

SOUTHERN WILLAMETTE VALLEY GROUNDWATER MANAGEMENT AREA

DRAFT RESIDENTIAL WORKING GROUP REPORT

February 2006

Introduction

The Southern Willamette Valley Groundwater Management Area was designated by the Oregon Department of Environmental Quality (DEQ) on May 10, 2004 in response to indications of high nitrate levels in the region's groundwater. Groundwater monitoring studies conducted by DEQ in the years 2000, 2001 and 2002 showed that in some parts of the Southern Willamette Valley, nitrate in the shallow groundwater exceeds 7.0 parts per million (ppm), or 70% of the Maximum Contaminant Level of 10.0 ppm set by the U.S. Environmental Protection Agency. The DEQ considers the 7.0 ppm level as a warning of a potential nitrate problem due to associated health risks, and is authorized to declare a Groundwater Management Area (GWMA) in regions where groundwater measurements of at least 7.0 ppm nitrate are widespread.

Nitrate contributions to groundwater in the Willamette Valley come from a variety of sources, including densely clustered or failing septic systems, agricultural practices, commercial and industrial practices, fertilizer applications, and animal waste management practices. Most of these are non-point sources of contamination, and are, therefore, difficult to quantify or to manage. Nitrate contamination is also an indicator of groundwater vulnerability to other contaminants.

{add information on estimated number of residents in GWMA, portion on private wells and septic, and estimated extent of failing septic, unused/older wells,}

Background

The Groundwater Management Area Committee (GWMA Committee) was appointed by the DEQ to provide guidance and input from stakeholders in determining ways to reduce nitrate in Southern Willamette Valley groundwater. As an advisory board to the Department of Environmental Quality, the GWMA Committee will provide review and critique of draft alternatives and prepare the final recommendations to be included in the Action Plan for the GWMA. The DEQ and other state agencies will consider recommendations from the GWMA Committee along with input from other members of the public during the review of the final Action Plan.

In order to adequately represent the diverse land uses and stakeholder interests within the GWMA, four working groups were established to address specific categories of nitrate sources and/or areas of concern within the GWMA. The groups include: Agriculture, Commercial/Industrial, Public Drinking Water, and Residential. The Residential Working Group is composed of county environmental health staff, OSU Extension staff, state agency staff and representatives from relevant businesses, community development organizations, real estate and local watershed councils. The Working Group was charged with researching potential residential sources of nitrate, determining appropriate strategies to prevent groundwater contamination from these sources, and identifying actions for achieving reduced nitrate levels. Over a series of meetings, the Residential Working Group drafted the goals, strategies, and actions contained in this report and will continue to refine these in subsequent drafts. This report comprises one component of the overall GWMA Action Plan to be proposed for adoption by DEQ.

Description of Problem

A number of residential sources may potentially contribute nitrate to groundwater. These include septic systems, lawn and garden practices, and animal waste management. In addition to these sources, unused wells

or wells that are in poor condition can act as conduits for nitrate to reach groundwater. Irrigation and fertilizer and animal waste storage practices may also contribute nitrate to groundwater [more detail to be added]

In addition to the residential nitrate issues outlined below, this report also outlines actions to increase public awareness of the health risks related to consuming water that contains nitrate. While increasing awareness of health risks may not directly help reduce nitrate levels in the groundwater, it is one of the most important aspects of the GWMA effort. The health-related risks of drinking water that contains nitrate are not clearly defined in the scientific literature, and ongoing analysis by toxicologists and other health-field professionals has, at times, yielded conflicting conclusions. Outreach and education efforts within the GWMA should include health-related risk information and options for residents who decide to take action to reduce their exposure to nitrate.

Septic Systems

Septic systems, whether properly functioning or failing, can contribute nitrate to groundwater, therefore, it is important that rural residents understand the connection between their septic systems and groundwater and be able to implement options to upgrade poorly functioning systems. Efforts to reduce the potential impact of septic systems on drinking water should focus on areas where septic systems are most likely contributing excess nitrate to groundwater. Possible strategies include best management practices for regular septic system maintenance; installation of proven alternative septic systems; changes in residential zoning towards more densely developed neighborhoods on communal wastewater treatment; or changes in residential zoning towards less densely developed neighborhoods that allow for appropriate septic system drainage. Barriers to implementing these strategies include cost, regulatory changes, and adequate access to information and technical assistance.

