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# Appendix A:
# Copies of Sampling Plans

# Nonpoint Source Program:

# DNA Fingerprinting of Coliform Bacteria

**Presented to**

**Idaho State Department of Environmental Quality**

**Presented by**

**Lower Boise River Water Quality Plan**

March 1998

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# Project Description Summary Information

## 1) Summary

In the past, determining the source of bacterial contamination in the lower Boise River watershed was a point of conflict among area residents. Until now, sampling only revealed the presence of fecal coliform, but offered no clue about the source, which led to finger-pointing and blame. As the Lower Boise River Water Quality Plan (LBRWQP) approaches total maximum daily load (TMDL) implementation in FY99, it becomes important for us to be able to rapidly characterize bacteria sources to prioritize implementation actions and restoration activities.

The purpose of this project is to use a new and emerging DNA fingerprinting technology to conclusively assign responsibility for nonpoint sources of fecal coliform in the lower Boise River, and develop a database that can eventually be used in other affected watersheds. This new tool is offered by the University of Washington (UW). The project has three primary objectives:

1. Use the DNA tool to identify nonpoint sources and prioritize restoration actions in response to the bacteria TMDL for Lower Boise River.

2. Adapt emerging technology for rapid source characterization for use in other watersheds in Idaho.

3. Develop a database of fecal DNA for Idaho.

## 2) Background

Almost one-third of Idaho's citizens live in the lower Boise River watershed (see Figure 1). In 1992, stakeholders, agency representatives, and interest groups organized to form the LBRWQP. Together, they share a commitment to develop and implement a phased TMDL for the lower Boise River. LBRWQP's key goals include creating partnerships, identifying problems, establishing priorities, implementing solutions, and measuring progress. Bacteria levels in the main stem of the Boise River and several tributaries currently exceed the Idaho Primary and Secondary Contact Bacteria Standard. A bacteria TMDL is therefore required for the lower Boise River and will be submitted to EPA in December 1998.

Land uses in the watershed include urban, industrial, irrigation, agricultural, and rangeland activities that influence the watershed as it drains to the Boise River between Lucky Peak Reservoir and the Snake River. The 1,290-square-mile watershed includes 350,000 acres of irrigated farmland. An arid climate (approximately 10 inches of annual rainfall) makes irrigation a requirement on the majority of the farmland. The large amount of irrigation required, coupled with reuse of pasture water on irrigated fields, results in the contribution

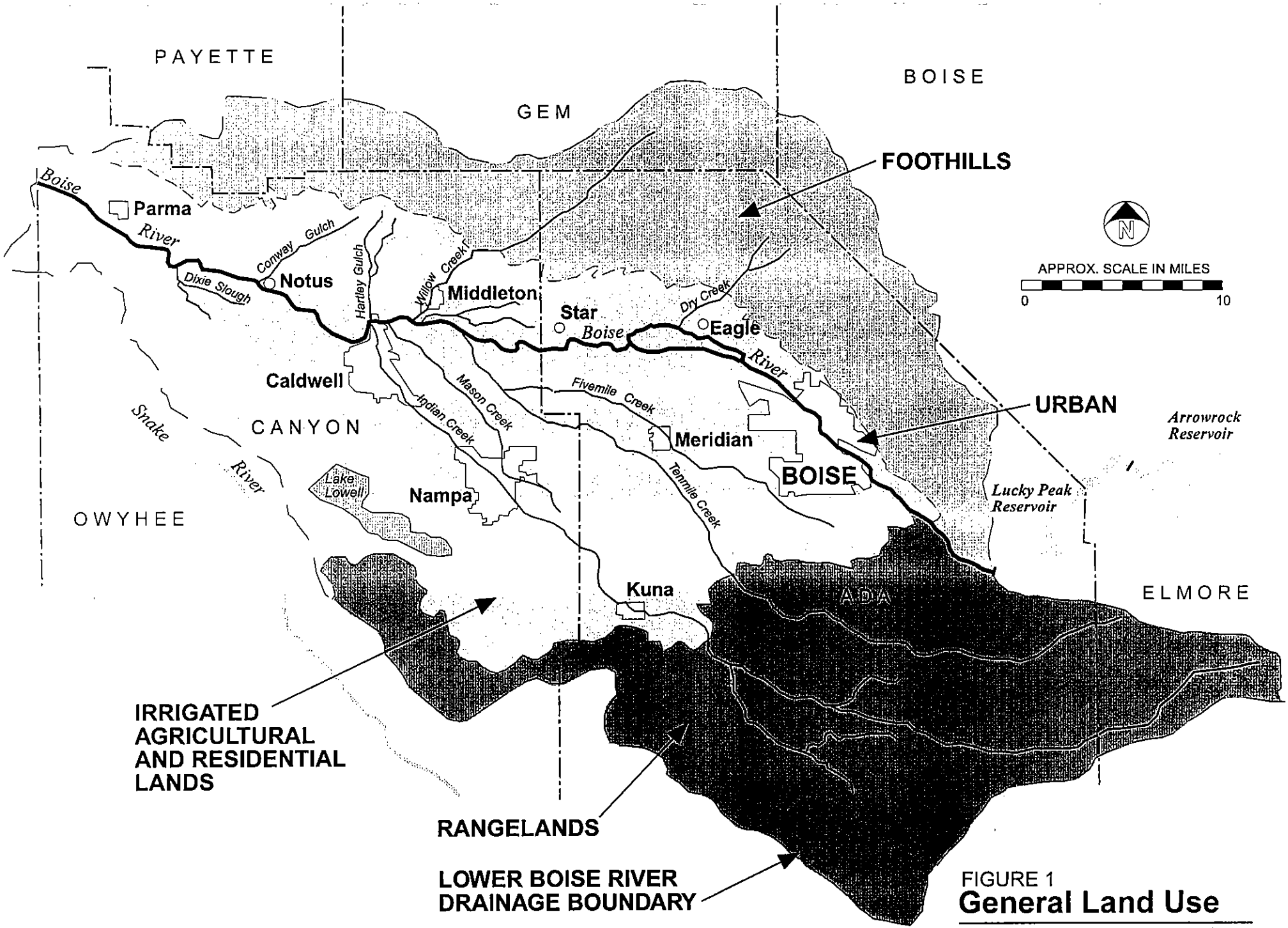


FIGURE 1
**General Land Use**
LOWER BOISE RIVER WATER QUALITY PLAN

of nonpoint fecal coliform bacteria to the river. Much of this bacterial contribution has been linked to specific agricultural drains.

