PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Idaho Fish Screen Improvement - O&M

BPA project number: 9401500
Contract renewal date (mm/yyyy): 1/2000 ☒ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Idaho Department of Fish and Game

Business acronym (if appropriate) IDFG

Proposal contact person or principal investigator:

Name	Patrick Marcuson
Mailing Address	P.O. Box 1336
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NPPC Program Measure Number(s) which this project addresses
7:10A

FWS/NMFS Biological Opinion Number(s) which this project addresses
None

Other planning document references
Salmon Summit
NPPC Strategy for Salmon Recovery
NMFS Recovery Plan
State of Idaho Statutes
Congressional Mitchell Act
USFS Land Use plans for Challis and Salmon N.F.

Short description
Enhance passage of juvenile and adult fish in Idaho's anadromous fish corridors by consolidation and elimination of irrigation diversions. Minimize impact of irrigation diversion dams, screen pump intakes and loss of fish to irrigation canals.

Target species
Chinook, Sockeye, Steelhead, Bull Trout and other indigenous resident salmonids.

Section 2. Sorting and evaluation

Subbasin
Lower Snake mainstream, Salmon, Clearwater

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
☒ Anadromous fish ☐ Resident fish ☐ Wildlife	☐ Multi-year (milestone-based evaluation) ☒ Watershed project evaluation	☐ Watershed councils/model watersheds ☐ Information dissemination ☐ Operation & maintenance ☒ New construction ☐ Research & monitoring ☐ Implementation & management ☐ Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
9401700	Idaho Model Watershed Habitat	Joint projects
9202603	Idaho Model Watershed Admin/Improvement	Technical Work Group advise/priorities
9107200	Redfish Lake Sockeye	Keep sockeye smolts from diversions
8909800	Idaho Supplementation Studies	Movement vs. fish screen efficiencies
9600700	Consolidation Program	Joint projects

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1993	Built Anadromous Fish Screen Shop	
1994	Equipment purchased and screen construction to NMFS criteria.	
1997	Constructed fish screens on consolidated canals, three fish friendly diversions, 20 pump intake screens, 2 infiltration screens and 17 headgates.	Yes
1998	Constructed fish screens, 4 fish friendly diversions, safety fences, canal eliminations and two stream reconnects, 20 pump intake screens, and 12 headgates.	

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Complete surveys, designs, construction and installations of all unscreened, obsolete gravity and pump intakes in Idaho's anadromous fish corridors	a	Complete topographic surveys of unscreened and antiquated fish screen sites.
		b	Design fish screen, headgate, and/or fish friendly diversion as appropriate at each site.
		c	Contract construction at each site.
		d	Fabricate and install fish screen and associated components at each site.
		e	Locate, measure, design, build and install fish screens on pump intakes.
2	Reduce the number of gravel push-up diversion dams by consolidation and elimination of irrigation ditches	a	Identify potential consolidation and ditch elimination sites.
		b	Obtain easements and flow agreements.
		c	Design consolidations and replacements of surface water diversions with ground water systems.
		d	Construct designs both by contract

			and IDFG crew.
		e	Evaluate and adjust as needed for proper function.
3	Maximize any rearing habitat in appropriate irrigation canals	a	Evaluate ditch fish habitat potential and existing fishery.
		b	Locate fish screen to maximize rearing habitat.
4	Reconnect streams to anadromous fish corridors	a	Locate streams providing historic spawning and rearing for anadromous fish.
		b	Determine if sufficient water exists to support anadromous fish spawning and/or rearing.
		c	Design and implement reconnect.
		d	Install fish screens where needed.
5	Install and evaluate alternative fish screening methods	a	Look for methods to reduce screen costs or maintenance needs, increase screen flexibility to handle ranges of water levels or flows. e.g. infiltration systems.
6	Make accessible fish screens safer to humans and domestic pets	a	Fence screen sites that are accessible to public.
		c	Design and implement reconnect.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	1/1999	12/1999			0.30%
2	1/1999	12/1999			0.45%
3	1/1999	12/1999			0.18%
4	1/1999	12/1999			0.05%
5	1/1999	12/1999			0.01%
6					0.01%
				Total	1.00%

Schedule constraints

Some proposed consolidations, eliminations and conservation agreements of irrigation diversions fail at last hour because one or more ditch owners cannot agree. Inconsistent or delayed date-of-issuance of grant awards.

