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Situation Assessment Report
On
Yakima Valley Groundwater Assessment, Washington

U.S. Environmental Protection Agency
Region 10

Submitted by
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INTRODUCTION

This report describes the findings and recommendations of the Dispute Resolution Center of Yakima and Kittitas Counties, a neutral third party, which conducted a situation assessment concerning issues related to groundwater contamination in the lower Yakima Valley and the various stakeholders' desire to participate in a process with the U.S. Environmental Protection Agency (EPA) to address the contamination. EPA authorized the assessment to identify areas of common ground or agreement and differing views between parties and to determine the willingness of stakeholders to participate in a stakeholder process regarding determination and implementation of actions to characterize and remediate identified groundwater contamination in the Yakima Valley.

Situation Assessment Process

The Dispute Resolution Center of Yakima and Kittitas Counties, through its executive director Matt Fairbank, conducted the situation assessment via face to face interviews in January, February and March 2010 with representatives of key stakeholder groups that have an interest in Yakima Valley Groundwater contamination. Those interviewed included representatives of the EPA, USDA, Indian Health Services, The Confederated Tribes and Bands of the Yakama Nation (Yakama Nation), WA state agencies, County Agencies, other agencies and representatives of stakeholder groups. The people interviewed and their affiliations are provided in Appendix B. People with whom interviews were sought received phone calls and e-mail contact from the DRC director explaining the goal of the situation assessment. Many of the agency representatives had received a prior courtesy contact from EPA representatives explaining the situation assessment and seeking their agreement to be interviewed. (Because of the breadth of the problem and potential contributing factors, not all possible stakeholders were interviewed. Additional groups with whom it may be helpful to make contact in the future are listed in Appendix C.) The Dispute Resolution Center told the interviewees that the themes from the interviews would be summarized in the report but that there would be no quotes or comments attributed to specific individuals.

Matt Fairbank conducted 23 interviews and met with 65 people between January 28 and March 30, 2010. During the interviews, the Dispute Resolution Center asked interviewees to provide background as to their role and their agency/organization's role in addressing the Yakima Valley Groundwater problems, their perspective on what needed to be done to clean up the groundwater and prevent future contamination, where they saw common ground with others working to address the problem, their ability to work with others on the problem, any concerns about their ability to do so, what obstacles they envisioned arising to implementing solutions to the problems, whether they would find facilitation of any of the areas of concern helpful, how they would like to see that process organized and their recommendations for addressing the Groundwater contamination problem.

BACKGROUND

Humans have inhabited the Lower Yakima Valley for thousands of years. In the last 150 years, the population in the valley has steadily grown and land uses have multiplied. For more than 100 years, irrigated agriculture has existed here, with farmers applying fertilizers and pesticides to attempt to maximize crop yields. In the past 25-30 years, large scale dairy operations have joined feedlots in the valley, significantly increasing the amount of nitrates present. For much of the past 150 years, people have depended on the aquifers for their domestic and stock water. Up until fairly recently, the well construction techniques and health and safety protections in place on those wells were fairly rudimentary. People have often utilized the first available water resource for their water supply. The shallowest aquifer in many areas of the valley has likely been contaminated by bacteria, nitrates and chemicals for decades.

Awareness about Lower Yakima Valley Groundwater problems has been present on a small scale for a number of years. Members of the public concerned about it have been frustrated by what they perceive as government regulatory agency inaction toward enforcing pollution/ environmental projection standards and laws. Government agencies have been stymied in their efforts to enforce regulations by inadequate funding for staffing, research and enforcement efforts, gaps in enforcement tools, a very confusing set of overlapping and gapped regulatory jurisdictions between many agencies and apparent lack of political will at higher levels in those agencies.

With the publication of a series of articles by reporter Leah Beth Ward in the Yakima Herald Republic collectively titled Hidden Wells, Dirty Water in October 2008, awareness of the groundwater contamination problem grew dramatically. As a result of the articles and ensuing public interest, regulatory agencies ramped up efforts to address the program and began meeting together in the fall of 2008. Since that time, the lead agencies; EPA, WA state Departments of Ecology, Agriculture and Health and Yakima County; convened meetings that included other agencies' representatives and other stakeholders (including agricultural interests and environmental group representatives) to develop a report on the problem and build stronger working relationships. A draft report on the problem was issued in October 2009, and then, after incorporation of comments and desired changes, a final report was published in February 2010. The report titled, "Lower Yakima Valley Groundwater Quality Report" is available on the WA Department of Ecology's web site at this address: http://www.ecy.wa.gov/pubs/1010009.pdf . The report outlines the scope of the problem, possible organizational frameworks for coordinating efforts to address the problem, options for addressing it and its diverse causes, and recommendations for doing so. It also includes maps generated from past studies and summaries of the scope and information learned from the available studies.

In 2009, the EPA Region 10 designated the Lower Yakima Valley an "Environmental Justice Showcase Community." The valley's designation is one of 10 such designations nationwide. Funding associated with this designation has made possible this situation assessment and has helped cover the cost of private well testing, which was conducted in February and March 2010 on approximately 330 wells in the Lower Yakima Valley. Preliminary results from these tests on contamination levels have been reviewed. Follow up sampling and analysis on around 30 of the

wells tested will be conducted along with sampling of potential upgradient sources to attempt to identify the sources of contamination in those wells. Characterization of those contaminants may help determine how long they have been present (whether recent or older practices caused the contamination), what the sources are and their likely originating source(s).