In the implementation plan development phase of the TMDL process, LBRWQP will focus restoration efforts on the portions of the watershed with historically high bacterial contributions. For example, municipal outfalls are well-characterized, and bacteria point sources from Lucky Peak to Star are not in dispute. Rather, we plan to identify nonpoint sources in the reaches from Star to Notus and Notus to Parma for TMDL implementation. Within these two reaches, approximately 16 agricultural drains and tributaries collect runoff from pastures, irrigated fields, rural areas with septic systems, and areas with high populations of waterfowl. To rapidly characterize the major sources of bacteria and thereby prioritize the restoration activities in our implementation plan, we propose to use the DNA tool to accurately link on-the-ground sources to water quality conditions.

## 3) Beneficial Uses

Within the watershed, beneficial uses for the lower Boise River include cold and warm water biota, primary and secondary contact recreation, domestic and agricultural water supply, and salmonid spawning. The 1994 and 1996 303(d) lists indicate that the cold water biota and primary and secondary contact recreation uses are not supported in the stream segments from Star to Notus (PNRS ID 727), and Notus to Snake River (PNRS ID 726). Both segments are ranked as high priority water-quality-limited segments.

## 4) Pollutants

The Idaho Division of Environmental Quality (DEQ) lists the lower Boise River segments from Star to the Snake River as a *high-priority water-quality-limited segment* for sediment, nutrients, temperature, dissolved oxygen (DO), and pathogens. Monitoring indicates that pollutant sources include both point and non-point sources.

This project would address bacteria, specifically fecal coliform, which is an indicator of the pathogen bacteria. Bacteria affects the beneficial uses of primary and secondary contact recreation. These uses are impaired in the Star to Notus and Notus to Parma segments of the river.

## 5) Treatment

The area impacted by this project is the lower half of the lower Boise River watershed from Star to Parma, a distance of 30.2 river miles and an area of approximately 1,170 square miles (748,800 acres). This area is shown on Figure 2.

The application of this source characterization technology also has applicability statewide. The lessons learned and implemented for the implementation plan development using this new technology will have direct application for other watersheds in Idaho requiring bacteria TMDLs.

