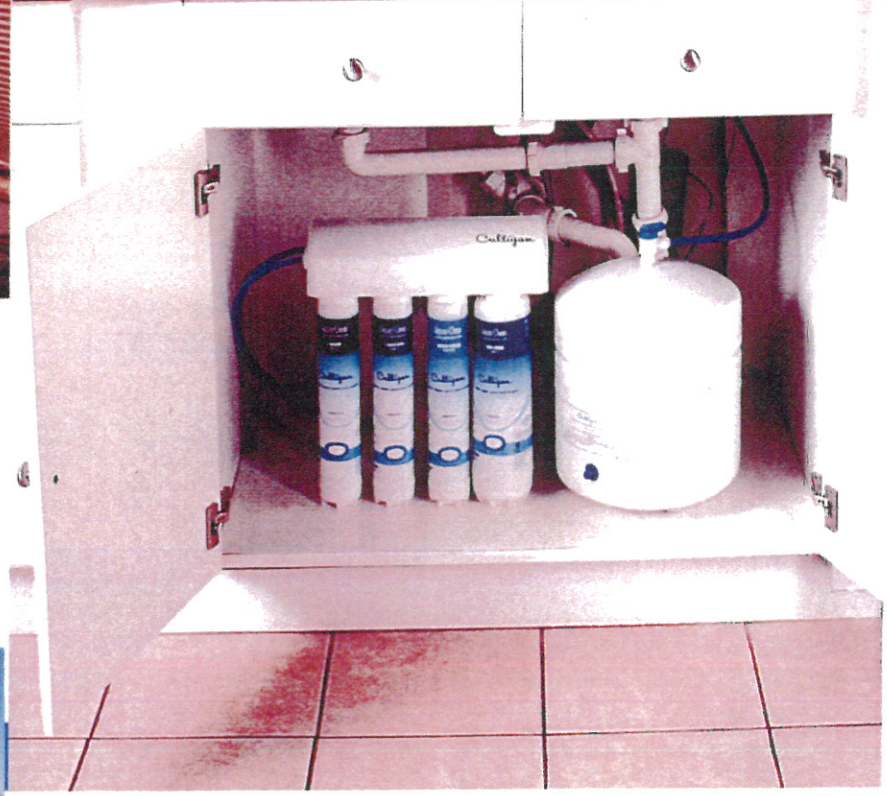
LOWER YAKIMA BASIN NITRATE TREATMENT PILOT PROGRAM

FINAL REPORT
JUNE 2011



Yakima County
Public Services

Public Services

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VERN M. REDIFER, P.E. - Director

July 25, 2011

Ginny Stern, Contract Manager
Washington State Department of Health
P.O. Box 47822
Olympia, WA 98504-7822

Re: Lower Yakima Basin Nitrate Treatment Pilot Program Final Report
DOH Contract #N18318

Dear Ms. Stern:

I am pleased to present you with the final report for the Lower Yakima Basin Nitrate Treatment Pilot Program. This report includes:

- A full accounting of how the monies were spent;
- A description of services provided (how many households served, type of service);
- Nitrate results;
- Financial summary;
- Remaining demand; and
- Issues encountered and recommendations for next steps.

On behalf of Yakima County, I would also like to extend our appreciation to the Department of Health and other partners who helped make the Program possible: State Senator Jim Honeyford, State Departments of Agriculture and Ecology; the Yakima Health District, the U.S. Environmental Protection Agency and the Yakama Nation.

If you have any questions regarding the report or the Program, please call me at 509-574-2300. Thank you.

Sincerely,

Vern M. Redifer, P.E., Director

Attachment

cc: Senator Jim Honeyford
Tom Tebb, Director, Department of Ecology Central Region
Kirk Cook, Department of Agriculture
Gordon Kelly, Yakima Health District
Phil Rigdon, Deputy Director, Yakama Nation Natural Resources
Tom Eaton, U.S. Environmental Protection Agency

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Acknowledgments

We appreciate our program partners, who made the Nitrate Treatment Pilot Program possible:

State Senator Jim Honeyford
Washington State Department of Ecology
Yakama Nation
U.S. Environmental Protection Agency
Washington State Department of Agriculture
Washington State Department of Health
Yakima Health District
Culligan International

Yakima County Team

Vern M. Redifer, P.E., Director, Yakima County Public Services

Many thanks to our County employee team, who devoted their time, talents and energy to ensure program success:
Community Meeting Support: Sandy Bandy, Lead; Vicki Adams, José Campos, Brian Cochrane, Lisa Freund, Don Gatchalian, Robin Huard, Gordon Kelly, Nicole Means, Marisol Oviedo, Joe Stump, Mary Wurtz.
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Printing Services: Robin Russell, Lead.
Spanish-Language Communications: Marisol Oviedo and Gordon Kelly.
Web Development: Kevin Wickenhagen, Lead; Jeff Legg.

Special Recognition

We also extend special appreciation to the following groups and individuals:
The County door-to-door delivery team, which delivered more than 900 nitrate packets in the program area during January and February: Doug Brown, Don Campbell, Jose Campos; Cliff Bennett, Matt Durkee, Carolyn Ehlis, Karen Hodges, Bill Trout and Jeff Legg.

In addition, many thanks to the employees of the Building and Fire Safety Division, County Roads (Construction, Development Review, Engineering, Right of Way, Road Maintenance and Traffic Divisions) and the Planning and Surface Water Divisions, who provided many staff hours to complete the packet assembly on deadline. Thanks also to our project volunteers Hilary Freund and Nick Hayter.

Washington State Department of Health

Thanks to Andres Cervantes, P.E., for project advice, Spanish-language hotline assistance and for making the Spanish-language radio interviews possible.

EPA

We also extend our appreciation to EPA staff Sandy Halstead, Rochelle Labiosa, and Caryn Sengupta for their above-and-beyond efforts in conducting lab testing, Spanish-language hotline assistance and offering coordinated project support.

Note

A lot of people worked hard to make this pilot project successful. If we have missed any individual or organization who participated, we would like to extend you our thanks.

