# Community Advisory Group – Groundwater Recharge Scientific Study

## Meeting 4 – April 9, 2013 – Summary

**Welcome and Initial Business**
The meeting opened at 6:00 pm with Patricia Tennyson of Katz & Associates acting as the meeting facilitator. The advisory group had no comments on the Summary Notes for Meeting 3, so they were acceptable as provided. One of the Community Advisory Group members requested that the group mission statement be read at the beginning of the meeting to provide context for the meeting and as a reminder about the group's primary tasks, so Patricia read it aloud. Lyle Fogg, advisory group member, provided a brief summary of his report to the LOTT Board in February. Pixie Needham confirmed that she will report to the Board at their April 10 meeting and Scott Morgan volunteered to attend the Board meeting on May 8.

**Public Comment**
Members of the public in attendance were invited to make comments. Two did so:

Dennis Burke:
Mr. Burke stated that he had several questions. Will there be a technical advisory group, because this is really what you really need? He also said he will be coming to these meetings and putting up a website. In addition, he said he had opposed the Hawks Prairie recharge site since the beginning because it is partially treated sewage full of harmful compounds. He believes reclaimed water contains high levels of phosphorus that is causing blooms of Cyanobacteria that cannot be killed. He owns a water system that is in the path of the recharge site and may comment from time to time because he has deep concerns about this. Once you pollute groundwater, it takes years and years to come back from that.

Holly Gadbaw asked Mr. Burke if he and his customers were connected to the sewer system. He responded that they are served by septic systems.

Bob Jacobs:
Mr. Jacobs thanked the group for being responsive to the request to move the public comment to the beginning of the meeting, but stated that he should have asked that there be comment at both the start and the end of the meeting so the public can comment on materials distributed before the meeting and then again on the business of the meeting. Bob then referred to two recent articles about the possible risks to the environment from compounds of potential concern. He believes we should use the precautionary principle "to do no harm." He noted that the city of Lacey issued a call for bids to construct a recharge project on 5 acres on Pacific Avenue, and the city of Tumwater is building a storage tank so they can use reclaimed water to irrigate the golf course, which he said will only serve to spread pollutants. He stated that these projects should be halted until the study is complete and put the decision to the public as to whether they are willing to pay more to clean the water thoroughly before it is used in any way.

**Report on Initial Results of Public Opinion Research**
Ian Stewart with EMC Research of Seattle presented a summary of results from the random digit dial telephone survey. He explained briefly how the survey was structured and reviewed key findings. Advisory group members asked several questions and Ian responded:

Bill Liechty:
Did respondents have any indication of what the survey topic was before answering the question about what is the most important environmental issue? *No, the introduction was very general. It did not state the survey was being conducted for LOTT or give any indication that the topic was water related.*

Karen Janowitz:
Was "water quality in Puget Sound" considered a completely separate answer from "water quality"? *Yes, "water quality in Puget Sound" was mentioned as a distinct issue, so it was treated as a different answer than the more general "water quality" answer.*

Dick Wallace:
Did the proportion of those served by sewer and those served by septic systems accurately reflect the true proportions? *Yes, the actual proportion is generally 60/40 sewer to septic in the urban areas, with most people in the outlying areas served by septic systems. The respondents generally reflected that proportion.*

Karen Janowitz:
Do the results from Question #24 show responses only from those who know what LOTT is? *No, Question #24 (What concerns or questions, if any, do you have about reclaimed water?) was asked of all respondents.*

Bill Gill:
If half the respondents don't respond to a particular question, does that shrink your sample size so small that your level of confidence goes way down? If so, it would be helpful to know the sample size on each question. *Yes, if only half are asked a particular follow-on question, then the sample size shrinks to 200 and the margin of error increases. The sample size for each question can be added to the report.*

Dick Wallace:
Is it fair to assume then that all the folks who know what reclaimed water is have concerns? *It is fair to assume that the level of concern rose as more information was introduced over the course of the survey. As the respondents awareness grew regarding compounds of potential concern, so too did their level of concern.*

