



Applying knowledge to improve water quality

Pacific Northwest

Regional Water Program

A Partnership of USDA CSREES
& Land Grant Colleges and Universities

Winter 2005
PNWWATER 054

Protecting Family Drinking Water in Rural Alaska

Introduction

Many remote small villages in Alaska don't have access to piped water and sewers. Families in these villages continue to use traditional (untreated) water sources including ice/snow melt, rivers, tundra ponds, and rainwater catchments. In some cases, honeybucket bags (containing human waste) are dropped off at temporary hoppers before transportation to open dump sites within close proximity to schools and homes.



A village school photographed from the adjacent honeybucket dump and burn area.

Research Partner

Our partner community is located southwest of Bethel on the Kuskokwim River in western Alaska. The traditional Yup'ik Eskimo village (approximately 300 residents) has a five year history of working with the University of Alaska–Fairbanks (UAF) to develop a greater understanding of traditional water source use and storage. The current 3-year partnership with UAF Water and Environmental Research Center will focus on ways in which drinking water sanitation can be improved.

Research Outline

Four graduate studies are currently focusing on:

- i. Pathogen survival and transmittance in the Arctic
- ii. In-home sanitation, including methods to optimize private water tank chlorination and alternate disinfection methods.

Research Completed During 2004

(1) Pathogen Transmittance

Broad sweep sampling and subsequent most probable number (MPN) *E. coli* counts de-emphasized natural background levels in lakes and ponds (likely resulting from waterfowl) while highlighting the most contaminated sites in and around the community. Test samples also confirmed that ATV tires and boots track *E. coli* from contaminated areas (including the local honeybucket dump) to Eek School and local homes.

Source discrimination efforts appear to eliminate village dogs as a significant source, while additional work is needed to determine whether human sewage is responsible.



Site of partner community in western Alaska.



Pacific Northwest Regional Water Quality Coordination Project Partners

Land Grant Universities

Alaska

Cooperative Extension Service
Contact Fred Sorensen:
907-786-6311

<http://www.uaf.edu/ces/water/>

University Publications:

<http://www.alaska.edu/uaf/ces/publications/>

Idaho

University of Idaho
Cooperative Extension System
Contact Bob Mahler: 208-885-7025

<http://www.uidaho.edu/wq/wqhome.html>

University Publications:

<http://info.ag.uidaho.edu/Catalog/catalog.html>

Oregon

Oregon State University
Extension Service
Contact Mike Gamroth: 541-737-3316

<http://extension.oregonstate.edu/>

University Publications:

<http://extension.oregonstate.edu/catalog/>

Washington

Washington State University
WSU Extension
Contact Bob Simmons:
360-427-9670 ext. 690

<http://wawater.wsu.edu/>

University Publications:

<http://pubs.wsu.edu/>

Northwest Indian College
Contact Dan Burns:
360-392-4328

dburns@nwic.edu or

<http://www.nwic.edu/>

Water Resource Research Institutes

Water and Environmental Research
Center (Alaska)

<http://www.uaf.edu/water/>

Idaho Water Resources
Research Institute

<http://www.boise.uidaho.edu/>

Institute for Water and
Watersheds (Oregon)

<http://water.oregonstate.edu/>

State of Washington
Water Research Center

<http://www.swwrc.wsu.edu/>

Environmental Protection Agency

EPA, Region 10

The Pacific Northwest

<http://www.epa.gov/r10earth/>

Office of Research and Development,
Corvallis Laboratory

<http://www.epa.gov/wed/>

For more information contact
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The Project

Land Grant Universities, Water Research Institutes, and EPA Region 10 have formed a partnership to provide research and education to communities about protecting or restoring the quality of water resources. This partnership is being supported in part by the USDA's Cooperative State Research, Education, and Extension System (CSREES).

Our Goal and Approach

The goal of this Project is to provide leadership for water resources research, education, and outreach to help people, industry, and governments to prevent and solve current and emerging water quality and quantity problems. The approach to achieving this goal is for the Partners to develop a coordinated water quality effort based on, and strengthening, individual state programs.

Our Strengths

The Project promotes regional collaboration by acknowledging existing programs and successful efforts; assisting program gaps; identifying potential issues for cross-agency and private sector collaboration; and developing a clearinghouse of expertise and programs. In addition, the Project establishes or enhances partnerships with federal, state, and local environmental and water resource management agencies, such as by placing a University Liaison within the offices of EPA Region 10.

(2) *Pathogen Viability in the Arctic*
Dog fecal matter/soil samples were maintained at temperatures as low as $-28 \pm 2^\circ\text{C}$ in the laboratory and at ambient Fairbanks temperatures in the field. Results indicate that coliform bacteria (indicator species), and by extension, some pathogens may survive Arctic conditions with a potential to mobilize when conditions permit.

A Lower Kuskokwim School District School administrator, noted that it is not uncommon for students to miss over twenty days of school per year because of chronic illness. "At other times they come through the school doors, but don't feel good...their learning suffers."

To learn more about the "Protecting Family Drinking Water In Rural Alaska" project, contact the Principal Investigator Daniel White at ffdmw@uaf.edu, 907-474-6222.



Untreated drinking water is frequently stored in dedicated 35-gallon non-food grade trash cans for a number of days, sometimes weeks, before use.

National Water Quality Program Areas

The four land grant universities in the Pacific Northwest have aligned our water resource extension and research efforts with eight themes of the USDA's Cooperative State Research, Education, and Extension System.

1. Animal Waste Management
2. Drinking Water and Human Health
3. Environmental Restoration
4. Nutrient and Pesticide Management
5. Pollution Assessment and Prevention
6. Watershed Management
7. Water Conservation and Management
8. Water Policy and Economics

CSREES is the Cooperative States Research, Education, and Extension Service, a sub-agency of the United States Department of Agriculture, and is the federal partner in this water quality program.