Completion date

2005

Section 5. Budget

FY99 project budget (BPA obligated): $1,000,000

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	Fisheries and Engineering Technicians	%4	41,670
Fringe benefits		%1	14,420
Supplies, materials, non-expendable property		%5	54,000
Operations & maintenance		%0	
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Contracts	%63	629,840
NEPA costs		%0	
Construction-related support		%1	12,000
PIT tags	# of tags:	%0	
Travel		%1	7,000
Indirect costs		%3	31,000
Subcontractor	Contracts	%21	210,070
Other		%0	
TOTAL BPA FY2000 BUDGET REQUEST			$1,000,000

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount ($)
Mitchell Act	Grant award O-M	%58	1,516,208
Irrigators/Landowners	Cost sharing	%5	120,000
NRCS	Professional employee assistance	%0	0
		%0	
Total project cost (including BPA portion)			$2,636,208

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	$1,000,000	$1,000,000	$500,000	$500,000

Section 6. References

Watershed?	Reference
☐	Abernethy, S.S., D.A. Neitzel, and W.V. Mavros. 1996. Movement and Injury Rates for Three Life Stages of Spring Chinook Salmon: A comparison of Submerged Orifices and an Overflow Weir for Fish Bypass in a Modular Rotary Drum Fish Screen. PNNL
☐	Clothier, William D., 1954. Effect of water reductions on fish movement in irrigation diversions. Journal Wildlife Mgt., Apr. 18 (2): 151-60.
☐	Corley, Donald 1961 Effect of irrigation diversions on smolt out-migrations in the Lemhi River, Idaho. M.S. Thesis, U of I
☒	Gebhards, Stacy. 1959 The effects of irrigation on the natural production of chinook salmon (Oncorhynchus tshawytscha) in the Lemhi River. M.S. Thesis, Utah State University
☐	Idaho Department of Fish and Game, 1998. Idaho's Anadromous Fish Stocks: Their Status and Recovery Options. Report to the Director, IDFG 98-13
☐	Keifenheim, M. 1992. USFS-Region 4 Salmon National Forest Level 1 Stream Diversion Inventory. In cooperation with IDFG and BLM-Salmon District
☐	Keifer, Russel and Lockhard, J. 1994. Intensive evaluation and monitoring of chinook salmon and steelhead trout production. Crooked River and Upper Salmon River sites. U.S. Dept. of Energy, BPA, No. 91-73
☐	Munther, Gregory. 1973. Unpublished USFS Program Rpt.
☐	Spindler, John C. 1995. Loss of game fish in relation to physical characteristics of irrigation canal intakes. Journal of Wildlife Mgt. 19 (3): 375-82.

PART II - NARRATIVE

Section 7. Abstract

Fish screens and fish friendly diversion dams save fish. Bonneville Power Authority grants in company with Congressional Mitchell Act grants and cost sharing with irrigators/landowners and other agencies has and continues to improve fish passage in Idaho tributary streams to the Columbia River. One hundred and seventy-five (175) of 250 old fish screens have been upgraded to meet current NMFS criteria. Thirteen (13) surface irrigation canals have been eliminated by conversions to wells or taken out of use. Thirty-two (32) canals were consolidated into 15 canals. Forty (40) pump intakes have been screened, six (6) infiltration systems installed to eliminate need for diversion dams, headgates and conventional fish screens. Sixteen (16) fences have been built around fish screens to exclude people and animals. Twenty-nine (29) headgates were improved and seven (7) fish friendly diversions have replaced gravel push-up, hay bales, tin, and mattress irrigation diversion dams.

Consolidation and or elimination of numerous diversions is the best solution to maximizing survival of migrating fish. Reconnecting streams previously captured by irrigation canals open up many miles of spawning and rearing habitat. Most of these tributaries have excellent habitat, are unpolluted and are essentially unchanged from their original, pre-agricultural quality. Two tributaries are in the process of being reconnected to the Salmon corridor. Elimination or modification or gravel push-up diversions to fish friendly diversions saves fish, improves streambed stability and improves chemical, physical, thermal and biological characteristics of Idaho waterways. Lockable, controllable headgates are cost shared with irrigators and provide a means of taking only the desired water volume and can be turned off when water is not needed.