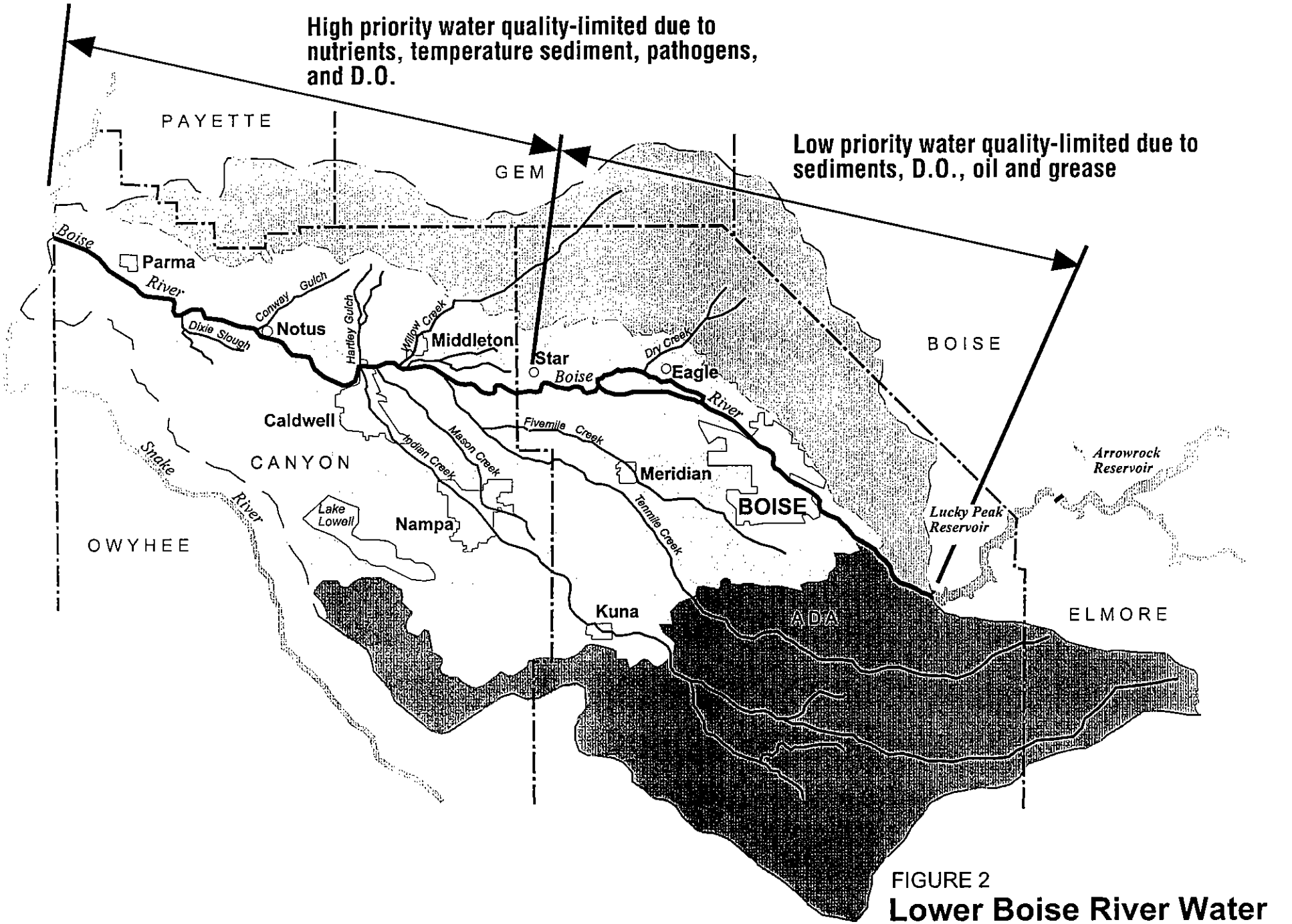


FIGURE 2

## Lower Boise River Water Quality-Limited Segments

LOWER BOISE RIVER WATER QUALITY PLAN

## Project Description Proposed Implementation of Project

## 1) Project Goals

The goal of the project is as follows:

**This project will provide an on-the-ground, immediate tool for linking instream bacteria concentrations to nonpoint sources through DNA fingerprinting technology of fecal coliform; this information will be used to prioritize restoration activities and the implementation plan development for the bacteria TMDL in the Lower Boise River watershed.**

This goal is easily measured through increased compliance with nonpoint TMDLs. In the initial stages of TMDL implementation, it is anticipated that fecal coliform levels from agricultural drains and tributaries will still be high, based on historical data. By determining the source of the contamination, such as human, cow, sheep, goose, or duck, specific action plans can be implemented to reduce the bacterial load to the river. Therefore, time and money will be effectively spent on the correct mitigation measures.

## 2) Project Schedule

| | |
|---|---|
| January to April 1999 | Allow TMDL submittal approvals to take place. Develop fecal coliform database and pilot test the technology. |
| April to Mid-June 1999 | Conduct DNA fingerprinting on two tributaries that are high contributors of fecal coliform, as well as two sites in the river. |
| Mid-June to the end of September 1999 | Repeat sampling and testing to confirm source characterization and resulting action plan priorities. |

## 3) Other Programs

This project complements two other programs in the watershed: sampling by the Soil Conservation Commission (SCC) and monitoring by DEQ and WAG for TMDL compliance. This tool enables stakeholders in the watershed to quickly and accurately determine the source of fecal coliform bacteria in the river and respond effectively to TMDL requirements for cost-effective implementation plan development. It will also be a factor in assuring that implementation plans will achieve the reduction goals of the TMDL.

## 4) Organizational Information

The Southwest Idaho Basin Advisory Group (BAG) has designated the LBRWQP as the watershed advisory group (WAG). The EPA and DEQ support the LBRWQP's efforts to develop a plan to address lower Boise River water quality concerns. The group includes representatives from conservation groups, agriculture, industry, irrigation districts, flood control districts, and local, county, state, and federal agencies and governments. The LBRWQP effort is a volunteer water quality improvement program that addresses major urban, agricultural, industrial, and environmental stakeholders. The project demonstrates an integrated voluntary approach that can be used in other watersheds. One of the main features of LBRWQP is that it brings stakeholders together for early buy-in to the planning and implementation process. Thus, this planning process promotes the cooperation among point and non-point source groups necessary to meet water quality objectives.

# Required NPS Elements

## 1) Purpose

This project is needed to accurately link bacterial contamination to nonpoint sources in the watershed. The benefits to the watershed from this project include the following:

1. Immediate characterization of sources for TMDL implementation
2. Accurate linkage of cause and effect for bacterial water quality
3. Improved water quality through TMDL compliance

## 2) Environmental Stewardship

This project promotes environmental stewardship by assigning responsibility for nonpoint bacteria contributions. This allows individuals within the watershed to conclusively see the effectiveness of the best management practices (BMPs) or other improvements.

## 3) Plan for Monitoring Results

LBRWQP has developed a water quality database for bacteria and other pollutants of concern through the TMDL development process. Through these sampling and testing efforts, we have determined what segments of the Boise River and tributaries are most appropriate for the DNA testing. The DNA fingerprinting rapidly identifies sources and the responsibility to be assigned for BMPs. Following implementation of BMPs, subsequent testing will verify the effectiveness of the program. The program's effectiveness is based on removing the guesswork of assigning responsibility for TMDL compliance. Solutions can be defined much more quickly and cost-effectively.

## 4) Characteristics

Nonpoint issues are addressed in the categories discussed below.

### *a) Priority*

The lower Boise River contains two segments designated as high priority water quality segments on the 1994 and 1996 303(d) lists. The lower Boise River is the most complex, populated, and rapidly growing watershed in the state. The 1,290-square-mile basin includes 350,000 acres of irrigated agriculture and about one-third of the state's population.

### *b) NPS Theme*

The project addresses the following NPS themes.

**1) Successful Solutions**. Using this new technology solves an old nonpoint source problem: who, in a nonpoint regime, is contributing what bacteria? By identifying whether the fecal coliform comes from a cattle operation or a septic system, solutions can more easily be reached to water quality problems.

**2) Good Science**. DNA fingerprinting is cutting-edge technology. This science is appropriate for nonpoint pollution problems because it identifies sources and paves the way for mutual agreement between individuals and agencies on water quality strategies. (See attached article—*DNA Whodunit*, Steve Warblow, CTIC Partners, 1997.)

**3) Public Awareness**. This tool educates and informs individuals with property along agricultural drainages of the positive contributions they can make to curb deposition of fecal coliform to the river.

**4) Financial Forces and Incentives**. Nonpoint pollution problems on agricultural lands often stem from a lack of funding to change existing practices. By targeting the causes of bacterial contamination, individuals can target their spending to solutions that provide measurable environmental benefits. This allows better spending of limited resources.

**5) Regulatory Programs**. This tool allows local stakeholders to evaluate their compliance with TMDLs. This makes it easier for individuals to comply with the regulations.