Under Section 1431 of the Safe Drinking Water Act, the EPA has broad authority to take action where there is a contaminant in an underground source of drinking water that may present an imminent and substantial endangerment to the health of persons. The EPA has determined that these conditions exist in the Yakima Valley because nitrate levels are above the maximum contaminant limits (MCLs). Under SDWA Section 1431, the EPA can take action to investigate sources of contamination and issue orders requiring other parties who caused or contributed to the endangerment to take any action that EPA believes may be necessary to protect the health of persons. This could include, for example, providing alternative water supplies, or requiring actions intended to reduce nitrogen loading to the aquifer, such as lining waste water lagoons.

AREAS OF COMMON GROUND

All those interviewed for the situation assessment, from community members and industry representatives to staff of federal, tribal, state, county and regional agencies agree that the Lower Yakima Valley Groundwater contamination is a problem that needs to be addressed effectively with efforts starting as soon as possible. All agree that steps need to be implemented soon to ensure safe drinking water to affected households and steps taken to reduce the amount of current and future contaminants affecting the groundwater.

Everyone was also willing to invest time and energy in working with others to find solutions to the problems and help implement them.

The majority of the interviewees were willing to participate in facilitated meetings to clarify a number of areas as they begin to move forward. Those areas include:

- explaining constraints in current enforcement tools within agencies,
- identifying gaps in enforcement of rules/regulations and laws that are designed to prevent contamination of groundwater,
- to the degree possible, building trust among stakeholders,
- Establishing priorities for addressing the Groundwater problems.

All those with technical knowledge agreed to help with educational efforts to the public and agricultural producers.

OBSTACLES TO IMPLEMENTING SOLUTIONS

Organizational Structure for improving groundwater quality

There are clearly different perspectives on the best structural approach to organizing efforts to improve groundwater quality. The options for structural approaches are outlined on pages 21-26 of the "Lower Yakima Valley Groundwater Quality report" released in February 2010. It is

available on the WA Department of Ecology's web site at this address: http://www.ecy.wa.gov/pubs/1010009.pdf

The people interviewed who had input and ideas regarding the structural approaches were primarily from the agencies which have participated in the creation of the report (WA Departments of Ecology, Agriculture and Health, Yakima County and EPA) and the environmental advocates and representatives of Valley Institute for Research and Education. The local and state agency representatives think the primary structural approach should be through a Ground Water Management Area (GWMA) as they believe that this approach will access the widest variety of public and foundation funding, and engage the broadest cross section of people and agencies.

Amongst the proponents of creation of a GWMA, there were still concerns expressed about this approach. Concerns included a question as to whether Yakima County has the man power and technical expertise available to complete the GWMA application process, whether it is appropriate for those within WA Depts. of Agriculture and Ecology with the technical expertise to contribute that to the application process and the fact that the timeline needed to create a GWMA and actually begin to address the groundwater contamination will be likely to take 18 months to 3 years.

Representatives of the EPA indicated that development of a GWMA may bring visibility, awareness and funding to the Groundwater contamination problem and that all would be helpful. They did express concern that some communities which have had GWMAs to address ground water problems have been dissatisfied with the structure and frustrated with the slowness and limitations on work accomplished. EPA representatives hold that no matter what structure is chosen to lead efforts, everyone should keep their eyes on the goal: to eliminate the groundwater contamination problem.

Environmental advocates, mainly due to distrust of Yakima County's resolve and interest in the issue (but also distrust of the regional and state agencies), believe the key tool should be designation of the Lower Yakima Valley as a sole source aquifer location. They believe that this would enable the EPA to step in with heightened enforcement of federal drinking water protection standards.

Some of those advocating for creation of a GWMA do not think the sole source aquifer designation would provide the coordination tools necessary or the access to a wide variety of funding resources that will be necessary to address the groundwater contamination issues effectively.

Environmental advocates and VIRE representatives expressed concern that a GWMA process is cumbersome and slow to implement any solutions. Environmental advocates believe that in many instances around Washington State GWMAs have been ineffective at implementing solutions or reaching stated goals.

Many of the other people interviewed did not express opinions about which structural approach should be utilized to organize efforts to address Lower Yakima Valley Groundwater contamination and may not have familiarity with the various options and the likely consequences for the clean up effort of choosing one over the other.

For environmental advocates, having the primary organizational structure be a GWMA led by Yakima County, could be a deal breaker for them. It is not clear whether they would be actively engaged in the stakeholder process or would pursue other means to address their concerns related to groundwater contamination.

Jurisdictional challenges

There appears to be a fairly high level of confusion or ambiguity as to how the many agencies (with regulatory and technical support roles) can work in such a way as to not duplicate efforts, but still effectively protect and provide safe drinking water in all areas in the Lower Yakima Valley. These regulatory and technical support agencies include EPA, US Dept. of Agriculture Natural Resources Conservation Services, Indian Health Service, Bureau of Indian Affairs, Yakama Nation Departments of Natural Resources, Water Code, Water Resources, Water and Sewer, WA state Departments of Ecology, Agriculture and Health, WA state Conservation Commission, Yakima County Public Works, Yakima Health District and the South Yakima Conservation District. Gaining clarity on roles and responsibilities for all of these agencies will likely need to be one of the key obstacles to be overcome early in the process.

The Washington State Department of Agriculture has two roles. One is the role of regulating the agricultural industry. The other role is that of promoting and supporting agriculture in Washington State. This dual role can lead to perceptions by outside observers that the department may be biased in favor of the producer as WSDA exercises its regulatory authority. These perceptions could present challenges in the future.

