

Thurston County

Public Health and Social Services

FINAL PROJECT REPORT
FOR
G1200391

On-Site Sewage Management in the Scatter Creek Aquifer



Total Cost of Project:	\$237,510
Grant or Loan Amount:	\$178,132

Website:
www.co.thurston.wa.us/health/ehsc

Project Start Date: January 1, 2012
End Date: December 31, 2014

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Thurston County Public Health and Social Services Department G1200391

Jan. 1, 2012 - Dec. 31, 2014

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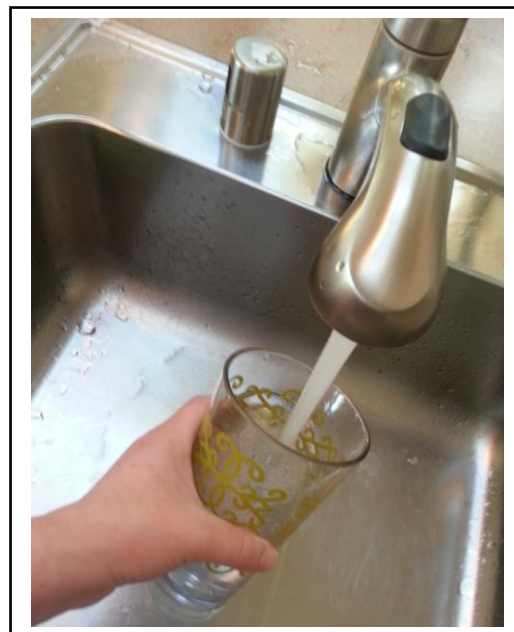
Final Ecology Grant Contribution: \$178,132

Project Description

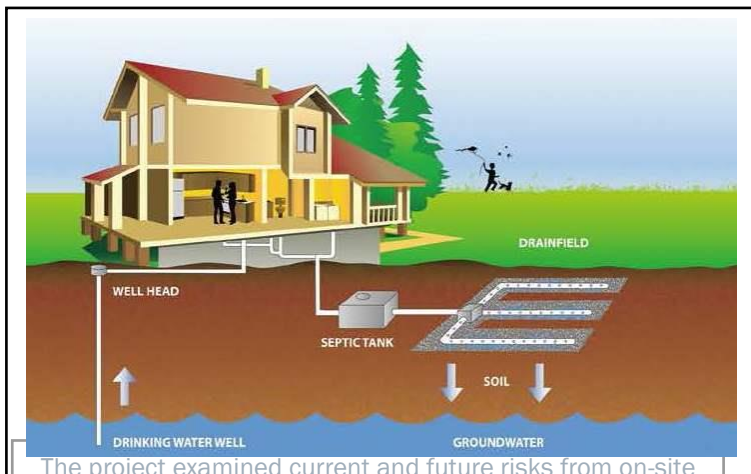
The Scatter Creek aquifer is a shallow, unconfined, and extremely vulnerable ground water supply that is the sole source of drinking water for more than 18,000 Thurston County residents. In the past septic systems and land use activities contaminated some areas of the aquifer, resulting in violations of drinking water standards, increased public health risks, and water quality degradation.

The project goal was to assess current aquifer conditions, use scientific modeling and citizen input to create recommendations to protect the aquifer as the area develops. A ground water model was used to quantify the risk posed by on-site sewage systems (OSS) to the Scatter Creek Aquifer and to evaluate different future development and sewage management scenarios.

Thurston County Board of Health appointed a citizen advisory committee to help guide community discussion regarding the water quality of the Scatter Creek aquifer, on-site sewage system impacts, sewage system management issues, and to assist in the development of a ground water protection strategy.



The Scatter Creek Aquifer is the sole source of drinking water for over 18,000 Thurston County residents.



The project examined current and future risks from on-site sewage systems to drinking water quality in the aquifer.

Project Accomplishments

A network of wells to monitor the Scatter Creek Aquifer was expanded from 32 to 38 wells. These were monitored for coliform bacteria, nitrates, and other parameters twice a year to provide information on current conditions in the aquifer and provide data used by our hydrogeologist to refine and calibrate the ground water model.

In consultation with the Citizen Advisory Committee, six land use scenarios were modeled to predict potential future impacts to the aquifer. After two years of working with experts in water quality, ground water modeling, public health, and the public, the Advisory Committee completed its evaluation and developed recommendations to protect the aquifer. The Board of Health accepted the final recommendations on December 17, 2014. The recommendations focused on well siting, OSS, ongoing water quality monitoring, education and funding.

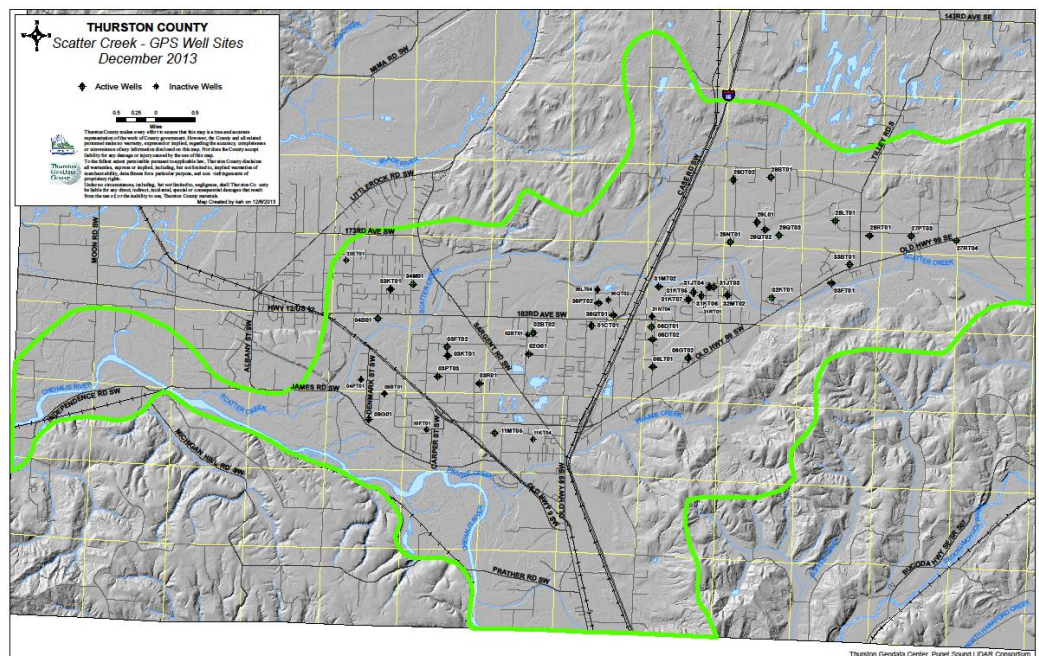
The Citizen's Advisory Committee reached the following conclusions which guided their recommendations designed to protect drinking water quality in the Scatter Creek Aquifer.

- Nitrogen levels in the aquifer have decreased over time and seem to be trending lower.
- The ground water model predicts that average nitrate concentrations in the most vulnerable part of the study area under full build-out conditions will be less than half the maximum contaminant level of 10 mg/l.
- In general, zoning, land use and health regulations have protected the aquifer from nitrate and many other contaminants. However, health and land use regulations can be strengthened to help assure the optimal placement of new septic systems and wells to minimize the potential for contaminating drinking water supplies.
- Education to area residents about septic system maintenance and wellhead protection will help residents protect water quality in the aquifer.

Implement the Scatter Creek Aquifer Citizen's Committee final recommendations as resources allow. A standing citizen advisory committee will help prioritize and direct implementation of the recommendations. Changes to current health codes such as well and OSS siting recommendations will occur as codes are updated. Increased education about actions residents can take to protect water quality, as well as ongoing water quality monitoring can begin immediately.

A robust public outreach process combined with scientific research helped accomplish practical recommendations to protect this important resource.

DESCRIPTION



The Scatter Creek aquifer is a shallow, unconfined, and extremely vulnerable ground water supply and is the sole source of drinking water for more than 18,000 area residents. The aquifer also supplies drinking water to more than 2,500,000 visitors who use the Scatter Creek Rest Area on Interstate 5. Course soils deposited during glacier flooding 13,000-15,000 years ago do not filter out contaminants well.

Many previous reports and studies (The Evergreen State College 1978, Thurston County Health 1984, Sinclair and Hirschey 1992, Thurston County Health 1995, Mead 1996, Parametrix 2003 and Thurston County Health 2006) have documented concerns about the aquifer. Past sampling found some drinking water wells exceeded the state and federal drinking water maximum contaminant levels for nitrate and coliform bacteria, resulting in violations of drinking water standards, increased public health risks, and water quality degradation. E. coli was confirmed in some coliform positive samples (Appendix B, Map 2; 2013 Sample Sites). The drinking water standard for coliform bacteria is non-detect, for nitrate is 10.0 mg/l. Nitrate levels at or above 2.0 are considered degraded. On-site sewage systems (OSS) combined with the course soils in the area appeared to be a significant threat to the aquifer as land use converts from agriculture to residential use.

The preliminary results from a ground water model developed by Thurston County prior to this project called into question whether existing OSS rules and policies were sufficient to protect the Scatter Creek Aquifer and the public health of those reliant on it. These preliminary results confirmed vulnerability of the Scatter Creek Aquifer documented in past studies, and at the same time, showed that the Scatter Creek Aquifer is prone to high dilution. The ground water velocity and dilution characteristics of the Scatter Creek Aquifer make it difficult to predict water quality and pollutant concentrations.

Funding from the Centennial Clean Water Program allowed for refinement of the contaminant fate and transport ground water model to more fully evaluate the risk posed by OSS and evaluate six different land use development and sewage management scenarios. The existing network of wells to monitor current conditions in the Scatter Creek Aquifer was expanded from 32 to 38, though a total of 53 wells were brought on line over the course of the project in response to model requirements and to replace wells lost due to change of ownership or other needs. Well monitoring occurred twice a year in March and October, sampling for coliform bacteria, nitrates, water levels and other parameters. A Citizen Advisory Committee was established to evaluate options, gather input from the community, and make recommendations to the Board of Health in order to protect the aquifer. As the area continues to develop, properly designed and implemented regulations and policies are the best means available to protect the aquifer and ensure safe drinking water, whether the water is served by single family wells, small community water systems, or large utility-managed water systems.

