Priority One Nitrate Area Ranking Process

Pursuant to guidance provided in the Department of Environmental Quality (DEQ) policy memorandum entitled "Policy for Addressing Degraded Ground Water Quality Areas" dated March 1, 2000, a statewide list of significantly degraded areas for nitrate was developed. The policy states that the list will be prioritized and the public given an opportunity to comment. The draft Priority One Nitrate Area Ranking Process was released for public comment on April 24, 2001. After an initial 30 days the public comment period was extended an additional 30 days until June 23, 2001. Public comments were incorporated into the ranking process as appropriate. This document represents the final Priority One Nitrate Area Ranking Process.

The Nitrate Area Ranking Process (Ranking Process), developed by DEQ, in consultation with the Ground Water Monitoring Technical Committee (GWMTC), provides the rationale for numerically ranking areas in Idaho with identified ground water degradation from nitrates. The process was initially limited to ranking 33 Priority One Nitrate Areas (Nitrate Priority Areas) identified by the GWMTC in 1999. The current number of Nitrate Priority Areas has been reduced to 25, largely through consolidation of smaller areas into larger ones. The small areas that were consolidated were adjacent and in close proximity with similar hydrogeologic parameters. Furthermore, from the standpoint of implementing corrective measures, the consolidated areas lend themselves to easier management by local entities. The statewide priority list created through this process will be used to prioritize the implementation of protective management strategies or corrective action measures within the Nitrate Priority Areas.

The prioritization process employed an approach intended to:

- Minimize subjectivity
- Have statewide applicability
- Be transferable to other types of contaminants, such as pesticides, and
- Make use of existing information.

The prioritization process considers three weighted principal criteria: population, existing water quality, and water quality trends. A secondary criterion, impacts to beneficial uses other than potable water supply, is considered to a lesser extent because it is not directly related to public health. The secondary criterion is included to comply with the DEQ Policy Memorandum entitled "Policy for Addressing Degraded Ground Water Quality Areas."

Priority Area Number: sample Priority Area Name: sample

Ranking Criteria			Score	Comments
1) POPULATION				
	Points	**Select One**		
a) Within Priority Area				
<1000	1			
1000 to 10,000	2	X	2	Population = 5853
10,000 to 100,000	3			
		Subtotal	**2**	
b) Source Water Protection Areas or Public Water System wells in Priority Area				
0	0			
1 to 20	1	X	1	11 PWS
>20	2			
		Subtotal	**1**	
c) Number of Wells with nitrate (NO_3) $\geq$ 10 mg/l				
0	0			
1 to 2	1			
3 to 5	2			
6 to 9	3			
10 to 15	4			
>15	5	X	5	29 Wells
		Subtotal	**5**	
		Population Score	**8**	
		Max Possible Score = 10		
2) WATER QUALITY				
	% wells	**Nitrate Concentration**		
		Criteria		
Percent of wells with nitrate (NO_3) $\geq$2 mg/l	88%	2	1.76	
Percent of wells with nitrate (NO_3) $\geq$ 5 mg/l	73%	5	3.65	
Percent of wells with nitrate (NO_3) $\geq$ 10 mg/l	45%	10	4.50	
		Water Quality Total	**9.91**	
3) WATER QUALITY TRENDS				
		Select One		
Increasing	10	X	10	
No Discernable Trend	5			
Decreasing trend	0			
		Trend Score	**10**	
		Max Possible Score = 10		
4) OTHER BENEFICIAL USES				
Other beneficial uses are impaired	2	Yes=2 No = 0	No	
		Beneficial use score	**0**	
		Max Possible Score = 2		
		Total Score	**27.91**	

Criteria and Scoring Format

The criteria and scoring format are described below.

Primary Criteria

1) **Population -** The population criterion considers the number of people living in an area that are potentially drinking nitrate-degraded water. This criterion consists of an assessment and point assignment of three elements.

a) Population within the priority area. This element is based upon census data. From 1 to 3 points may be accrued at this stage. One point is assigned to areas with populations less than 1,000; 2 points are assigned to areas with populations between 1,000 and 10,000; and 3 points are assigned to areas with populations of 10,000 or greater. *Example - Population =5853=1000 to 10,000=1 point*

b) Source Water Protection Areas or Public Water System (PWS) wells within the priority area. The DEQ Policy Memorandum "Addressing Degraded Ground Water Quality Areas" directs DEQ to consider source water assessment areas in ranking the priority areas. Source water assessment areas, or "capture zones," represent the aerial extent of 3-, 6-, and 10-year travel times for ground water to reach the PWS well. However, at this time, source water assessments are not yet completed for the state. Therefore, to meet the intent of the policy, PWS well locations are used instead of source water assessment areas. This substitution is not conservative because wells located outside the priority areas may have source water assessment/protection areas extending into a neighboring priority area. If a source water assessment/protection delineation touches a nitrate priority area, the susceptibility rating of the source water assessment is increased. Once the source water assessments are completed the ratings can be revised to reflect the number of source water assessment/protection areas rather than public water systems affected by the nitrate priority area.