A potential constraint on the work to improve Yakima Valley Groundwater will be concerns of agencies with jurisdictions beyond the Yakima Valley as to how decisions reached here may have implications in other parts of Washington and the United States. These agencies may be constrained by current limitations and the possibility that local actions may be precedent setting.

Some people expressed concern that getting “buy in” from others within their agencies and higher up the governmental structure may hamper efforts on the groundwater efforts. Those higher up the chain of command may be more subject to political pressures applied from stakeholders or interest groups. If these stakeholders are engaged in collaborative efforts to address the problems, it is hoped that this will absorb some of that pressure.

Another obstacle to implementing solutions is the very low funding level for Yakima Health District. The District has an overall budget of $5.6 million dollars, but only $100,000 of that is local funding, which is solely dedicated to work on tuberculosis. (This rate of local funding is the lowest per capita rate for all counties in Washington State.) The district has no dedicated funding to monitor private septic systems and private wells (and no other agency has responsibility for wells that serve four or fewer households) or to advise the public on how to

protect their groundwater supply from contamination. It lacks dedicated funding to have staff participate in meetings on the groundwater contamination problem and possible solutions. It does not have funding to provide outreach or outreach materials in the two primary languages spoken in the valley, English and Spanish.

Cost to implementing solutions

Another obstacle to successfully addressing the groundwater contamination issues is the anticipated high cost for implementing solutions, especially in a tight economy. There wasn't clear consensus on where the funds should come from to provide safe drinking water or how much should be invested by whom to reduce current and future contaminants.

The possible solutions could include reverse osmosis drinking water systems for affected households (about $1,000 per household), providing new wells complete with casing, pump and sealed wellhead (likely $10,000 to $20,000 depending on depth), new septic systems for households with failed ones ($4,000 to $12,000 per household depending on whether gravity or pressurized system), creation of satellite public water supply systems with wells drilled to as yet unpolluted aquifers (unknown cost), detection of abandoned wells and properly decommissioning them, development of wastewater treatment plant and additional anaerobic digesters for management of animal waste generated at dairies and feed lots, monitoring wells near waste lagoons and spray fields and the cost for monitoring service, modification of irrigation/fertilizer application practices on croplands, orchards, vineyards to reduce leaching and nitrate loading, purchase of additional property by some dairies/feedlots so that manure and waste water can be applied at agronomic rates or below, educating the public about the problem and steps they can take to protect their water supply, find and pay for alternative safe drinking water resources and educating agricultural producers on the importance of protecting the aquifer and helping them adopt practices that do so, research into specific causes of the groundwater contamination, consistently enforcing regulations and pursuing other enforcement options.

Other possible Obstacles

An additional obstacle is posed by the likely gaps in communication that will arise, within agencies, between agencies and other stakeholders and among stakeholders. In most of the interviews, people described a strong desire that agencies in leadership remain in close regular communication, explain enforcement action, and talk about plans with all interested parties. As there is currently no clear structure for this to take place, this need/desire likely needs to be addressed soon.

Up to this point, there has not been involvement by more than a few individual well owners whose water supply is affected. The absence from the process of a broad cross section of individual well owners whose water supply is contaminated may be a challenge down the road since they will likely be impacted by any action plans.

ABILITY AND WILLINGNESS TO WORK TOGETHER

The many governmental agencies were eager to get to work on the groundwater issues and looking forward with anticipation to the characterization information that they hope will be

available from the private well testing currently being evaluated by the EPA. The EPA and WA state Department of Ecology leaders were able to point to increases in the amount of staff time being devoted to this issue as evidence of this dedication. Dairy industry representatives expressed a willingness to work with others towards this goal as well. They hope for an agency approach that will be science based to identify the problems. If dairies are identified as part of the problem then they ask the agencies to help them comply with any new requirements by providing technical support and cost sharing resources. They believe that focusing strictly on punitive actions will create a distrustful atmosphere and lessen cooperative, owner-initiated improvements which could result in piece meal compliance rather than voluntary industry-wide compliance.

The importance of tribal sovereignty to the Yakama Nation needs to be recognized. The checkered history of past working relationships between government agencies and the Yakama Nation, and the decision making/legislative process of the Yakama Nation will likely require considerable patience and respect to develop and maintain consensus on how to implement solutions to the Lower Yakima Valley Groundwater contamination.

The high level of distrust expressed by some environmental activists of local, regional, state and tribal agencies reduce the likelihood that their voices can be heard and effectively incorporated into the efforts to address the groundwater problems. Of the 11 advocates interviewed, most expressed a desire to see strict enforcement of existing environmental and agricultural practices regulations be one of the primary efforts undertaken to address the ground water contamination problem. They are willing to work on efforts for effective enforcement of environmental protections to groundwater, surface water and air quality from industrial agriculture sources. These enforcement efforts may include levying fines against violators and ordering violators to pay for remediation efforts and refrain from future violations. Many of the environmentalists reported personally documenting and reporting to enforcement agencies frequent violations of current environmental protections by some agricultural producers with little or no effective enforcement action being taken.

DESIRES FOR FACILITATION/STAKEHOLDER INVOLVEMENT PROCESS

Many of the people interviewed, including all of the agency representatives, presumed that EPA would be working in collaboration with them to address the groundwater contamination problem. A “go it alone” approach by EPA was not even contemplated. This may be due in part to the EPA’s working with a variety of agencies and stakeholders over the past 18 months to develop the report cited earlier. It could also be due to the interviewees’ recognition that because of the various regulatory responsibilities, the many agencies’ participation, involvement and engagement will be essential to the success of the efforts.

