UNIVERSITY OF IDAHO

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IDAHO WATER RESOURCES RESEARCH INSTITUTE

G.L. Bloomsburg, Director

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Program Report

Grant 14-08-0001-G839

G.L. Bloomsburg, Director

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ABSTRACT

This report is a synopsis of the results of research projects sponsored under Grant Program G839, the 1983 Water Research Institute Program (WRIP) for the University of Idaho Water Resources Institute. The Idaho WRIP package is a sub-set of the Institute's overall research program effort and contains 8 one year projects investigating the following areas: Effects of Suspended Sediments on stream Invertebrate Detrital Processing and Bioenergetics, Impacts of Individual On Site Sewage Disposal Facilities on Mountain valleys - Phase II, Abundance Upstream from Dworshak Dam Following Exclusion of Steelhead Trout, Hydrologic and Legal Assessment of Ground Water Management Alternatives for Idaho, Calibration of the Snake Plain Aquifer Ground Water Flow Model, Development of a Methodology to Evaluate the Success and Consequences of Establishing Exotic Fishes in Idaho, Enhancement of Duration Curve Prediction Using Short Time Low Flow Measurements, Aquaculture Utilization of Geothermal Wastewater, and Information Dissemination.

ACKNOWLEDGEMENT

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Contents of this publication do not necessarily reflect the views and policies of the United States Department of the Interior nor does mention of trade names or commercial products constitute their endorsement by the U.S. Government.

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UNIVERSITY OF IDAHO
INSTITUTE PROGRAM REPORT

The past year has brought about several changes in the Idaho Water Resources Research Institute. The most obvious of these changes is the dropping of energy from the title which is a return to the title used before 1978. In August, 1984, Dr. George Bloomsburg assumed the role of Director, replacing Dr. John Busch who had been the director since 1982. The effort of Dr. Busch in providing leadership for the Institute for the past two years is greatly appreciated. The Institute has continued to function in a vigorous manner providing the focal point for water related research in the state.

During the current situation of limited research funds, every effort is being made to provide the maximum support possible for research training, information dissemination and to assure the direction and coordination of response to research projects in the IWRRI program. In addition to the annual grant program, support for water resources research has come from state and federal agencies along with some from the private sector. Liaison has been maintained with the Idaho Department of Water Resources and other agencies and groups that govern water policy in the state to assure that the research programs administered through the Institute are responsive to needs in the state and region. The Institute is following the revised Five-Year Plan adopted in January of 1985. The five top priority areas in the Five-Year Plan are:

1. Water resource research needs associated with energy development, use and conservation.

2. Irrigation water supply management and methods of applying and controlling water.

3. Water resource development and use impacts on the environment.

4. Water resource related social and institutional factors within the state and region.

5. Water conservation aspects including water supply, use and reuse within water resources systems including both surface and sub-surface waters.

The research program presently includes some 27 separate projects. The results from these projects provide pertinent information and answers to questions related to the research categories designated in the State Water Plan.

A Policy Advisory Committee has been formed to provide direction for the Institute research program. The following departments, agencies and organizations are represented on the committee. The University of Idaho Administration, Idaho State University, Boise State University, Idaho Department of Water Resources, Idaho Water Users

Association, Idaho National Engineering Laboratory, Idaho Department of Health and Welfare, Idaho Forest Industry Council and within the University of Idaho the College of Mines, College of Forestry, Wildlife and Range Sciences, College of Engineering and College of Agriculture. The committee meets twice a year, once at the University of Idaho and once at either Idaho State University or Boise State University. The Director greatly appreciates the time and effort that these members of the committee put forth to advise the Institute.

SYNOPSES OF RESEARCH PROJECTS

G839-02 EFFECTS OF SUSPENDED SEDIMENTS ON STREAM INVERTEBRATE DETRITAL PROCESSING AND BIOENERGETICS

Principal Investigator: Merlyn Brusven

The effects of suspended sediments on stream invertebrate detrital processing and bioenergetic parameters were investigated in replicated, light and temperature-controlled chambers in the laboratory. The leaf-shredding insects Pteronarcys californica and Hesperophylas occidentalis were studied. Mean daily ingestion rates were less among test insects than control insects for seven of the eight trials. In five of the eight trials, mean ingestion rates were suppressed by >41% when compared to insects held in 0.0 g/l suspended sediment environments. Feeding inhibition was typically greater at the end of the feeding trials (14 days) than at the beginning (0-4 days). Growth of the immature feeding stage of the insects studied in both test and control environments for all trials combined was negligible when compared to their ingestion rates. Mean daily growth rates ranged from -1.2% to 1.6% of the mean daily ingestion rates. The mean assimilation efficiencies of second-year naiads of P. californica were 17.4% and 21.3% when subjected to 3.0 g/l and 00 g/l suspended sediment concentrations, respectively.