OUTCOMES

Water Quality and Environmental Outcomes: With the updated ground water model, it was possible to predict that even in the worst case scenario, the most vulnerable parts of the Scatter Creek Aquifer will meet drinking water standards for nitrate. The ground water model is unable to predict coliform bacteria levels. The ground water model predicts that average nitrate concentrations in the most vulnerable part of the Scatter Creek Aquifer Area under full build-out conditions will be less than half the maximum contaminant level of 10 mg/l.

Much work was done by staff to assess and monitor current conditions in the aquifer, and model potential future impacts. After two years of cooperating with experts in water quality, ground water modeling, public health, and the public, the Advisory Committee completed its evaluation and developed recommendations (appendix A) to protect the aquifer. The advisory committee reached the following conclusions as they developed their recommendations:

- The aquifer is vulnerable to contamination from septic systems and land use activities.
- Nitrogen levels in the aquifer have decreased over time and seem to be trending lower.
- Current aquifer conditions and worse case model results do not warrant taking regulatory action at this time. The ground water model predicts that average nitrate concentrations in the most vulnerable part of the study area will be less than half the maximum contaminant level of 10 mg/l.
- The committee wants to be cautious and monitor water quality so, if needed, we can take action before it is too late. Ideally monitoring should: evaluate trends, the accuracy of the computer model, water quality in the deeper aquifer, the extent and duration of water quality spikes, chemicals of emerging concern, and pathogens such as viruses.
- In general, zoning, land use and health regulations have protected the aquifer from nitrate and many other contaminants. However, health and land use regulations can be strengthened to help assure the optimal placement of new septic systems and wells to minimize the potential for contaminating drinking water supplies.
- The committee believes that with proper information, education, and incentives, area residents will be good stewards and take action to protect the aquifer.

The ground water strategy and recommendations were widely distributed to the public and were the subject of community workshops. Thurston County Board of Health reviewed the final recommendations and accepted the recommendations at their December 16, 2014 meeting.

Performance Items and Deliverables: Each task's deliverables are described below.

Ground Water Monitoring

1. Develop QAPP and send draft to DEPARTMENT by April 30, 2012.
QAPP approved, April 9, 2012.
2. Conduct ground water sampling in accordance with approved QAPP.
Ground water sampling occurred twice a year in March and October from October 2012-October 2014.
3. Evaluate, tabulate and map sample results and pollutant concentrations.
Maps are found in appendix B

4. Sponsor one drinking water well sampling event for up to 50 well owners.
28 households took advantage of the sampling event from August-October 2013.
5. Map existing on-site sewage systems.
 - Maps are found in appendix B
 - There are approximately 3,400 septic systems currently in the project study area. Staff found **1,324** on-site sewage systems that were either not in the permit tracking system at all, or were not identified as “active” at the start of the project. Of these 1,324 systems, **1,136** were on parcels not previously identified as being served by an on-site system. Septic records were added to the permit tracking system for each of these on-site systems. Where parcels previously identified as being served by on-site are being served by sewer, the permit tracking system was also corrected. Staff identified 178 parcels presently served by sewer.
6. Map existing undeveloped lots within the study area.
 - An additional 324 undeveloped legal lots and another 516 parcels (for a total of 840) could be developed with on-site sewage systems under current permitting standards in the aquifer area.
 - Maps are found in appendix B
7. Quantify pollutants associated with land uses found in the region.
 - On-site sewage system data includes the number of gallons per day (GPD) of sewage per parcel, which was used to calculate nitrate loading in the ground water contaminant fate and transport model. With the assistance of experts from the Department of Health, staff determined that the typical single family OSS discharges 225 gallons per day of wastewater that has a nitrate concentration of 60 mg/l.
8. Enter data collected, as part of QAPP, into DEPARTMENT's EIM System.
 - Data has been entered into EIM
9. Provide items produced through this task to the DEPARTMENT with final report submission.

Regional Ground Water and Contaminant Fate and Transport Model

1. Refine the calibrated numerical ground water and contaminant fate and transport model for the Scatter Creek basin using additional water quality, water level and stream flow data and pump test data.
2. Perform contaminant fate and transport simulations and continued calibration of the numerical model using new data and the latest information as it comes in. This information includes land use scenarios, calculations of contaminant loads from septic, acreage size and scenarios from policy makers and stakeholders.
3. Update geologic cross-sections, water quality databases and continue to refine physical ground water numerical model.

The groundwater model was calibrated using the collected groundwater data. The hydrogeologist met regularly with the citizen's committee and provided 6 priority model simulations requested by the committee in the form of nitrate concentration maps, graphs and tables. The completed ground water modeling simulations and maps were used along with the information in the committee meetings and the last public workshop to support recommendations. Please note that Thurston County's hydrogeologist left on indefinite medical leave beginning in August 2014 and could not participate in this project after that

time. The modeling outputs are in appendix C. The required performances have been met in this task.

- **Simulation 1** or baseline, looked at the current nitrate contribution to the aquifer from existing septic systems only. Model results show that septic systems currently contribute 0.5 - 2.5 mg/l nitrate to groundwater in the region. Actual nitrate levels are higher than the model predictions because livestock, fertilizer, and other land use activities contribute nitrogen. These activities add an average of about 1.0 mg/l nitrate to the aquifer, however contamination is higher in some areas from historic practices.
- **Simulation 2:** Planners from Thurston County Resource Stewardship, EH and GeoDATA provided 'legal lot build out' spatial locates and data in spreadsheets for incorporation into the model. This second major simulation added 324 more septic systems on existing legal lots that could accommodate new development, primarily at the eastern end of the model boundary. The model predicts these additional septic systems will raise ground water nitrate concentrations by 0.1 to 0.3mg/l.
- **Simulation 3** 'Full Build out' scenarios where an additional 516 septic systems could be added to the area (4,536 total) if property develops the maximum extent allowed by current zoning. This 'future' build-out scenario was developed with data provided by Thurston Regional Planning Council and GeoDATA. This model included modeling of Tenino Reclaimed Water quality (monitoring well data) at eastern end of numerical model. The model predicts these additional septic systems will raise ground water nitrate concentrations by as much as 0.5 mg/l. Under this "full build out" scenario, nitrate concentrations could almost reach 4 mg/l nitrate in the most vulnerable portion of the study area (the northwest corner).
- **Simulation 4** consisted of adding fertilizer estimated contributions from each household to the previous simulation. We assumed lawns would be fertilized at a rate of four pounds of nitrogen per 1,000 square feet annually as per WSU extension recommendations. This is likely a worse-case scenario as many residents do not fertilize their lawns.
- **Simulation 5** remodeled the Tenino Reclaimed Waste Water facility to better represent the actual location where ground water is recharged and to reflect the current output of the facility. Simulation 5 looked at current and legal lots (simulation 2) plus lawn fertilizer and the actual Tenino data.
- **Simulation 6** looked at full build out (simulation 3) plus lawn fertilizer and Tenino at a worse-case scenario that doubled the discharge of the plant from the current permit limit of 228 mgd and increased the nitrate concentration of reclaimed water discharged from the plant to 10 mg/l nitrate – the maximum allowed under state law.

Public Outreach and Education

1. Convene a stakeholder committee to advise throughout the project.

The Board of Health appointed a diverse group of 11 people to the Scatter Creek Citizen's Committee at their October 9, 2012 meeting. The citizen's committee began meeting in November 2012 and met monthly until October 2014. The agenda, notes, and meeting materials are all posted to the project website, along with information about the selection process and role of the committee.

2. Conduct three public meetings, establish a project website, and send at least two direct mailings.

Public outreach, especially getting resident input to protect drinking water quality in the aquifer, was an essential part of this project. The following describes steps taken to involve the public.

Mailings

- 1st mailing: April 2012. The first mailing was a letter introducing the project, included a map with the project boundary, and asked for nominations of people to serve on the Citizen's Committee. The original mailing was sent to 3,659 addresses. We discovered that residents in mobile home parks did not receive the original mailing, and so sent the mailing to them belatedly and corrected our mailing list.
- 2nd mailing: July 2013. A newsletter with project updates, a survey, and an announcement about the community workshop was mailed to 5,493 addresses in the study area.
- 3rd mailing: April 2014. A postcard announcing the upcoming Community Workshop was mailed to 5,493 addresses in the study area. Residents were encouraged to provide input in a variety of ways, even if they could not attend the workshop.
- 4th mailing: September 2014. A postcard announcing the upcoming Community Workshop was mailed to residents and property owners in the study area several weeks before the workshop. This mailing was needed because the preliminary recommendations would not be decided in time to give adequate notice for residents to hold the date for the workshop.
- 5th mailing: September 2014. A newsletter with the full text of the preliminary recommendations and a feedback survey was mailed to residents and property owners in the study area.

Website, Blog Posts, Tweets

A project website: www.co.thurston.wa.us/health/ehsc went live in April 2012, before the first mailing was sent. In addition to keeping the website updated as the project progressed, there were links for viewers to comment, ask questions, or request to be added to the update list. A Frequently Asked Questions (FAQ) page was started right away to respond to questions and comments from advisory committee members and the community. The FAQ document was revised over the course of the project and updated versions were posted on-line and made available at community workshops. At the request of the Citizen's Committee business

cards with the project website were made and distributed. This allowed interested folks to access accurate information about the project any time. The Scatter Creek Aquifer

Protection Project was mentioned several times on the health department twitter feed and in blog posts.