Idaho is about 72% completed with the screening effort. Consistent funding could assist completing the work by 2005. Evaluations of fish screens, reconnected stream projects and sites needing attention are on-going using a combination of in-kind and combined private, state, and federal funding sources.

Section 8. Project description

a. Technical and/or scientific background

The fish screen program is a "do-it" activity. The title assigned to this project and the program "is not" Operation & Maintenance. It should be Minimizing Impacts of Irrigation on Fish Passage and Survival in Idaho. It is not a research or management action. All the technical aspects are formulated by the Fish Screen Oversight Committee comprised of Oregon, Washington and Idaho, BPA and NMFS contract officers and engineers. The fish screen criteria generated by this committee were formed from the best available evaluations, literature review and engineering standards (see NMFS fish screen criteria). The fish screen programs are directed by Salmon Summit, NPPC strategy for Salmon Recovery, NMFS Recovery Plan, State Statutes and Congressional appropriations of the Mitchell Act. NMFS has an informal consultation under Section 7 (a)(2) of the ESA and biological assessment relative to all fish screening and adult fishways funded under the Mitchell Act, "The programs under this act are not likely to adversely affect the listed salmon".

Idaho's fish screen program consults other fisheries managers, researchers and a Model Watershed Technical Team to evaluate and prioritize screen projects. Some of the impacts irrigation has on fish migration are:

1.) loss of fish to irrigation canal intakes;
2.) impingement of juvenile fish on pump intakes;
3.) dry stream channels because of inefficient headgates and diverision dams;
4.) total use of all the flow of some tributary streams;
5.) chemical application to ditches to reduce aquatic vegetation;
6.) a spawning location later dried up when the ditch is turned off;

7.) increased water temperatures and sediment loads from irrigation return flows.

The fish screen program involves the migratory corridors of anadromous fish in Idaho's Snake River system. The Salmon and Clearwater river drainages are the major target area.

b. Rationale and significance to Regional Programs

The screen program in Idaho and other Columbia River states has been recognized as a positive value to protecting both anadromous and resident fish. In 1956, Gebhards found an annual loss of one (1) million smolts to 250 diversions in 500 miles of the Salmon River drainage. The Snake River system historically produced over half of the spring/summer chinook for the Columbia River system. As recently as the late 1960's, the Snake River supported wild runs exceeding 120,000 adult spring/summer chinook salmon and summer steelhead. These runs supported popular fisheries generating significant financial and recreational benefits to local and regional communities (unpublished IDFG report, 1998).

In 1961, Corley estimated 279,000 smolts were saved by 84 fish screens on the Lemhi River. Munther, 1973, found 3,200 chinook juveniles diverted into one unscreened ditch in the Sawtooth valley. Kiefer, 1994, researched one Salmon River diversion (S-28) and found 68% of the down river migrants were funneled into this ditch. Present on-going studies reveal some wing dams take all migrants, others on outside meanders divert most of the downstream migrants. The loss of game fish are not restricted to anadromous species. Clothier, 1954 and Spindler, 1955 emphasized the loss of resident fish in Montana years ago.

Idaho's fish screen program has gone beyond screening fish. It endeavors to find ways to keep fish out of irrigation ditches. It recognized the importance of reconnecting streams to migrating, spawning and rearing of all fish species. The program strives to keep fish out of irrigation ditches first, then screen the ditch as a secondary measure.

c. Relationships to other projects

This proposal relates directly to USBR project (SBT 9600700) which combines consolidation of large mainstream diversions with IDFG screen program. Redfish Lake Sockeye (9107200) releases need the IDFG screen program to minimize migration problems in Idaho. Other supplementation efforts in Idaho waters (8909800) eliminate the need for numerous ditches, help stabilize stream channels and provide the very best protective measures for fish. Evaluations of various screen configurations are well documented. Abernethy, et.al. 1996, has used BPA funds to study physical impacts of screens on juvenile fish. Oregon and Washington also have a Fish Screen Program.