Processing of coarse particulate organic matter in streams is of major importance not only to the shredding insect component, but to collectors which feed on fine particulate organic matter. Much of the fine particulate organic matter is the ingested residue of shredding insects. Vertebrate predators on the other hand benefit by feeding on invertebrates, thus facilitating productivity of their own trophic level.

The project's primary objectives were to determine the effects of various suspended sediment levels on leaf breakdown, ingestion, egestion (fecal production) and growth rates of selected aquatic insect species that serve as shredders of coarse particulate organic matter (CPOM); further to develop insect-energy budget models employing the above parameters to portray the effects of various suspended sediment levels on subject insects.

The publication from this project is Brusven, M.A. and C.E. Hornig. 1984, Effects of Suspended Sediments on Stream Invertebrate Detrital Processing and Bioenergetics, Research Technical Completion Report, Idaho Water and Energy Resources Research Institute, University of Idaho, Moscow.

G839-03 IMPACTS OF INDIVIDUAL ON SITE SEWAGE DISPOSAL FACILITIES ON MOUNTAIN VALLEYS, PHASE II

Principal Investigator: C.E. Brockway

Phase I addressed the land use and building densities of the area and quantified current and projected nutrient loadings. This phase of the project evaluated the hydrologic characteristics of the Big Wood

River and aquifer systems, addressing ground water characteristics, ground water/surface water relationships, and water quality related to on-site sewage disposal systems.

Ground water is unconfined and often occurs close to land surface in unconsolidated valley-fill deposits, which range from less than 40 feet to more than 180 feet in thickness. Ground water underflow at Hailey was calculated to be approximately 40,000 acre-feet per year.

A ground water quality network of approximately 50 wells was established from which samples were collected in July-August, 1983. Approximately 20 wells were then selected, from which samples were collected about every 6-8 weeks through March, 1984. The mean concentrations of nitrate-n, chloride, and orthophosphate were 0.53, 2.4, and .013 mg/L, respectively. Nitrate-n concentrations ranged from 0.1 to 2.2 mg/L, well below the USEPA recommended limit of 10 mg/L. The mean specific conductance was 371 micromhos/cm at 25° C. Mean concentrations of nitrate-n, chloride, and orthophosphate from surface water samples were 0.44, 1.8, and .015 mg/L, respectively.

Ground water levels were measured in approximately 60 wells from which a water-table contour map and a ground water/surface water profile were constructed for July-August, 1983. The profile indicates hydraulic connection between ground water and surface water in much of the study area.

Discharge measurements made in the Big Wood River and tributaries indicate the river gained approximately 156 cfs between Ketchum and Hailey in September, 1983, and gained approximately 84 cfs within the same reach in March, 1984. The river lost approximately 57 cfs between Hailey and Glendale Bridge in September, 1983.

The project's primary objectives were to determine current and potential maximum build-out and density in current subdivisions and non-platted areas; to quantify the current on-site sewage disposal systems by type and location; and to determine nutrient loadings on the Big Wood River aquifer under current, intermediate, and maximum build-out for the study area.

The publication from this project is Luttrell, S.P. and C.E. Brockway, 1984, Impacts of Individual On-Site Sewage Disposal Facilities on Mountain Valleys - Phase II Water Quality Considerations, Idaho Water and Energy Resources Research Institute Research Completion Report, Moscow, Idaho, WRIP/371403, 74 p.

G839-04 ABUNDANCE UPSTREAM FROM DWORSHAK DAM FOLLOWING EXCLUSION OF STEELHEAD TROUT

Principal Investigators: Christine M. Moffitt and Theodore Bjornn

One to four reaches (transects) on each of 12 tributaries of the North Fork Clearwater River were photographed, measured for length and width, described and snorkeled. Fish were enumerated by species, and

in most locations classified by size into three age classes: 0, 1, and 2 years and older. Numbers of fish and surface area of each transect were used to calculate the density of fish at each site. Data from previous studies of the watershed conducted by Idaho Department of Fish and Game between 1968 and 1976 were used for comparison to establish trends of fish abundance.