Final Report

Nitrate Treatment Pilot Program
For
Lower Yakima Basin

I. EXECUTIVE SUMMARY

In response to ongoing concerns about nitrate contamination in Lower Yakima Valley groundwater, the 2010 Legislature provided $395,200 to allow Yakima County to develop a treatment program for households with people at high public health risk from nitrate contamination. The Nitrate Treatment Pilot Program (Program) goals were to provide public education, technical assistance and water treatment systems to households with individuals at high public health risk from nitrate contaminated wells in the lower Yakima basin.

Administered through the Washington State Department of Health (DOH), the Program was publicly launched, implemented and completed in approximately six months (January through June 2011). Program partners included the Yakima Health District, the Washington State Departments of Agriculture and Ecology, the U.S. Environmental Protection Agency (EPA), the Yakama Nation and Culligan International.

Expenditures for the project totaled $264,085 and were well within the budget of $395,200. Ninety percent of the Program budget was for the purchase and installation of up to 400 free or reduced-cost water treatment systems in affected homes.

Program Accomplishments

1. Financial Assistance. 177 free filtration systems were offered to eligible Lower Valley households.
2. Public Education, Technical Assistance and Financial Information. Over 7600 households received public education, technical assistance and financial information delivered to their home mailbox or door in their primary language (English and Spanish). In addition,
    a. Approximately 100 households received free certified lab testing.
    b. Over 250 callers received one-on-one program assistance in their primary language;
    c. Approximately 1200 Web visitors had access to information in their primary language.
    d. Over 70 people received one-on-one assistance at three public workshops.
3. 1870 households responded to the Program (21 percent response rate) by returning nitrate test results from a test strip provided in the Program mailing.
4. Definitive area-wide nitrate contamination rates were identified.
5. Program established the groundwork for comprehensive nitrate mapping.

Issues Encountered

Even at "free," the demand for a filtration system was lower than anticipated. This is attributed to a combination of factors:

- The percentage of homes with nitrates that exceed the drinking water standard of 10 ppm appears lower than originally estimated. Previous estimates indicated that 21 percent of the wells in the Program area were contaminated; however, the program's in-home testing results indicated only 9 percent were at or above the 10 ppm standard.
- A lack of interest from the public. With no local reports of nitrate-related health problems, the public's concern was not high.
- The multiple steps in the application process and the time and cost associated with obtaining certified lab results delayed participation.
- Some households were unwilling to assume the cost and/or time of system maintenance, even at Culligan's guaranteed reduced rate of $10 a month.

Next Steps

- Encourage households on private wells near community water systems (both public and private) to connect to a community water system.
- Encourage households on private wells to periodically test their water and to install treatment systems (or connect to a community water system) if nitrate levels are close to or above drinking water standards.
- If on a private well, inspect around the well to make sure surface water drains away from the well and that there is no nitrate source such as livestock.
- Maintain the required well setbacks of at least 100-foot radius around the well.
- Support and actively participate in Yakima County's Groundwater Management Area (GWMA) process.

Conclusions

- Water test results as shown on the Nitrate Map indicate that nitrate contamination, i.e., above 10 ppm, is widespread throughout Lower Yakima Basin, although it is more commonly found north of the Yakima River between Granger and Grandview and south of the river in the vicinity of Mabton.
- There are areas in Lower Yakima Basin that are at or above 5 ppm, but below 10 ppm, that require further study or analysis.
- A two-tiered public outreach strategy integrating standard practices (direct mail, media outreach, public meetings) with intensive one-on-one follow-up (door-to-door canvassing, personal calls, application assistance) is necessary to reach the diverse audience.
- EPA's inability to share groundwater test results due to its confidentiality agreement with residents prevented a more complete mapping of nitrate levels, and may have resulted in failure to provide systems to EPA-eligible households. However, EPA staff worked diligently within these constraints to help provide systems to its households and to provide water testing and application assistance to other households in the program area.

II. INTRODUCTION

Background

Yakima County Public Services, with assistance from the Yakima Health District, the Washington State Department of Ecology, and the U.S. Environmental Protection Agency (EPA) implemented a Nitrate Treatment Pilot Program (Program) to provide water treatment systems, public education, and technical assistance to households with individuals at high public health risk from nitrate contaminated wells in the lower Yakima basin. Funding for the Program was provided by a $395,200 grant from the Washington State Department of Health (DOH).

The Program was in response to a series of news articles published in the *Yakima Herald Republic* in 2008 titled "Hidden Wells Dirty Water." The articles described an on-going problem of nitrate contamination in private wells in the Lower Yakima Basin.

Following the news articles, the Environmental Protection Agency (EPA) began working with various agencies to resolve the problem, including the Yakama Nation, the State Departments of Ecology, Agriculture and Health, Yakima County and other local governments. As part of their work, EPA facilitated a number of public meetings from December 2008 through June 2010.

In February 2010, EPA began testing the water quality in private wells in the Lower Yakima Basin. EPA's testing showed that 21 percent of the 337 wells tested (70 wells) exceeded EPA's drinking water standard for nitrate of 10 parts per million (ppm). Some of the wells had nitrate levels above forty parts per million. A conservative estimate indicated that as many as 1,800 private wells might exceed the nitrate drinking water standard.

In April 2010, State Senator Jim Honeyford helped secure $400,000 in funding from the State's Toxic Control Account "for granting to a willing local public entity to provide emergency water supplies or water treatment for households with individuals at high public health risk from nitrate contaminated wells in the lower Yakima basin."

Yakima County agreed to be the local public entity to implement such a program, and in July 2010 signed an agreement with the Washington State Department of Health. The agreement provided funding for Yakima County to implement a Program, now referred to as the Nitrate Treatment Pilot Program, to provide in-home water treatment systems and public education related to nitrate contamination to homes supplied by private wells in the lower Yakima basin.