Community workshops

- The first community workshop was held on July 30, 2013 from 6:30 -8:30 pm at Rochester Middle School, attended by approximately 60 people. Articles about the workshop appeared in the August 1, 2013 Centralia Chronicle and the August 7, 2013 Rochester Sun News. This workshop introduced the project.
- The second community workshop was held on April 23, 2014 attended by about 94 people. Results from water quality monitoring and the groundwater computer model were shared. Participants had an opportunity to ask questions and provide input at stations, and to complete a short survey.
- The third and final community workshop was held on September 30, 2014 attended by about 78 people. This workshop focused on sharing the preliminary recommendations developed by the Scatter Creek Aquifer Citizen's Committee and seeking community input before the committee finalized their recommendations.

Events & Presentations

In order to reach as many people as possible about the project and get their input, staff attended a number of special events and gave presentations to interested groups.

- Swede Day 2013: talked with approximately 72 people
- Tenino Oregon Trail Days 2013: talked with 61 area residents
- Rochester Head Start: March 13, 2014: briefly introduced project at Family Night, 85 attendees

Surveys

In order to get as broad a level of input into the project as possible, we included surveys in the newsletters and had them available at the community workshops. The results and comments from the surveys were shared with the Citizen's Committee, the Board of Health, and posted on the project website. The Citizen's Committee used the input to help shape their recommendations. Sixty-five people completed the survey mailed with the first newsletter and available at the July 30, 2013 workshop. Fifteen people responded to the "best outcomes" comment form available at the April 2014 community workshop. Fifty-five people completed the fall 2014 survey asking for feedback to the preliminary recommendations. Survey results and comments are in appendix D.

3. Draft ground water protection strategy

The Citizen's Committee drafted preliminary recommendations to protect the aquifer after reviewing water quality monitoring data and ground water model results. The committee developed conclusions that reflected their understanding of the Scatter Creek aquifer and what is needed to protect it as a drinking water source. The conclusions and recommendations were mailed to all residents and property owners in the aquifer area, and shared at the third community workshop. At the October 1, 2014 committee meeting, the committee finalized the recommendations (appendix A).

Policy Development and Implementation

1. Review ground water strategy with the Thurston County Board of Health and Health Officer.
The Scatter Creek Citizen's Committee final recommendations were presented to the Board of Health during a briefing on November 6, 2014.
2. Prepare regulations and policies for consideration by the Board.
The Board of Health directed staff to prepare a resolution for the Board of Health to officially accept the Scatter Creek Citizen's Committee final recommendations to protect the Scatter Creek Aquifer at their December 16, 2014 meeting.
3. Implement regulations as directed by the Board.
The Board of Health resolution (appendix E) directs the Public Health and Social Services Department to implement the Advisory Committee's recommendations through its own actions or through coordination with other county departments and other agencies, as time and resources allow.

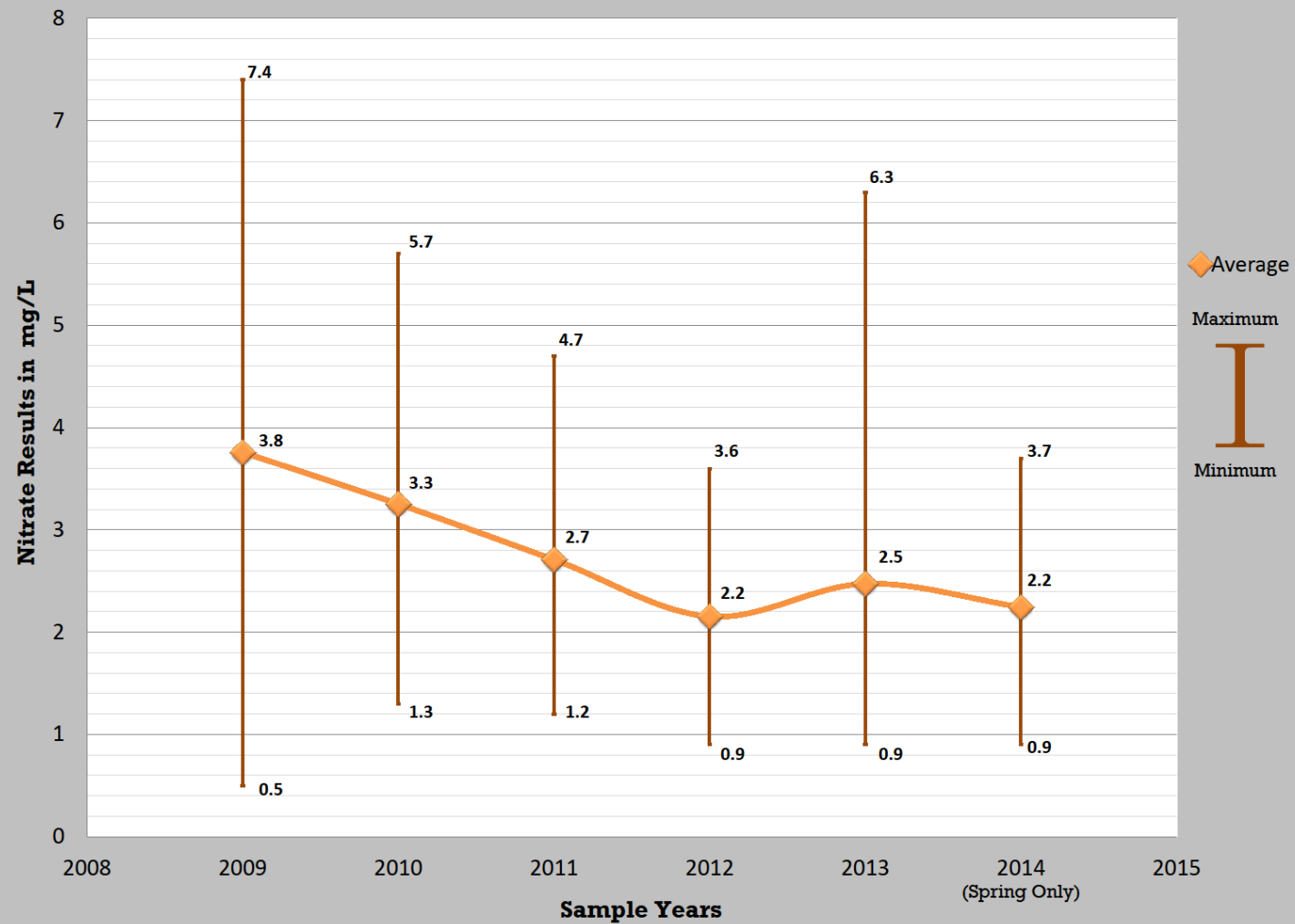
EVALUATION

The project is considered successful because the overall nitrate concentration in the aquifer was less than 4 mg/l with no single occurrences greater than 10 mg/l as shown in the following graph.

The updated, more robust groundwater model was used to quantify the risk posed by on-site sewage systems (OSS) to the Scatter Creek Aquifer and to evaluate six different development and sewage management scenarios. The current conditions and worse-case predictions do not warrant taking regulatory action at this time. Implementation of the recommendations should protect the drinking water quality of the Scatter Creek Aquifer into the future.

The citizen's advisory committee unanimously approved all the final recommendations. The committee, except for one member who resigned his position in June 2014, stayed engaged throughout the project.

Scatter Creek Groundwater Sampling Network Nitrate Concentrations Spring 2009 – Spring 2014



FOLLOW-UP

The Scatter Creek Aquifer Citizen's Committee recommendations will be implemented as resources allow. A standing Aquifer Protection Advisory Committee will be established to help prioritize implementation activities. We anticipate that:

- Many of the well-siting and OSS-siting recommendations can be implemented for little added cost during regular code and policy updates;
- County funding will continue supporting ongoing monitoring and data management. The monitoring goals are likely to change year to year to implement monitoring recommendations over time.
- Some education and outreach activities can begin immediately. Others will be implemented as priorities and resources allow.

Appendix A: Aquifer Protection Strategy Recommendations

Aquifer Protection Strategy Final Recommendations of the Scatter Creek Aquifer Citizen's Committee:

These recommendations were unanimously approved by the Scatter Creek Aquifer Citizen's Committee at their October 1, 2014 meeting. They were presented to the Thurston County Board of Health at their November 6, 2014 briefing. The Board of Health asked for a resolution to officially accept the recommendations at their December 16 meeting.

Well Siting Recommendations

1. Consider changing the shape (not the overall square footage) of well sanitary control areas from a circle with a 100-foot radius, to a shape that would be more protective and better take into account the groundwater flow.
2. Require developers to identify the location of septic systems and known pollution sources and locate wells in the safest locations that are likely to preserve and protect water quality to the maximum extent possible.
3. Consider revising health and land use regulations to give regulators the authority to require that wells be drilled in locations and that property be developed to minimize the risk to wells from recognized contamination sources.

Septic Recommendations

1. The health department should encourage and provide incentives for nitrogen-reducing septic system technologies where appropriate.
2. The health department should educate the public that alternative systems, such as composting toilets and incinerating toilets, can be permitted and installed in Thurston County. These systems should be recognized as an approved nitrogen-reduction and water conservation method.
3. The health department should routinely provide education and outreach to residents and businesses in the Scatter Creek Aquifer Area about septic system operation and maintenance.
4. Support the implementation of Article III, Section 5.1 that refers to new well siting. In the Scatter Creek Aquifer Area, particular attention should be paid to assure that septic systems are installed in locations that reduce the potential to create plumes of contamination that can adversely affect down gradient properties and wells.
5. Thurston County Environmental Health should work in partnership with Thurston County Public Works, City of Tenino, WA Department of Health, WA Department of Ecology, and others to assure that any new sewer treatment plants for towns and urban growth areas and any expansion of existing facilities take into account what is known about the aquifer vulnerability and geology. The health department should provide comment to pursue alternative sewage disposal methods.

Data and Monitoring Recommendations

1. Staff should develop a monitoring program to accomplish the following goals:
 - a) Collect data to systematically check on the water quality of the aquifer, see trends, and identify any emerging concerns; i.e. an early warning system.
 - b) Evaluate the effects of changes in the environment, such as the effects of recommendations of this committee.
 - c) Check on the predictive accuracy of the computer groundwater model.
 - d) Monitor groundwater levels.
 - e) Collect information about water quality deeper in the aquifer.
 - f) Learn more about how pathogens such as viruses move in the aquifer.
 - g) Learn more about the presence and health effects from chemicals of concern such as pharmaceuticals, personal care products, stormwater contaminants, etc.