Elimination of anadromous fish from the North Fork of the Clearwater River has reduced the overall density of fish in tributaries of the watershed by two-thirds. Rainbow trout, presumably residualized steelhead, were the most abundant fish and were found in 82 percent of the transects. Average densities for rainbow and cutthroat trout were 5.5 and 0.9 fish $100m^2$, respectively. This reduction in density can be attributed primarily to reduced numbers of juvenile fish rearing in the streams. The average density of cutthroat trout (Salmo clarki) in the transects was similar to levels estimated when anadromous fish were utilizing the watershed. Thus, neither cutthroat nor resident rainbow trout are fully utilizing the space formerly occupied by juvenile steelhead.

Experimental studies of the behavior and habitat requirements of the endemic juvenile and adult rainbow and cutthroat trout should be conducted to determine if, for example, a portion of these residualized rainbow trout still emigrate downstream like smolts. Other stocks of rainbow or cutthroat trout that could more fully utilize the tributaries and even use the reservoir such as adfluvial later-maturing stocks should be evaluated carefully for potential introduction into the drainage.

The North Fork of the Clearwater River, Idaho, historically hosted one-third to one-half of the total Clearwater River production of anadromous rainbow trout (steelhead), Salmo gairdneri. After 1969, no adult anadromous fish spawned upstream from Dworshak Dam. The objectives of this project were to examine resident fish use of habitat formerly occupied by juvenile steelhead; establish permanent transect areas to monitor fish abundance and distribution in the North Fork Clearwater River drainage; determine the distribution and abundance of all fish species, particularly cutthroat and residualized steelhead trout in transect areas; compare the present fish distributions with those obtained from previous studies of the watershed before anadromous fish were blocked from the drainage and then in the period immediately following blockage; and evaluate densities of cutthroat and residualized steelhead in areas with sympatric populations.

The publication from this project is Moffitt, Christine M., Theodore C. Bjornn, 1984, Fish Abundance Upstream From Dworshak Dam Following Exclusion of Steelhead Trout, Research Technical Completion Report, Idaho Water Resources Research Institute, Moscow.

G839-05 HYDROLOGIC AND LEGAL ASSESSMENT OF GROUND WATER MANAGEMENT ALTERNATIVES FOR IDAHO

Principal Investigators: Dale R. Ralston and Douglas L. Grant

The hydrologic aspects of conjunctive management of surface and ground water are presented first. Particular emphasis was placed on classifying selected basins tributary to the upper Snake River with respect to the magnitude of discharge, extent of development and estimated lag time between ground water pumpage and reduced discharge to the Snake River. Four factors were developed upon which to base the classification of the tributary basins: 1) the ratio of the quantity of water supplied by the tributary basins to the flow of the Snake River at King Hill, 2) the occurrence of consumptive ground water pumpage in excess of basin recharge, 3) the ratio of annual water yield to the drainage area of the basin, and 4) the distance that suface and ground water must flow to discharge into the Snake River. Time lags were developed as estimates of the lag time between basin pumpage and reduced flow of the Snake River. Three basins had estimated time lags of greater than 90 years. Two additional basins have estimated maximum time lags of 40 to 50 years.

The legal aspects of conjunctive management are presented as a second major section. Issues addressed include the magnitude and timing of impacts on junior diversions, selection of junior diversions for closure, burden of proof and policy objectives. The legal analysis concluded that conjunctive management of physically integrated surface and ground water is at an embryonic stage of development. The existing structure of statutory encased law has gaps that result in a number of more or less technical legal uncertainties and complexities. At a more fundamental level lies the need to resolve potential conflict between the policies of protecting senior vested rights and optimum development of water resources.

The project's primary objective was to focus on conjunctive management of surface water and ground water resources. The hydrologic aspects of the research were directed toward conjunctive management of surface water and ground water resources in the upper Snake River Basin in Idaho. The legal research was based upon Idaho laws and cases with correlation to other western states. The report was published in May 1984 in two parts.

The publication from this report is Ralston, Dale R., Roxanne Broadhead, Douglas L. Grant, 1984, Hydrologic and Legal Assessment of Groundwater Management Alternatives for Idaho, Research Technical Completion Report, IWRRI, University of Idaho, Moscow.