Program Area

The Program area is shown on Figure 1. Included in the area are approximately 800 square miles located within the Lower Yakima Basin below Union Gap, south of the Rattlesnake Hills and Ahtanum Ridge, west of the Yakima/Benton County line, and north of the Horse Heaven Hills. The Yakama Nation Closed Area was not included in the Program area since permanent residences are not allowed in the Closed Area. Although not part of the Program Area,

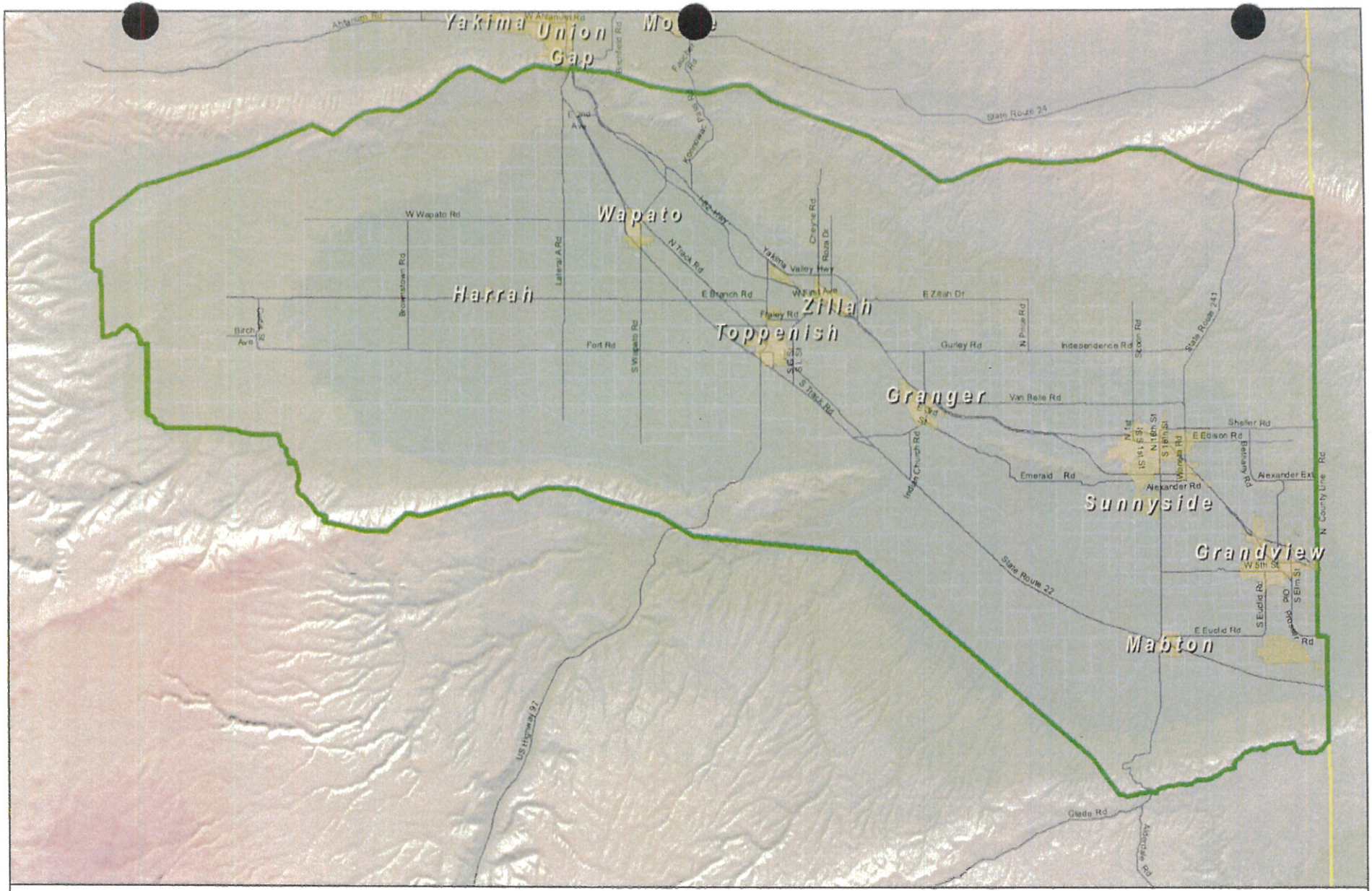

Figure 1
Nitrate Treatment Pilot Program Area

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households in Benton County within the Lower Yakima Basin were eligible to purchase a system at Program costs.

Program Description and Implementation Strategy

A written description of the Program (Program Narrative) was prepared early on in the project. The Program Narrative includes goals, the scope and eligibility of assistance to be provided, selection criteria for financial assistance, a communications strategy, an implementation plan, and a program timeline and budget. A copy of the Program Narrative is included in Appendix A.

It was unknown at the onset of the Program exactly how many households would meet the criteria for financial assistance for a free water treatment system. Of those that would meet the criteria, it was also unknown how many would actually apply for financial assistance. Because funding was sufficient for only about 400 systems, and it was estimated that as many as 1,600 households might be in need of a system, it was anticipated that the number of households meeting the criteria would exceed the amount of grant funds available. For that reason, the Program included selection criteria to determine which households received financial assistance and which households did not. The criteria included household income level, nitrate level, and when an application was received.

III. SERVICES PROVIDED

Public Education and Technical Assistance

Integral to carrying out the implementation strategy was the Program Communications Strategy. It was designed to meet the program's public education and technical assistance outcomes: 1) to provide water treatment systems, education and technical assistance to households with individuals at high public health risk from nitrate contamination; 2) to manage the program in a transparent manner that allowed Lower Valley residents full and fair access to the services offered under the program; and 3) to be able to report back to stakeholders in the community at large about the program successes and limitations along with recommendations for further work. A copy of the Program Communications Strategy is included in Appendix B.

Because Spanish is the primary spoken language in many households within the Lower Yakima Basin, all communication materials were prepared in both English and Spanish. In addition, interpretive services were offered for all verbal communications with the public.

The program goals required—and the program delivered—a multi-tiered, ongoing bilingual communication strategy and marketing plan that targeted and continually reached program audiences, offering ongoing opportunities for the public to ask questions and receive answers through extensive written materials, a strong media partnership, public meetings, a visual presence at local businesses and community agencies, and one-on-one program and application assistance. The outreach program was also responsive to residents' and partner agency feedback, resulting in a midcourse program correction that revised the message and identified new means to reach audiences.