- h) Better identify the cause of large fluctuations in nitrates.
 - i) Better identify the frequency and duration of water quality “spikes” that seem to be associated with heavy rainfall events.
 - j) Improve monitoring sites as needed, to better ensure reliability of sampling results.
2. Improve coordination to retrieve and analyze public, private, and tribal water quality data.
 3. Prioritize producing and publishing water quality data and maps at regular intervals so that the data is available to the public.
 4. Maintain the computer groundwater model that was developed for the project as a functional tool.

Education, Outreach and Community Input Recommendations

1. Offer “Septic Sense” workshops in the Scatter Creek Aquifer Area annually.
2. Offer “Keeping Your Well, well” workshops in the Scatter Creek Aquifer Area annually.
3. Continue to provide technical assistance services offered by the Thurston Conservation District and WSU Extension.
4. Explore, evaluate, and use effective multiple methods such as newsletters, newspapers, presentations, special events, displays, websites, social media, interactive methods, and other means to regularly share water quality protection messages, educate, and market services without alarming people.
5. Prioritize outreach to tenants/landlords, new home owners, new property owners, and students.
6. Develop a packet of water and sewage treatment options with pros and cons, upkeep and responsibilities of various systems to provide to people seeking building permits.
7. Make technical assistance available from the county for people with septic and well questions.
8. Establish an ongoing aquifer protection advisory group to meet annually and as needed for status updates and to address emerging issues.

Funding Recommendations

Estimated costs to fully implement the Scatter Creek Aquifer Citizen’s Committee recommendations are \$212,100 of one-time costs. Annual costs range from \$114,200 to \$123,200, depending on options.

One-time costs include items such as:

- Drilling monitoring wells to examine the water deep in the aquifer, a current data gap;
- Staff time to implement code and policy changes;
- Time to research and develop new educational materials.

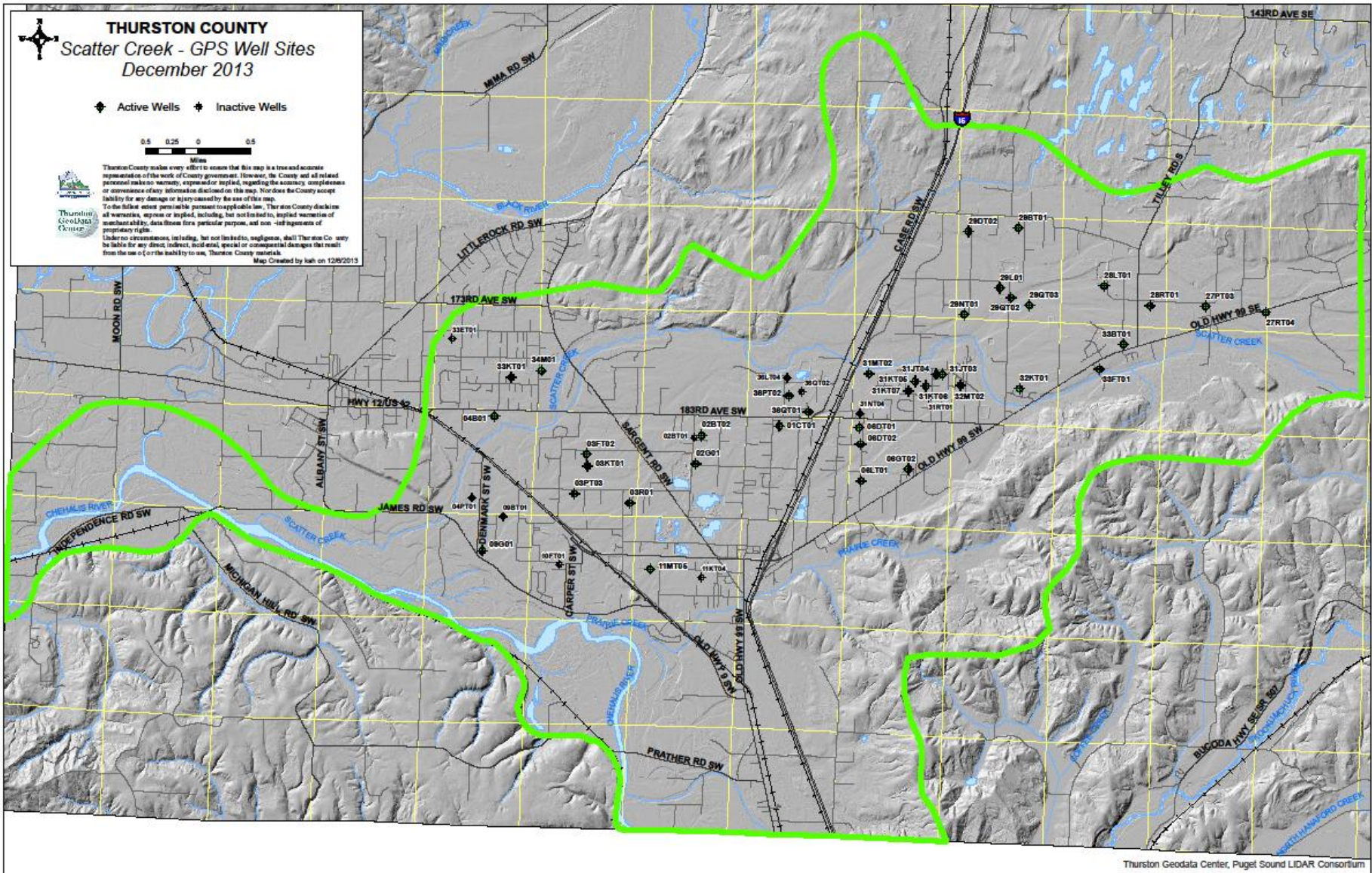
Ongoing annual costs include items such as:

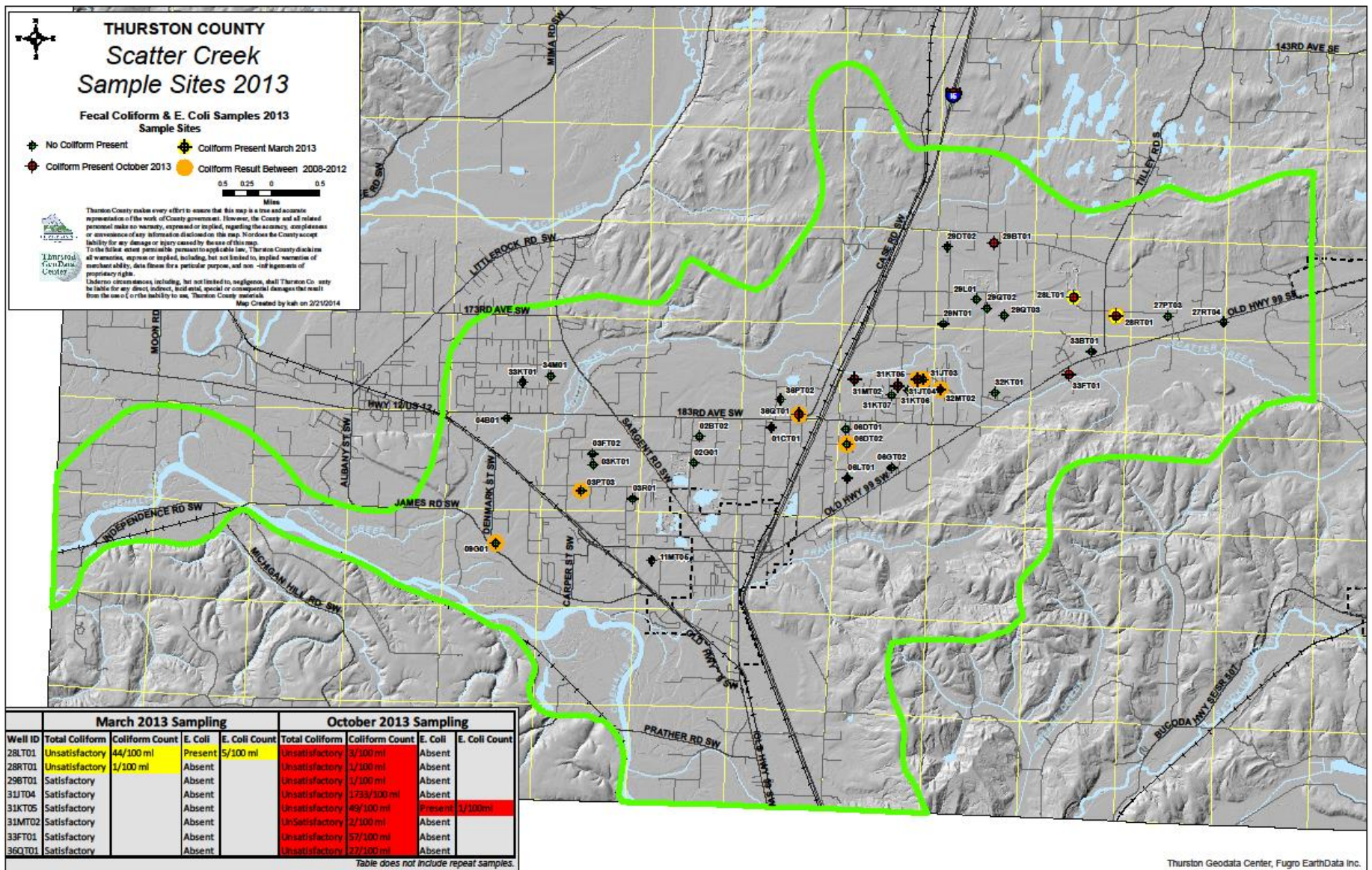
- Routine ongoing groundwater monitoring and data management;
- Incentives to encourage the use of nitrogen-reducing septic system technology where appropriate;
- Regular education and outreach to area residents about actions to protect drinking water quality.