G839-06 CALIBRATION OF THE SNAKE PLAIN AQUIFER GROUND WATER FLOW MODEL

Principal Investigator: C.E. Brockway

A ground-water flow model of the Snake Plain aquifer has been developed by the Idaho Department of Water Resources as a tool for

determining effects on the aquifer resulting from changes in water use. The calibration of the model is being updated using the improved data base available from the U.S. Geological Survey's Regional Aquifer Systems Analysis (RASA). These data form the basis for determining aquifer recharge and discharge and for mapping water table elevations. The recharge and discharge determinations are nearly complete and model calibration will follow by staff of the Idaho Department of Water Resources.

To provide technical assistance to the Idaho Department of Water Resources for updating calibration of the State's ground-water flow model of the Snake Plain aquifer.

The publication from this project is Johnson, G.S., C.E. Brockway, and J. Lindgren, 1984, Calibration of the Snake Plain Aquifer Ground-water Flow Model, Idaho Water and Energy Resources Research Institute Technical Completion Report, University of Idaho, Moscow, Idaho.

G839-07 DEVELOPMENT OF A METHODOLOGY TO EVALUATE THE SUCCESS AND CONSEQUENCES OF ESTABLISHING EXOTIC FISHES IN IDAHO

Principal Investigator: David H. Bennett

A survey of fish and game management agencies in the contiguous United States and Canada was conducted by use of a questionnaire. By means of the survey, we identified waters where walleye were successfully and unsuccessfully established. Water quality and morphometric data were obtained from reports or via the National Computer Center's STORET data base. Once a data base was obtained we determined those factors affecting the success of establishing a reproducing population of walleye by stepwise discriminant analysis. The discriminant functions were then incorporated into a computer model to predict the probability of success or failure of establishing walleye.

To identify possible interactions among species which could occur if walleye were established, we applied loop analysis. Because of the lack of information on interactions between walleye and indigenous fishes, we used a variety of hypothetical situations germane to Idaho to determine whether the ecosystem would go towards stability or instability.

Fifty of 58 state and provincial fishery agencies responded to our questionnaire. Our results suggest an approximate success rate of establishing walleye of 35.3%. We identified more than 500 lakes and reservoirs where walleye were planted but only could obtain the necessary data on 293 reservoirs.

The discriminant analysis selected four variables: area of reservoir; maximum depth; pH; and, date of dam closure (all transformed to natural logs). Statistics of the analysis suggested that we would be able to accurately classify approximately 77% of the waters for walleye. Using the discriminant coefficients from this analysis we

constructed our FORTRAN predictive model. Input required for the model would be values for coefficients of the four variables (area, maximum depth, pH and date of dam closure) identified in the discriminant analysis.

Results of the loop analysis suggested that if walleye were established in selected waters the result could be a stable ecosystem. Other scenarios which examined various species combinations with walleyes, however, suggested that instability in the ecosystem would result.

These findings suggest that our model can be used to predict the probability of establishing walleye in selected reservoirs. The significance of our findings is that fishery management agencies, through the use of our model, could increase their success rate from 35% (based on results of the questionnaire survey) to 77%.

In conclusion, a FORTRAN model was developed to predict the probability of establishing walleye in previously uninhabited waters. Coefficients for the model were obtained by discriminant analysis of water quality and morphometric data. Use of our model should enhance a fishery manager's ability to predict the probability of successfully or unsuccessfully establishing walleye in uninhabited waters.

Increased numbers of sports fisherman have expressed interest in the introduction of exotic fishes in Idaho. Many of these fishes, including walleye (Stizostedion vitreum), have the potential to feed on and compete with desirable native game and anadromous fishes. The purpose of this project was to develop a methodology to assess the probability of successfully introducing an exotic fish and evaluate its potential for adverse interactions with indigenous fishes.

Objectives of this project were to develop a model to predict the probability of success of establishing fishable populations of exotic fishes in Idaho waters; to apply this model to walleye (Stizostedion vitreum) as a target species and assess the probability of establishing fishable populations in Idaho waters; to apply this model to representative waters in southern, eastern, and northern Idaho and assess their potential for establishing fishable populations of walleye; and to evaluate the potential of using loop analysis to identify possible interactions between an introduced exotic and indigenous fishes.

The publication from this project is Bennett, D.H. and T.J. McArthur, 1985. Assessing Habitat Suitability for Walleye (Stizostedion vitreum) and Possible Species Interaction with Salmonid Fishes, Idaho Water Resources Research Institute Technical Completion Report, University of Idaho, Moscow, Idaho.

