

2014 Nitrate Priority Area Delineation and Ranking Process

Response to Public Comments—July 2014

Comment	DEQ Response
<p><u>Comments from: George K. Wells, Cassia Co.</u></p> <p>The cassia county ground water advisory committee would like to submit a comment on DEQ’s draft document 2014 Nitrate Priority Area Delineation and Ranking Process.</p> <p>After discussion on our Meeting April 17 a d May 20, a motion was made to change the name from Cassia county nitrate Priority area to; Marsh Creek Nitrate Priority Area. The reasons for this are as follows:</p> <ol style="list-style-type: none">1. The name Marsh Creek is more representative of the location of the watershed where the high nitrate values are located.2.The name Cassia County is a much larger area and does not represent the area which is of high nitrate values. <p>Thank you for this consideration: George K. Wells Chairman Cassia County Ground Water Committee</p>	<p><u>DEQ Response</u></p> <p>Thank you for your comment. The 2014 Cassia County NPA has been renamed to Marsh Creek Nitrate Priority Area.</p>

Comment from: Sara Arkle, Boise



June 24, 2014

Tonia Mitchell
DEQ State Office
Water Quality Division
1410 N. Hilton
Boise, ID 83706

Submitted via email: toniamitchell@deq.idaho.gov

Re: 2014 Nitrate Priority Area (NPA) Delineation and Ranking Process

Dear Ms. Wilson,

Since 1973, the Idaho Conservation League (ICL) has been Idaho's voice for clean water, clean air and wilderness—values that are the foundation for Idaho's extraordinary quality of life. ICL works to protect these values through public education, outreach, advocacy and policy development. As Idaho's largest state-based conservation organization, we represent over 25,000 supporters, many of whom have a deep personal interest in protecting Idaho's drinking water resources.

ICL is concerned that groundwater contamination in Idaho continues to degrade finite drinking water resources. Elevated nitrate levels pose health risks to humans and animals and can be an indicator of other water quality problems such as pesticide and bacterial contamination¹. In regard to human health impacts, nitrate contamination of groundwater has been shown to cause methemoglobinemia, or blue-baby syndrome. Methemoglobinemia occurs when nitrate is converted to nitrite in a child's body reducing the oxygen in the child's blood². In addition, more recent findings indicate that long-term exposure to elevated concentrations of nitrate may contribute to the risk of developing bladder and ovarian cancers³ and

¹ Kross, B. C., Hillberg, G.R., Bremer, R., Chernobrov, K., Johnson, K. J., 1991. The Nitrate Contamination of Private Well Water in Iowa. *American Journal of Public Health*, v. 81, p. 270-272

² Karmin, M. A., 1987. Health Implications of Groundwater Contaminants in Rural Groundwater Contamination. D'Inci, F.M., Walker, L. O., eds. Lewis, Chelsea, MI, p. 236-238.

³ Wegler, P.J., Corhan, J.B., Kross, B. C., Hillberg, G.R., Kartanaves, J., Bremer, G., Jones, M.P., Zheng, W., and Lynch, C.F., 2001. Municipal drinking water nitrate level and cancer risk in older women: the Iowa women's health study. *Epidemiology*, v. 11, p. 327-338.

ICL comments re: 2014 Nitrate Priority Area (NPA) Delineation and Ranking Process

DEQ Response

Thank you for your comments.

The nitrate priority area (NPA) ranking and delineation process was initiated to comply with DEQ policy memorandum PM-004, which outlines the process to define and prioritize areas of the state with degraded ground water quality that could adversely affect a beneficial use. The ultimate purpose is to prioritize limited resources by targeting the most severely degraded areas in the state. DEQ has worked with the Ground Water Monitoring Technical Committee (GWMTC) since 2000 to develop and refine the process for delineating and prioritizing the areas. Membership is comprised of agency ground water professionals meeting several times each year with a smaller technical working group meeting more frequently to continually refine the NPA process.

Comment 1:

DEQ has included a graphic example illustrating the changes in nitrate trend from 2002 to 2014 to the 2014 NPA report.

Comment 2:

In 2002, the NPA delineation was based on ground water quality and professional judgment. Professional judgment consists of overlying several GIS layers or coverages such as land use including LANDFIRE and GAP, geology, soils, aquifer vulnerability, hydrogeologic aquifer systems of Idaho, geologic structure, and topography. The suggested LANDFIRE and GAP GIS coverages maybe more appropriate to use when trying to identify sources of nitrate, however, nitrate source identification is beyond the scope of the NPA process. Historic and local knowledge was also taken into account, as well as political boundaries for implementing management strategies. Following the 2002 NPA ranking, the GWMTC was concerned that the professional judgment component could be considered subjective. In 2008 and 2014, the delineation process was

non-Hodgkin's lymphoma⁴. Nitrate contamination also impacts ecological systems and can result in algal blooms and widespread fish kills⁵.