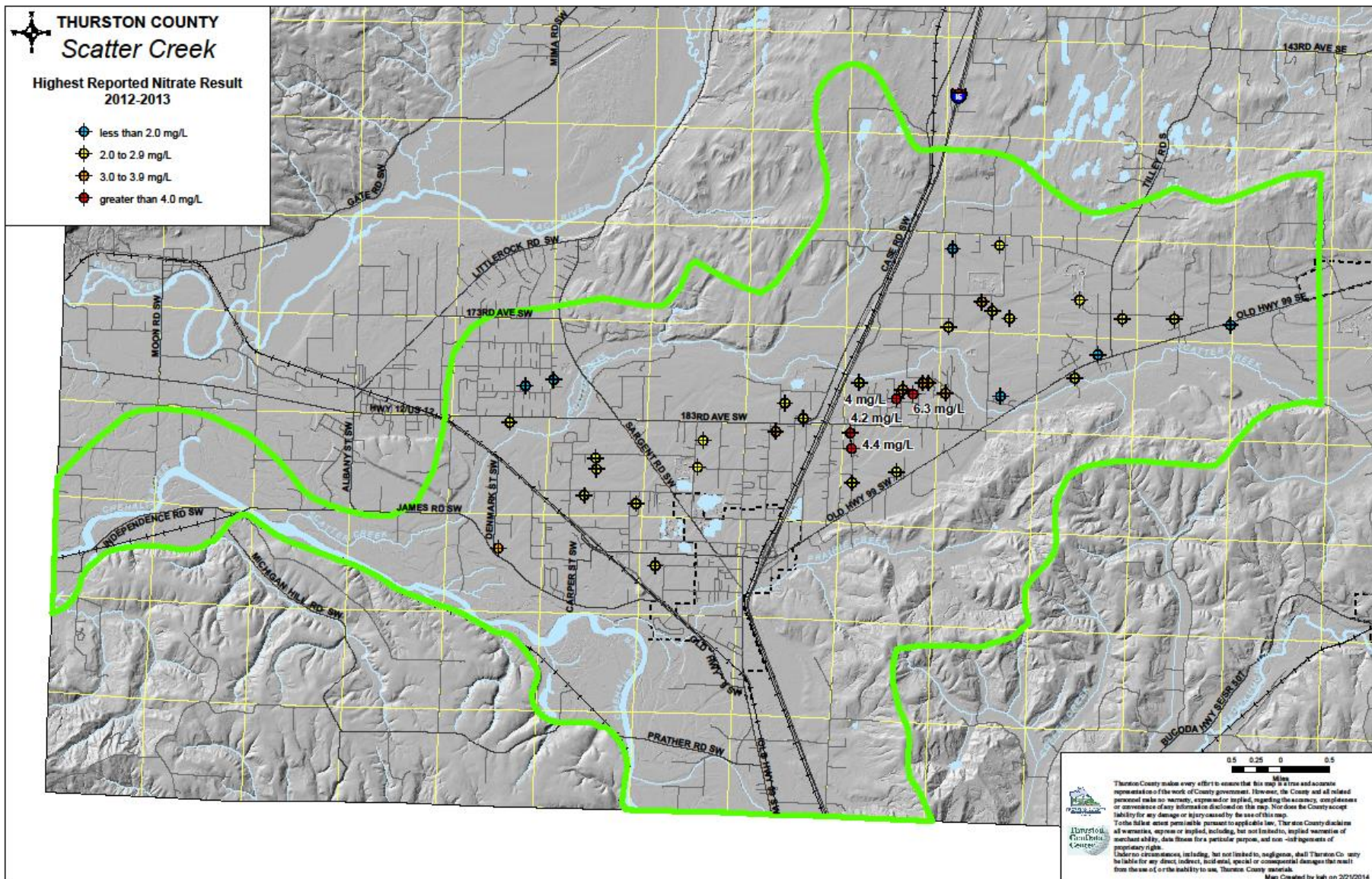
The Scatter Creek Aquifer Citizen’s Committee does not recommend new fees or taxes. They identified the following funding strategies to implement the recommendations. In priority order they are:

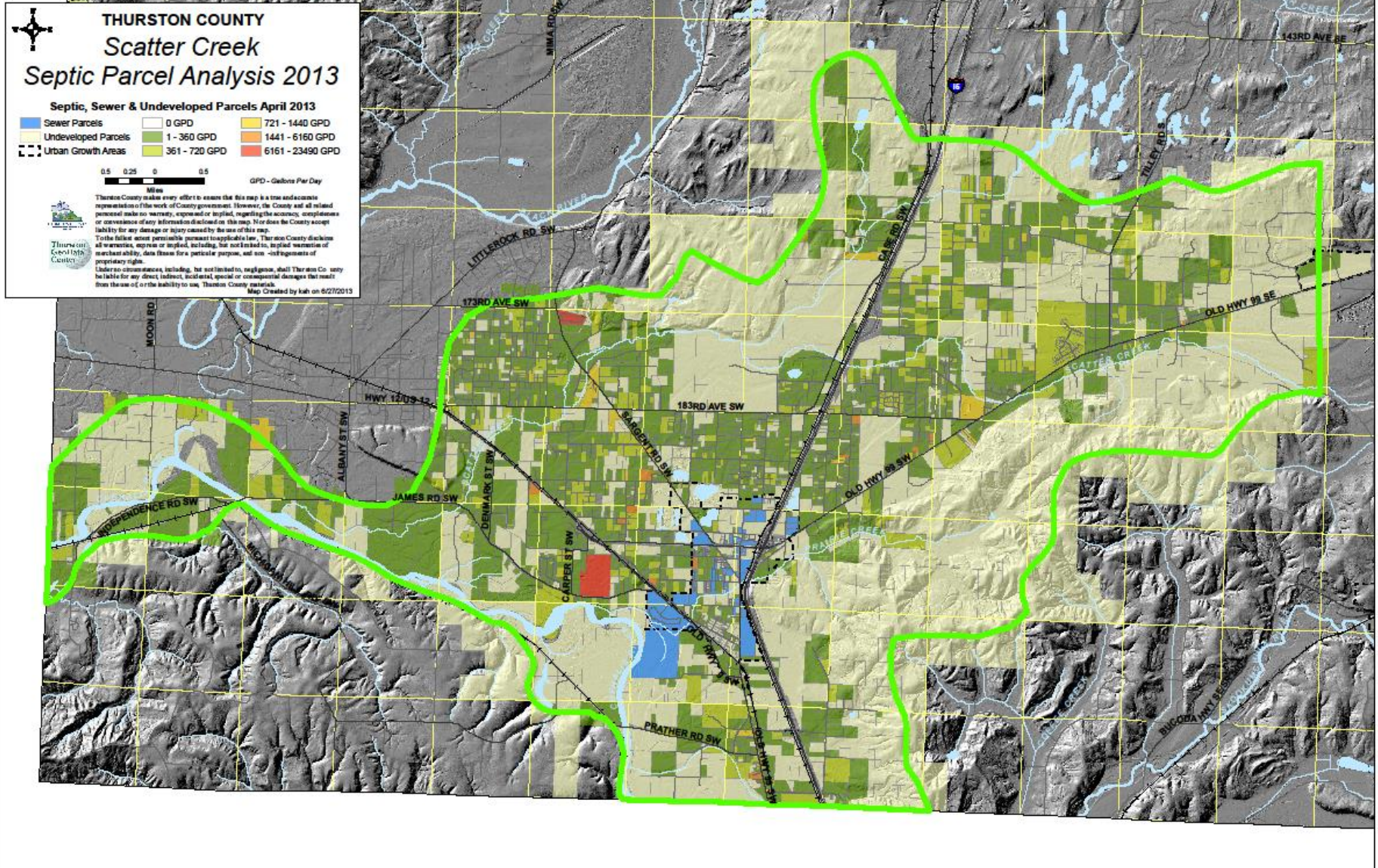
1. Seek grants where appropriate
2. Use existing stormwater fees
3. Seek funding from partners
4. Use existing fees