Unused Wells or Wells in Poor Repair

Nitrate can reach the groundwater via conduits such as older wells which were driven, have been poorly maintained, or have been improperly decommissioned. In addition, these wells can also serve as pathways for other groundwater contaminants. It is, therefore, important that rural residents within the GWMA understand the connection between their wells and groundwater and have the resources and information necessary for proper well maintenance and proper decommissioning of unused wells. Strategies to increase awareness may include general education programs or on-site visits to test wells, assess subsurface construction, and provide technical assistance. Efforts to encourage proper well decommissioning should focus on areas with high concentrations of old wells, and should also provide for repair and construction of new wells as needed. Barriers to implementing these strategies include cost and adequate access to information and technical guidance.

Lawn and Garden Activities

Lawn and garden activities can contribute nitrate to groundwater in a variety of ways including type of fertilizers used, timing of application, irrigation practices, and compost management. In general, all types of nitrogen fertilizers can leach to groundwater if they are applied at the wrong time or in combination with excessive irrigation. Using slow-release nitrogen fertilizers, drip irrigation, and mulching mowers, covering compost piles to prevent excessive leaching, choosing nitrogen-fixing plants, and timing fertilizer/manure applications to meet plant nitrogen demands are effective ways of minimizing lawn and garden impacts on groundwater nitrate. It is important to note that although slow-release fertilizers are typically more expensive, consumers can apply them less often than other fertilizer types and achieve the same results. Efforts to encourage groundwater-friendly lawn and garden activities might include outreach and education programs and consumer incentives to increase awareness of the connection between lawn and garden activities and groundwater quality and facilitate the implementation of alternative practices to decrease nitrate contribution from lawn and garden activities. Barriers to implementing these strategies include cost of products and access to information and guidelines.

Animal Waste Management

Animal manure applied to fields or stored in piles can contribute nitrate to groundwater through leaching, particularly during the rainy season. Efforts to reduce the potential impact of animal waste on groundwater might include improved storage and handling practices, and appropriate timing and amount of application to fields. These actions will serve to increase awareness of the connection between animal waste and groundwater nitrate, and encourage small-scale animal management practices that can reduce nitrate contribution to groundwater.

Goals and Strategies

Goal 1 – Outreach and Education: Promote awareness of residential sources and pathways of nitrate to groundwater and potential related human health risks; encourage actions to reduce nitrate contributions to the groundwater.

Outreach and Education Strategy 1: Communicating Information and Facilitating Nitrate Reduction Practices

Communicate to residents how animal waste, wells, septic systems and lawn and garden activities are connected to groundwater quality. Encourage and facilitate practices that can prevent nitrate migration via old or unused wells, or leaching of nitrate from septic systems, animal waste, and lawn and garden activities.

Comprehensive Actions

- Identify high-risk areas within the GWMA based on elevated nitrate concentrations, or status/condition of septic systems and wells. Focus on these areas as a high priority for implementing programs and other strategies.
- Develop maps of GWMA depicting areas with high-density septic systems, older wells, wells with elevated nitrate, and other details to characterize high-risk areas.
- Continue implementation of water-related educational programs, including K-12 (contact EHSC at OSU) and adult programs, with focus on groundwater protection
- Develop new water-related educational programs that emphasize groundwater protection
- Produce and distribute materials such as fact-sheets, newsletters, or groundwater protection tips in utility bills.
- In literature and education programs, clearly explain groundwater-specific importance of well maintenance, well decommissioning, septic system maintenance, appropriate lawn and garden practices, and animal waste management
- Communicate information on practices that promote soil nitrate retention and minimize leaching from fertilizer, animal waste, and septic systems
- Work in concert with cost-share/grant programs to provide information to residents on financial assistance available for nitrate reducing activities (septic system replacement or repair), addressing contaminant pathways (well decommissioning, well repair or replacement) or nitrate risk reduction (treatment, bottled water, or drilling a deeper well)

Actions Related to Septic Systems

- Research proven septic system management techniques to reduce nitrate contribution
- Research proven alternative septic system technologies that would provide the best groundwater protection for soil types in the GWMA (focusing on areas where septic systems are more likely to be a significant nitrate contributor).
- Identify existing septic system literature and/or develop new literature that addresses Best Management Practices for long-term septic system maintenance

Actions Related to Wells

- Research alternative, lower-cost methods for decommissioning wells
- Develop and distribute a technical assistance packet for well owners to assess the condition of their well, including subsurface construction

Actions Related to Lawn and Garden

- Research proven management techniques for fertilizer and manure application and storage, and irrigation practices to reduce nitrate contribution
- Develop demonstration projects that emphasize groundwater protection and nutrient retention
- In collaboration with local nurseries, garden stores, and fertilizer manufacturers in GWMA, launch a "groundwater friendly" labeling campaign to identify slow release fertilizers, nitrogen-fixing cover crops (which can decrease the need for nitrogen fertilizer), mulching lawn-mowers, home composting systems, and drip irrigation systems/soaker hoses
- Distribute groundwater-friendly lawn and garden information with all purchases made at nurseries and garden shops, and to landscapers and lawn maintenance professionals within the GWMA.
- Clearly communicate to consumers the advantages of using slow-release fertilizers (more expensive, but fertilizer can be applied less often and yield the same results).

