

## Data Collection, Characterization, Monitoring

### Charge from Groundwater Management Area Advisory Committee

#### Working Group Members

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Melanie Redding (Chair); Andres Cervantes; Bob Stevens; Charles (Pony) Ellingson; David Bowen; Chelsea Durfey; Dave Cowan; Doug Simpson; Elizabeth Sanchez; Frank Lyall; Ginny Stern; Jaclyn Hancock; Jan Whitefoot; Jean Mendoza, John Van Wingerden, Kevin Lindsey; Laurie Crowe; Lino Guerra; Mike Shuttleworth; Ralph Fisher; Ron Cowin; Scott Stephen; Steve Swope; Stuart Turner; Dr. Troy Peters

#### Meetings/Calls Dates

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Meeting: Thursday, March 1, 2018, 1:00-3:00 PM  
Call Number: 509-574-2353 pin: 2353#

#### Participants

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Present: Melanie Redding (Chair), Vern Redifer, Jim Davenport, Jean Mendoza, Sage Park, Steve George, Michael Martian, Andy Cervantes, Dave Bowen\*, Margaret Drennan\*, Chris Saunders, Patty LeBlanc (County support staff) \*via phone

#### Key Discussion Points

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##### Update on Role of Data Working Group:

The meeting was called to order at 1:03pm. The main purpose of the meeting was to discuss the Deep Soil Sampling data analysis. Additionally, Jim and Vern asked for time on the agenda to discuss GIS data. After the customary introductions, Jim explained that there was a lot of data that had been compiled by GIS on maps that had been displayed at the last few GWAC meetings, but currying lessons from it would require creative minds looking for patterns or anomalies for which we don't have an explanation. The point was to give future lead entities and members of the public a tool to use in understanding nitrates' presence in the GWMA, and how best to apply action to mitigate high nitrate levels.

As an example, the last time Vern talked with GIS and USGS, they noticed what seemed to be a band of high-testing wells. After some examination, they discovered that they seemed to follow the Sunnyside Valley Irrigation District canal. Vern mapped a one-mile buffer strip on the north and south sides of the canal, and found that average and median nitrate levels inside the band were significantly higher than nitrate levels outside, suggesting that aging water infrastructure might be contributing towards driving nitrates into the ground. These results might also be coincidental, but that's why it's important to have a group scrutinize these questions, with the goal of coming up with a list of areas that demand further study.

A member commented that it was hard to provide input without seeing the map. Vern agreed, saying his purpose at this meeting was to let the group know where things were at, and to suggest the possibility of future meetings to study the data and suggest areas in need of further study. Discussion ensued on whether an outside statistician should be brought in to examine the data on the maps as an alternative to having the Data Working Group look it over. Melanie and Vern preferred to have the group look over the information. They hoped a meeting could be arranged at the end of the month with Matt Bachmann and others present and fully realized maps printed off for examination.

### **Deep Soil Sampling Results Analysis:**

Melanie presented the group with an analysis she had performed of the deep soil sampling results after the December GWAC meeting. She emphasized that the data she was presenting was only an analysis of the analytical data, not the survey data, and it was not meant to draw firm conclusions, but rather to make observations about the data that had been collected. The results had not been tied to specific crops, given the difficulty in obtaining statistically valid populations of fields sampled, and the skepticism some group members had expressed as to the accuracy of survey results in calculating nitrogen application. The first page of her handout titled “Deep Soil Sampling (DSS) in the Lower Yakima Valley GWMA” had a bullet-pointed list of the limitations of the data.

The second handout was titled “Deep Soil Sampling Analytical Data Analysis”, which contained a number of charts and graphs. On page 2 was a graph titled “Mean Soil Nitrate Concentrations”. Melanie observed that of the fields which were sampled, the mean nitrate levels in the first foot of soil were twice as high in the fall as opposed to spring. Jim had some concerns about the randomness of the data sites collected, but other group members felt that the results could still be useful in pointing to the need for further study. The results of the deep soil sampling described only what was happening on the fields which were sampled, and could not be extrapolated to the rest of the Lower Valley.