The Program Packet

Central to the strategy was the program packet, a 16-page English-Spanish self-contained kit that described the program, provided health information related to nitrates and answers to frequently asked questions. It included an in-home nitrate test strip with which recipients could test their water and, in the event their water tested high in nitrate, a one-page application for financial assistance for a water treatment system. A self-addressed stamped envelope was provided for recipients to return their test strip results, certified lab results and completed applications. A copy of the packet is included in Appendix C.

The only step required of a household independent of the packet was to obtain certified lab results documenting the level of nitrates. A list of local testing labs and applicable fees was enclosed for this purpose. Instructions for contacting EPA for financial assistance for certified well testing ensured financial need would not create a barrier to participation.

7641 packets were individually prepared for mailing to households on private wells in the program area. Each packet was labeled on its mailing envelope, application and test strip with 1) parcel number, 2) resident's or owner's name and 3) address to ensure parcel-accurate results were entered into the program database.

500 unlabeled packets were delivered at the Yakama Nation's request for distribution to tribal members.

Setting the Stage

The week of December 27, 2010, EPA sent letters to its 70 households that had tested high in nitrate, announcing the program. The Yakima County Health District faxed a program letter to 350 healthcare providers in Yakima County, asking providers to talk to their at-risk patients about nitrates and to encourage program sign-up. The EPA and Health District's letters are included in Appendix D.

Yakima's Radio KIT [Townsquare Media] and Granger's Spanish-language Radio KDNA ran teasers, announcing that a County program addressing nitrate contamination was coming.

Tuesday, January 4 Program Kickoff

A kickoff news conference hosted by Yakima County and attended by Senator Jim Honeyford and the program's six federal and state partners was held at the Sunnyside Community Center. Media and program packets were distributed to the media and public; media coverage was provided by local NBC and ABC affiliates; National Public Radio; the *Grandview Herald*, *Sunnyside Daily Sun Toppenish Review*, and *Yakima Herald-Republic*.

KIT Radio hosted County, Yakima Health District and DOH staff on its January 4 morning show to discuss the program; Spanish-language Radio KDNA dedicated a one-hour public affairs call-in program that evening, attended by a bilingual DOH staff member and a county representative.

The program packets, mailed on Monday, January 3, were now arriving in Lower Valley mailboxes. The hand delivery of 900 packets began that week and continued through February.

Community Workshops

One-on-one application assistance, public education and technical assistance were offered at three evening meetings January 12 (Artz Fox Elementary School, Mabton); January 13 (Denny Blaine Building Boardroom, Sunnyside); and January 19 (Toppenish High School, Toppenish). Approximately 70 attended the meetings; Spanish-language interpretation ensured there were no barriers to communication.

Nitrate Hotline and the Program Website

English and Spanish calls began arriving on the Nitrate Hotline [1-855-740-8429]. The hotline, established to provide an easy means for individuals to ask questions and receive answers, generated over 250 calls between January and June, 2011. The top reasons for calling:

- I need another packet
- What's the status of my application?
- I need certified lab testing assistance
- I want information about the program
- I am concerned about the health impacts of nitrates

About 25 percent of the callers required a Spanish speaker call back.

The program's English-Spanish website also provided access to public education, technical assistance and program materials. As the weeks progressed, it offered regular updates on the test strip and certified lab results. The website received approximately 900 English-language and 300 Spanish-language visitors. 20 Web visitors signed up to receive the updates on the program.

Early Results

Test card results response rate was strong; application response was low. The week following the January 28 "first come first served" deadline, a total of 1,211 (16 percent) test cards were returned, but only 20 completed applications had been received. Consequently, the selection criteria of household income level, nitrate level, and when an application was received were not utilized. Ultimately, it was decided that all homes could have an individual at high public health risk from nitrate, and the criteria for a free filtration system was modified such that the only qualifying factors were a completed application and a test result showing nitrates equal to or greater than 10 ppm.

The public message was revised to encourage all households in the program area with certified lab results at or above 10 ppm to apply for a free system. EPA, meanwhile, offered its free testing services to all households in the program area, effectively removing the cost and time barrier associated with obtaining certified lab results. EPA also reviewed the applications and, upon identifying a low EPA-household response rate, began calling its confidential 2010 sampled household list to encourage program participation.

The week of February 21, as Culligan began site surveys and installations at 43 households, a plan to invite media coverage of an installation to boost interest was considered and rejected as no household was willing to participate. Instead, news releases were sent out announcing that installations were underway and provided results of the project to date. For a copy of the news releases, see Appendix E.

Follow-up and Program Feedback

Beginning in March and continuing through May 2011, County staff called and/or sent personalized follow-up letters to nearly 100 households that had submitted incomplete applications. Program feedback ranged from keen interest in receiving a system to ambivalence or disinterest and, in some cases, confusion about the program and the health impacts of nitrates. For example, some participants believed that their income levels or ethnicity would preclude them from a free system. Others were unconcerned by the health impacts of nitrates ("I've been drinking this water for 60 years and never had a problem," or "It's my landlord's problem").

Participants also expressed frustration at having to obtain and pay for certified lab results ("you already have my test card results.") Eligible households tested by EPA were confused, believing that EPA had submitted their results on their behalf. Many also expressed concern about ongoing filtration system maintenance costs.

Even at "free," the level of desire for a filtration system was low. Program feedback indicated a combination of factors: no locally-documented "proof" of adverse impacts from ingesting nitrates; no visible signs of nitrates (no taste, odor or color associated with nitrate); many residents were unwilling to take on maintenance costs; many found the application process confusing or too complex; many simply did not want to take the extra step of obtaining certified lab results.

Midcourse Corrections

In response to program feedback, the message was simplified, EPA's cost-free testing assistance emphasized, and the outreach extended through a second mailing, flyers and door-to-door outreach.