The projects undertaken by the fish screen program are part of a watershed plan formulated by the technical work group and a conservation program endorsed by the governor, local citizens and politicians.

d. Project history (for ongoing projects)

The BPA title Upper Salmon Anadromous Fish Passage (NPPC Title: Idaho Fish Screening Improvement) started in 1993 to construct and equip a fish screen shop in Salmon, Idaho. This was a joint project with Mitchell Act funds administered by NMFS. This was originally set-up as a 5 year, 5 phase program. It has been modified several times by BPA because of various funding levels and contract period changes. In 1994, $749,716 budget assisted with purchase of equipment and started assisting the Mitchell Act fish screen objectives. No additional grant awards were made until FY97. This award was $701,000 of the $1,000,000 requested. The FY98 request of $1,000,000 was awarded at $800,000 for contract calendar year of 1998. In FY99, the grant award was $1,000,000.

FY	BPA Contract Award	Amount Awarded	Purpose
1993	DE-FG79-92BP84362	341,978	Shop & Equipment
1993	DE-FG79-92BP84362	110,252	Shop & Equipment
1994	94FG14031	749,716	Equip & Screen Proj
1997	94FG14031	701,000	Screen Projects
1998	94FG14031	800,000	Screen Projects
1999	94FG14031	1,000,000	Screen Projects

Project results are published monthly through 1994, quarterly and annually from 1995 through present. Additional reports include CBFWA – Fish Screen Oversight's tri-state report and NMFS Report to Congress.

Major Results:

The program has an 8,000 square foot shop with specific use tools and construction equipment. Engineering support is also provided to survey, design and administer public construction contracts. All project efforts are directed toward the objectives described above. Idaho has designed, engineered and built two drum screen configurations occupying a smaller space than the NMFS criteria calls for. These designs have been adopted by other screen builders and considered better for fish. The program has been installing and evaluating several types of infiltration collectors which show great promise for an inexpensive, visually unnoticed, way to keep fish safe.

BPA/MA funds reconstructed 175 of 250 screens to NMFS criteria. Thirteen (13) surface irrigation canals have been eliminated by conversions to wells or by being taken out of use. Thirty-two (32) canals have been consolidated into 15 canals. Forty (40) pump intakes have been screened. Six (6) infiltration systems have been installed to eliminate need for a diversion dam, headgate and fish screen. Sixteen (16) fences have been built around fish screens to exclude people and animals. Twenty-nine (29) headgates were improved and seven (7) fish friendly diversions have replaced gravel push-up irrigation diversions dams. Two streams (Agency and Morgan) are in the process of being reconnected to the salmon corridor. Several screens were monitored by catching all fish diverted from the irrigation canal back to the river via the by-pass pipe.

Catches of these fish varied by season and by species. Six fish screens on the Lemhi River by-passed 841 fish in 150 days of the 1997 irrigating season. Two screens passed 632 (98%) steelhead during the irrigation season on the Pahsimeroi River.

e. Proposal objectives

1. Complete surveys, designs, construction and installations of all unscreened, antiquated gravity and pump intakes in Idaho's anadromous fish corridors.
2. Reduce the number of gravel push-up diversion dams by consolidation and elimination of irrigation ditches.
3. Maximize any rearing habitat in appropriate irrigation canals.
4. Reconnect streams to anadromous fish corridors.
5. Install and evaluate alternative fish screens.
6. Make accessible fish screens safer to humans and domestic pets.

Objective 1 goal is to accomplish 30 to 50 screen projects annually until each irrigation diversion is screened to prevent fish loss. IDFG has pre-topographic surveys on all potential screen building sites on the main anadromous fish corridors. As Objective 4 continues (two reconnects are in progress and two others have been identified), and additional pre-topographic surveys of water withdrawals will be required in these reconnected tributaries. The analysis of fish saved by a selected group of screens and the search for the less expensive screening alternatives (Objective 5) in irrigation canals is on-going pending sufficient funds. This allows the program to seek the best location of the fish screen to maximize any rearing area available in the canals, Objective 3. Reducing the number of gravel push-up diversion dams, Objective 2, is accomplished by consolidation and elimination of ditches and installation of fish friendly diversion dams. The Department of Fish and Game also has made seven old diversions fish friendly, and continues to look for opportunties to improve diversions blocking spawning migrations and diverting entire smolt out-migrations through screen by-pass pipes. These usually consist of step-up pools of native materials, i.e., rock or logs. They are designed to allow upstream and downstream fish passage and allow the sediment bed load the opportunity to move through the pools. All new screens viewed as a threat to animals and humans are being fenced as needed (Objective 6).