Page 3 contained similar information, which broke down the results of the fields sampled by year. In both 2014 and 2015, mean fall nitrate levels in the first foot of soil were twice the levels they were in the ensuing spring seasons. In the fall of 2014, mean nitrate levels declined from 30 ppm in the first foot, to 9 ppm in the 6<sup>th</sup> foot. Group members observed that it would make sense for nitrate levels to be higher in the fall if the SVID hypothesis about summer irrigation waters driving nitrates was correct. The problem is that the locations of the soil samples are confidential. Discussion ensued on the feasibility of constructing a study of nitrate levels during the 2015 drought compared to the wet year of 2016. Instinctively, there would seem to be a clear connection, but members brought up factors such as some irrigation districts having senior water rights and others not, and the long crop planning timeframe. Farmers plan next year’s crop in the fall, but those with junior water rights don’t find out their water allotment until March.

Page 4 contained a graph depicting the maximum soil nitrate concentrations for the fields sampled by depth and season. All of them were over 30 ppm, with the highest levels being above 300 ppm five and six feet deep in the fall of 2015. Melanie also pointed to the first foot of soil, where the maximum levels for fall were greater than the spring concentrations.

Melanie took the group back to the first handout on page 5, where tables had been put together breaking down the fields sampled into nitrate concentration categories. About 48 percent of sites tested had concentrations below 30 ppm in the fall of 2014 and 2015, compared to 60 percent in the spring of 2015 and 59 percent in the spring of 2016. There were a total of 29 fields (17%) where the cumulative soil nitrate from all sampled depths was greater than 200 ppm.

Returning to the second handout, page five held a bar graph with the maximum value soil nitrate concentrations broken down by soil depth. The numbers were highest at the five and six-foot depth. These numbers included both fall and spring. Page 6 depicted the number of soil nitrate samples by different concentration ranges according to soil depth. Low-end concentrations below 15 ppm were the largest categories at all depths, although there were significant percentages of sites over 30 ppm as well. This information was captured in percentage terms on page 8. A member wanted to know whether we knew the root zone at these sites. Melanie replied that it would be interesting to tie this into the data.

The group discussed what kind of structure they wanted in place for examining the data and carrying forward recommendations. A member noted that there are a lot of grants out there, and staff at WSU looking for research projects, but first, the GWMA or its successor agency would need to identify the most important projects they wanted done.

Melanie asked the group to send her any further ideas. Jean thought the findings Melanie presented lacked the context of Jean's research on the subject. Jean had previously analyzed the Deep Soil Sampling data (both the analytical and survey data) and sent this analysis to the GWAC in July 2017. No action was taken by the GWAC on Jean's work. This analysis focused on triticale, corn, and alfalfa, crops where there were larger sample sizes. Jean found cause for concern that individuals might take the information on the charts and graphs and extrapolate them onto crops where the irrigation and nitrogen application methods were very different. Vern and Jim suggested that Jean could present her findings at the next GWAC meeting and see if there was a way to combine her data with Melanie's. Jean agreed to forward a copy of her research to Melanie and other members of the group.

The group discussed the various limitations on the data available so far, and where they would like to see more information in addition to the canals issue. A group member felt that eventually, they would need to collect some non-anonymous samples in order to effectively monitor watering and nitrate applications at the same sites at regular intervals throughout the seasons. The presence of organic matter in the soil layer was another topic of interest.

The meeting adjourned at 3:05pm.

## **Resources Requested**

## **Recommendations for GWAC**

## **Deliverables/Products Status**

## **Proposed Next Steps**

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The Data Working Group will meet again on March 29<sup>th</sup> to discuss the GIS well mapping.

The root zones of fields will also be looked at in relation to nitrate levels with regards to the Deep Soil Sampling.

Jean will send the group her analysis of the deep soil sampling results.