Appendix B: Maps

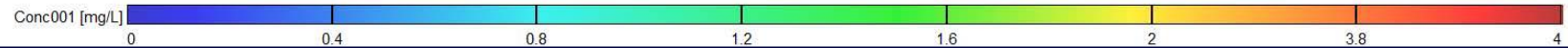




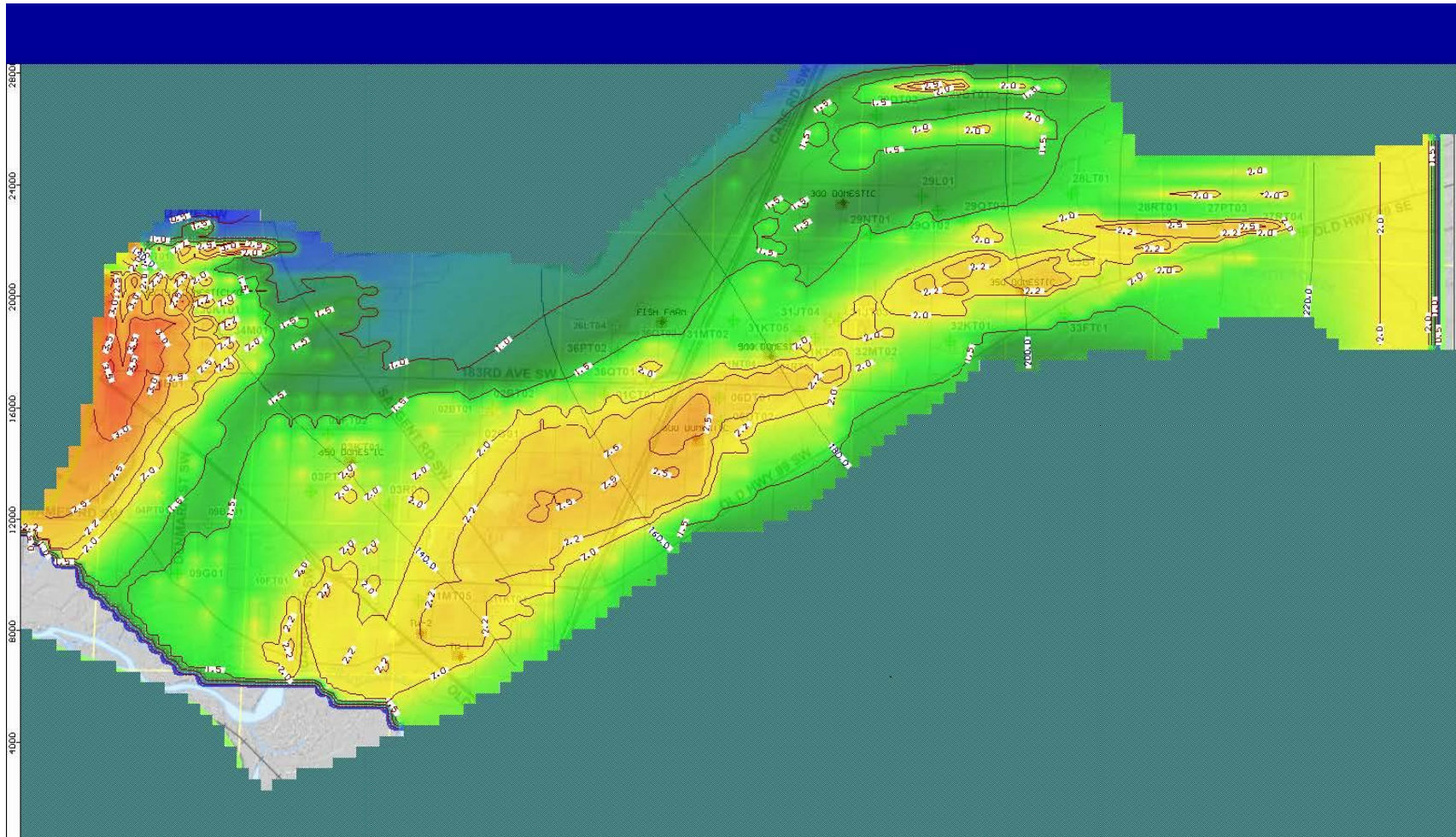




Current septic systems only



Assumes full build-out + 2 mg/l nitrate from Tenino



4th Model Scenario

Current & legal lots + 2 mg/l Tenino + lawn fertilizer

Appendix D: Survey Results From Three Surveys

Scatter Creek Aquifer Project: 1st Survey Final Response September 17, 2013

Surveys were included as a self-mailer in the newsletter mailed to all residents and property owners in the Scatter Creek Aquifer Area in July 2013, a total of 5,493 newsletters mailed. There was also a link to the survey on our website, which was open for over three months. There were also copies available at the July 30, 2013 Community Workshop, attended by approximately 60 people.

This data is from the final responses, a total of 65 respondents. Some answers add up to more than 100% because multiple answers were allowed.

Summary: As expected, there is a wide range of opinion about the issue of responsibility for clean, safe drinking water. Most people felt that drinking water quality was either extremely (50.8%) or very (38.5%) important to them. About 42% felt there was reason to be concerned about the quality of drinking water in the Scatter Creek Aquifer, the others were divided between needing more information and thinking there is not a reason to be concerned. Several people expressed great confidence in Rochester Water Association.

Multiple choices were allowed to the question “*Who should be responsible for solving or preventing drinking water quality problems in the aquifer?*” About 32% felt this should be a shared responsibility, about the same (34%) felt only residents should have that responsibility. Only 6% felt it was solely a governmental responsibility, and 8% thought water providers should be solely responsible.

In response to questions about making changes, a substantial minority (about 16%) said no. For many, it depends on what the type of actions or programs might be and importantly, how much they will cost. Comments cover a full spectrum of attitudes and concern ranging from concern about the drinking water, to a strong distrust of government.

Complete Responses:

1. How important is drinking water quality to you?

50.8% extremely

38.5% Very

7.7% Somewhat

0 Not very

3.1% Not



Comments:

- But let us monitor our own water. No more government in our business.
- I have served 14 years on Rochester Water Association Board.

2. Do you believe there is reason to be concerned about drinking water quality in the Scatter Creek Aquifer?

42.2% Yes

28.1% No

29.7% Can't decide until I get more information



Comments:

- You are the problem.
- Depends on water quality testing.
- Overkill by county.

3. Who should be responsible for solving or preventing drinking water quality problems in the aquifer? Note:

Multiple responses were allowed, so totals are more than 100%. About 32% felt this should be a shared responsibility, about the same (34%) felt only residents should have that responsibility. Only 6% felt it was solely a governmental responsibility, and 8% thought water providers should be solely responsible.

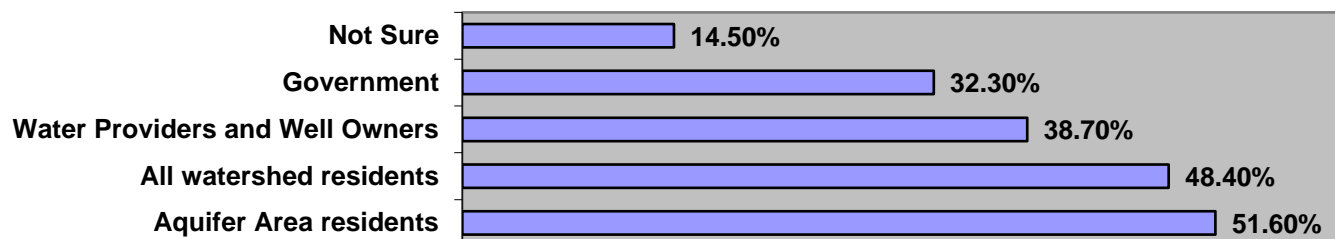
51.6% Aquifer Area residents

48.4% All watershed residents

38.7% Water Providers and well owners

32.3% Government

14.5% Not sure



Comments:

- Can not trust the government.
- No one needs to do this. Leave us alone!
- Gov't for not enforcing permit/licensing requirements for large development.
- All watershed residents, businesses, and farms.
- The ones that cause the problems
- Government is needed to enforce laws.

4. Would you be willing to change your practices or make changes on your property to protect drinking water quality? Note: Multiple responses were allowed, so totals are more than 100%.

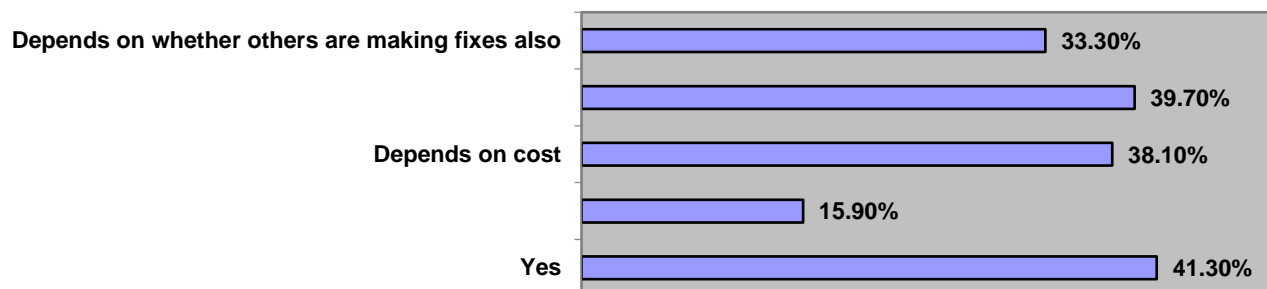
41.3% Yes

15.9% No

38.1% Depends on cost

39.7% Depends on the programs

33.3% Depends on whether others are changing and making fixes also



Comments:

- You'll make us tear down buildings and stop us from growing gardens.
- Nothing's broke!

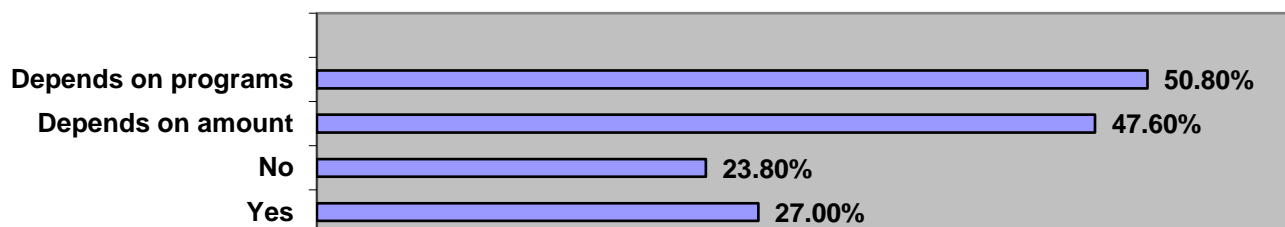
5. Would you be willing to pay for programs to correct or prevent drinking water quality problems?

27.0% Yes

23.8% No

47.6% Depends on amount

50.8% Depends on programs



Comments:

- We already do.
- Government should pay like they do all over the world.
- Reasonable
- Not necessity to have more employees, Let the homeowners and well owners decide on their own solution if one is necessity.
- The ones that cause the problems should pay.
- We already pay Rochester Water Association. They do an outstanding job of monitoring and maintaining our large water system.

6. Whom else should we talk to as we develop options to protect drinking water quality? This might include groups, organizations, businesses, or individuals. Any contact information you can provide is helpful.