Many of the agency representatives explained that the work they have jointly undertaken over the past 18 months has helped them build or rebuild working relationships amongst each other. It was expressed that up to this point, the differences of opinion (mainly related to report content and focus) have been relatively minor and have not been major stumbling blocks. People have expressed concern over their ability to continue to work collaboratively when remediation and

enforcement actions begin to be taken. They expect things to get more challenging at that point based on perceived differences in orientation to, and support for, enforcement efforts.

Most agency representatives expressed how important they felt it was for the EPA to include them and other local stakeholders in efforts to address groundwater contamination. They believe their local knowledge, technical expertise, long term investment and future responsibilities for follow through and enforcement roles as well as their relationships with people in the area make them indispensible to the success of these efforts.

Some people, primarily those outside the agencies that have been working together the past 18 months, have expressed interest in having facilitated meetings in the near future to talk about the groundwater contamination problems, likely approaches to address it and their desire to be involved in the process rather than having action "done to" them and those they represent.

Some of the environmental advocates have asked to meet directly with dairymen to discuss their concerns, not only about the impact of their practices on groundwater but also on air quality and surface water.

RECOMMENDATIONS FROM STAKEHOLDERS

All parties recognize the complexity and breadth of the Lower Yakima Valley Groundwater contamination problem and many had recommendations on addressing various aspects to it. Most people recognize that due to the nature of aquifers and groundwater movement, the "clean up" of groundwater, even if all current and future contamination were halted immediately, will be a long term process. Many agency representatives encouraged those involved to take a longer term view of the challenge so that efforts can be sustained and successful and not be subject to growing frustration or lack of dedication to resolution based on an unrealistic picture of what will be involved in "the fix".

The specific suggestions for addressing the current contamination and reducing/ eliminating future contamination are provided in Appendix A.

RECOMMENDATIONS FROM DISPUTE RESOLUTION CENTER

From the interview process, the Dispute Resolution Center has been able to determine that a number of processes would likely be helpful in insuring that efforts to protect and clean up Lower Yakima Valley Groundwater resources are as successful as possible. These recommended processes are described below followed by some general suggestions.

Process Suggestions (Listed in Chronological Order)

The first 6 proposals are recommended to take place in the next 3-4 months.

1. Convene a meeting of the lead agencies to discuss their goals in involving the broader group of stakeholder representatives in efforts to address the Groundwater contamination issues. It is not clear to the Dispute Resolution Center at what level of participation (from providing

information to participating in creating agreements and taking action on those agreements) the lead agencies are prepared to involve the broader array of stakeholders. Those interviewed from the broader stakeholder group do anticipate levels of involvement up to taking action.

2. If the lead agencies in this effort want to get "buy in" from other stakeholders to the organizational structure to be used as the primary vehicle to coordinate efforts on Lower Yakima Valley Groundwater protection and clean up, we encourage the agencies to do the following: Invite all interested stakeholders to a meeting to inform them about the various options for organizational structures. The meeting would include describing the positive attributes of each approach and the potential drawbacks/limitations, responding to questions about the approaches, and inviting input/suggestions on the desired organizational structure. The process would include development of ground rules for the meetings so that all voices could be heard and the necessary levels of civility and respect would be maintained.

3. Have agencies that have been meeting last 18 months convene a meeting of interested stakeholders to clear the air on perceived regulatory overzealous enforcement, bias and/or inaction. This would permit the clearing of misperceptions and work to build trust. (It might be important to convene separate meetings on the two sides of the issue due to the level of frustration and lack of trust between some environmental advocates and agricultural producers.) These meetings would provide the chance for folks on all sides to hear about the structural challenges with regard to overlapping and missing regulatory roles.

4. Early high level engagement between EPA leadership and Yakama Nation Tribal Council: Many agency representatives spoke about the importance of engaging the participation and collaboration of the Yakama Nation and its applicable agencies. Tribal sovereignty issues, sometimes strained prior working relationships between the tribe and the variety of federal, state and local agencies involved, and the decision making and legislative processes and changes in elected leaders of the legislative bodies from the Yakama Nation to Yakima County and Washington State Legislature mean that successful engagement will require a concentrated effort on the key players' parts to develop the trust, working relationships and understanding necessary to enable this collaboration.

The DRC also recommends offering the following to help improve working relationships:

- Training for lead agencies' representatives on working with the Yakama Nation.
- Training to talk about how to converse/dialogue together in cross culturally appropriate manners.
- Opportunities to process difficulties which arose in past strained collaborative efforts.
- These trainings would likely need to be led by Yakama Nation leaders.

5. Offer training sessions for agency representatives on interacting with the public on contentious issues. These sessions should include: how to listen, acknowledge and respond as well as act on input.

6. Offer trainings for interested environmental advocates, agricultural producers and spokespeople on how to help deliver their messages without generating automatic defensive/combative reaction. Topics to be covered include:

- Interest and Issues,
- Aikido and the art of negotiation,
- How to express your concerns while not causing other side to shut down, tune out, dismiss you, and
- Strategic thinking towards long term goals.

7. Convene a meeting that includes all regulatory and advisory agencies, agricultural producer associations, environmental advocates and social justice representatives once results of EPA well testing are known. This process would include sharing results of the tests and describing the organizational structures chosen or likely to be chosen which will lead efforts to clean up the groundwater problems present in the Lower Yakima Valley.

General Suggestions

The following round out the Dispute Resolution Center's suggestions on how to make the groundwater contamination clean up efforts as successful as possible.