On March 25, 5,503 English/Spanish "Last Chance" postcard mailing was sent to non-responsive households in the program area, urging households to test their water and if their test strip indicated 10 ppm or above, to apply for a free system. 400 flyers and posters with the simplified message were also created and distributed by Culligan in neighborhoods where they were installing systems, inviting neighbors to test their water and apply. Culligan also distributed posters and flyers to 18 lower Valley employers and businesses. Seattle University students on a "working" spring break were also recruited to distribute flyers to Wapato-area businesses. A copy of the flyers, posters, and distribution sites are included in Appendix F.

Simultaneously over 100 "undeliverable" packets with the new, simplified message were inserted and re-mailed with updated addresses or hand delivered. County and DOH staff returned to Radio KDNA's public affairs program on March 30 to encourage listeners to test their wells and

apply. The *Yakima Herald Republic* also ran a follow-up article.

With the "Last Chance" postcard mailed, the on-air interview with Radio KDNA conducted and flyers distributed, calls to the hotline increased–especially Spanish-language calls.

EPA offered to return the Spanish-language hotline voicemails, which streamlined the application and certification process considerably. Spanish-language program participants had the same communication continuity (a means to ask questions and receive answers regarding impacts of nitrates, filtration system) as did their English-speaking counterparts. In addition, EPA and Culligan offered on-site assistance with applications as well as certified lab testing, removing another barrier to program success.

Approximately 60 packets and flyers were hand-delivered to the unincorporated community of Outlook after the County discovered that many households on private wells were not part of the original database and mailing. County staff also attended the Outlook Community Meeting on April 25 to explain the program and distribute packets.

Second program extension-May 31

By the County's April 29 deadline, 110 households had received or met eligibility criteria for installation. The County announced a program extension to Tuesday, May 31, communicating through a news release. New flyers were created and the posters updated (see Appendix G).

In June EPA and Culligan, in coordination with the County, made a final door-to-door push to help households complete their applications and to conduct well tests. As of June 30, 161 systems had been installed.

Installation of Water Treatment Systems

Request for Proposals

The first step towards hiring a contractor to install water treatment systems in homes was to prepare and issue a Request for Proposals (RFP). The RFP process was selected over a typical bid process over concerns about the long term viability and product support of a system selected solely on cost. The RFP process was allowed under RCW 70.95A.090 since the project involved installation of equipment used to abate water pollution.

Once prepared, the RFP was advertised in the *Yakima Herald Republic* on October 22 and 28, 2010. It was also provided to Contractors in the area with experience in installing Reverse Osmosis (RO) filtration systems. Contractors were given until November 8 to submit their proposal.

Yakima County received a total of seven proposals. The proposals were reviewed and ranked by staff from Yakima County and the Washington State Department of Health (DOH). Contractors submitting the top three proposals were then interviewed by Yakima County, DOH, and Yakima County Health District staff.

Selected System and Installer

Culligan International was ultimately selected for the project along with their Aqua Cleer reverse osmosis (RO) drinking water system. This system is a point of use system that provides treated drinking water at one sink in the house. Generally, the systems are installed at the kitchen sink. A point of use system was selected over a "whole house" system due to cost.

Culligan's Aqua Cleer system is NSF approved with a minimum nitrate reduction of 82.8 percent. It is rated at 36 gallons per day and includes a four port manifold to accept various filter combinations.

Systems Installed

Culligan's proposal included 4 variations of their Aqua Cleer RO system. The first (Package A) included their Aqua Cleer RO system with a 10 micron particulate pre-filter, a carbon block pre-filter, a 30-gallon per day RO membrane, a granular activated carbon post filter, a 3 gallon bladder type storage tank and a faucet. Package B included everything in Package A plus a booster pump for low pressure applications or applications with nitrates greater than approximately 20 ppm. Package C included everything in Package A plus an ultraviolet light for applications testing positive for bacteria. Package D included everything in Packages A, B and C. Manufacturer's literature on the Aqua Cleer RO system is included in Appendix H.

The cost and number of each system installed is included in the table below. Prices listed are good for two years from the date of signing of the contract between Culligan and the County, or until January 18, 2013.

Treatment System Options and Cost

	Package A	Package B	Package C	Package D
Aqua Cleer RO	$695	$695	$695	$695
Booster Pump	n/a	$195	n/a	$195
UV Light	n/a	n/a	$100	$100
Total Unit Cost	$695	$890	$795	$990
Number of Units Installed	88	35	18	20

Sixteen property owners declined a system after being approved. Two declined because they already had some form of a treatment system, while another declined so they could purchase a different system on their own. Other reasons are unknown, although maintenance costs are believed to have been a concern for some.

Post Installation Site Visits

Yakima County conducted post installation site visits with Culligan on four households to verify with the homeowner that the systems were operating as intended. Homes selected had systems installed for at least seven weeks. They also had some of the highest nitrate levels encountered during the program, including one that measured 60.8 ppm. Each of the homeowners said they were pleased with the system and none had experienced any problems. All said they had received or thought they had received owner's manuals on the systems. During the site visit, Culligan conducted field tests to verify system performance. Results of the field tests are summarized in the table below.

Post Installation Test Results

Parcel	Location 1	Location 2	Location 3	Location 4
Parcel No.	220913-11003	231026-43001	231030-21022	221024-42443
Address	4471 Sunnyside-Mabton Rd	4041 Factory Rd	1921 Sheller Rd	912 Cemetery Rd
Raw Water				
Nitrate (ppm)	40.9	17.8	60.8	28.4
TDS (ppm)	395	350	383	421
Hardness (grains/gallon)	18	0	23	0
Finished Water				
Nitrate (ppm)	4	2	4	4
TDS (ppm)	20	17	25	12

Notes:
1. Raw water nitrate level is based on certified test results provided by Culligan obtained as part of their site survey.
2. Finished water nitrate level is based on field test from post installation site visit.
3. TDS levels are based on field test from post installation site visit.
4. Raw water hardness is based on field test from Culligan's site survey.

Maintenance and Repairs

Culligan will perform system repairs for all systems installed at no cost during the first year from the date of the installation, including replacement of the membrane. Replacement of the filters is not included unless the customer purchased a maintenance program. After the first year, Culligan will adhere to the manufacturer's defect warranty and bill its labor for repairs. Parts, excluding the membrane and filters, carry a lifetime warranty.

