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## PART I - ADMINISTRATIVE

### Section 1. General administrative information

Title of project

Improve Water Quality Monitoring Program

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BPA project number: 20154

Contract renewal date (mm/yyyy):  Multiple actions?

Business name of agency, institution or organization requesting funding

Roza-Sunnyside Board of Joint Control

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Business acronym (if appropriate) RSBOJC

Proposal contact person or principal investigator:

Name	<u>James W. Trull</u>
Mailing Address	<u>P.O. Box 239</u>
City, ST Zip	<u>Sunnyside, WA 98944</u>
Phone	<u>(509) 837-6980</u>
Fax	<u>(509)837-2088</u>
Email address	

NPPC Program Measure Number(s) which this project addresses

7.6B.1,7.6B.2,7.6B3,7.6D

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FWS/NMFS Biological Opinion Number(s) which this project addresses

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Other planning document references

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Short description

Enhance the water quality monitoring program that is being conducted by RSBOJC. By increasing the sampling locations, frequency of sampling, and analytical work, the effectiveness of the water quality improvement programs can be monitored better.

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Target species

Chinook, Coho, Sockeye, Steelhead, Bull Trout, Cutthroat, Brown Trout, Brook Trout

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### Section 2. Sorting and evaluation

Subbasin

Lower Yakima River

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***Evaluation Process Sort***

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

### Section 3. Relationships to other Bonneville projects

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

Project #	Project title/description
20526	Multi-Year Plan Yakima Anadromous Fish Plan

***Other dependent or critically-related projects***

Project #	Project title/description	Nature of relationship

### Section 4. Objectives, tasks and schedules

***Past accomplishments***

Year	Accomplishment	Met biological objectives?

***Objectives and tasks***

Obj 1,2,3	Objective	Task a,b,c	Task
1	Expand Sampling and Data Analysis Capabilities to include Spring Creek Wasteway and drainage area and Snipes Creek Wasteway and drainage area	a	Hire technicians and expand water quality lab
2	Analyze Water Samples	a	Increase RSBOJC field analysis capabilities
		b	Enter into agreements with qualified laboratories
3	Compile Results and Publish	a	Show water quality results and benefits from projects done by our districts and other agencies

### Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	10/1999	10/2000			76.00%
2	11/1999	10/2000			19.00%
3	1/2000	12/2000			5.00%
				<b>Total</b>	100.00%

#### Schedule constraints

Enhanced water sampling and analysis program needs to be in place to monitor effectiveness of improvements that RSBOJC proposes to implement.

#### Completion date

2004

## Section 5. Budget

FY99 project budget (BPA obligated):

### FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	RSBOJC Staff	%31	50,000
Fringe benefits		%16	25,000
Supplies, materials, non- expendable property	Includes 13 ramp flumes	%17	28,000
Operations & maintenance		%0	
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Expanding the water quality lab	%31	50,000
NEPA costs		%0	
Construction-related support		%0	
PIT tags	# of tags:	%0	
Travel	Vehicle mileage	%1	2,000
Indirect costs	Office overhead	%1	1,000
Subcontractor	Analytical Laboratory	%3	5,000
Other		%0	
<b>TOTAL BPA FY2000 BUDGET REQUEST</b>			<b>\$161,000</b>

### Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount (\$)
		%0	
		%0	
		%0	
		%0	

<b>Total project cost (including BPA portion)</b>	\$161,000
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**Outyear costs**

	<b>FY2001</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>
<b>Total budget</b>	\$75,000	\$78,750	\$82,688	\$86,822

**Section 6. References**

<b>Watershed?</b>	<b>Reference</b>
<input checked="" type="checkbox"/>	Joy, J. and Patterson, B. 1997 A suspended sediment and DDT total maximum daily load evaluation report for the Yakima River: Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Watershed Assessment Section,
<input checked="" type="checkbox"/>	Rinella, J.F., McKenzie, S.W., Fuhrer, G.J., 1992, Surface-water-quality assessment of the Yakima River Basin, Washington, analysis of available water-quality data
<input checked="" type="checkbox"/>	CH2M HILL, 1975. Agricultural Return Flow Management in the State of Washington. Prepared for Washington State Department of Ecology.
<input checked="" type="checkbox"/>	Department of Ecology, 1990. Statewide Water Quality Assessment 350 (B) Report, State of Washington.
<input checked="" type="checkbox"/>	USGS, 1976. Sediment Transport by Irrigation Return Flows in the Lower Yakima River Basin, Washington. Open File Report 78-946.
<input checked="" type="checkbox"/>	Ecology, 1986, Priority waterbody assessment of the lower Yakima River, Washington State Department of Ecology, Olympia, Washington.
<input checked="" type="checkbox"/>	Ecology, 1996, Impaired and threatened waterbodies requiring additional pollution controls, Proposed 1996 Section 303(d) list: Washington State Department of Ecology, Water Quality Report, ECY #WQ-R-95-83, Olympia, Washington, 25 p.
<input type="checkbox"/>	

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**PART II - NARRATIVE**

**Section 7. Abstract**

The RSBOJC currently operates a water quality-monitoring program of limited scope. RSBOJC needs to expand the monitoring program to include Spring Creek Wasteway and its drainage area and Snipes Creek Wasteway and its drainage area. With the implementation of the proposed water conservation and water quality enhancement projects, it will be valuable to expand the sampling and analysis program. In order to accomplish the level of monitoring that will be needed to measure the success of the projects, more staff and increased analytical services will be needed. It is proposed that two full time technicians be hired to collect samples and manage the analytical results. The RSBOJC proposes to continue to contract with qualified laboratories for analytical services. Equipment will be purchased to expand our existing lab and to allow time and environment sensitive parameters to be measured at the time of sample collection.