To the degree possible, without compromising ongoing investigations or legal actions, share information and plans about groundwater efforts with stakeholders and the broader public.

Develop and maintain internal communication within regulatory and advisory agencies to insure "buy in" to agreed groundwater remediation plans at all levels of involved agencies.

Have representatives of agencies who are at the table working on these issues have the necessary authority to commit their agencies to agreed actions/plans (in timely consultation with upper management within agencies).

Utilize the expertise, wisdom and working relationships of all interested agencies and groups to bring about the necessary and desired positive changes to nutrient and chemical loading on, and contamination of, the Lower Yakima Valley groundwater supply and access to safe drinking water for affected people.

For stakeholder process participation into the future, there is a disparity in individuals' abilities to participate. For most agency representatives, participation would be part of their job responsibilities and they would be paid to participate and represent their agency. For many industry representatives, their participation would be paid for by their industry/association out of assessments or fees (this would likely not be the case for elected leaders from these groups, but for the groups' advisors or attorneys). For environmental advocates and social justice representatives, there would usually not be any financial support to cover their costs and time dedicated to these efforts. In order to have their consistent participation in any stakeholder process, grant support may be necessary. Also, consideration as to when meetings are held will be essential in ensuring participation from necessary representatives. Meetings are usually most

convenient for agency representatives during the work week and most convenient for some industry representatives and environmental advocates in the evenings or on weekends.

There are a large number of other potential stakeholders whose involvement may be helpful depending on the primary sources of contamination determined by the current testing. Coordination of a stakeholder process to include them will likely be a challenge. It may help to have subsets of participants working on specific issues such as:

- Reducing or eliminating ditch irrigation practices.
- Securing funding packages/reduced costs to homeowners replacing wells or septic systems.
- Conducting effective outreach to area residents on the groundwater contamination problem and resources for providing safe drinking water.
- Communicating with area health professionals about talking with patients regarding the safety of their drinking water and what to watch for (especially new parents and elders with health challenges).
- Developing timelines, plans and funding proposals for changes to agricultural practices necessary for protecting the groundwater.

CONCLUSION

The Dispute Resolution Center of Yakima and Kittitas Counties, as a neutral third party situation assessor, finds that convening a stakeholder group to address Lower Yakima Valley Groundwater contamination is feasible and will likely lead to the most successful remediation regimen possible. To be successful, the process will require continued collaboration with stakeholders and vigorous communication at all stages including before any enforcement action taken against identified polluters. The Dispute Resolution Center believes this approach has a good chance of maximizing funding, engaging broad involvement and attracting resources to the efforts to address the Lower Yakima Valley Groundwater contamination.

APPENDIX A

Amongst the suggestions as to how to move forward came the following from interviewees:

- Communicating with the public about the groundwater contamination problem.
    - Educate without causing panic.
    - Encourage agency personnel to share information with the public in a manner that educates about health risks of contaminated water, but at the same time, reduces any unnecessary anxiety.
    - Provide materials and outreach efforts in English and Spanish.
    - Reassure members of the public that if they allow their wells to be tested, and their well is found to be polluted, this in itself will not force them to pay for costly repairs, new well, new septic systems etc.
    - Share information about the problem more broadly only when a plan for how to address it and financial assistance for doing so is available.
    - Take steps to mitigate loss of land/home value for effected homeowners.
    - Conduct outreach via face to face contact using familiar outreach workers serving as liaisons to water testers, workers conducting remediation work, etc.
    - Educate hobby farmers as to how they can change practices to protect ground and surface water quality.
    - Utilize non-profit agency resources to reach the public including Fred Hutchinson Cancer Research Center outreach employees, Head Start agencies including Yakama Nation, EPIC and Washington State Migrant Council, school district home visitors, medical clinic home visitors from YV Farmworkers clinics and Yakima Neighborhood Health.
    - Contract with Northwest Communities Education Center (NCEC) to produce radio novella about groundwater contamination and what to do about it.
    - Air information about public outreach events on commercial radio stations including both English and Spanish language stations (may require advertising dollars).
    - Utilize known, comfortable locations for meetings such as Head Start centers, 21st Century learning center schools, NCEC building (Granger), Nuestra Casa (Sunnyside) and Marie Rose House (Wapato).

- Ways to provide safe drinking water to affected households.
    - Satellite public water supply systems (for four households or fewer), with county management, users providing electricity for pumps and annual fees for part of maintenance costs.
    - Low interest/no interest loans for homeowners to make improvements to private water supplies via public entity which can coordinate efforts, funding resources and secure grants.
    - Government negotiated discounts for new wells/septic systems where needed.
    - Force polluters to pay for alternative water supplies for affected neighbors.
    - Hold an annual or biannual free water testing day with follow up advisory resource day to review results, discuss resources for remediation. Ask variety of agencies to participate.