Lyle Fogg:
Is Question #21 biased because the wording seems reassuring? *The description of recharge (allowing the water to slowly filter through the soil, just like rain, until it reaches and replenishes groundwater) was designed to be simplistic, factual, objective, and relatable, so that it would be easily understood. It was developed so as not to introduce bias.*

Bill Gill:
Why examine cross tabs and opinions of various subgroups? Doesn't that serve to make the issues more divisive? *Cross-tabulating the data is standard practice for analyzing survey results. It is not intended to be divisive.*

Karen Janowitz:
In environmental education, it is important to understand subgroups and target education and involvement activities to meet the needs of those groups.

Marissa Dallaire:
There may be important differences between subgroups. Groups like women might have more reason to be concerned, based on their activities, than other groups.

Bill Gill:
Could you explain the approach to analyzing Question #27? I'm interested in the difference between those who own vs. those who rent. *Again here, we are just looking for any significant differences in subgroups. The difference between those who own and those who rent was surprising, and cannot easily be explained.*

Karen Janowitz:
Are the respondents a self selected group? *Respondents do not know upfront what the survey is about so they cannot self select – respondents are representative.*

Holly Gadbaw:
How do you get to a representative group by calling random numbers? *When we conduct a survey, we want to select our sample in such a way that every person has a chance of being called. One of the ways we did that was to use a method called random digit dialing where everyone within specific zip codes has a chance of being asked to participate in the survey. A more complete answer to that question is fairly complex, but the bottom line is that this is standard practice that has been used for years in the survey industry, and it works – it matches the census.*

Bill Liechty:
What did you find surprising? *In terms of uses of reclaimed water, it was surprising that more respondents were concerned about streamflow augmentation than groundwater recharge.*

Holly Gadbaw:
Did the question about use for streamflow augmentation and for groundwater recharge come before the concept of compounds was introduced? *Yes.*

Bill Liechty:
Will you (the research firm) be analyzing what this all means? *It is the charge of the research firm to tabulate and summarize the data, and the charge of the client to decide what it means.*

Dennis Burke:
The description of reclaimed water is very biased. You should have said this was "treated sewage".
*The description was kept very simple so that it would not introduce bias. Terms like "treated sewage" carry more bias than the description that was used. The intention of the survey design was to capture levels of concern by introducing information slowly as the survey progressed. The concept of potential contaminants was introduced toward the end of the survey, thus allowing us to capture general perceptions of concern early in the survey, and compare those with opinions formed once more information was introduced.*

Patricia Tennyson then explained that not all of the structured interviews are complete since the last interview is scheduled for April 11. For that reason, a full report is not yet available, but will be ready by the next meeting. One initial theme from the interviews: nearly all of the interviewees stated that

protecting groundwater is very important. Another question from the interviews that might be of particular interest to the advisory group as it looks at the public involvement plan involved ways to engage the public in the study. Interviewees provided a number of ideas for public involvement, including:

- public meetings, held with some frequency and not just when the study is complete
- schedule meetings so it's easy for people to participate
- include scientific data and findings at meetings
- reach out to young people using social media, among other outreach activities
- talk with a variety of groups including public officials, the agricultural community, local academics, scientists, science teachers and more
- partner with local community/environmental groups, as well as LOTT partners, to participate in already scheduled events, co-sponsor forums, make presentations at regular organizational meetings, etc.
- be present, be friendly, be informative, have activities for kids at public events

The final structured interview questionnaire and list of interviewees will be sent to the group after the last interview has been completed.

**Discussion: Public Involvement Plan Phases and Tools**

Lisa Dennis-Perez reviewed several graphics that described phases of the study, the proposed structure of the Public Involvement Plan, and the three main steps for the scoping phase of the study. The group then offered comments on the draft involvement plan:

Bill Liechty:
Be sure to include a mechanism to illustrate/explain why some questions, ideas, or suggestions fall off the table or cannot be included for one reason or another. It is important to show that people's ideas have been considered, even if they cannot all be incorporated.