G839-08 ENHANCEMENT OF DURATION CURVE PREDICTION USING SHORT TIME LOW FLOW MEASUREMENTS

Principal Investigator: Leroy F. Heitz

Past streamflow gaging records were used to evaluate the variation over time as well as the variation of simultaneous measurements at different sites. Methodologies were developed for determining the low flow percentage exceedance values at an ungaged site using a single streamflow measurement coupled with knowing the exceedance percentages at gaged streamflow sites in the area. A major contribution of this methodology is a means of estimating the confidence bounds of the estimates made. This study also included a number of field measurements of unregulated streams in northern Idaho for which interest in hydropower development has been shown or where streams were thought to be indicators of smaller basin behavior.

This study investigated the use of single or short-term flow measurements to enhance the prediction of the low flow portions of flow duration curves on ungaged streams. The purpose of this project was to study the year-to-year and day-to-day variation of low streamflows and to determine if a period or time of year exists that would be the best indicator of low flows; develop methods of using measurements during the low flow period to enhance previous predictions of ungaged flow using the parametric or normalizing duration curve techniques; and make a number of field flow measurements on a number of ungaged streams in northern Idaho. These streams were selected on the basis of their potential use for hydroelectric development or their use to evaluate the methodology developed and to provide information for larger ungaged regions in northern Idaho.

The publications from this report are Heitz, Leroy F., Jeff R. Filler, 1984, Enhancement of Duration Curve Prediction Using Short Time Low Flow Measurements, Idaho Water Resources Research Institute, University of Idaho, Moscow, Idaho and Filler, Jeffery Robert, 1984, Improvement of Flow Duration Curve Predictions Using Low Flow Discharge Measurements, Master's Thesis.

G839-09 AQUACULTURE UTILIZATION OF GEOTHERMAL WASTEWATER

Principal Investigator: Claude Spinosa

The project's primary objective was to determine whether the aquaculture of the giant Malaysian prawn Macrobrachium rosenbergii can be conducted directly in geothermal water of southern Idaho. Water from five sites was selected and seven to twenty-one specimens were placed in tanks with that water. Growth (length and weight) was recorded. Findings include that fluoride levels (up to 19 ppm) do not correlate with high mortality rates or low growth rates. High fluoride levels have previously been considered an obstacle to direct utilization of water for crustacean aquaculture; this is not the case for M. rosenbergii.

Several conclusions result from this study. Some geothermal water in Idaho can be utilized directly for the aquaculture of Macrobrachium rosenbergii, high fluoride levels cannot be directly correlated with high mortality rates and low fluoride levels do not correlate with high growth rates.

Data suggests that low fluoride levels are associated with low mortality rates and generally with good health. The Boise Water Company domestic water tanks (control group) maintained specimens with high growth rates, but not appreciably higher than control than other water which had moderately low (2.3 milligrams per liter) fluoride levels. The Erwin Ranches (Bruneau) water with high fluoride levels (11 milligrams per liter) sustained high growth rates which were generally higher than the control group. The Bruneau water tanks did, however, sustain higher mortality rates than the control group. Since the deaths were in part due to cannibalism, the mortality rate difference cannot be attributed to differences in fluoride levels exclusively or partially. The experimental tanks were subjected to high rates of cannibalism. So high, in fact, that it was necessary to decrease the number of specimens in each tank to two. The tanks are presently being maintained and data gathering is continuing but there is only a single specimen in each tank. Small numbers of specimens do not provide a statistically valid sample.

Death due to cannibalism also occurred in the tanks with large display and brood stock especially during the vulnerable time of shedding. In each of four large (100 gallon) display tanks only one specimen remained after as many as five specimens were placed in each tank. The author's conclusion from over six months of direct observation is that Macrobrachium rosenbergii cannot be regarded as a good candidate for intensive aquaculture efforts in areas where large ponds and low population densities cannot be accommodated. M. rosenbergii is territorial, aggressive and generally cantankerous. Published data suggest that this species is the least aggressive and cannibalistic of all the Macrobrachium species and that it will require a maximum of one square foot of pond space per animal. Observations in aquarium tanks suggest that each specimen requires much larger territory. One large male 40 cm in length (22 cm rostrum to telson) ate every other former cohabitant of a 150 gallon tank and demonstrated continuously aggressive behavior towards a specimen of Tilapia equal to his size.