f. Methods

The following describes the course of action for screening an irrigation canal, consolidation of ditches, replacing a diversion that blocks migration of fish and improving the conveyance flows of some inefficient ditches. Replacing or installing screens on pump intakes requires an agreement (IDFG file) with each irrigator. Headgate replacements also require a signed agreement (IDFG file) and a cost share by the irrigators.

Course of Action for Screening on Private and Public Property:

1. Annual selection of 40-50 sites(pending funding level) by a technical work group of agencies and interested irrigators. This is usually done in conjunction with Idaho Model Watershed.
2. Educational and informative newsletters to all irrigators and affected agencies in the drainages of the 40-50 sites.
3. Determine land ownership of screen site, point of diversion, access route for construction and for routine maintenance, and bypass route.
4. Secure or verify easement for access to screen sites not on properties being irrigated.
5. Secure flow agreements and secure or verify access easements with water users.
6. Secure headgate agreement from water users.
7. Visit site with IDFG biologist, IDWR representative, landowner(s) and irrigator(s) prior to site survey to discuss current operations, problems, and study fisheries issues.
8. Complete topographic surveys of sites including preliminary screen sizing and site location(s).
9. Estimate ditch flow volume from survey and other available flow measurements.
10. Secure permits, water right transfers for point of diversion relocations. (404, highway right-of-way, SUP., NEPA, EA's, etc.)
11. Design site installation cooperating with NRCS on headgate designs.
12. Review installation design with: landowners, irrigators, Model Watershed, permitting agencies, ShoBan Tribe, IDFG fisheries, and NMFS.
13. Package contract and bid.
14. Award contract.
15. Shop materials and equipment submitted for bids.
16. Provide construction access.
17. Contractor construction and IDFG inspection.
18. Prepare site punch list with landowner, contractor and IDFG crew.
19. Contract closeout.
20. Prepare as-built drawings and show actual by-pass pipe locations.
21. Fabricate screen and associated metal work in shop.
22. Idaho Fish and Game installation/construction; screen and metal installation, ditch and diversion modifications.
23. Headgate fabrication, irrigator's installation, site restoration, demolition and/or restoration of old screens, etc.
24. Final product inspection and preparations for use.
25. Idaho Fish and Game operates and maintains screens as funds allow. Irrigators operate and maintain headgates, diversions and conveyance systems.

Footnote: Many modifications to this general procedure outline can and do occur. Improperly functioning facilities require corrective action. Special fish habitat, and

alternative screens usually require a special course of action. Other department activities consume 10% of employee time.

The rate of progress often depends on IDFG's success at getting signed flow agreements, easement for access, weather during spring and fall construction, securing permits, and consistent funding. Each screen project has a lengthy pre-construction process.

g. Facilities and equipment

BPA and NMFS funded a new 8,000 square foot shop in Salmon, Idaho in 1993 to fabricate fish screens and related appurtenances. The shop was equipped with tools through generous funding by BPA and NMFS. Specific use tools and equipment include cold cut saw, band saw, plasma cutter, ironworker, sheet metal shear, power plate roller, profile roller, paint booth, abrasive blast machine, overhead crane, and MIG/TIG welders.

The Idaho Screen Program also has some various construction equipment used to install screens, headgates, fish passage ways, and support for riparian habitat improvements. This fleet consists of four dump trucks, dozer, ¾ yard track excavator, front end loader, rubber tired backhoe, grader, rough terrain forklift, boom truck, and two utility service trucks. This equipment is used for small projects that would be too costly to bid out to private contractors and for routine maintenance of facilities.