Karen Janowitz:
Also, many people, though not technically scientists, fall into a pseudo-science category in terms of their expertise, and they can provide valuable feedback on technical aspects of the study.

Holly Gadbaw:
Will there be an Environmental Impact Statement (EIS) completed for the study? I ask because scoping is generally a standard activity when completing an EIS and it might provide a useful model. In an EIS, public comments are listed, along with a response to each comment. We should consider using a similar methodology so that people who offer comments and suggestions can easily see that their ideas were considered.

Tina Peterson:
One graphic shows the Community Advisory Group in the first two steps of scoping, but not in the third step. It would be weird to have the advisory group active now and then not later in the process.

Bill Gill:
When it's a study like this, you're not impacting the environment much, so an EIS might not be important or relevant.

Karla Fowler:
Because this is a study and not a plan, we were not anticipating doing an EIS. However, for any sites or projects that are planned or undertaken in the future, we would certainly do an EIS.

Holly Gadbaw:
That's fine, but the EIS process can serve as an example of how to incorporate and include comments. I would also like to see the advisory group added back in to Step 3 of scoping to look at the details.

Dick Wallace:
How will the study be used? Is the intent to use results to revise the management plan or to adjust how the management plan is implemented? Make sure that you are able to explain to the public why the study is being done and once it is done – so what? Explain the role of the study in terms of what will follow – what comes next.

The discussion ended with an invitation to group members to send any further comments or thoughts about what should be added or revised in the public involvement draft plan to Lisa by Wednesday, April 17. The study team will incorporate comments and send out a revised draft Public Involvement Plan for review by the group at least one week prior to the next meeting. A summary of the structured interviews will also be sent to the group so they will have that information to assist with their review of the revised draft Public Involvement Plan.

**Discussion: Television/Video Documentation of Meetings**
Karla Fowler shared with the group some information regarding televising future meetings. She noted that we have been putting the cart before the horse in several respects. First, the LOTT Board of Directors has been considering televising Board meetings and has instructed staff to research options and associated costs. The Board will be making a decision about potential additions or improvements to LOTT's audio-visual system by the end of the year, which will impact decisions related to televising the advisory group meetings. Second, it is important to consider the most effective ways to use video or television as part of a comprehensive public involvement plan, rather than as a separate issue. Third, LOTT, as a partnership of four jurisdictions, often needs to evaluate consistency with the practices of its partners when considering a new course of action. Since the last meeting, staff researched the practices of citizen advisory committees of our four partner jurisdictions. As shown in the table that was displayed, most of these groups provide a record of their meetings by posting agendas and minutes on their websites. Two planning commissions post audio recordings. None of the groups post video of their meetings or televise meetings live.

Marissa Dallaire:
Video is one tool, but I don't know many people who would be willing to sit down and watch 3 hours of this meeting.

Karla Fowler:
That is why it should be considered as part of a comprehensive Public Involvement Plan, to make sure we make the most effective use of all outreach/involvement tools.

Dick Wallace
Another option that can be considered is "Go To Meetings", but it does require microphones for each advisory group member. It allows people to "attend" the meetings on their computers, see the presentations and hear the discussion, and it's recorded at the same time. We used it for another group and had great participation that way.

**Presentation: Groundwater Recharge and Soil Aquifer Treatment 101**
Jeff Hansen provided a presentation on groundwater recharge and the treatment that occurs as water moves through the ground. The advisory group asked questions, including:

Tina Peterson:
How is a basin a "recharge basin" if there's no water standing water in the basin? *A basin can be a recharge basin whether or not there is standing water. Some recharge basins involve standing water and others drain quickly and rarely hold water.*
What is a monitoring well compared to a supply well? *A monitoring well is one that is drilled specifically to monitor - not to withdraw any quantity of water.*