The question of the effects of fluoride levels on growth and mortality cannot be answered quantitatively because of the small samples which were used. Fluoride levels as high as 19 milligrams per liter are not significantly deleterious to growth of Macrobrachium rosenbergii. The reason for high mortality in water from the Magic Reservoir well is unknown. The significantly higher constituents present in this water which are not present in other water include silica, calcium, sodium, bicarbonate, chloride, and total dissolved solids. Tests prior to placing animals in the tanks indicated no measurable ammonia levels. Mitchell, 1976, indicated the presence of trace metal concentrations which could be of concern but comparable data for other water used in the study are not available. Mitchell

lists the following chemical constituents (in milligrams per liter): scandium: .45 x 10-8; iron: 2.3 x 10-4; zinc: .18 x 10-5; rubidium: 11 x 10-5; strontium: 7.7 x 10-4; antimony: 1.5 x 10-5; barium: 11 x 10-5; and cesium: 40 x 10-7.

Fecundity studies were not conducted because specimens had not reached sexual maturity and appropriate size to enable us to place test females in the same tank with large male stock. Fecundity tests and taste tests will be conducted at a later time.

The publication from this project is Spinosa, Claude, 1984, Feasibility of Direct Utilization of Selected Geothermal Water for Aquaculture of Macrobrachium rosenbergii, Research Technical Completion Report, Idaho Water Resources Research Institute, University of Idaho, Moscow.

G839-22 INFORMATION DISSEMINATION

Principal Investigator: John R. Busch

A broad range of information dissemination activities were supported through the Idaho Water Resources Research Institute during the project period. Users of this information represented a wide variety of interests from researchers to public agencies to private interests. Activities related to each objective were effective in providing the broadest coverage with the resources available. An Institute newsletter was produced and mailed approximately every three to four months. The main audience for the newsletter was water resource interests within the state, but it was also distributed to other Institutes and interested parties throughout the country as well as internationally.

An updated Publications List was published and provided to all interested individuals and groups. This publication contains a listing of all Institute reports along with a brief description of the Institute and its current activities. The Publications List was updated a second time and reprinted during this project. It has served well in providing up-to-date information about Institute activities and current research efforts.

Another important aspect of this project has been the publication and dissemination of research project reports. These reports cover a wide range of research coordinated through the Institute. Users include a wide variety of individuals and groups including researchers, public agencies, private individuals and groups, and policy-making groups including the state legislature.

A library of regional water resources literature has been maintained in the Institute. The main purpose of this library is to provide current information for researchers, students and others with interests in up-to-date water resources research results.

Shortcourses and seminars were also organized and sponsored by the Institute. A three-day intensive shortcourse dealing with "Decision-Making Processes Influencing Farmers in the Western United States" was developed. This course was presented to regional policy makers in the US Bureau of Reclamation by University of Idaho faculty active in water resources research. An irrigation research workshop was developed and organized under this information dissemination project. The workshop was held in September, 1984 for regional researchers and agency personnel directly involved with various aspects of irrigation systems research, design and operation. A portion of the support for this workshop was supplied by the FY85 Information Dissemination Project.

On the University of Idaho campus, the Institute maintained its long standing tradition of coordinating the Water Resources Seminar. This seminar is a graduate level seminar for all graduate students interested in water resources. The semester-long seminar dealt with issues related to the subordination of water rights for hydroelectric power generation. Outside speakers presented a wide variety of views representing interests throughout the state.

The overall objective of the Water Resources Technology and Information Transfer Program for Idaho is to disseminate pertinent water resources research results in the most effective manner throughout the State, Region and Nation.

Specific objectives were to supply current information about the Institute and the water resources projects supported through the Institute; to make current water resources literature available to a broad spectrum of interested users; and to sponsor conferences, short courses and/or symposia.

The publication from this project is Water Resources Publications List, Idaho Water Resources Research Institute, 106 Morrill Hall, University of Idaho, Moscow, ID 83843.

ANNUAL REPORT -TRAINING AND EDUCATION ASPECTS
OF THE WATER RESEARCH PROGRAM

Name of University: University of Idaho
Moscow, Idaho

Number of students receiving employment as research project or program assistants.

Category of Students	Number by Scientific Discipline or Major Field of Study (Engineering, Biology, Economics, etc.	
	Scientific Discipline of Student	Number
Undergraduates		
	Agricultural Engineering	2
Master's Students		
	Entomology	1
	Hydrology	1
	Geological Engineering	1
	Agricultural Engineering	1
	Fisheries	1