Interviewees' Suggestions continued

  - Fund staff (at health district) to provide on site advice to those with contaminated wells.
  - Filters and filtration systems for affected households.
- Reducing/Eliminating current and future contamination
  - Provide incentives for agricultural producers to make switch to irrigation/ fertilizer application systems that are more efficient and which prevent overloading of nutrients. (Surface water contamination remediation efforts have made significant strides using this approach in the Valley the past 10-15 years.)
  - Provide disincentives to agricultural producers to continue irrigating/fertilizing the way they have been.
  - Include a graduated time schedule for agricultural producers to make the switch to more efficient irrigation/fertilization approaches.
  - Impose a moratorium on growth of the number of cows at existing dairies and feed lots and do not permit new dairies or feedlots until it is clear that additional cows can be added to the valley without negative impact on the aquifer.
  - Count the actual number of cows on each dairy and feedlot (rather than accepting the producer's provided number) to determine if they exceed the limits based on the amount of cropland/spray fields they own or lease. If the number of cows exceed the land they control's carrying capacity for liquid and solid manure/wastewater, require them to downsize the number of cows they have so that they are within their Nutrient Management Plan.
  - Study the carrying capacity of the Yakima Valley for agronomic application of animal husbandry waste.
  - Close the gaps in enforcement responsibilities [e.g. (1) feedlot or dairy manure/compost sold or given to area farmers: once it leaves the dairy or feedlot, it appears no regulatory agency oversees the application rates or responds to complaints, (2) no groundwater monitoring exists on agricultural lands, only soil monitoring overseen by the WA state Department of Agriculture in the first foot of soil. Nutrients below that level are not monitored. Soil monitoring only records nitrates being available at end of growing season which could leach into groundwater over winter. There doesn't appear to be any enforcement when those residual nitrates are is found.]
  - Construct regional Anaerobic Digester and waste water treatment plant to handle dairy and feedlot waste. Also, require the heating of waste to levels required to kill bacteria and adequately treat other contaminants. (Some people who have studied Anaerobic Digesters see them as ineffective tools since they don't eliminate heavy metals and waste material still must be managed in much the same way as waste that hasn't been through a digester.)
  - Require bigger setbacks from existing wells and stream courses and drains for spray fields or wastewater lagoons.
  - Require wastewater lagoons to be created (and current ones modified) to take all reasonable precautions to protect against leaks and ban wastewater lagoons from areas with shallow aquifers and sandy, highly permeable soils.

Interviewees' Suggestions continued

  - Change Best Management Practices for dairies from advisory in nature to regulatory (laws).
  - Have regulatory agencies monitor the application of manure at or below agronomic rates and enforce regulations when the rates of application exceed agronomic rates.
  - Require the review and monitoring of National Pollutant Discharge Elimination System (NPDES) permits which are granted by the EPA.

- Enforcement of available protections.
  - Reliably, consistently enforce current protections.
  - Don't announce inspections of agricultural producers' operations.
  - Have agencies employ investigators whose work hours (particularly in spring and fall when dairy lagoons are being drawn down) include evening/night and weekend hours.
  - If required documents are not available when regulatory agencies inspect an agricultural producer's operation or investigate a reported violation, take immediate enforcement action.
  - Investigate existence of liquid waste water injection wells. If they exist, fine injectors and shut down wells.
  - Make data from 3rd party monitoring of dairies' test wells available to the public.
  - Have the local health district create health regulations related to Concentrated Animal Feeding Operations (CAFOs) which are stricter than state standards.

- Other approaches suggested
  - Utilize the same high level of diligence and dedication to reducing/eliminating current and future contamination independent of source (don't just go after one industry and make it out to be the sole cause of the groundwater contamination problem).
  - Insist on accuracy in reporting on the groundwater contamination problem, including using science based evidence rather than public perception or media bias.
  - Recognize that the groundwater contamination problem in the Lower Yakima Valley isn't limited to shallow wells or private wells as per information on WA Dept. of Health Web site.
  - Require Concentrated Animal Feeding Operation (CAFO) permits for all producers over a specific number of animals.
  - Adequately fund the Yakima Health District so that it can have staff members advise and assist homeowners whose poorly constructed, cased or maintained wells and septic systems are contributing to the contamination of the groundwater and their own water supply.
  - Make arrangements for an environmental justice representative to be present at all future meetings of significance.

Interviewees' Suggestions continued

- When meetings are held, introduce everyone present rather than just agency representatives.
- Have agency officials/representatives and mediators/facilitators participate in environmental justice training.
- Require agricultural producers to speak on their own behalf rather than hire association staff or attorneys to speak for them with regard to the Lower Yakima Valley Groundwater contamination.
- Create Nitrate Priority Areas in WA State similar to Idaho's designation.
- Revise zoning laws or create special use permit requirements for CAFOs and AFOs and spray fields to avoid being in areas with high water tables or in areas with population concentrations above a certain level.
- Rather than have technical experts from the various agencies design remediation plans for inclusion in agency budgets without a clear picture of how much money is available for the efforts, let the experts know from the beginning how much funding is available and then have them design plans to do the most with those funds.

APPENDIX B

List of Interviewees

U.S. Environmental Protection Agency
Tom Eaton
Washington Operations Office
300 Desmond Dr. SE Suite 102
Lacey, WA 98503

Marie Jennings
Ed Kowalski
Mike Cox
Mike Bussell
Richard Parkin
Steve Potokar
Caryn Sengupta
Jennifer MacDonald
Ted Yackulic
U.S. Environmental Protection Agency
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1200 Sixth Avenue, Suite 900
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Mark Masarik
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US Department of Agriculture
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Indian Health Service
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Yakama Nation
Natural Resources
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Stewart Crane
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WA State Department of Ecology
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Charlie McKinney
Ryan Anderson
Bob Raforth
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Melissa Gildersleeve
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WA State Department of Agriculture
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Olympia, WA 98504-2560

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Ephrata, WA 98823

WA State Department of Health
Dorothy Tibbetts
River View Corporate Center
16201 East Indiana Avenue, Suite 1500
Spokane Valley, WA 99216

Washington Conservation Commission
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1620 Road 44 North
Pasco, WA 99301-2667