Dennis Burke:
Please explain if it is correct that the Hawks Prairie site sits on geology that is gravel so that the water moves directly from the basins to the aquifer, while septic systems in the area sit on an intervening hard pan layer so that effluent moves off and doesn't go into the aquifer. *It is correct that the Hawks Prairie site was selected because the underlying soils have the capacity to infiltrate a large quantity of water without clay or hard pan that might cause the water to pool up or flood the area. That does not mean infiltrated water is moving directly into the aquifer; nor does that mean that the water flows through the soils so quickly that there isn't additional treatment. The sand and gravels underlying the recharge basins are unsaturated (i.e., vadose zone), meaning the groundwater aquifer is not directly underneath the basins. Furthermore, it is important to keep in mind that treatment occurs as the water flows through the ground, regardless of the soil type – gravels, sand, clay. Also, effluent from septic tanks is subject to similar processes and pathways – it is being treated as it moves through the ground and it also eventually interacts with aquifers.*

Karen Janowitz:
Would Woodland Creek receive water from the new recharge site at the Woodland Creek Community Park? *The short answer is no – the facility is being designed and sized such that the recharged water will not enter the creek adjacent to the site. Modeling shows that the majority of the water will move below the creek to the northeast, while a portion is projected to enter the creek approximately 1.5 miles downstream (i.e., north) after a subsurface (i.e., in groundwater) travel time of three years.*

Bill Liechty:
Just to clarify - regulated contaminants do not address these compounds. *That is correct, these compounds of potential concern are not currently included in the lists of contaminants/parameters that are regulated.*

John Cusick:
How do you actually measure travel times? *In the field, the physical way to determine travel times is through tracer studies. Tracer elements, which are inert (or conservative, meaning they don't degrade)*

*are introduced into the aquifer and then monitoring is conducted at various sites to determine when and where the tracer is detected. That data then paints a picture of how the water moves underground.*

Maureen Canny:
Are we impacting the DNA of microbial organisms by introducing these compounds? *It's not that their DNA is impacted, but the populations of these organisms can be affected. Those that can use these compounds may out-compete those that can't, so that the proportions of different organisms in the microbial community may change.*

Ruth Shearer:
Why put sand in the recharge basins if you want sorption to occur? *The design tries to find that sweet spot in allowing for efficient movement of water into the ground while also maintaining effective soil aquifer treatment in the subsurface. Treatment is a combination of sorption and biodegradation, and the exact makeup of the soil is not as important to treatment effectiveness as is residence time of the water in the soil.*
But sand doesn't contain microbial organisms. *Yes, research shows that it does. In fact, studies have shown that the majority of the removal of compounds of potential concern occurs within the sand layer and upper-most portion of the underlying soil, due both to sorption and biodegradation.*

John Cusick:
How do these studies know that compounds actually degrade rather than just move off site? *That is taken into account in the studies. Monitoring occurs at various locations relative to the point of recharge (both vertically and horizontally). Thus, the movement of those compounds that are more resistant to degradation is tracked both throughout the local site and then down-gradient (i.e., off site).*

Dennis Burke:
My concern is that even if these things are broken down, there are still pieces of these compounds that exist, and it creates a toxic soup that is dangerous.

Maureen Canny:
Gravel is a big particle with little surface area and water moves through it quickly, so isn't that two negatives? *No, not necessarily. Remember, the most important factor is the amount of **total** soil surface area a drop of water encounters over time. Gravels have relatively small surface areas due to their large particle size and relatively large spaces between particles. By contrast, silts or clays have very high surface areas due to their small particle size. However, water general travels faster through gravels, thereby covering more distance and encountering more material. Water travels slowly through silts and clays and thus covers less distance and encounters less material. As a result, the **total** surface area encountered under both conditions is fairly similar. Because surface area supports biodegradation (since that's where the microorganisms like to reside), removals of compounds of potential concern are also similar under these varying conditions. Soil type becomes more of an issue when there is a potential receptor, like a water supply well or a stream, within a short distance down-gradient from a recharge site. So, again the important thing is understanding how long it takes for compounds to degrade, and then comparing that with how far recharged water is projected to travel during such times, and what the water might encounter (such as wells, streams, etc). Given that level of understanding, then an informed assessment of risk can be made.*

Karen Janowitz:
Jeff is explaining what the experts look at and consider when designing a site, and it can help us determine what we want to know in order to have the water be clean enough.