### *c) NPS Category*

The primary NPS Category is Agriculture—All.

### *d) NPS Secondary*

The secondary NPS Category is Other—Septic Tanks.

### *e) Functional*

The functional category is Watershed Project—Implementation.

### *f) Pollutant Types*

Known pollutants include nutrients, sediment, and pathogens. This project addresses one pollutant of concern; specifically, fecal coliform bacteria.

### *g) Waterbody Type*

Waterbody types include drains, creeks, streams, and rivers.

### *h) Hydrologic Unit Code*

The hydrologic unit code is 17050114.

## 5) Tasks

The following three tasks are identified for this project:

1. **Project Management:** technical oversight of project, administration, sample site selection, data analysis and database entry, and file management

2. **Sampling for Fecal Coliform:** sample two tributaries and two locations in the Boise River; request sample analysis for DNA

3. **Bacteria Source Identification:** use the sampling results to identify nonpoint sources of fecal coliform to implement TMDLs, report results to stakeholders and agencies

### *Task 1: Project Management*

The manager of this project will direct project activities and assure that budget and schedule requirements are met.

**Output 1:** Project management activities include the following: provide technical oversight of project, supervise data entry and file maintenance, and track budget and expenses. LBRWQP would fund project management, and administrative costs within this task will not exceed 10 percent. Reports will be made to EPA on the progress of the project, and requests for reimbursement will be processed as part of this task.

**Milestone 1:** Project kept on schedule and within budget throughout grant cycle. Delivery of project results to stakeholders and DEQ by October 1999.

## *Task 2: Sampling for Fecal Coliform*

First, a database of fecal DNA must be assembled and the tool will be pilot tested. Then, sampling for fecal coliform will take place in four locations in the watershed twice during the grant year, as described below. The water samples will be sent to a Boise laboratory to grow fecal cultures. These cultures will be submitted to UW for DNA fingerprinting. A senior technician will select sites for sampling, determine the sampling time, and oversee equipment setup and security provisions. A field technician will collect the samples.

**Output 1:** Collect fecal samples from suspect sources in the watershed. Fecal samples include cow, sheep, human, duck, and goose. Submit samples to UW. Sample collection will be conducted by the Soil Conservation Commission (SCC) as an in-kind service. LBRWQP would fund sample analysis.

**Milestone 1:** The fecal analysis will be completed by January 31, 1999. The results will be used to create a database that LBRWQP can use to compare the fecal coliform in the fecal samples to fecal coliform collected in water samples during the rest of the project.

**Output 2:** Pilot-test the technology by collecting one water sample from the Boise River near Parma. SCC will conduct sampling as an in-kind service. LBRWQP would fund sample analysis.

**Milestone 2:** Submit one water sample to UW by February 28, 1999.

**Output 3:** Collect water samples during the high water season from Mason Creek, Indian Creek, the Boise River near Middleton, and the Boise River near Parma. First, submit samples to Boise City lab for bacterial culture growth. Then, submit these cultures to UW. Sample collection will be conducted by the SCC as an in-kind service. Boise City would grow the bacteria cultures and supply sampling equipment as an in-kind service. This grant would fund DNA fingerprinting at UW.

**Milestone 3:** High water season analysis will be conducted between February 14, 1999, and June 14, 1999. Samples will be collected every other day for a 30-day period; a total of 15 sampling events in each location.

**Output 4:** Collect water samples during the irrigation season from Mason Creek, Indian Creek, the Boise River near Middleton, and the Boise River near Parma. First, submit samples to Boise City lab for bacterial culture growth. Then, submit these cultures to UW. Sample collection will be conducted by the SCC as an in-kind service. Boise City would grow the bacteria cultures and supply sampling equipment as an in-kind service. This grant and cash from LBRWQP Stakeholders would fund DNA fingerprinting at UW.

**Milestone 4:** Irrigation season analysis will be conducted between June 15, 1999, and September 15, 1999. Samples will be collected every other day for a 30-day period; a total of 15 sampling events in each location.

### *Task 3: Bacteria Source Identification*

In this task, the results of Task 2 are made available to state agencies and stakeholders.

**Output 1:** Assemble results of sampling and distribute to government agencies and affected individuals. Results will be summarized in a technical memorandum to all affected parties, and will be presented to DEQ. This task would be funded by LBRWQP stakeholders.

**Milestone 1:** Deliver technical memorandum by October 1, 1999. Complete a prioritized implementation plan for constructing BMPs or other measures to decrease bacteria loads to the river. Continued monitoring for the effectiveness of BMPs is funded as part of the TMDL implementation plan and is not part of this grant.

## 6) Contacts

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Environmental Protection Agency
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Boise, ID 93712
208/384-3916

Tom Krumsick
CH2M HILL
700 Clearwater Lane
Boise, ID 83713
208/345-5310

## 7) Budget

The budget developed for this project is based on the tasks described in this grant proposal. The matching contribution from local sponsors is $32,295.29, which represents 41 percent of the total grant cost.

| Task | Output/ Milestone | Activity | Grant | Local | Total |
|---|---|---|---|---|---|
| 1. Project Management | 1/1 | Management | - | $1,326.60 | $1,326.60 |
| | 1/1 | Administration | - | $363.68 | $363.68 |
| | 1/1 | Data Entry; file maintenance | $777.24 | - | $777.24 |
| 2. Sampling for Fecal Coliform | 1/1 | Fecal Sample Collection | - | $600.00 | $600.00 |
| | 1/1 | Fecal Sample Analysis | - | $187.00 | $187.00 |
| | 2/2 | Pilot Test Water Collection | - | $150.00 | $150.00 |
| | 2/2 | Pilot Test Analysis | - | $375.00 | $375.00 |
| | 3/3 and 4/4 | Water Sample Collection | - | $9,000.00 | $9,000.00 |
| | 3/3 and 4/4 | Technical Oversight | - | $1,735.68 | $1,735.68 |
| | 3/3 and 4/4 | Bacteria Culture | - | $10,800.00 | $10,800.00 |
| | 3/3 and 4/4 | DNA Fingerprinting | $45,000.00 | - | $45,000.00 |
| | 3/3 and 4/4 | Shipping | - | $1,110.00 | $1,110.00 |
| | 3/3 and 4/4 | Travel | - | $588.00 | $588.00 |
| | 3/3 and 4/4 | Equipment Rental | - | $473.75 | $473.75 |
| 3. Bacteria Source Identification | 1/1 | Reporting | - | $5,585.58 | $5,585.58 |
| | 1/1 | Stakeholder Involvement | $1,061.28 | - | $1,061.28 |
| **Total** | | | **$46,838.52** | **$32,295.29** | **$79,133.81** |