Culligan's agreement with Yakima County includes a provision where Culligan will maintain and repair the systems under their Privilege Program at a reduced cost. Participation in the Privilege Program is optional and is paid by the household receiving the system. The cost for Package A systems is $9.95 per month. Privilege Program costs for Packages B and C is $13.95

per month and Package D is $17.95 per month. Prices include annual filter changes and replacing the RO membranes on an as needed basis. Maintenance costs are good until January 18, 2013.

Purchase Assistance

The project, as originally contemplated, included an option for those households not receiving financial assistance to purchase a system at the same cost as the County's cost to have a system installed. Because everyone who met the minimum criteria received a system at no cost, this option was not utilized. Culligan did install one system at the County's Program cost for a household that requested a system even though their nitrates were less than 10 ppm.

IV. NITRATE RESULTS

Description of Database

All data received from the test strip results, applications and certified lab results were stored in a Microsoft Office Access database. The database provides a convenient way to enter, query, track and report data received as part of this and future Programs.

The database includes:

1. Parcel number.
2. Resident's name, situs address and mailing address.
3. Owner's name, situs address, and mailing address.
4. If an application was returned, the date it was returned, nitrate level, phone number, if an at risk population is in the home, number of people in the home, age of the oldest and youngest people in the home, income, primary source of drinking water, and well depth if known.
5. If a test strip card was returned, the nitrate level and phone number.
6. Comments regarding the parcel.

Test Strip Results

Figure 2 provides a general indication of the nitrate level in over 1,800 private wells in the Program area. Levels shown on this figure are based on test strips mailed out and received back from the public as part of the mass mailing to households in the Program area. This method of testing is not as accurate as a test from a certified lab, but the data received does provide a sample of wells with nitrates both above and below 10 ppm, whereas the data received from the certified lab tests is primarily for wells already believed to be at or above 10 ppm.

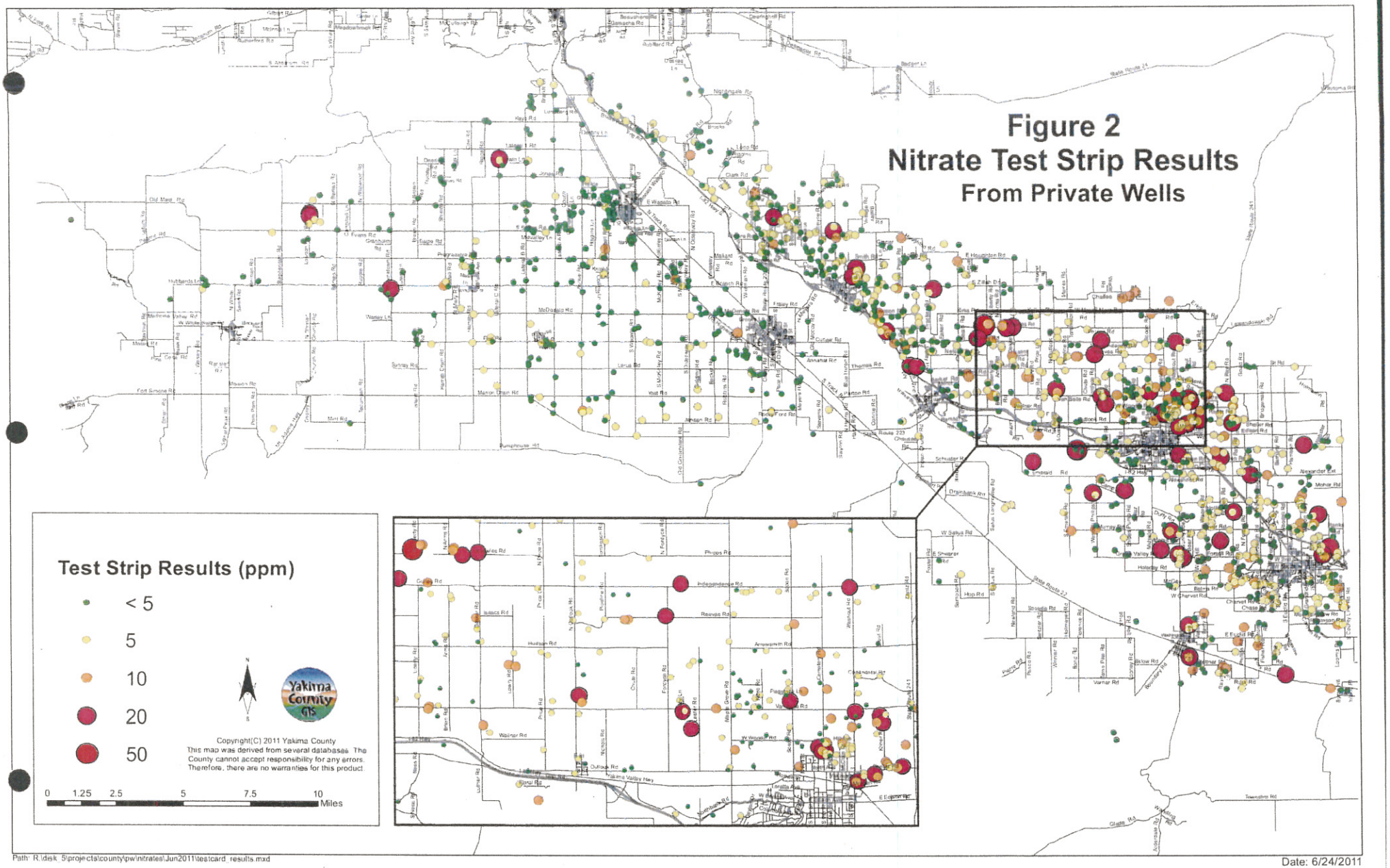
Figure 2
Nitrate Test Strip Results
From Private Wells
Test Strip Results (ppm)
< 5
5
10
20
50
N
S
Yakima County GIS
Copyright(C) 2011 Yakima County
This map was derived from several databases. The County cannot accept responsibility for any errors. Therefore, there are no warranties for this product.
0 1.25 2.5 5 7.5 10
Miles
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Date: 6/24/2011

A tabular summary of the nitrate levels based on the nitrate test strips is included in the following table. Of the test strips returned, approximately 9 percent were over 10 ppm. This is significantly less than the 21 percent found by EPA while testing wells in the spring of 2010. If 9 percent rather than 21 percent is used to estimate the number of wells that exceed the nitrate drinking water standard, then the estimated number of nitrate contaminated wells would drop from 1,800 to approximately 700.