Water-quality constituents monitored as part of this plan include total suspended solids, turbidity, fecal-coliform bacteria, total phosphorus, nitrite-plus-nitrate, and total Kjeldahl nitrogen, and in-field measurement of pH, dissolved oxygen, specific conductance, stream temperature, and stream flow (discharge).

The water quality-monitoring program would be expanded immediately. After the program is fully operational, the RSBOJC may be able to govern the costs through increased assessments. The success of the program will be vital to the other conservation and water quality improvements proposed.

## **Section 8. Project description**

### **a. Technical and/or scientific background**

The lower Yakima River basin has been identified as one of the most intensively irrigated and agriculturally diverse regions in the United States. More than 325,000 acres of cropland is being irrigated in the Yakima Valley and a vast network of drains exist to convey excess water, in the form of irrigation- and agricultural-return flows, to the Yakima River. These return flows can account for as much as 80 percent of the lower Yakima River main-stem flow during the irrigation season. Return flows are seriously polluted and, as a result, the lower Yakima River exceeds permissible state standards for DDT, Ammonia and other nutrients, temperature and turbidity. Because of these conditions, the Yakima River has been listed as impaired under the Federal Clean Water Act. Once abundant salmon and steelhead populations have dwindled to precariously low levels and other beneficial uses of the Yakima River water are in jeopardy. Consequently, the quality of the water in the lower Yakima River is highly dependent upon the quality of these agricultural-return flows (Joy and Patterson, 1997).

Several tributary segments in the lower Yakima River basin are not meeting state water-quality standards according to the Wash State Department of Ecology (Ecology). As a result, these segments have been identified in the most recently submitted 303(d) list (Ecology, 1996). Wastes from some agricultural practices, irrigation-return drains, municipal and industrial treatment plant effluents, run-off from poorly managed forest and range practices, and urban runoff have been identified as pollutant sources, according to Ecology's Suspended Sediment and DDT Total Maximum Daily Load Evaluation Report for the Yakima River (Joy and Patterson, 1997). Intensive agriculture (return flows and grazing) has caused widespread habitat degradation. Resource problems include low flow at diversions, water quality degradation and pesticide. Low flows, high temperatures and sedimentation reduce fall chinook spawning success.

The movement of suspended sediment in streams is an important factor in the transport and fate of chemicals in the environment. Many water-quality constituents including trace metals, organic compounds, indicator bacteria, and nutrients are associated with suspended sediment. Large suspended-sediment concentrations and associated contaminants can potentially affect water used for domestic-water supplies, aquatic-life propagation, and recreation (Rinella *et al.*, 1992). Sediment, predators and lack of side-channel refuges limit juvenile rearing and over-wintering survival. Sediment also limits egg-to-fry emergence survival for all species of salmonids in virtually all reaches of the Yakima Basin.

Water quality studies performed in the mid-1970's through the mid-1990's by Ecology, the U.S. Geological Survey, Washington State University, Conservation Districts, the United States Bureau of Reclamation (USBR), and others focused on irrigated agricultural areas in the lower Yakima River basin. Results from these studies indicated that suspended-sediment concentrations and turbidity in agricultural-return drains, and in the lower Yakima River, were directly affected by irrigation practices (Joy and Patterson, 1997). In fact, irrigation return flow has been identified as the single most significant source of pollutants to the lower Yakima River (Ecology, 1986).

The water quality of the Yakima River has been evaluated by many agencies; however, there is no continuing program to monitor individual waterways that carry water to the Yakima River. The expansion of the RSBOJC water quality monitoring program will provide valuable data consistently and continuing into the future. This information will be used to measure the effectiveness of improvements made within the irrigation and drainage systems.

### **b. Rationale and significance to Regional Programs**

The expanded water quality-monitoring program specifically addresses Section 7.6 of the Fish and Wildlife program by:

Providing valuable water-quality data in a response to restoring our watershed.

Providing water quality data to other agencies in a coordinated cooperative effort to protect and improve salmon and steelhead habitat in the basin.

Providing water-quality data for educational training and materials.

**c. Relationships to other projects**

The RSBOJC established a water quality program in 1997. The water quality program was established to provide base line data and monitoring information to help the RSBOJC develop policies and program aimed at improving water-quality conditions in its area of jurisdiction. The RSBOJC has a long-term objective of determining how management activities by the irrigation districts and land- and water-use practices by landowners affect water-quality conditions in agricultural return flows, which, in turn, impact the quality of water returning to the lower Yakima River and the anadromous fish population and habitat. In addition, the RSBOJC has a goal of bringing these returns flows into compliance with current state water-quality standards and recent total maximum daily load (TMDL) goals set by Ecology (Joy and Patterson, 1997).