ICL has reviewed the 2014 NPA Delineation and Ranking Process draft report and provides the following comments, by topic, on the attached pages:

Please contact me if you have any questions at 208-345-6933 x 23 or sararide@idahocconservation.org

Sincerely,



Sara Aride
Community Conservation Associate

⁴ Ward, M.H., Math, S.D., Caster, E.P., Weisenburger, D.D., Correa-Villaseca, A., and Zahra, S.H., 1996. Drinking water nitrate and the risk of non-Hodgkin's lymphoma. *Epidemiology*, v. 7, p. 463-471.
⁵ Nolan, B.T., 2002. Moving from Monitoring to Prediction: National Assessment of Nitrate in Groundwater. Briefing sheet prepared for Congressional Briefing, sponsored by Water Environment Federation, Environmental and Energy Study Institute, and U.S. Geological Survey Washington, D.C., March 11, 2002.

robustly strengthened for defensibility by adding the statistical component of indicator and predictive kriging to define degraded areas.

The scoring system to rank the areas was developed by the GWMTC for the 2002 NPA ranking and was slightly modified for the trend score component in 2014. The ranking process considers several components, of which the trend is just one of several. The trend analyses for the 2002, 2008, and 2014 NPAs compared nitrate concentrations between two time periods for each NPA analyses.

Comment 3:

The vast majority of the sites used in the NPA analysis are either sampled on a yearly basis, or as a one-time investigative follow-up sample, or for a short-term monitoring project. For sites with multiple sampling events, the GWMTC discussed options for selecting a single value to represent the nitrate concentration. No option was without downfalls. For example, using the maximum value or a minimum value during a time period would bias the information. The consensus of the GWMTC was that using the most recent value was a simple, straight forward unbiased approach that would be appropriate for the scope of this project.

Of the 10,955 sites used in the 2014 NPA analysis, 5,526 sites were sampled by DEQ or its contractors, 3,795 sites were sampled by IDWR/USGS and 2,695 sites sampled by ISDA. The data are dated from 1990 through 2011.

IDWR has administered the Statewide Ground Water Monitoring Program and has collected ground water samples since 1990. The number of sites in the program has varied and are contingent upon funding, with the highest number of 1,500 sites in 1994. About 400 sites are sampled each year; 100 sites are sampled annually; and the remaining sites are sampled on 5-year rotations. For several years, the USGS collected samples for the Statewide Ground Water Monitoring Program in addition to USGS regional and local monitoring projects.

Trend Analysis and Assessment

ICL urges the Department of Environmental Quality (DEQ) to provide a more robust trend analysis including a representative graphic in the 2014 NPA Delineation and Ranking Process report. It is appropriate for the Department to include a trend analysis using data collected since the beginning of groundwater quality assessment programs to inform the ranking process. However, this trend analysis is of import as a stand-alone assessment of groundwater quality degradation in the state. By identifying those areas that have seen either sharp increases or decreases in nitrate contamination, DEQ can better assess the efficacy of existing management strategies in protecting drinking water resources. This level of understanding will allow DEQ to better inform groundwater management decisions statewide.

1

DEQ should include, in this more robust assessment, a land cover classification map overlay to identify surrounding land use factors that may contribute to any trends demonstrated. Such land cover tools to consider include LANDFIRE or GAP, interactive mapping tools developed by the U.S. Geological Survey for uses such as this.

2

Idaho Department of Water Resources Analysis Methodology

Page five of the NPA Delineation and Ranking Process draft report describes additional analysis methodologies used by the Idaho Department of Water Resources (IDWR) *"to provide a more comprehensive evaluation of the trends."* On sites where multiple samples were taken, IDWR enlisted the most recent sampling event to inform the ranking process. The maximum values were not used in these cases. However, DEQ provides no argument to indicate this assessment method is appropriate or representative of groundwater quality. ICL contends this is not a defensible assessment method.