IDF&G relies heavily on the private sector to construct medium and large scale projects. Most concrete construction is performed by outside contractors. Some specialized equipment is used so infrequently that it is not practical to own by the program. Items of this nature would include concrete cutting machines and lowboy tractor-trailer transports. Most concrete cutting needs are satisfied by hiring firms from the private sector. Heavy equipment such as the road grader is transported by commercial carrier. There are many contractors in the area that can provide equipment and manpower for any large project requiring heavy equipment, heavy hauling, concrete pumping, blasting, and material screening.

The screen program also has engineering support equipment such as a total station survey system and data downloading interface to computers. This equipment allows our engineering staff to survey, design, and perform construction contracting of all projects relating to the screen program. The two federal grants also assist with preliminary fisheries data collection and fish screen evaluations. An electrofishing unit, nets and associated gear are available to our crew.

h. Budget

The budget is predominately capital outlay for "on-the-ground" projects. A small amount of personnel is primarily for temporary technicians to assist with fisheries field work and locating and installing screens on pump intakes. The indirect charge is on personnel and operations expenditures only. Idaho's Fish Screen Program has the staff

and infrastructure in place and thus can direct the BPA grant to specific fish saving and enhancement action.

In FY98, Idaho irrigators contributed $150,000 cash as a cost share to complete several projects. In-kind services were performed on a number of projects. The program requires 25% cost share on headgates, some diversion dams, and various other projects.

Mitchell Act funds administered by NOAA provide personnel and operation and maintenance for the program.

Section 9. Key personnel

Patrick Marcuson, Screen Program Coordinator, Salmon, ID 83467

Summary:

My professional career features a diversity of fisheries science, management, rehabilitation and enhancement and supervisory activity. Besides working with salmon, trout, groundfish, shellfish and warm water fisheries, my experience includes considerable involvement with outdoor recreation, land allocation, planning and environmental protection. I have hired, trained and supervised over 125 technicians, currently supervise up to 30 employees, published a book and worked closely with a diverse array of landusers, agencies and public groups. I worked as a biologist for a board of commercial salmon fishermen in Alaska, for the National Marine Fisheries Service as an observer of the groundfishing fleet, as a biologist and manager for the State of Montana, a fisheries research biologist and program coordinator of the Anadromous Fish Screen Program for the State of Idaho. I owned and operated CRYSTAL OBSERVERS, INC., a certified shellfish and groundfish observer contractor. I have over 155 technical reports mostly DJ, 5 popular magazine articles and one book.

Education:

University of Idaho	BS	Zoology – Letters & Science	1964
University of Idaho	MS	Fisheries Management	1966

Professional Accomplishments:

Guided construction of 98 fish screens in irrigation canals.
Initiated and operated successful private business.
Administered employee payrolls, accounting, related duties.
Designed and constructed five (5) fish ladders.
Built two flow-control structures to assist salmon migrations.
Guided construction of a salmon spawning channel.
Simplified passage of salmon through beaver dams.
Planned and constructed numerous remote fish egg incubators.
Established and set up cabins and biological field camps.

Analyzed and monitored several stream channel modifications.
Taught operational techniques for numerous fish weirs I built.
Supervised numerous fish population estimates.
Organized and performed numerous salmon and trout egg takes.
Initiated fish health surveys for two agencies.
Coordinated two lake enrichment programs.
Developed inventory of streams in two large geographic areas.
Pioneered largest alpine lake investigation in USA.
Drafted annual project budgets.
Attended conferences and made numerous oral presentations.
Testified in court on reservations of instream flows.
Trained and supervised 125 technicians, biologists and observers.
Ordered equipment and supplies.
Drafted over 155 scientific reports.
Managed regional fisheries regs, public input and implementation.
Resolved several land/water allocation issues.
Promoted land conservation practices with demonstration projects.
Perfected lake stocking in my fish management region.
Monitored and resolved an agricultural stream sediment problem.
Inventoried and studied all golden trout populations in Montana.
Supervised three graduate level research projects.
Negotiated removal of 17 irrigation diversion dams through ditch consolidations.
Coordinated elimination of 5 irrigation diversions through conversion to ground water.

Time Spent on Project:

I spend 100 percent of my time working on fish screening work and ancillary tasks.