## 8) Other

For your consideration, we have attached the following:

1. Two technical articles referenced in this grant proposal

2. Letters from lower Boise River stakeholders that support the grant proposal

Thank you for your consideration of these items.

# Technical Article

# DNA whodunit

## Microbiologists use genetic fingerprinting to identify sources of water pollution

**By Steve Werblow**

Imagine fabled detective Sherlock Holmes transported through time, strolling along the shore of a small Pennsylvania lake in 1996, chewing his pipe and puzzling over a case of contaminated water. High fecal coliform levels have forced park officials to close Deep Creek Lake to swimmers. Despite attempts to reduce the contamination—removing pit toilets near the lake, persuading some homeowners to replace failed septic systems, looking at farms—coliform levels remain high.

Where is the contamination coming from? How can the Philadelphia Suburban Water Company and Montgomery County reduce the pollution?

Chances are, Holmes would send his faithful sidekick, Watson, out to pick up a few Philly cheese steaks so the great detective could compare notes over lunch with a new generation of sleuths — biologists who track microbial contamination to its source using genetic fingerprinting.

**Canadian Geese—regulars on Deep Creek Lake.** Photo: Philadelphia Suburban Water Company

### The Usual Suspects

Park managers had bacterial test results in hand that indicated high levels of fecal coliforms — in this case, *Escherichia coli*, a common indicator of fecal contamination. Holmes might well recognize the bacterial tests: using indicator organisms such as fecal coliforms to ascertain water quality goes back to the late 19th Century. The problem is that common bacterial tests indicate only that fecal matter is present, but give no clues to the source of the contamination.

*E. coli* is present in most fecal matter, regardless of the source. In most contamination cases, communities find fecal coliform in their water and round up the usual suspects — often local farmers. "But just because the numbers are higher below a dairy farm doesn't mean that's the source," says Preston Luitweiler, manager of research and environmental affairs for the Philadelphia Suburban Water Company in Bryn Mawr, Penn. "The farmer says, 'it's not us, it's the geese, it's the septic systems, it's the deer.' The homeowner says, 'it's the farmers.' There can be a lot of finger-pointing before anything gets done."

### Microbial Source Tracking (MST)

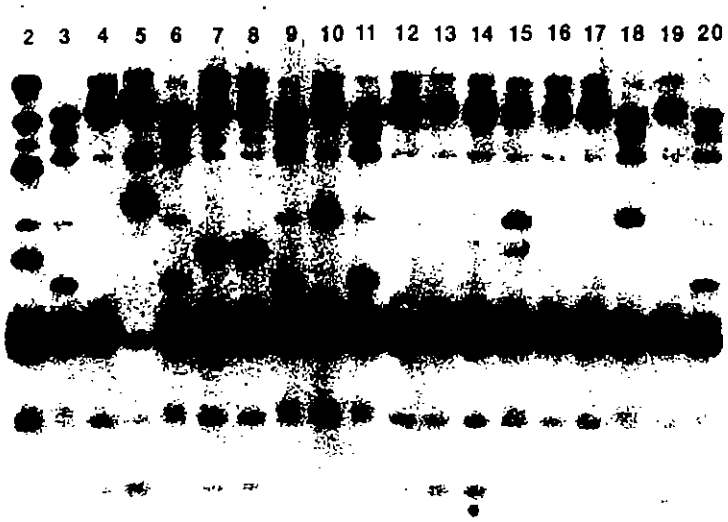
Faced with this coliform conundrum, Luitweiler called in two microbiologists using separate genetic fingerprinting techniques and asked them to find the culprit — a process called Microbial Source Tracking (MST). At the heart of MST is the fact that although *E. coli* is common to animals and birds, different animals host different strains of the bacterium. "Each source is a kind of specialized ecosystem," says Mansour Samadpour, assistant professor of environmental health at the University of Washington School of Public Health and Community Medicine in Seattle and one of the sleuths hired by Luitweiler. "The environment in the intestine of a human is substantially different than the environment inside the intestine of a cow or duck." The trick: figuring out which strains thrive in which host, then matching the strains of *E. coli* in the water to the animals that carry them.

Samadpour and molecular biologists Vito Delveccio and Sharon Rose of the Institute of Microbiology and Medicine at the University of Scranton received *E. coli* samples taken from the lake and from feces found nearby. The two labs tested the samples using separate DNA fingerprinting techniques, zeroing in on different portions of the bacterial chromosomes in search of telltale patterns.

Samadpour used ribotyping — focusing on characteristics in a gene in the *E. coli* that codes for ribosomal

*(Continued, next page)*

**The cost of conducting a Microbial Source Tracking study can range from around $10,000 to hundreds of thousands of dollars, depending on variables such as the size of the water body, the duration of the sampling period, and whether you're studying a fast-moving river or a placid pond.**




**Different-sized strands of DNA are arrayed on a gel plate, forming distinctive "genetic fingerprints." Samples 3, 6, 9 and 11 contain the same strain of *E. coli*; that information helps scientists match coliforms in water samples with the sources of the fecal contamination.**
(Photo: Dr. Mansour Samadpour)

*(Continued from previous page)*
RNA. With restriction enzymes, he broke the genetic material into fragments. Using radioactive markers, Samadpour highlighted the ribosomal RNA-coding genes among the fragments, which are distinctive for each strain of *E. coli*. In Scranton, Rose employed a process called Rep-PCR: she looked for specific, repeated sequences in the DNA, then used primers to amplify the genetic material between the repeats. Because the locations of the repeating sequences differ in each strain of *E. coli*, the length of the fragments between the repeating codes differs, too.