3

Numerous studies conducted by the Department and by the US Geological Survey have indicated that seasonal variations in nitrate concentration are persistent in wells throughout Idaho⁶. A "one-size fits all" approach to sites where multiple samples are taken is not an effective way to describe or assess groundwater quality. These sample sites exist in unique hydrologic conditions and have varying types of surrounding land use. DEQ should, rather than use the most recent value, use the

⁶Schurman, K., Erdheim, J., and Böker, J., December 2009. Possible sources of nitrate to the springs of southern Gooding County, Eastern Snake River Plain, Idaho. Ground Water Quality Technical Report No. 38
USGS in cooperation with the US Air Force. Groundwater level nitrate contamination trends on mountain home air force base, southwestern Idaho 2014-1022.
Idaho DEQ. Follow-up sampling for bacteria, nitrates, major ions, stable isotopes, and tritium 2009-2010, Ashley-Drammond nitrate priority area

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The data contributed by DEQ includes public water system regulated monitoring, in which the frequency of sampling varies. DEQ has often collected a follow-up sample to investigate potential problems based on a complaint or concern and may not revisit the site. Occasionally a follow-up sampling event will lead into a monitoring project. Since 1990, DEQ has had regional or local monitoring projects but very few have continued long term. Monitoring depends upon available funding.

ISDA conducts regional and local monitoring projects to obtain ground water for nutrient and pesticide analysis. The number of sampled sites and the frequency has also varied over time. ISDA also samples dairy production wells on an annual basis.

For the trend analysis, DEQ contracted with IDWR. IDWR, like DEQ, consulted with the GWMTC about the process. IDWR observed that peak concentrations in nitrate values sometimes occurred in the middle of a time period at individual sites rather than at the end of a time period. For sites with multiple sampling events, the GWMTC discussed options for selecting a single value to represent the nitrate concentration. No option was without downfalls. For example, using the maximum value or a minimum value during a time period would bias the information. The consensus of the GWMTC was that using the most recent value was a simple, straight forward unbiased approach that would be appropriate for the scope of this project. For details regarding the trend analysis, visit the following:

[http://www.idwr.idaho.gov/WaterInformation/Publications/wib/wib50p8 Nitrate Trend analyses Report 2013.pdf](http://www.idwr.idaho.gov/WaterInformation/Publications/wib/wib50p8%20Nitrate%20Trend%20Analyses%20Report%202013.pdf)

Comment 4:

The GWMTC recognizes nitrate concentrations may vary seasonally. Seasonality of nitrate concentrations was not considered for the trend analyses due to limited resources and a desire to apply consistent methods to all NPAs. Seasonal nitrate concentrations are not available for the vast majority of the sites used in the NPA analysis. The sites

highest value within a given year. This approach would capture seasonal variations in groundwater quality that would impact drinking water resources.

4

Mandate Groundwater Protection BMPs

Much like the 2008 Nitrate Priority Area Delineation and Ranking report, the 2014 assessment shows an increase in total NPAs in Idaho and increasing contamination of certain existing NPAs. This demonstrates the inadequacy of existing voluntary management plans aimed at reducing nitrate contamination of drinking water resources in the state. Indeed, a recent modeling assessment of nitrate concentrations in the mid-Snake indicated increase levels of contamination through 2028 should the state take no action in reducing nitrogen loading into the aquifer system⁷. To protect water quality and human health in the State of Idaho, DEQ must set a quantifiable nitrate reduction target and must mandate BMP implementation in NPAs where the trend analysis indicates nitrate contamination levels are increasing. This seems essential to reducing and preventing nitrate contamination of drinking water resources in the state.

5

⁷ Skamer, K.D and Rupert, M.G., 2012. Numerical model simulations of nitrate concentrations in groundwater using various nitrogen input scenarios, mid-snake region, south-central Idaho. U.S. Geological Survey Scientific Investigations Report 2012-5237, 30p.
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are either sampled every 5 years, on a yearly basis, or as a one-time investigative follow-up sample. For sites with multiple sampling events within a year, the GWMTC consensus was that using the most recent value was a simple, straight forward unbiased approach that would be appropriate for the scope of this project.

For details regarding the trend analysis, visit the following:

http://www.idwr.idaho.gov/WaterInformation/Publications/wib/wib50p8_Nitrate_Trend_analyses_Report_2013.pdf

Comment 5:

DEQ recognizes that nitrate in Idaho ground water continues to be a concern that needs to be addressed. The purpose of the NPA process is to identify areas with degraded ground water quality and rank them based on degree of severity. The NPA results can be used to direct additional investigation activities. These activities may include further data evaluation and statistical analysis to address seasonality and link land use practices to nitrate concentrations in ground water. This information could be used to more effectively implement best management practices.