The percentage of test strips above 10 ppm was also less than what is estimated in the February 2010 multi-agency Lower Yakima Valley Groundwater Quality report. In this report, it was estimated that 12 percent of the domestic wells were exposed to nitrates greater than 10 ppm.

Nitrate Test Strip Results

Nitrate Level (parts per million)	Number of Test Cards Returned	Percentage
0	472	27%
1	248	14%
2	404	23%
5	447	26%
10	96	6%
20	54	3%
50	2	<1%
Subtotals	1,723	100%
Test cards at or above 10.0 ppm	152	9%
Test cards with no value indicated	147	
Total cards returned	1,870	

Notes:
1. Results are as of July 11, 2011

Certified Lab Results

Figure 3 shows certified lab results for private wells with nitrate levels over 10 ppm. The lab results were provided by the public as part of their application for financial assistance in installing a treatment system. Also included in the Figure are lab results received from EPA. Wells with lab results less than 10 ppm were not included so as to not give a false impression that most wells tested had nitrates greater than 10 ppm. In actuality, few lab results are available for wells with nitrates less than 10 ppm, because these households were not eligible for financial assistance and generally would not have submitted an application.

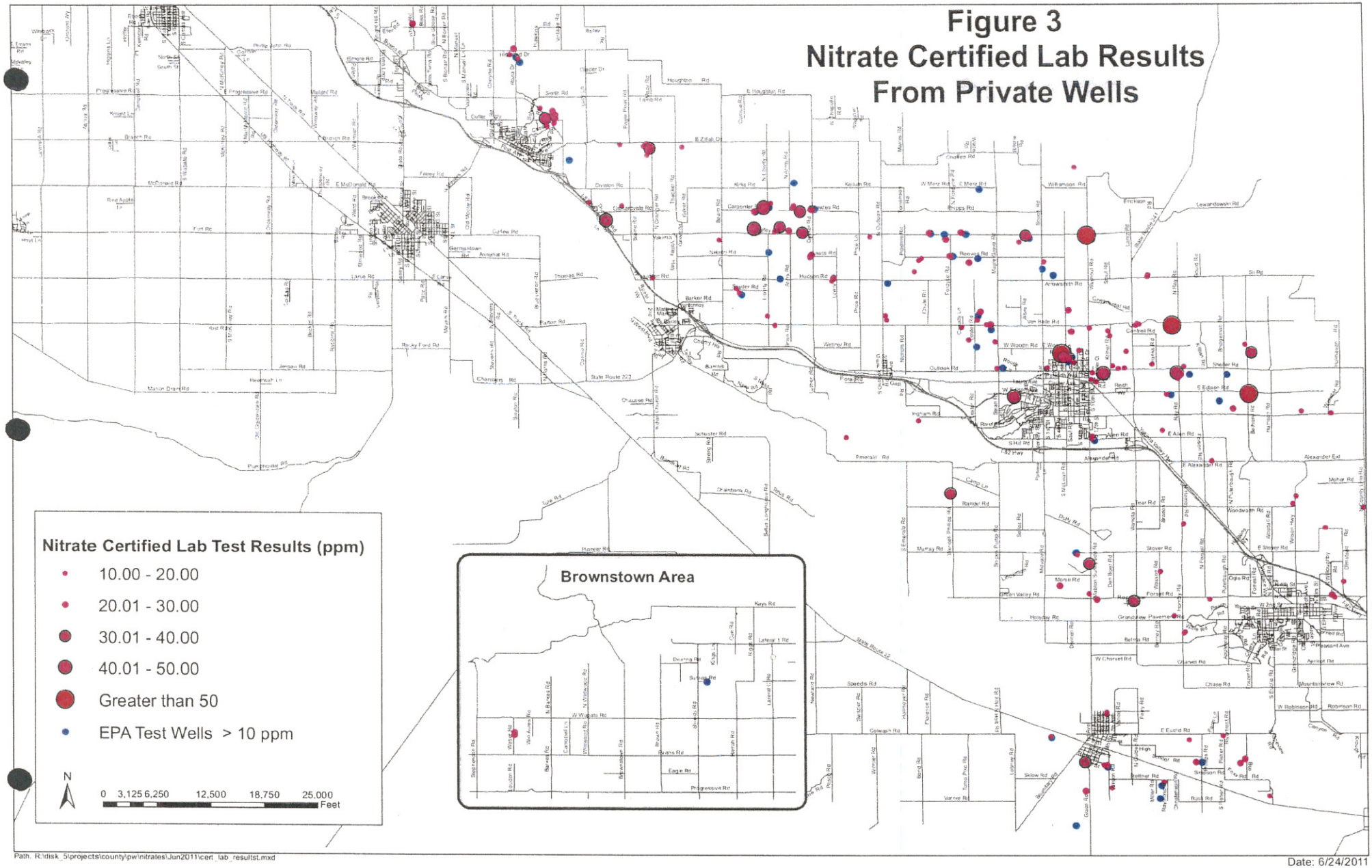
A tabular summary of the nitrate levels based on certified lab results is included in the following table. The highest concentrations found were over 50 ppm. One sample collected by Culligan showed a nitrate level of 70.4 ppm.