This stage provides 0, 1, or 2 points. Areas without a PWS well do not receive points. Areas with 1 to 20 PWS wells receive 1 point and areas with more than 20 PWS wells receive 2 points. *Example - PWS wells in Priority Area=11= 1 point*

c) Number of Wells with Nitrate Concentrations above 10 mg/l. The GWMTC determined the number of wells with nitrate exceeding 10 mg/l was an important ranking factor. Furthermore, the number of sampled wells with nitrate greater than or equal to 10 mg/l within the priority area is representative of the potential for the public to ingest contaminated ground water. This step is intended to equalize the scoring of large populations drinking water from uncontaminated sources with small populations drinking water from nitrate contaminated sources. Nitrate contamination greater than or equal to 10 mg/l is the only factor tallied.

Points are accumulated as follows: 0 wells = 0 points, 1 to 2 wells = 1 point, 3 to 5 wells = 2 points, 6 to 9 wells = 3 points, 10 to 15 wells = 4 points, and greater than 15 wells = 5 points.
Example - Number of Wells with Nitrate greater than 10 = 29 wells = 5 points

At this stage the population scores are subtotaled.
Example - (2 + 1 + 5 = 8)

2) **Water Quality** - This criterion considers the concentration of nitrate contamination with respect to drinking water standards. The criterion is based on the percent of sampled wells with ground water nitrate concentrations greater than or equal to 2 mg/l, 5mg/l, and 10 mg/l respectively. These categories were selected to maintain consistency with existing data formats used by the GWMTC.

a) Percentage of wells with groundwater nitrate concentrations greater than or equal to 2 mg/l. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l. Points are accumulated by multiplying the percentage of sampled wells by 2. *Example - 88% of the wells sampled equaled or exceeded 2 mg/l. (0.88 x 2 = 1.76)*

b) Percentage of wells with ground water nitrate concentrations greater than or equal to 5 mg/l. This nitrate concentration is considered evidence of significant degradation. This concentration represents one half the drinking water standard for nitrate of 10 mg/l. Public drinking water systems are required to increase monitoring frequency when this level is reached. Because these wells are a subset of the wells containing nitrate greater than or equal to 2 mg/l, this percentage is always less than or equal to the percentage of wells above 2 mg/l. Points are accumulated by multiplying the percentage of sampled wells by 5. *Example - 73% of the wells sampled equaled or exceeded 5 mg/l. (0.73 x 5 = 3.65)*

c) Percentage of wells with groundwater nitrate concentrations greater than or equal to 10 mg/l. State of Idaho and federal drinking water standard maximum contaminant level for nitrate is 10 mg/l. Nitrate concentrations above this level present health risks to certain individuals. Because these wells are a subset of the wells containing nitrate at or above 5 mg/l nitrate concentration, this percentage is always less than or equal to the percentage of wells greater than or equal to 5 mg/l. *Example - 45% of the wells sampled equaled or exceeded 10 mg/l. (0.45 x 10 = 4.50)*

The sum of all three factors above gives the final water quality score.
Example - (1.76 + 3.65 + 4.50 = 9.91 points)

3) **Water Quality Trends** - This criterion considers water quality trends within each priority area. Determining water quality for a specific priority area is a complex process requiring a comprehensive analysis of water quality data. DEQ contracted with the U.S. Geological Survey to evaluate the nitrate data using statistical methods to determine if scientifically defensible water quality trends are present in the areas. The concentrations of nitrate are classified as *increasing, no discernable trend, or decreasing.*

This criterion will be assigned a maximum value of 10 points. The scoring breakdown is listed below:

a) Increasing = 10 points
b) Static or no discernable trend = 5 points
c) Decreasing = 0 points

Secondary Criterion

3) Other Beneficial Uses - The "Other Beneficial Use" criterion is included in the process because DEQ policy states that this is to be a consideration in ranking the Nitrate Priority Areas. However, this factor does not appear to be an issue in any of the existing Nitrate Priority Areas with the exception of Twin Falls area aquaculture. When other beneficial uses are impacted, two points will be added to the score. Aquaculture is an example of a beneficial use potentially impacted by elevated nitrates.

Example - no other beneficial uses = 0 points
Total Score - (8 + 9.91 + 10 = 27.9)
For clarity the final score is rounded to the nearest tenth - 27.9