Actions Related to Animal Waste Management

- Research proven management practices for composting and/or storing manure and for determining amount and timing of application
- Research issues of groundwater contamination and nitrate content variability associated with manure and develop guidelines for determining quantity and appropriate timing of application.

Implementation Responsibility

Educational programs and materials: Working group, county sanitarians, OSU Extension, OSU student interns (public health, environmental science, environmental health, science ed.), educators in local schools and other educators (e.g. Benton Soil & Water Conservation District)

Research related activities: Working Group members, DEQ, county staff, OSU Extension, OSU graduate students

Measurements of Effectiveness

- Completed maps of high priority areas
- Completed research summaries that can be used to generate fact-sheets, tips, newsletter articles, etc. for outreach/education efforts
- Reaching target number of schools in which groundwater programs are offered
- Increased number of groundwater education events in GWMA
- Increased number of "groundwater friendly" gardening projects in schools
- Successful distribution of newsletter and groundwater protection tips to all GWMA residents
- Achieve target number of nurseries and garden shops that participate in either product labeling or discount programs
- Demonstrated changes in time of fertilizer application and increased use of slow-release fertilizers by residents (how could this be demonstrated?)
- Demonstrated increase in number of residents who cover animal manure

Outreach and Education Strategy 2: Public Health Risk Reduction

Promote awareness of the potential risks associated with consuming water with elevated nitrate and provide alternative actions to decrease risks.

Comprehensive Actions

- Continue research on health risks associated with varying levels of nitrate in drinking water and incorporate current information on health risks into all educational programs offered and written information distributed to public
- Research treatment options available to reduce or eliminate nitrate from drinking water and associated costs
- Establish a volunteer network to conduct nitrate screenings and provide one-on-one consultation with residents to address nitrate risks
- Provide fact-sheet addressing health risks and treatment options for residents with nitrate in their drinking water (including treatment, drilling a new well, or purchasing bottled water)

Implementation Responsibility

- OSU student interns and researchers, OSU Extension, County Health Departments, community development organizations, other educators

Measurements of Effectiveness

- Reach targeted portions of GWMA population with volunteer network activities
- Demonstrated increase in personal actions taken to reduce nitrate risk as a result of programs

Outreach/Education Strategy 3: On-site Outreach Program

Establish an on-site outreach program to offer property owners assessment of potential risks to groundwater such as septic systems, animal waste handling/storage, fertilizer use, and old or unused wells. Assessment to include nitrate screening, well and septic maintenance information, subsurface construction of well, and possible solutions such as proven alternative septic system technologies or well repair.

Comprehensive Actions

- Explore staffing options for the program such as county Environmental Health department interns, OSU student interns, or residential neighborhood volunteers
- Work in concert with cost-share/financial assistance programs to provide appropriate information on how to decommission or repair a well, replace a failing septic system, or address health risks
- Develop a site-assessment protocol and supporting outreach materials (guide to septic maintenance, solutions manual, system checklist) (use existing materials where possible)
- Develop a technical assistance guide for well owners to assess the condition of their well, including subsurface conditions

Implementation Responsibility

- County Environmental Health or Subsurface Sanitation departments, OSU Extension Staff, OSU student interns

Measurement of Effectiveness

- Adequately staffed program with sufficient long-term funding
- Achieve targeted percentage of site visits in pre-designated areas of concern.

Goal 2 – Financial Incentives: Overcome cost barriers to reducing nitrate contributions and associated health risks by providing financial incentives and assistance to residents.

Financial Incentives Strategy 1: Cost-Share or Grant Programs

Establish a cost-share, grant or other financial assistance program to help property owners properly decommission old, unused wells, repair or replace poorly maintained or poorly constructed wells, upgrade old and poorly functioning septic systems; and/or pursue options for reducing level of nitrate in drinking water.