Nitrate Certified Lab Results

Nitrate Level (parts per million)	Number of Test Results Returned	Percent of Total Results Returned
0 to less than 2.50	22	8%
2.50 to less than 5.00	27	10%
5.00 to less than 10.0	42	16%
10.0 to less than 15.0	60	22%
15.0 to less than 20.0	50	18%
20.0 to less than 30.0	46	17%
30.0 to less than 40.0	13	5%
40.0 to less than 50.0	6	2%
Above 50.0	5	2%
Total Lab Tests Returned	271	100%
Lab Tests at or above 10.0 ppm	180	66%

Notes:
1. Results are as of June 28, 2011

Figure 3
Nitrate Certified Lab Results From Private Wells



Path. R:\disk_5\projects\county\pw\nitrates\Jun2011\cert_lab_resultst.mxd

Date: 6/24/2011

V. FINANCIAL SUMMARY

The total grant funds available for the Program were $395,200. Total expenditures were just $264,085. A breakdown of the Program budget and expenditures is as follows:

Nitrate Treatment Pilot Program Budget and Expenditures			
Task	**Task Budget**	**Total Expenditure**	**$ Remaining**
1. Grant Administration			
Grant Accounting – Salaries & Benefits	$2,000	$642.00	$1,358.00
Grant Administration Subtotal	**$2,000**	**$642.00**	**$1,358.00**
2. Community Outreach			
Salaries and Benefits	$10,000	$74,246.07	($64,246.07)
Equipment	$500	$4,544.93	($4,044.93)
Supplies and Materials	$3,500	$7,445.26	($3,945.26)
Copying Services	$1,000	$9,085.99	($8,085.99)
Postage	$12,500	$16,312.30	($3,812.30)
Translation Services	$3,000	$1,230.00	$1,770
Meeting Room Rental	$1,500	$225.50	$1,274.50
Community Outreach Subtotal	**$32,000**	**$113,090.05**	**($81,090.05)**
3. Treatment System Contracting			
RFP Development – Salaries & Benefits	$1,500	$10,859.20	($9,359.20)
Advertising Costs	$1,000	$204.14	$795.86
Postage	$0	$23.20	($23.20)
Treatment System Contracting Subtotal	**$2,500**	**$11,086.54**	**($8,586.54)**
4. RO Purchase and Installation			
Purchase and Install ROs	$355,700	$136,407.19	$219,292.81
RO Purchase and Installation Subtotal	**$355,700**	**$136,407.19**	**$219,292.81**
5. Final Report			
Prepare Report – Salaries & Benefits	$3,000	$2,737.68	$262.32
Supplies and Materials	$0	$55.01	($55.01)
Copying Services	$0	$66.98	($66.98)
Grant Administration Subtotal	**$3,000**	**$2,859.67**	**$140.33**
Totals	**$395,200**	**$264,085.45**	**$131,114.55**

VI. REMAINING DEMAND

It is estimated that between 700 and 1,000 homes in the Program area are supplied water by wells with nitrates in excess of the drinking water standard of 10 ppm. Of these homes, 161 received nitrate treatment systems as part of this Program. It is not known how many may have already had a treatment system installed.

The low end of this range is based on an estimated 8,000 homes in the Program area supplied by private wells. It is also based on nitrates in excess of 10 ppm in 9 percent of the wells, which is what was found in the test strip results returned by residents as part of this project. The high end of this range is based on nitrates in excess of 10 ppm in 12 percent of the wells, which is what was estimated in the February 2010 multi-agency Lower Yakima Valley Groundwater Quality report.

All households that requested a treatment system, had nitrates at or above 10 ppm, and completed an application received a system. 58 homes that requested a system did not receive one because their certified lab results were below 10 ppm.

VII. ISSUES AND NEXT STEPS

Problems Encountered

- Some households were missed in the initial mailing because it was initially believed that they were served by a public water system but they are actually served by private wells.
- 900 packets required hand delivery due to incomplete address data from the County Assessor's database.
- Complexity of the program, the multiple steps in the application process, and eligibility criteria was difficult to communicate to the broad and diverse audience.
- Health effects of nitrate were difficult to convey, not visible, and not easily understood related to contamination threshold and risk factors.
- The success of the initial public outreach message made it a challenge to re-educate the public when the public message was revised in February. The initial message, anticipating large public response, emphasized program constraints (program eligibility and financial assistance criteria). This message was understood by the public; however, it was difficult to reeducate the public when the message was modified to emphasize that *all* households with nitrate levels equal to or greater than 10 ppm were eligible.
- Due to the large size of the project area and its rural character, there was little "community" presence and community leadership to draw upon for outreach.
- EPA's promise of confidentiality to its 2010 sampled households initially promoted program inefficiency, and duplication of efforts. It may have resulted in failure to provide systems to some EPA-eligible households.
- Illiteracy and low reading comprehension skills in some households required one-on-one on site assistance to verify eligibility and to complete applications.

- Some households unwilling to assume maintenance fees, even at Culligan's 2-year guaranteed reduced rate of $10 a month.
- Some households did not understand they are not required to participate in Culligan's maintenance program.

Next Steps

- Encourage households on private wells near community water systems (both public and private) to connect to the community water systems.
- Encourage households on private wells to periodically test their water and to install treatment systems (or connect to a community water system) if nitrate levels are close to or above drinking water standards.
- Encourage households on private wells to inspect around the well to make sure surface water drains away from the well and that there is no nitrate source such as livestock.
- Encourage households to maintain the required well setbacks of at least 100-foot radius around the well.
- Support and to actively participate in Yakima County's Groundwater Management Area (GWMA) process.

Conclusions

- Water test results gathered as shown on the Nitrate Map appears that nitrate contamination, i.e., above 10 ppm, is widespread throughout Lower Yakima Basin, although it is more commonly found north of the Yakima River between Granger and Grandview and south of the river in the vicinity of Mabton.
- There are areas in Lower Yakima Basin that are at or above to 5 ppm, but below 10 ppm that require further study or analysis.
- A two-tiered public outreach strategy integrating standard practices (direct mail, media outreach, public meetings) with intensive one-on-one follow-up and support (door-to-door canvassing, personal calls, application assistance) is necessary for a project of this scope.
- EPA's inability to share groundwater test results due to its confidentiality agreement with residents prevented a more complete mapping of nitrate levels, and may have resulted in failure to provide systems to EPA-eligible households. However, EPA staff worked diligently within these constraints to help provide systems to its households and to provide water testing and application assistance to many other households in the program area.