South Yakima Conservation District
Dirk Van Slageren
Jim Newhouse
Chris Klebaum
Stephen Bangs
Laurie Crowe
Harriet Berg
1116 Yakima Valley Highway
Sunnyside, WA 98944

Yakima County
Rand Elliott
County Commissioner
128 N. 2nd St.
Yakima, WA 98901

Vern Redifer
Public Works
128 N. 2nd St.
Yakima, WA 98901

Yakima Health District
Gordon Kelly
1210 Ahtanum Ridge Dr
Union Gap, WA 98903

City of Grandview
Public Works
Cus Arteaga
207 W. 2nd St.
Grandview, WA 98930

Non-Governmental Organizations

Valley Institute for Research and Education
Ron Sell
Linda Knudsen

Washington State Dairy Federation
Steve George

Northwest Dairy Association
Lori Terry Gregory
Foster Pepper Law Firm
1111 Third Ave.
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Seattle, WA 98101

El Projecto Bienestar and its member organizations

University of Washington
Matthew Keifer
Professor of Public Health and Medicine
Rachel Schwartz
Box 357234
Seattle, WA 98195

Heritage University
Kazuhiro Sonoda
Dean, College of Arts and Sciences
3240 Fort Rd.
Toppenish, WA 98948

Yakima Valley Farmworkers Clinic
Vickie Ybarra
402 N. 4th St. Suite 202
Yakima, WA 98901

John Thayer
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Toppenish, WA 98948

Graciela Villanueva-Lopez
307 S. 12th Ave Ste 4b
Yakima, WA 98902

Northwest Communities Education Center
Maria Fernandez
Teodora Martinez Chavez
120 Sunnyside Ave.
Granger, WA 98932

CARE (Community Association for Restoration of the Environment)
Helen Reddout
Hans Schuller
Larry Fendell

Friends of Toppenish Creek
Eric Anderson

Concerned Citizens of the Yakama Reservation
Jan Whitefoot

Others concerned with environmental issues
Jean Mendoza
Jim Dyjak
Linda Dyjak
Marci Ogden
Anita Rojas
Laurie Porter

Nuestra Casa
Blanca Bazaldua
1007 S. 6th Ave.
Sunnyside, WA 98944

Marie Rose House
Sr. Mary Ellen Robinson
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DeVries Family Farm
Tom DeVries
15720 Highway 24
Moxee, WA 98936

Additional contact information for most of the people interviewed is available through the Dispute Resolution Center.

APPENDIX C

Possible other stakeholders

Organization	**Representative(s)**
US Geological Survey	
Washington Hop Growers Association	Ann George
Washington Mint Growers Association	Shane Johnson
WA State University Cooperative Extension	Troy Peters and Bob Stevens
Ag Forensics (dairy consultant)	Stu Turner
Darigold	Antone Mickelson
Pacific NW Vegetable Association	Mike Bush and Bob Stevens
Yakima Valley Growers and Shippers Association and NW Horticultural society	Mike Willett & Deb Carter
Washington State Farm Bureau	Enrique Gastelom and Devin Dekker
Cattle Feeders Association	Ed Field
WA State Cattlemen's Association	Jack Fields
Farwest Agribusiness Association (fertilizer applicators and agrichemical group)	James Fitzgerald
Northwest Justice Project	Elizabeth Tutsch and Alma Zuniga
Columbia Legal Services	Lori Jordan Isley and Saresh Sampath
Lower Yakima Valley Cities' drinking water treatment staff	
Wine Grape growers association	
Juice Grape grower association	
Washington State Mexican Farmer Growers Coalition	
Irrigation District Representatives: Wapato, Sunnyside and Roza	
WA State 15th District Legislators	Sen. Jim Honeyford, Rep. Bruce Chandler, Rep. David Taylor
Pumpdrillers Association	Mike Bach
Yakama Nation Tribal Council Water and Sewer Office Water Code Office Water Resources Office	Tribal Council member appointed to work on this topic, Marlene White, Bub Mills, Bob Pims and Tom Ring
Bureau of Indian Affairs	Bud Robbins and Rick Mains
Indian Health Services (additional staff)	Rex Quampts, Dean Effler
Benton County Health District	
Benton County Commissioners	

Additional contact information for many of these people is available through the Dispute Resolution Center.

APPENDIX D
Summary of Lower Yakima Valley Groundwater Contamination

I. **What is the problem?**

The following factors were cited in the March 2010 joint report as likely contributors to the nitrate contamination of groundwater in the lower Yakima Valley. (Other contaminants such as bacteria, including e-coli and coliform, and chemicals have not been the focus of the report though are also of concern and likely need to be addressed as well.)

- Fertilizers: Non-organic chemical fertilizers:
  - applied to agricultural crops that promote their growth with the goal of maximizing productivity,
  - applied to private yards to enhance grass and other plant growth,
  - Applied to parks and golf courses to enhance grass and other plant growth.
- Fertilizers: Organic animal waste (liquid and solid):
  - applied to agricultural fields and crops to promote plant growth with the goal of maximizing productivity,
  - Applied to get rid of this waste product of animal husbandry. In the Yakima Valley, this has primarily been from cattle feed lots and dairies. In other parts of the country, this could be from poultry and hog operations.
  - Generated on site and which can leach into the groundwater from waste lagoons and animal pens.
- Human waste from septic systems, particularly failed and poorly maintained ones, and, potentially, treated waste water from public sewer systems.