Comprehensive Actions

- Find and manage monies for such a program
- Establish standards for assessing when financial assistance would be offered, particularly for drilling new wells.
- Work in concert with outreach/education staff to provide up-to-date research/regulations on proven alternative septic system technologies which would provide the best groundwater protection for soil types in the GWMA, and approved methods for well decommissioning

- Work in concert with outreach/education staff to provide up-to-date information on health risks associated with drinking water that contains nitrate

Implementation Responsibility

- County Environmental Health or Subsurface Sanitation departments, community development organizations

Measurements of Effectiveness

- Cost-share/grant program established and implemented with long-term plans for future funding
- Achieve targeted percentage of upgrades in areas where septic systems likely contribute to elevated nitrate in groundwater
- Achieve targeted percentage of repairs/new wells in areas with high likelihood of nitrate migration via unused or old wells.
- New wells were installed at residences where it was deemed necessary or of benefit by county sanitarians

Financial Incentives Strategy 2: Consumer Incentives

Provide financial incentives to encourage the purchase of groundwater-friendly products

Comprehensive Actions

- Contact local nurseries and garden stores to establish a consumer incentive program that includes store discounts for groundwater-friendly products
- Provide groundwater-friendly giveaways or discount coupons, such as small packets of slow-release fertilizer, nitrogen fixing plants, drip-irrigation hoses, or mulching mowers at local events
- Develop and implement mechanism for issuing discounts

Implementation Responsibility

OSU Extension, other educators, DEQ, participating nurseries and garden stores

Measurements of Effectiveness

- Demonstrated purchase of "groundwater friendly" products attributed to participation in incentives program
- Demonstrated decrease in purchase of products that pose higher risk of nitrate leaching to groundwater (e.g. high nitrogen fertilizer)

Goal 3: Recommend regulatory changes that will facilitate actions by residents to reduce nitrate from contributing sources and reduce the risk of nitrate migration to groundwater via unused or old wells.

Regulatory Change Strategy 1: Reduce Nitrate Contributions from Septic Systems

Recommend that county and state offices examine regulatory changes that would allow/encourage the use of alternative technologies to reduce nitrate contributions from septic systems

Comprehensive Actions

- Research proven alternative septic system technologies that would provide the best groundwater protection for soil types in the GWMA areas where septic systems are most likely contributing to elevated nitrate. Consider requiring that these systems be installed at time of development within the GWMA.
- Document steps and timeline needed to establish a new requirement for alternative septic system technology
- Draft proposed code and submit to regulatory body for approval

Implementation Responsibility

County sanitarians, DEQ, Working Group

Measurements of Effectiveness

- Achieve targeted percentage of households installing alternative septic system technologies

Regulatory Change Strategy 2: Cluster Development Zoning Changes

Recommend that county and state offices consider possible zoning changes that would encourage cluster development with communal wastewater treatment (rather than individual septic systems).

Comprehensive Actions

- Research examples of communal wastewater treatment implemented for cluster development and present findings at appropriate state or county meetings
- Document zoning changes required to encourage cluster development with communal wastewater treatment and present proposal at appropriate state or county meetings
- Draft proposed zone change language and submit for review and adoption.

Implementation Responsibility

County sanitarians, county planners, Working Group

Measurements of Effectiveness

Adoption of zoning changes

Regulatory Change Strategy 3: Housing Density Zone Changes to Ensure Adequately Sized Drainfields

Recommend that county and state offices consider possible zoning changes in areas that rely on septic systems that would encourage appropriate housing density allowing for adequately sized drainfields

Comprehensive Actions

- Research and document examples of development projects where zoning was used to encourage housing densities that allow for adequately-sized drainfields
- Document steps needed to implement zone changes to encourage housing densities that allow for adequately-sized drainfields
- Place septic zoning requirements or presentation of research findings on agenda at appropriate county or state meetings
- Draft text for zone change

Implementation Responsibility

County sanitarians, County planners, Working Group

Measurements of Effectiveness

Adoption of zoning changes

Regulatory Change Strategy 4: Well Decommissioning

Adopt new code to allow for alternative methods of well decommissioning that could facilitate the process and enhance groundwater protection

Comprehensive Actions

- Investigate alternative, lower-cost methods to decommission wells
- Draft text of code and submit to Groundwater Advisory Board for adoption

Implementation Responsibility

Oregon Water Resources Department, Working Group

Measurements of Effectiveness

- Draft rule changes developed and adopted if warranted
- Demonstrated increase in number of well decommissionings in GWMA compared to trend prior to new code

Summary/Conclusion