To examine the lengths of the genetic materials and reveal the crucial patterns, the researchers put the fragments on gel plates. An electrical field attracted the negatively-charged DNA fragments toward the positive end of the gel. Weighed down along the way, the bits of genetic material arrayed themselves along the plate in size order, forming "fingerprints" that look like bar codes.

By matching the patterns between water and fecal samples, both scientists concluded that it looked like resident geese and ducks were to blame for 70 percent of the *E. coli* samples found in the lake. "That doesn't mean [waterfowl] are the only problem," says Luitweiler, who notes that Samadpour found matches with deer and horses to account for some of the lake's *E. coli*, too. "But if you have limited resources to spend to try to solve the problem, where are you going to spend them?" Luitweiler and his colleagues are currently focusing on controlling the population of Deep Creek Lake's resident Canada geese; continued Microbial Source Tracking will help chart their success.

### Building A Bigger Rogues Gallery

Samadpour took his research a step further and compared the Pennsylvania samples to DNA fingerprints (also called ribotypes) in his library of 15,000 strains of the bacteria. There were a number of matches, indicating that a collection of ribotypes — a sort of rogues gallery of bacterial strains — could be employed across a wide geography.

Samadpour and Luitweiler have since teamed up on a grant project to collect and fingerprint *E. coli* samples from a broad range of sources, building Samadpour's library and extending its utility. Says Luitweiler, "Right now, it's like sending in a fingerprint to the FBI if they have a file that has one million fingerprints. If there's 250 million people, you've got a one-in-250 chance of getting a match. If the FBI had 250 million fingerprints in its file — or even 100 million - your chances of finding a match would be much better."

The Washington biologist is also organizing other, similar projects around the nation. "The idea is to turn this into an international database of source-specific genetic fingerprinting," Samadpour says. Sherlock Holmes, master of deduction, would be impressed.

*—For more information on microbial source tracking, contact Mansour Samadpour at (206) 543-5120, Preston Luitweiler at (610) 645-1132 or Vito Delveccio and Sharon Rose at (717) 941-6353.*

Photo: Philadelphia Suburban Water Company

**Scientists used two genetic fingerprinting techniques to identify resident geese as the culprits in fecal contamination that has kept Deep Creek Lake closed to swimmers for years.**

# Letters of Support

PUBLIC WORKS DEPARTMENT
CITY HALL
4TH FLOOR

BOISE
CITY OF TREES



February 26, 1998

Division of Environmental Quality
1410 N. Hilton
Boise, ID 83706

Subject: LBRWQP §319 Grant Application: DNA Fingerprinting of Coliform Bacteria

To Whom it May Concern:

The Lower Boise River Water Quality Plan (LBRWQP) is submitting a grant application that uses new technology to determine bacteria contamination sources within the watershed. The City of Boise supports LBRWQP's DNA Fingerprinting of Coliform Bacteria grant proposal.

The grant would use new DNA technology to identify the source of E. coli bacteria to better target the Bacteria TMDL Implementation Plan. A Bacteria TMDL Implementation Plan is due 12 to 18 months after the TMDL is approved. To date, LBRWQP has been able to determine bacteria criteria are exceeded in the lower portions of the watershed but has not been able to determine the source of the bacteria with a high level of confidence (e.g. agriculture, waterfowl, leaky septic systems, wastewater facilities). Use of this new technology would focus the implementation plan on the primary or most significant sources and could provide a useful tool for application throughout the state to address similar problems.

The city is providing general support of the proposed project and is willing to provide limited in-kind support as necessary (e.g. sample bottles, lab technician time, field technician time...). The grant proposal is a necessary next step in improving the water quality of the lower Boise River basin.

Sincerely,

Robbin Finch
Water Quality Manager

cc: Carl Ellsworth
Bill Ancell
CF/SF SAR-383

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IDAHO SOIL
CONSERVATION
COMMISSION

P. O. Box 790
270 Old Penitentiary Rd.
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83701-0790

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February 23, 1998

Tom Krumsich, P.E.
Division Manager, Water Resources
C#2M Hill
Box 8748
Boise, Idaho 83707-2748

Dear Tom:

The purpose of this letter is to provide support for the Lower Boise River Water Quality Plan 319 proposal for DNA Fingerprinting. We offer our support via in-kind services involving technical assistance from David Ferguson.

We feel that this is a worthy effort deserving of 319 funding. This project should greatly enhance the TMDL for the Lower Boise River.

Sincerely,

Jerry Nicolescu

Jerry Nicolescu
Acting Administrator

JGN/dms

C: Tony Bennett
David Ferguson
George Davis

IDAHO SOIL
CONSERVATION
COMMISSION

David F. Ferguson,
Water Quality Resource Conservationist
510 Arthur St. Caldwell, ID 83605
(208) 454-8684, 454-1037 Fax

February 17, 1998

Letter of Support to the Lower Boise River Water Quality Plan 319 DNA Fingerprinting Proposal

Correctly identifying the sources of coliform bacteria and other pathogens is important when attempting to correct the problem in a water body. Fecal coliform has been used to identify where there are high levels of pathogens, but assumes harmful bacteria are also present. It also has been assumed that the predominant or noticeable land uses near the water body were the sources of these pathogens. By using precise technology, such as the DNA analysis of pathogens, we can correctly identify the sources and possibly save time and money in problem solving.