The rationale behind the water quality-monitoring program is very conventional. It will be more effective for the RSBOJC to expand and continue to operate the program than reliance upon other outside agencies. The RSBOJC has a vital financial and regulatory interest in water quality issues as they impact the water users. For those reasons, the RSBOJC is the logical agency to manage the water quality-monitoring program.

RSBOJC's expanded water-quality program directly relates to all water quality efforts in the lower Yakima Valley. The data collected by RSBOJC will be used as a baseline and will be compared to the data collected after a water quality project is complete. Without the before and after data, agencies would not have scientific proof of the success or failure of their projects based on water quality.

**d. Project history (for ongoing projects)**

N/A

**e. Proposal objectives**

OBJECTIVE 1: It is the objective of the water quality program to expand monitoring to include the quality of water returning to the Yakima River from the Spring Creek drainage area and the Snipes Creek drainage area. The RSBOJC plans to hire two technicians and expand the existing water quality lab. Background data must be collected in order to establish a base line water quality data. Once the background is in place the Districts will be able to see scientific evidence that water quality has improved as a result of our projects. Not only will R.I.D. and S.V.I.D. benefit from the expanded water quality program, but also other agencies will benefit from the same information, such as the conservation districts.

OBJECTIVE 2: RSBOJC will increase field analysis capabilities to analyze water samples. Samples will be sent to an independent lab to test for nutrients.

OBJECTIVE 3: Results will be compiled and published in the RSBOJC landowner newsletter. We will be able to show water-quality successes based on data collected.

**f. Methods**

Implementation of the enhanced water quality monitoring program will require hiring two-trained technicians, expanding the current water-quality lab, collecting more samples, and arranging for more analytical work to be done.

Sample sites will be selected to represent the water-quality conditions of specific sub-basin tributaries (sub-drains, also referred to as Joint Drains) to the expanded monitoring area, with additional sites representative of conditions in the mainstream flow prior to its confluence with the Yakima River.

The methods by which the data will be analyzed will be done by data quality objectives (DQOs). DQOs are the qualitative and quantitative statements necessary for the environmental data to serve the objectives of the intended project. These include measures of precision and bias, and statements of the representativeness, completeness, and comparability of the data.

The proposed project by the RSBOJC is designed to answer the following questions:

1. What are the current (1999-2000 non-irrigation season and 2000-irrigation season) concentrations, levels, and loads of constituents of interest at flow points in our expanded area? Constituents of interest where listed above.
2. What is the hourly variability between samples collected every two weeks during the irrigation season for constituents that can be monitored continuously?
3. What portion of the constituent loads from the expanded monitoring area is associated with urban versus agricultural activities?

At the beginning of the work, it may be necessary to obtain the advice from a qualified water quality authority to make recommendations regarding expansion of the program. This will ensure that samples and parameters will be accurate indicators of improvements in the waterway and Yakima River systems.

**g. Facilities and equipment**

The expansion work needed to improve the water quality-monitoring program is similar to the type of work regularly performed by the RSBOJC staff. The current lab will need to be expanded with limited amount of standard test equipment and consumable supplies will be needed as the program is expanded. This equipment will be used to measure time and environmentally sensitive parameters as the samples are collected.

**h. Budget**

The budget is broken down into five parts. The cost of hiring two full-time technicians is \$50,000. The fringe benefits for the technicians will total \$25,000. Expanding the water-quality lab will cost \$50,000. The purchase of various supplies and 13 ramp flumes will cost 28,000. Vehicle mileage will cost \$2,000. Office overhead will total \$1,000 and cost of the analytical laboratory is \$5,000. The total cost will be \$161,000.

## **Section 9. Key personnel**

Primary responsibility for this project will lie with the RSBOJC. It is proposed that two additional technicians be hired as a part of this project. The technician positions are expected to be permanent. Roza-Sunnyside Board of Joint Control personnel will work in conjunction with the USBR Yakima Area Field Office and Pacific Northwest Regional Laboratory personnel for support related to the acquisition of hydrological data, storage of continuous monitoring data through the Hydromet system, and nutrient analyses. The following list includes contacts for those individuals and organizations involved directly, and indirectly, in the implementation of this project:

Bill Rice	Project Leader	RSBOJC
Ann Jennings	Project Member	RSBOJC

Technician to be hired	Project Member	RSBOJC
Technician to be hired	Project Member	RSBOJC
Bill Stroud	Lead Chemist	USBR PN Regional Lab
Steve Fanciullo	Operations Hydrologist	USBR Yakima Field Office
Stu Mckenzie	Technical Advisor	USGS-retired

## **Section 10. Information/technology transfer**

The project is expected to serve as a demonstration of the benefits that can be achieved by monitoring the quality of water that returns to irrigation and drainage waterways by using improved irrigation techniques. This expanded monitoring program could be applied to many other irrigation/drainage projects and by projects done by other agencies. Results can be published and sent to other agencies.

**Congratulations!**