Professional Societies:

AFS “Certified”

Matthew Hightree, P.E. Regional Engineer, Salmon, ID 83467

Education:

BSME , University of Idaho, 1978

Professional Engineering Registration:

Idaho, 1983, No.4841, expires 9/30/99

Employment:

CH2M HILL: Boise, Idaho, 1978 to 1988 and Bellevue, Washington, 1988 to 1994; Idaho Department of Fish and Game, Salmon, Idaho, 1994 to present.

Current Responsibilities (Duties on F&G Project):

Oversee preparation of contracts for public bidding; administer public contracts after award, including: manage resident observation, stakeout construction sites, prepare pay estimates and change orders and final paperwork for each contract; retain professional surveyors to prepare topographic site plans; conduct small site topographic surveys; design screen sites; identify and procure tools needed for these duties. Primary tools include AutoCAD and Softdesk software; Sokkia Set 4B total station instrument with Sokkia SDR33 data logger; plus miscellaneous surveying, concrete testing, and computer products.

Time Spent on Project:

Matt is a full time employee, and spends 100 percent of his time working on fish screening work, or ancillary tasks such as headgate and consolidation ditch designs.

Expertise and Experience:

Matt has extensive experience in construction contract preparation and administration, highlighted specifically below. For the project proposed herein, Matt will apply that experience in preparing contract documents for fish screen construction, and administering those contracts from bid opening to final completion.

Studies: Prepared engineering studies to evaluate feasibility of various engineering alternatives for building space heating, district heating pipeline routes, and biomedical incinerators (1 year experience).
Predesigns: Prepared engineering predesigns and value engineering assessments for cryogenic oxygen facilities, chlorination facilities, and district heating systems (1 year experience).
Final Designs: Participated in all aspects of final designs for district heating systems, and for single and multiple-building facilities for municipal and industrial wastewater treatment. Involvement ranged from production of drawings and specifications to overall design project management. Also participated in all facets of design for Idaho's anadromous fish screening program, including design of 210 cfs screen (6.5 years experience with CH2M HILL and 1.2 years with F&G).
Services During Construction: Participated in all aspects of services during construction for district heating systems, and for single and multiple-building facilities for municipal and industrial wastewater treatment. Involvement ranged from review of shop drawings to overall engineering services project management. Also participated in all facets of construction services for Idaho's anadromous fish screening program (2.5 years experience with CH2M HILL and 2 years with F&G).
Resident Observation: Performed resident observation of construction of municipal wastewater treatment facilities. Also performed inspection for all types of contracts in

Idaho's anadromous fish screening program. Supervise part-time resident inspector for fish screens (1 year experience with CH2M HILL and 0.4 years with F&G).
O&M Manuals: Wrote Operation and Maintenance manuals for a district heating system, a natural gas transmission pipeline, a raw sewage lift station, and a wastewater treatment plant (0.3 years experience).
Start Up and Field Engineering: Performed process data logging, supervised rebalancing of the HVAC in a multiple-story office building, assisted in startup of several wastewater treatment plants, performed topographic surveys of screen and other sites, and performed construction stakeouts for numerous screen sites (0.4 years experience with CH2M HILL and 0.5 years with F&G).

Publications and Presentations:

None expecially relevant to current work.

Professional Societies:

ASME

Section 10. Information/technology transfer

Idaho Fish Screen Program hosted the 6th Annual Fish Screen Workshop in September, 1997. Representatives from 5 states, 5 federal agencies and county governments toured many of the projects. At least 3 tours are provided each year for various agencies, irrigators, contractors and various other groups. The Fish Screen Program has a large van to transport groups to the numerous fish improvement sites. Other agencies, citizen groups and local politicians often use this van and always go to sites built under this program. IDFG is a member of the Fish Oversight Committee and presents technical information. The Fish Screen Program hosted the State Legislative Joint Finance Committee, an IDFG Commission meeting and an appreciation barbecue for landowners/irrigator clients. A quarterly list of accomplishments are mailed to anyone wishing a copy. The program provides technical assistance almost daily and to individuals and agencies in various USA states and other countries. Three employees of the fish screen program were presented with the governors award for innovative ways to build better and more economical fish screens.

Congratulations!