I fully support this proposal if its intent is to identify actual sources of pathogens. If there is a distinction between pathogens coming from live cattle on a pasture and a beef packing plant or a slaughterhouse, then this testing is very suitable. I recommend that the location of the testing be carefully thought out and the source types be identified previous to random selection. Each drainage and land area consists of many types of pathogen sources, especially on the downstream drainages along the Lower Boise River.

I intend to provide assistance by providing technical support in identifying monitoring locations, land use characterization above testing sites, and interpretation of results where appropriate. The DNA analysis is a new tool for Idaho and needs to be carefully thought out prior to widespread use to reduce the risk of negative implications.

David F. Ferguson

c. Bennett

# CANYON SOIL CONSERVATION DISTRICT

510 Arthur Street • Caldwell, Idaho 83605 • Phone 454-8684



February 18, 1998

Letter of Support to the Lower Boise River Water Quality Plan 319 DNA Fingerprinting Proposal

The Canyon Soil Conservation District supports the proposed DNA testing by providing assistance in identifying testing locations, possible negative implications of results, and interpretation of results where appropriate.

The District has been providing technical assistance to many farmers and related non-point sources for many years. Water quality has been a high priority on the Lower Boise River and the Lower Snake River in regards to sediment, nutrients, and bacteria. We appreciate this proposal to correctly identify the sources of bacteria where they are a threat to humans. We have a concern, however, that there may be negative implications if the testing is not thought out completely or done correctly. This testing is new for Idaho and we must rely on the experience from the University of Washington and others who have previously done this testing.

We intend to follow this proposal into implementation and provide guidance where appropriate to ensure minimal negative implications. It is a policy of the District to treat actual non-point sources of pollutants having negative impacts on our natural resources.

George W. Davis

George W. Davis
Chairman

# Riverside Irrigation District, Limited

Parma, Idaho



February 23, 1998

Tom Krumsick, Chairman
CH2M HILL
700 Clearwater Lane
Boise, ID 83712-7708

Dear Mr. Krumsick:

The Riverside Irrigation District, Ltd. supports the Lower Boise River Water Quality Plan (LBRWQP) in their efforts to develop a plan to address lower Boise River water quality concerns. The District is also in support of LBRWQP submitting a §319 Grant Application.

Sincerely,

Lonnie Maggard

Lonnie Maggard, Chairman
RIVERSIDE IRRIGATION DISTRICT, LTD.

LM:bm

# Southwest District Health Department

**920 Main St. • Caldwell, Idaho 83605 • (208) 455-5300 • Fax (208) 454-7722**

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*46 W. Court St., Weiser, ID 83672, 208/549-2370*

*Administration 455-5310*
*Environmental Health 455-5400*
*Family Health 455-5390*
*General Support 455-5306*
*Nutritional Services 455-5340*
*Social Services 455-5375*


February 23, 1998

Tom Krumsick
CH2M Hill
P.O. Box 8748
Boise, Idaho 83701

Dear Mr. Krumsick:

The Lower Boise River area contains various agricultural related endeavors, plus the industries necessary to process the farm products produced. Construction of residences, retail businesses and industrial buildings is rapidly occurring. These activities are impacting the surface and groundwater greatly by exposing aquifers and drainage ways to pollutants. Immediate action should be initiated to trace, measure and mitigate the movement of contaminants in order to preserve the quality of Idaho's streams and aquifers.

The Southwest District Health Department (SWDHD) has been involved in water quality preservation activities in the Lower Boise River area. Since the formation of the SWDHD in 1971, the District has issued septic tank permits and monitored private and public water supplies for chemical and bacterial contaminants. Over the past years, it appears the water quality in the Lower Boise River area is deteriorating. This lends appreciation to the proposed methodology addressed in the Lower Boise River Water Quality Plan grant to identify and measure contamination sources. The SWDHD recommends and supports this grant application.

Some in-kind labor may be available through the SWDHD to assist with sampling and monitoring efforts. Further discussion regarding this issue is necessary before implementation.

Thank you for the opportunity to comment on this proposal. If I can be of further assistance, please contact me.

Sincerely,

Tom Goss
Director of Environmental Health

680-5903

February 20, 1998

Mr. Tom Krumsick
CH2M HILL
700 Clearwater Lane
Boise, ID 83712-7708

Dear Tom:

This letter is offered in support of the LBRWQP's 319 Grant Proposal-DNA Fingerprinting of Coliform Bacteria. This project would provide information that is currently not available in this area as well as establish a coliform bacteria DNA database for use by watersheds throughout the state.

The Ada County Highway District is an active participant in the development of the lower Boise River Total Maximum Daily Load (TMDL). The District is also a co-applicant of a NPDES Storm Water permit. Information gained from the proposed project would benefit both of these activities. Moreover, accurate source characterization of coliform bacteria will bring the lower Boise River watershed one step closer to resolving the bacteria problem in the lower Boise River and its tributaries.

The District encourages the Division of Environmental Quality and the Environmental Protection Agency to provide the requested funding for this project.

Sincerely,

ADA COUNTY HIGHWAY DISTRICT

Erica Anderson Maguire

Erica Anderson Maguire
Drainage Coordinator

cc: Dorrell Hansen, P.E.
Central, Chron Files

**ada county highway district**
318 East 37th • Boise, Idaho 83714-6499 • Phone (208) 345-7680

# Office of City Engineer & Public Works Director

RECEIVED
FEB 25 1998
CH2M HILL
BOISE

GORDON N. LAW, P.E.

City of Caldwell
P.O. Box 1177
Caldwell, Idaho 8306-1177
BUS. 208/455-3006

February 24, 1998

CITY OF CALDWELL

621 Cleveland Blvd.
Caldwell, Idaho 83605
PHONE (208) 455-3000
FAX (208) 455-3003

Tom Krumsick
LBRWQP
700 Clearwater Lane
Boise, ID 83712

Subject: Support for 319 Grant Application

Dear Tom,

The City of Caldwell, Idaho supports the 319 Grant proposed by the lower Boise River Water Quality Plan. The focus of this project is to identify the sources of fecal coliform bacteria in the lower Boise River. We believe that completing this project will lead to greater understanding of the nonpoint source problems facing the river, and most cost-effective mitigation measures down the road.