- Port of Centralia
- Centralia Sewer Plant
- Great Wolf Lodge

- Cattle Farms on James Road
- Violet Prairie Water - Todd Hanson, Hanson Construction
- Property owners
- Rochester Water Association - Board of Directors Lowell Deguise, Manager of Rochester Water Association. Rochester Water Assoc. has 43 years worth of records that could be used in conjunction with the Thurston County well studies.
- Capitol Land Trust - 360-943-3012. They protect key drinking water properties in the aquifer area.
- No one, let us be
- State and federal DOT (public roadway) run-off
- Definitely water providers, particularly H&R.
- School districts
- Any "local" farm associations,
- Officials from closed Maple Lane School
- Center for Natural Lands Management.
- Departments of Licenses and Permits NATIONAL septic development organizations
- Infant and breastfeeding organizations
- Businesses
- Gravel mines, industries,
- State, county, cities, towns – about roadway pollution: oil run off, tire wear off, spills, wrecking - salvage yards. In short, enforce the rules, laws, ordinances. Better enforcement.
- Department of Ecology, Water Quality Program
- Land Use Planners
- Real Estate companies
- Developers
- Farmers
- No idea
- ALL who will be effected by any changes!
- Cattlemen's Association
- Youth groups

7. Other comments:

- We have concerns about the effect Miles Sand and Gravel will have on the aquifer. Also, livestock needs to be kept out of Scatter Creek. A year ago Fred Colvin applied fertilizer to his pasture and the fumes were so strong it burned our eyes.
- You need to also include the Tenino area
- The second item in fall 2013 indicates that the county already has its mind made up to change septic system management. Yet it does not appear that there is enough data to know if that change is necessary or not. Remember we are not rich.
- I am amazed at the people that think it is ok to dump their used motor oil on their driveway to keep the dust down. I wish they cared.
- Direct communication/education of local property owners about the impact of fertilizers, pesticides, insecticides, etc. So much indiscriminate spraying of herbicides. People just don't realize the impact or the availability of more natural alternatives. Thank you.

- This infers we have a problem when WE DO NOT! Our water is provided by Rochester Water Association which constantly monitors, tests and takes care of customers. Are we concerned overall, YES!, but inference that we have problem by Rochester Water Association is absurd.
- Stay away from my property.
- Have had well tested 2 years apart. Both reports come back excellent water - if problems with water occurs I would then be concerned. There are more rocks than dirt on my property which cleans the water.
- Our nitrate levels are a little higher than typical background, but within limits. Our water is acidic. Apparently the aquifer is acidic, according to county lab. It's eaten through several of our fixtures in 5 years since they were newly installed. We are concerned about health effects and wish we knew better what to do.
- I am in favor of clean water and I try to do my part to protect its quality. My fear is the county will use this cause to further control or seize our water rights completely.
- We strongly support this project.
- We need more residents on this, the only ones I see are business representation, not one individual who is just a resident! Business people should not be making all the decisions.
- Some groups are, I feel, are destroying the aquifer by taking soil and drainage away from area.
- You created the problem by changing the 5 acre zoning. You're just after more control over our life. STOP-STOP-STOP Leave us ALONE!!!
- Whose wells are you testing? We have lived at our address since October of 2010 and have not seen or have been asked to test our water.
- Thank you so much for addressing this important issue!
- I do not need government interference, taxes, or regulations to keep clean drinking water! When it comes to Thurston County, less is more!
- Require advance public notice of ANY development and require environmental impact studies.
- Everyone should help PREVENT and no one should be left alone to SOLVE a problem caused by others.
- Only area property owners should be allowed in the decision making process.
- I think that this whole nitrate scare is another trumped up, make-believe issue to control or stop growth in the south county. Nitrate levels have been dropping even as population has increased. The few high readings have been in my opinion "cherry picked." The few areas close to dairy farms or areas with poor wellhead management have been tested and show high nitrate levels. With less and less agriculture the levels have improved. If more people and more septic systems were the source of the problem why aren't nitrate levels increasing? So why are we promoting agrotourism? Organic farming uses animal manures which seems to make the problem worse. Bottom line - You have an agenda. Stop growth, force people into the cities and totally control OUR property. If you want to control my property then buy it from me.
- Property taxes are too high.
- When quality is borderline or mostly ok and trend in quality is flat, sustainable, or down, then individual homeowners can do more if they want and government should stay out of it.
- Make sure your baseline information is accurate.
- The need to protect our drinking water must be balanced with our need to use our property, businesses, and homes. Over regulation & fees (are) a huge problem! (*paper torn*)
- It appears that our aquifer has protective hard pan above it which resists the intrusion of surface runoff. I believe that our aquifer actually originates in the Mt. Rainier area and travels underground to reach our area at a comparatively fast rate. The newer methods of sealing well heads in areas of manure application seems to have been effective in limiting surface water from reaching the aquifer. It appears that the potential for contamination has already been dealt with in a very commonsense manner at this time.
- Why are some paying for ULID and others are not?
- Why is septic being targeted? What about commercial land use and livestock?

- Would graywater diversion systems help this situation by increasing time for sewage to be worked on by bacteria and reducing water pushed through septic system?

Scatter Creek Aquifer Project: 2nd Survey: Best Outcomes Final Result

September 17, 2013

At the second Scatter Creek Aquifer Project Community Workshop, held on April 23, 2014, residents were asked to provide their comments about the best outcomes for the project. We received 15 forms which are tallied below. The Citizen's Committee considered this input as they developed recommendations.

1. Are the projected future conditions something that needs to be addressed?

67% Yes 20% No 13% Not sure

Through future monitoring

2. What issues, ideas, or options should the committee consider when developing recommendations?

- Costs
- Best methods to protect the aquifer
- Funding since we are in a low income area
- Population growth: up or down
- Possible contaminants
- Usages
- How our town/area interacts with others
- Sewer and water should be considered when going into problem areas. Costs are cheaper in the long run.
- Clean up problem areas first, i.e. those areas that have contaminated areas. High population areas should be done first
- My proposal is that the Scatter Creek should be fenced in so that all the animals can not go in the creek. The water should be kept clean – not allow the animals to relieve themselves.
- No one can predict the future or weather. None of your studies were convincing or overwhelming done with proof that we have a severe problem.
- Reduce the number of units per acre. Make it 1 unit per 5 acres to reduce septic and protect ag.
- Drug content monitoring and projections
- Is there an effect from increasing use of treated wood in decks collecting chemicals in water system?
- Limiting development (housing)
- Consider septic treatment plant for wider area
- Encourage organic farming/agriculture
- Preserve open space for recreation
- County should institute stricter lot size in the future for well/septic – at least 1/ acre. More information needs to be made available thru meetings like this one i.e septic upgrades, change in lawn care, farming, etc. Individuals need guidance from committee and education.
- Look at wells having problems for specific issues at that site.
- The rural/ag environment that drew many of us to this area seems doomed to dense housing as platted lands show. As stated, the soil types here and relatively high water levels cannot absorb the probable densities. So, it seems that this area will need to go off wells and onto a public water system. This will be expensive and drive up property taxes – as would city sewer if it came to that. These increases could make the lower cost of housing that is now attractive will go away and potentially send current residents out of the area. Try to keep a balance of development and rural/ag.

- It appears like the past actions have provided more than adequate protection. It is apparent that no further action is needed except possible continued monitoring.
- Livestock grazing & effects on groundwater

3. The best outcome will...

- Protect the aquifer, develop immediate and long range actions to ensure that expensive water treatment plants are never needed.
- Less regulation
- That we will have enough and quality water for all now and in the future.
- ...be if you can get grants to help pay the costs of change.
- Keep monitoring as you are doing!! Best thing to do!
- Limit development to 5 acre parcels. No mass development apartment housing projects.
- Do not overreact! Remember this is America!
- Check septic systems! New technology
- Keep people healthy in spite of how long they live.
- Be clean, clear water free from contamination by bacteria, harmful chemicals, and pesticides.
- Water that is drinkable and safe.
- Preserve rural/ag lifestyle with some controlled growth of small lot homes. Public water system(s) at some time in the future, but delay sewer systems as long as possible – too expensive and where's it going to go if not back into our land as is happening with Tenino's sewage treatment system.
- Keep a watchful eye on where people drill wells, not stop development. The Tenino Wastewater adds half of the projected nitrates = nothing you can do about that. Even at worst the levels were not alarming.
- Be to monitor wells in the area periodically.

Recommendations should err on the side of:

Caution

Reaction

1	2	3	4	5	6
(14%)	(29%)	(14%)	(7%)	(7%)	(7%)

Note: Staff is not sure if folks were consistently applying the same meaning to the continuum scale. Use results of this scale with caution.

Scatter Creek Aquifer Project: 3rd Survey: Input to Preliminary Recommendations Final Result

Preliminary Recommendations Feedback Summary

TOTAL RESPONSES: 55 individuals

TIME PERIOD: Gathered between September 9, 2014 through 4:00 pm October 1, 2014

VIEW OF RECOMMENDATIONS ON A SCALE OF 1-7

- 1 = Not strong enough to protect drinking water
- 4 = Just right
- 7 = Too strong or restrictive for the situation

RECOMMENDATION AREA	AVERAGE SCORE ^		Number of people selecting the response option							
			1	2	3	4	5	6	7	NA
Zoning and Well Siting	5.0		1	1	2	23	9	4	14	1
Septic	4.9		1	1	5	20	7	5	14	2
Data and Monitoring	4.9		0	2	5	22	5	3	16	2
Education, Outreach & Community Input	4.6		1	2	7	25	6	0	13	1
Funding	5.2		2	2	3	17	3	7	19	2

^ Average = All scores added together then divided by the number of responses.

NA = No answer provided by individual.

Comments received from Recommendations to Protect Drinking Water in Scatter Creek Aquifer Survey

- Type that is regular is from written comments included in the feedback form as of 4:00 pm Oct 1, 2014
- *Type in italic is from staff notes taken during verbal comments at the community workshop on 9/30/14.*

Hard to judge. Seems like a lot of money.

Re Well Siting: A good idea, but could lead to some potentially severe restrictions on folks wanting to subdivide.

Education: focus should be broader, not just new home owners.

Funding: I'm willing to pay something, but again, it would depend on the amount. And if homeowners are paying you would want a lot of accountability that what you're doing is making a difference.

Thanks for all your hard work!

Education: Provide more information, prefer email.