Fertilizers are very beneficial to agricultural production when applied at agronomic rates or below (the rate at which the plants can absorb and utilize the fertilizers) but can be harmful to surface and groundwater when applied at rates (and times) above agronomic ones. Plants are most productive when they receive fertilizer up to the agronomic rate, not below it or above it. The agronomic rates vary by crop, soil conditions, and amount of water falling or applied to that soil. (Water falling on or applied to a plot with varying elevation can pool at the lower area and lead to over saturation and over fertilization of that area even if the rest of the plot is receiving fertilizer at an agronomic rate.) There is growing awareness and careful application of fertilizer in many agricultural sectors of agronomic rates for specific soils and crops though there is still some hit or miss aspects due to weather and other conditions.

With non-organic fertilizers farmers and ranchers seek to minimize their use to agronomic rates because they pay for the fertilizers (as well as irrigation water and electricity for pumps to deliver the water/fertilizer), and because in conjunction with their application of fertilizer with irrigation water, over application can lead to observable contamination of surface water and subject them to fines and remedial action.

With organic fertilizers, producers of the animal waste products are under pressure to dispose of the waste at the rate their animals are producing it. Farmers and ranchers not producing the waste product generally can receive these products for the cost of transporting them or at very

reasonable rates so there isn't as much of a disincentive to carefully watch how much they apply, though their crop productivity may decline if they over apply the fertilizer.

The recent growth in the number of cows on dairies and feedlots in the Yakima Valley and awareness of the potential negative impact of organic fertilizers on surface and groundwater contributes to the need for greater vigilance and careful application of these fertilizers.

The awareness of the over-application of non-organic fertilizers to parks, golf courses and private properties/yards does not seem to be as high as awareness by the public and agricultural producers of organic fertilizer nor have educational campaigns to limit the over application been very visible. Commercial fertilizer applicators to private yards depend on selling larger quantities their product and they probably haven't made the shift to selling technical assistance/chemical management along with smaller amounts of non-organic fertilizer to their clients as has happened in some sectors of the agricultural industry. Self application by homeowners is not regulated and motivations such as having the greenest lawn or largest tomatoes may influence homeowners over use of fertilizers.

The nitrates in the fertilizers and human waste products enter the groundwater through leaching from overly irrigated/naturally watered croplands, waste ways and other surface water and leaching from septic systems. They also can enter the groundwater via the conduits of poorly constructed or maintained wells currently in use and by abandoned or poorly decommissioned wells which are no longer in use.

Wells that are poorly constructed and maintained or pull water from contaminated aquifers (groundwater exist at different levels below the ground, frequently separated by layers of relatively impermeable rock, the shallowest aquifers tend to be most commonly polluted) mean human and animal users of the water are subject to these contaminants. The negative health impact of drinking water, cooking food in it or using it for personal hygiene when it is contaminated by nitrates, bacteria and chemicals can be quite significant.

The three prong problem in the Yakima Valley is:

- how to prevent current and future contamination of the groundwater,
- how to clean up the groundwater still underground and
- How to provide safe water for human (and animal) consumption for those depending on water currently contaminated or which will become contaminated in the future.

(Under current standards for the cleanliness of drinking water 12% of the tested wells in the lower Yakima Valley had nitrate contamination levels above those considered safe for human consumption at the time of testing. An additional 22% had elevated levels of nitrate contamination which put their users at some risk. If the rates of nitrate contamination in the tested wells is mirrored more broadly across the Valley, that means that more than 1/3 of those who rely on private wells for their drinking water are using water that puts them at some health risk.)

II. What is known about the specific causes of the nitrate contamination of the groundwater in the Lower Yakima Valley?

At this point, there is little specific information about the exact causes of contaminated wells in various locations throughout the valley. Well testing conducted on private wells over the past 35 to 40 years has not been longitudinal and has not been of a nature to break down the existing contaminants by trace sources. (For example, existence of caffeine in the tested water can trace one of the sources of the contamination to human waste, likely from a septic system or trace chemicals from bovine growth hormone could indicate that one of the sources was waste from a feedlot or dairy wastewater lagoon or applied to an agricultural field/crop.) The U.S. Environmental Protection Agency during February and March 2010 has been testing private well water on approximately 330 wells to determine contamination levels. It will conduct more in depth testing on water from a smaller sample of these wells to determine sources of the contaminants (to the degree possible). Some of the wells being tested have been tested in the past and so comparisons may be made as to whether the contamination level is lessening, worsening or remaining constant.

One of the recommendations from this Situation Assessment was to conduct sampling to better link high nitrate levels in groundwater and private wells to possible sources of contamination. EPA completed an initial two-week sampling project on March 6th. EPA sampled over 330 residential water wells and found 21% of wells sampled had nitrate levels greater than the EPA drinking water standard of 10 parts per million and eight wells tested positive for bacterial contamination. Of these eight wells, three also had high nitrate levels.

EPA used the first round of sampling results to identify locations for the second, more focused round of sampling. The second round included taking water from 29 wells to test for a wide array of contaminants including nitrate, isotopes of nitrogen, bacteria, pesticides, general chemistry parameters, and a variety of pharmaceuticals and hormones. Soil samples were taken from crop fields and dairies. Manure and lagoon water samples were taken from dairies, and samples were collected at wastewater treatment plants. In total, over 1,000 sample bottles were collected and sent to seven laboratories for analysis. This sampling was completed on April 22, 2010.

Over the next few months, EPA will analyze and evaluate these samples, which may help link the high nitrate levels in the Valley's groundwater with possible sources of contamination. The results should be available in late summer of 2010. EPA hopes that these results will help provide the information needed to determine how to best reduce nitrate levels in groundwater.