We feel that this project deserves 319 funding. The project will clarify issues within the lower Boise River and help with TMDL implementation.

Sincerely,

CH2M Hill

Gordon N. Law, P.E.
City Engineer

# Rural Community Assistance Corporation

February 25, 1998

Tom Krumsick
CH2MHill
LBRWQP Facilitator/Consultant
P.O. Box 8748
Boise, Idaho 83707-2748

Dear Tom:

The Rural Community Assistance Corporation (RCAC) supports the Advisory Group's efforts to develop a project which uses DNA fingerprinting technology. This technology will assist in maximizing the effectiveness of pollution reduction efforts by specifying nonpoint sources of bacterial contamination.

RCAC is committed to assisting rural communities, and this project will help define the role rural Idaho will play in developing the Total Maximum Daily Load for the Lower Boise River Watershed and that of other watersheds in the state.

As a representative of RCAC, I appreciate and look forward to being a part of this very important process.

Sincerely,

Jeff Kissler
Environmental Technician
cc: Charles Zulu
George Chimiklis

C:\OFFICE\WPWIN\WPDOCS\LBRLTR\JJK

**Ada Soil Conservation District**
118 W. Franklin - Meridian, Idaho 83642 - Phone (208) 888-1890 - FAX (208) 884-5636



February 12, 1998

Mr. Tom Krumsick
CH2MHill
LBRWQP Chairman
P.O. Box 8748
Boise, Idaho 83707-2748

Dear Tom:

The Ada Soil Conservation District supports of the Lower Boise River Water Quality Plan's efforts to develop a plan to address the lower Boise River water quality concerns. We are interested in your 319 project and although we are unable to assist with matching expenses, we would like to be involved and will contribute in-kind planning assistance whenever possible.

Sincerely,

Ada Soil Conservation District

Aimee Hanks

Aimee Hanks
Water Quality Conservation Planner

Mayor: Rick Yzaguirre

CITY OF EAGLE
P.O. Box 477
Eagle, Idaho 83616
(208) 939-6813
(208) 939-6827 Fax

Council: Stanley J. Bastian
Steve Guerber
Nancy Merrill
Lynne Sedlacek

February 19, 1998

CH2M HILL
Attn: Tom Krumsick
P.O. Box 8748
Boise, ID 83707

Dear Mr. Krumsick:

On behalf of the Eagle City Council and myself, I would like to formally express our support of the Section 319 Grant Application being submitted by the Lower Boise River Water Quality Plan. This grant would provide the funds necessary to take positive steps towards enhancing and preserving the quality of the Lower Boise River as well as, various watersheds throughout Idaho. In Idaho, our natural resources are precious and future generations depend on our ability to be responsible guardians. This grant would allow LBRWQP to act as guardians on behalf of all Idaho citizens.

If you have any further questions or concerns please contact me at (208) 939-6813.

Sincerely,

Rick Yzaguirre,
Mayor

RY:teo

cc: Council

# Wilder Irrigation District

709 CLEVELAND BOULEVARD • P.O. BOX 416
Caldwell, Idaho
83606 0416

TELEPHONE (208) 459-3421

DIANE PAULSEN
SECRETARY-TREASURER

February 24, 1998

To Whom It May Concern:

Wilder Irrigation District fully supports grant #319 for the Lower Boise River Quality on testing for fecal coliform on the Boise River. Knowing that many contribute to the river, whether natural or human caused, needs to be identified.

Sincerely,

WILDER IRRIGATION DISTRICT

Alfred F. Sarceda

*HUB OF TREASURE VALLEY*

A Good Place to Live

# CITY OF MERIDIAN

**33 EAST IDAHO**
**MERIDIAN, IDAHO 83642**
Phone (208) 888-4433 • FAX (208) 887-4813
Public Works/Building Department (208) 887-2211
Legal Department (208) 884-4264

ROBERT D. CORRIE
Mayor



February 25, 1998

Mr. Tom Krumsick, PE
CH2M-Hill
P.O. Box 8748
Boise, ID 83707-2748

RE: Lower Boise River Water Quality Plan - §319 Grant Application

Dear Tom:

The City of Meridian has and will continue to support the Lower Boise River Water Quality Plan's (LBRWQP) efforts to develop a plan to address water quality problems in the Lower Boise River. We feel the use of the new DNA fingerprinting technology to identify, and ultimately remove, sources of bacterial contamination to the Lower Boise River would be beneficial to all citizens of the region as well as the City of Meridian.

In summary, the City of Meridian fully supports LBRWQP's application for a §319 Grant Application for the above purposes.

Sincerely,

Gary Smith

Gary Smith, P.E.
Public Works Director/City Engineer

cc: File

c:\bw\s5\lbrwqp.319support letter.2-25-98.doc

**Sylvia Robison**, *City Clerk*
*(208) 585-3133*

**Robin McKean**, *Treasurer*
*(208) 585-6611*

# CITY OF MIDDLETON

P.O. Box 176, 15 No. Dewey Ave.
Middleton, Idaho 83644

*Office of City Council*
**L. D. Swigert**, Mayor

**Bob Schmillen**
*Public Works Supervisor*

February 17, 1998



Mr. Tom Krumsick, P. E.
LBRWQP Chairman
CH2M Hill
P. O. Box 8748
Boise, ID 83707-2748

Re: SS319 Grant Application

Dear Mr. Krumsick:

The City of Middleton supports the SS319 Grant Project to develop a plan addressing lower Boise River water quality concerns.

We may be able to provide in-kind labor support by collecting samples for analysis.

Sincerely,

L. D. Swigert
Mayor

LS:sr