Funding: Why not use current wells? I would appreciate mine being tested.

Recommendations is a choice of word here vice regulation; I take that to mean just that a recommendation - no legal basis to pursue if not used. Requiring and placing in a recommendation appears to me just that... no basis in law.. and how you do this is beyond me with most land plots already developed? Am watching this closely and will monitor and be there.

There is no discussion of animals. I had the experience of a dairy farmer in the middle of a rain storm in the fall dumping tens of thousands of gallons of waste that fowled a class b system. That may not happen today but it can. Also a important note is what is happening to animal use and is it going down and house in volume to human use and toxicity? If it is going down is human waste critical? I am for clean water but is this just another County Commissioner anti rural development ruse? Rochester not near the safe limits and Tenino was well below limits and now has a sewer system.

General - everyone in the Scatter Creek Aquifer Area should be or, I believe, is concerned about water quality. I, for one, and I think most of us applaud the committee for their efforts. I certainly do not agree with some of their findings or with some of the statements made by individual members but the information they have acquired is invaluable.

Mostly I believe most of us are very concerned about bureaucratic decisions being made by individuals who have preconceived ideas on what is best for all. I am not all convinced whatever the committee recommends will be even considered by the decision makers. I sincerely hope I am wrong but everything I hear in speeches or have read in the paper has me deeply worried. I understand at least one of the original members has even walked out and resigned based on the exact same concerns.

1. Well Siting A. These things, by my understanding of existing ordinances, are already being done except the 100' radius and what information do you have that says this is not adequate. I also hesitate giving more power to people who I am not at all sure have had adequate training or education.

2. Septic Recommendations A. I do not see how anyone could argue with these recommendations EXCEPT where certain individuals will misinterpret this recommendation to make further ordinances that enforce "provide incentives", "educate", "work in partnership with". We do not need more ordinances!

3. Data & Monitoring A. Is this necessary, or are you just adding additional work on an already over worked staff?

4. Education, etc. A. Same comment as #3. If not adding to an already overworked staff, how would you fund all this additional work?

5. Funding A. I am opposed to raising any fees but mostly I am opposed to "federal" grants. As we all know, even federal money comes from us taxpayers. If we want any of the recommendations to be and if there is any cost to them, WE as a county should pay for them.

CONCLUSION

WE do not want untrained individuals, whether elected or appointed to make these seriously affecting to us decisions! Add the words "engineers" or "fully trained in the appropriate disciplines" to your recommendations to the "powers that be" and you will have full support from us.

Thurston County has created a land monopoly with the land use rules currently in place. In 1996 I talked to the County about an above ground sewage treatment system for my proposed manufacturing facility in rural Thurston County and was told it could not be used even though it was designed to produce cleaner out flow than an in ground septic system. Because of zoning and other regulation a \$600,000.00 facility was not built and in 2000 12 people lost their jobs. "If you are not directly or indirectly producing what you consume you are a Parasite."

Too much government control Just another way to get more tax dollars.

What about the sewer line running along I-5, can anyone hook up to it?

Need to monitor or enforce illegal septic systems - there appears to be several "RV" style homes on lots that are lived in. These show up in the county and to date I have never observed a septic system installed or black/gray water removed (in my area).

Well siting - strongly disagree with "giving regulators more authority..."

Septic - Is Health Dept willing?

Data & Monitoring - What "staff" are you referring to? Who? I recommend Volunteers.

Education - Good ideas - too expensive to hire - Recommend Volunteer Citizens

Funding - Too expensive! Would result in increased taxes. Use Citizen Volunteers!

Do not raise taxes and fees. Make other cuts.

Well Siting #2: Making such a shape change may not take into consideration the cone of influence created by a well pump, thus accomplishing nothing helpful as a result of such change.

Well Siting #3: Well site inspections are already required. During short or long plat or large lot subdivisions property inspection and evaluation processes already exist. Any such "new" regulatory authority is redundant.

Septic #4: See above components as they apply here as well.

Monitoring #1: All monitoring presently available through state and feds should be checked before embarking on a new data and monitoring program.

Monitoring #3: this info is available on line at DOH already through Sentry.

Funding: Group A and B systems operated by investor owned companies are already taxed through an annual fee which should cover their participation.

I forgot to mention in the online survey that I'm excited to know there may be greater acceptance of composting toilets in the future. Do you know yet what the recommendations will be for dealing with the compost? I've heard some of them don't really create a finished, garden-safe compost.

Regarding well siting recommendations, we assume that these apply to new development and construction, and that existing wells/septics would not fall under these regulations. Regarding funding, we have been charged stormwater fees for years, yet in our location we have never had any stormwater issues. We assume that the same is true for many of our neighbors, so there should be excess money in that fund that could be used for this project without charging septic fees.

If nitrogen levels are decreasing and trending lower, you've won. You don't need more regulation.

This is just another way for Thurston County to extract more money and impose more regulation on it's citizens. We pay enough money to our water company and have already paid for septic systems to be installed. We don't need septic fees or more fees on private wells. Thurston County has taken enough property rights away from its citizens as it is, this is also an avenue to put meters on private wells which is very invasive, if we wanted this we'd live in the city. The bottom line is this is another scam by this corrupt county government and the thieves that run it.

Great work committee! How will ongoing monitoring and deeper well drilling be funded?

Apparently fees were not unanimous as reported in info. Ask Weaver. Septic Recommendations: None talk about except to provide funding. I test my group B well. The results go to the county not to state no extra staff needed. Use stormwater fees, water quality is part of NPDES permit. Scientific exploration at the cost of the citizens Just looking until you get a problem.

I want to thank all the members of the committee for their dedication to completing this study. I was apprehensive initially about the result and costs but am very pleased with your conclusion!

Worst Case Scenario won't happen. Mazama Pocket Gopher ruling will stifle a lot of residential housing possibilities in our area. That means less housing/less need for septic/less contribution to the aquifer, less possible pollutants into Scatter Creek Aquifer. Encourage responsible property ownership, but if there isn't a problem, don't fixate on a non-problem. We have fewer agricultural farms in the area so less pollution of course. Let's not over regulate everything.

Interest of County to generate tax \$\$\$ isn't necessary in this area. We appreciate the time & effort the Citizens Committee has put in & recommending no additional money needed.

What about sedimentation now filling up Scatter Creek as a result of closing the fish hatcheries by the freeway or reduced water flow in the creek?

No TAXES added!!!

If it's not broken don't fix it

We pay enough taxes & fees. Our property values are down due to Prairie ordinance. The restrictions only allow the tribe to develop. No new restrictions.

Water is important to all of us it is not the gov't trying to take away your water. They just want to know if it is safe.

Stop!

Concerned about issues being compartmentalized: agriculture, on-site, zoning are not being looked at together. When do we and decision makers get a holistic view?

Question: Will there be changes to water rights? Answer: Committee did not consider water rights.

Pleased to see that the model does not show a problem. Use the water quality data that is being collected by public water systems. Don't need to tax septic systems to do additional monitoring or duplicate with county sampling.

Pharmaceuticals getting into the water is a problem. Tenino Police Department has a drop-off bin to collect, don't flush them down the toilet.

Agriculture says he needs to add nitrogen to his soil.

Question: We talked about the Tenino Wastewater Treatment Plant, what about the Grand Mound Wastewater Treatment Plant? Answer: It discharges to the Chehalis River, not to groundwater, so should not be a drinking water concern.

Thank you to the Committee for its conclusions that didn't require us to over-regulate. Glad the recommendations do not include new fees and regulations. Single biggest point source is the Tenino Wastewater Treatment Plant. No way septics could have as big an impact as Tenino Wastewater Treatment Plant. It needs to be addressed, it is not being adequately tested. The county recently increased stormwater fees for monitoring, no reason to charge more for monitoring that is already going on.

In the 1980s agriculture was a problem, especially applying manure near wellheads. After that was fixed nitrogen decreased. Question: She asked us to clarify what the health effects of too much nitrogen in the water was.

Answer: It effects infant and their ability of hemoglobin to carry oxygen in the blood stream – often called blue-baby syndrome.

Also suggested that the county change the private well sampling instructions to suggest that water be collected from the tap closest to the well, not from the kitchen or bathroom. Really appreciate that the county has water sample pick-up available at ROOF locally.

Like to remind people that everyone's actions can affect the groundwater and their neighbor's well. One reason why everyone needs to take care of their septic system. A septic system is like adopting a pet, it needs to be taken care of in order to protect the water.

Question: What kind of impact does Great Wolf Lodge and other businesses like the new Starbucks have on the aquifer? Answer: They are on the Grand Mound Wastewater Treatment System, which discharges into the Chehalis River, so their wastewater should not impact the aquifer.

Does not compute – there is ongoing monitoring by water systems, there is no need to do more. There is no problem, no need to raise fees to take care of a non-problem.

Important to pay attention and be involved to keep regulation at bay.

Wanted to let everyone know about the Rochester Facebook site, Rochester What A Great Place to Live. Getting harder and harder to get announcements into the paper, good way to get word out.

Is there a way to vote out this study? It's too much. We need permits for septic, wells, etc. It is our private property.

Was on the committee, clarify several points. The Onsite Sewage Management Plan Committee was different from the Scatter Creek Aquifer Committee. The aquifer has plenty of water for residential uses, the county does not address water rights, the state does – you will be able to have your wells. There are only about 400 more homes possible, so we are all going to get to enjoy our rural property, septic & wells. The study was good news.

Being on the committee was a very educational process. I came from a city in another area where you could not drink the water – only bottled water. I don't think that is likely here, but you should never think that it could not happen. I learned how important good stewardship was. It has changed my practices.

I was on both committees. The proposed fee for septic systems is because there are places in the county that do not have good water, or have problems. The fee was a compromise, agreed upon unanimously, to address conditions throughout the county.

Question: Seems like there is a lot of overlap on monitoring. Does the county coordinate with each other? Answer: Yes, the health department and resource stewardship department work closely together around monitoring and water issues.

Appendix E: Board of Health Resolution