Bill Liechty:
This is very important to gather this type of information to share with the public and important information for the study.

Karen Janowitz:
This type of presentation won't work for a lot of adults, but there are a lot of approaches that will work better for the public. Local environmental educators can help in developing effective presentations.

Scott Morgan:
Does the height of the water table matter because it is better to have a deeper vadose zone that contains oxygen? *It doesn't necessarily matter - treatment will occur in saturated zones too, it may just take longer.*

Tina Peterson:
Does it mean that the soil is trashed at some depth below the infiltration site? *I cannot answer that without the site specific information. We do know that there are sites where infiltration has been going on for decades and those sites continue to function properly. It is likely that most of the compounds that are sorbed to the soil undergo biodegradation over time, freeing up the soil to sorb again.*

Would coyotes or raccoons or other critters that walk over or through the recharge basins pick up bad stuff and carry it off site to other locations, like my home across the street? *I don't have information tonight to be able to answer that, but it's a good question.*

Marissa Dallaire:
On the diagram in Slide 6, can some of the reclaimed water get into a drinking water well? *Yes, it could, but that is why we study things like flow paths and travel times, to prevent that from happening. Also, treatment will have occurred by the time it reaches the well; thus, it's not the same drop of water that was initially recharged into the basin.*

John Cusick:
Have the jurisdictions considered putting development of other projects on hold until the study is done? (Karla Fowler and Ben McConkey addressed this series of questions). *LOTT has made the decision that it will not be building new recharge facilities on properties it has purchased or will be purchasing until the study is complete. The cities' Woodland Creek project has been in the works for many years and is needed to meet their contracted obligations for new water rights. The Departments of Ecology and Health have been involved through the planning and design to assure the project meets all water quality requirements.*
What about for the storage project in Tumwater? *That project is not for recharge - it's for irrigation. The use of reclaimed water for irrigation is approved and encouraged by the state and is common practice in many states, including Washington. Irrigation uses are regulated so that the rate of irrigation does not exceed the ability of irrigated grasses and plants to take up the water or for the water to evaporate. The intent is that the water does not runoff or infiltrate in any appreciable amount, but instead, it is "used up".*

Is there any consideration for treating the water to a higher standard until the study is complete? *Increasing the treatment level is not something LOTT can just readily do. It would require adding new facilities and equipment, which take years to plan, design, and build.*

Bill Liechty:
I'm interested in the relationship between water rights and reclaimed water. I suspect that is a driver for infiltrating the water. I think the public would like to understand the relationship. *That is one driver, but the primary driver is to reduce discharge of treated wastewater into Budd Inlet. Upland discharge (through groundwater recharge) is a key element of the wastewater management plan, and it was included in the plan based on broad support from the public and the state. The result of supplementing groundwater supplies is considered an added, secondary benefit of recharge.*

Debra Jaqua:
If you stopped infiltration at Hawks Prairie, would there be capacity issues? *Yes, immediately. The water still has to be treated and has to go somewhere after treatment. It could not just be added to the amount currently discharged to Budd Inlet, as that amount is limited by state permit.*

Lyle Fogg:
Are there events that affect the microbial community, like drought? *Yes, things like moisture and temperature can change the populations somewhat.*

Debra Jaqua:
What about heavy metals? *We are not prepared to speak to those tonight, since the focus here has been on compounds of potential concern. However, in contrast to compounds of potential concern, metals are regulated and routinely monitored for. Their removals in soils and groundwater are primarily through sorption.*

**Next Steps**
Patricia Tennyson reminded the group to send any further comments on the public involvement handout to Lisa by April 17. She explained that the group will be receiving a number of work products that they will need to review before the next meeting, including a draft Public Involvement Plan.