor, Recreation and Park Administration

Specialties: Outdoor Recreation Management
Area Planning
Perception Analysis

Kerr, Robert D. -- Research Engineer, Water Resources Research Institute

Specialties: Water Quality Management
Salinity Control
Water Supply and Distribution--Industrial and
Municipal
Waste Water Treatment
Water Quality Monitoring

Knight, Dennis H. -- Associate Professor, Botany

Specialties: Plant Ecology
Ecosystem Analysis

Lang, Robert L. -- Professor, Plant Science

Specialties: Reclamation of Strip Mine Spoil Material
Effect of Pollutants on Native Vegetation
Work with Seeded Pastures for Meat Production

Maki, Leroy R. -- Associate Professor, Microbiology

Specialties: Bacterial Taxonomy
Statistical Analysis
Bacteria as Ice Nucleation Agents

Marrs, Ronald W. -- Assistant Professor, Geology

Specialties: Remote Sensing

May, Morton -- Professor, Plant Science

Specialties: Mine Reclamation
Reclamation Revegetation
Environmental Assessment
Range Management

Mueller, Gerald E. -- Assistant Professor, Geography

Specialties: Environmental and Fluvial Geomorphology
Drainage Networks

Nydahl, John E. -- Assistant Professor, Mechanical Engineering

Specialties: Heat and Mass Transfer of Blowing Snow
Thermodynamic Responses of Bridges
Laser Transmissometer
Heat Transfer and Rotating Flows

Pell, Kynric M. -- Associate Professor, Mechanical Engineering

Specialties: Snow Sublimation
Fluid Mechanics and Heat Transfer

Phillips, Clynn -- Associate Director, Water Resources Research Institute

Specialties: Water Allocation
Cost-Benefit Analysis
Beneficiary Identification
Project Financing

Pochop, Larry O. -- Associate Professor, Agricultural Engineering

Specialties: Climatology
Environment

Rechard, Paul A. -- Division Director, Water Resources Research Institute

Specialties: Snow Hydrology
Hydrology and the Environment

Sawaya, William J. -- Assistant Professor, Business Administration

Specialties: Operations Management and Research
Energy Resource Planning
Industrial Engineering

Singleton, P. C. -- Associate Professor, Soil Science

Specialties: Soil Survey
Clay Mineralogy
Nutrient Cycling

Skinner, Quentin D. -- Environmental Specialist, Water Resources
Research Institute

Specialties: Range Management
Water Quality
Recreation

Smith, Verne E. -- Research Engineer, Water Resources Research Institute

Specialties: Storage and Retrieval of Water Data
Snowpack Measurement
Municipal and Industrial Water Demands
Estimation of Streamflow Runoff
Hydrology of Stockwater Ponds
Aesthetics of Water Bodies

Spahr, Ronald -- Assistant Professor, Business Administration

Specialties: Operations Management
Financial Planning
Mechanical Engineering

Steidtmann, James R. -- Associate Professor, Geology

Specialties: Sedimentology (Sand in Streams)
Sedimentary Mechanics
Hydrodynamics of Sedimentation

Stinson, Donald L. -- Department Head, Mineral Engineering

Specialties: Hydrocarbon Fluid Properties
Thermodynamics
Saline Water Conversion
Disposal of Slurried Wastes

Warder, Donald S. -- Acting Head, Recreation and Park Administration

Specialties: Outdoor Recreation Behavioral Analysis
Recreation Development
Perception Analysis

Wei, Tsong C. -- Research Engineer, Water Resources Research Institute

Specialties: Systems Analysis of Surface Water Management
Hydrologic Watershed Modeling
Precipitation-Runoff Relationships
Flow Routing of Open Channel Systems

Wesche, Thomas A. -- Research Biologist, Water Resources Research
Institute

Specialties: Fisheries