MIDDLE SNAKE REGIONAL WATER RESOURCE COMMISSION

Lew Pence, Chairman
Bob Muffley, Acting Executive Director
122 5th Ave. West
Gooding, Idaho 83330
PH: 208-934-4781 Fax: 208-934-5648

December 12, 2002

TO: Commission member & Executive Committee

FROM: Lew Pence,Chair

RE: Various items of interest

DATE: 12/12/02

You may be aware that Commission members voted at the November meeting to cancel the December meeting because of The holidays. We do have some work to do, however. The Commission decided at the last meeting to work with the University of Idaho to establish a working group made up of people in the scientific community to see if methods can be developed that would reduce nitrate input from agriculture. Bob Ohlensehlen of the University of Idaho Extension Service met with the Commission to discuss the proposed partnership. Bob said that he had already been instructed by his superiors to start work on a similar project so he believes the university would be glad to work with us. The Commission also instructed the Chairman that he, Bob Ohlensehlen and Bob Muffley should meet to create a draft mission statement for the work group. We met on December 12th and the draft mission statement is enclosed. I would like each of you to study the mission statement and contact the executive director with proposed changes prior to January 9th. It is important that Bob receives this information before that date so he can include your proposed changes when the agendas are mailed prior to our January meeting. It would also help Bob if your proposed changes are in writing so there can be no confusion. These can be faxed to Bob at the above listed fax number.

Also enclosed is a study proposal that Bill Allred of DEQ is working on. The study is essentially an update of a previous study analyzing nitrate levels from animal, chemical and other sources above and below Niagra Springs south of Wendell. The update will help them with trend data. Their previous study showed nitrate input in this area of the Snake River springs is primarily coming from sources in Gooding, Jerome, Lincoln and Minidoka counties. The new study will show increases or decreased to previously recorded nitrate levels and hopefully give us better trend information. This trending data could be important to the scientific team we are putting together with the University and Bill Allred has promised to keep us updated.

We are moving along with the public hearings for the new ground water plan. Twin Falls county will hold their hearing on 12/16/02, Gooding on 12/23/02 and Lincoln on 1/13/03. We haven't heard from Jerome county as yet. Once these hearings are held and the "finding of fact and conclusions of law" completed the Commission will need to review these finding to see if material changes are necessary. Our findings will then be sent to the Executive Committee for their final review. When agreement is reached by the Executive Committee we will approach the County Commissioners of Minidoka and Cassia counties to see if they would like to adopt the plan as revised by ordinance of if they prefer to adopt the changes by resolution since they originally adopted the plan in this manner. Once the revisions have been adopted, we will need to make appointments with all the county planning and zoning commissions in the region to update them on the revisions and offer our support and expertise. We will also be able to take them a complete set of USGS maps to help in their zoning and other deliberations.

I spoke with Pat Lambert of the USGS and he assured me that we would have access to the probability and other maps very soon. Ken Skinner of the USGS contacted Bob Ohlensehlen on the 12th and will be sending him, within 5 days, a computer disk with the maps. Bob will be able to print as many maps as we need at the 1/20,000 scale. We will not have them in time for the Twin Falls hearing, however.

**I want to take this opportunity to thanks each of you for your hard work and dedication throughout the planning process. You really went above and beyond with your efforts.
I hope you and your families have a wonderful holiday season and I look forward to seeing you next year.**

Mission Statement:

The surface and ground water quality of the Middle Snake River Region has become a major concern to area residents and local political leaders. Comprehensive plans throughout the region have identified water quality as an issue of major importance. Several federal, state and local entities have dedicated substantial resources to the study of water quality in the region. With all of the work that has been done in the collection of data, there has not been a coordinated effort to analyze and utilize the data to develop a practical means to continue current land uses while improving water quality.

A group of scientists representing several federal, state and local entities will be formed with the charge to analyze the available information including nutrients, pesticides and bacterial contamination. Based on their evaluation of the data the group will develop practices and projects which will be implemented to improve water quality. The programs and projects that are developed as a result of the group effort must be technically sound, socially acceptable and economically feasible.

Objectives:

1) Analyze all of the current water quality data for the region
2) Determine if there is a need for additional information or research
3) Develop a coordinated plan of action which will result in improved water quality
4) Develop practices and programs to improve water quality
5) Identify appropriate test sites for practices and programs
6) Submit a plan of action to the Middle Snake Regional Water Resource Commission who will help facilitate implementation
7) Analyze data from test site

Entities whose scientific representatives will be involved:

1) NRCS
2) ARS
3) INEEL
4) ISDA
5) DEQ
6) IDWR
7) EPA
8) U OF I Research & Extension
9) CanalCompanies

Memo

Middle Snake Regional

Water Resource Commission
122 5th Ave. West
Gooding, Idaho 83330
(208) 934-4781 (208)934-5648 FAX

TO: Timothy A. Hurst, County Administrator
SUBJECT: Revision to Coordinated Water Resource Management Plan
ATTENTION:
DATE: 9/6/02
FROM: Bob J. Muffley, Executive director

Enclosed is the completely revised water quality portion of the Coordinated Water Resource Management Plan. I have also enclosed a copy of the entire planning document. The first page of the authorization portion of the plan explains how the plan is to be adopted by each county. The process should be the same as the one used for adoption a counties comprehensive (land use) plan. If there is something in the existing plan or the revisions that your commissioner are not comfortable with let me know. The Commission is continually revising and updating the document so your Commissioners can be address in future revisions. The document was, however, accepted in its entirety by the other counties of the region. Please remind your commissioners to completely disregard the old water quality portion of the plan.

The water quality section of the plan was outdated so the Commission has spent the last 1 ½ years working with a planning group made up of people from all 6 counties to update this section and add ground water quality. In conjunction with this planning effort, the Commission has been working with the USGS to develop probability maps for nitrates for each of the counties. These maps will be presented at our public hearings since the plan and the various USGS maps compliment each other.

It appears that the areas of our region that are most likely to have or get nitrate contamination are in Twin Falls, Cassia and Minidoka counties. Because of this, the Commission plans to put together a working group made up of the U of I, Idaho Dept. Of Ag, NRCS and Soil Conservation Districts to see if farming methods are or can be developed to reduce nitrate pollution from farming activities which make up most of the nitrate problems within the region. The USGS estimates that 80% of nitrate loading is caused by field agriculture activities and 17% from animal agriculture. Progress in these areas will go along way in protecting the regions ground water supply.

Memo

Middle Snake Regional
Water Resource Commission
122 5th Ave. West
Gooding, Idaho 83330
(208) 934-4781 (208)934-5648 FAX

TO: Ridenbaugh Press
SUBJECT: Invoice #RP1-22639
ATTENTION: Accounting Dept.
DATE: 9/4/02
FROM: Bob Muffley, Executive Director

I received your invoice for $129.00. I checked our records and found that we sent a Jerome County warrant number 2002-2747 to you in the amount of $129.00 last March. This warrant was cashed on 4/4/02 on your invoice number RP1-22300. Please check your records and let me know if you need further information.

public hearing

COUNTY OF CASSIA

COURTHOUSE

TIMOTHY A. HURST
COUNTY ADMINISTRATOR
e-mail: thurst@cassiacounty.org

1459 Overland Avenue
BURLEY, IDAHO 83318
208-878-7302

PHONE: 208-878-7302 ✓
FAX: 208-878-9109
www.cassiacounty.org

August 29, 2002

Cassia did not adopt our plan by ordinance – Did Minidoka

Bob Muffley
Mid-Snake Regional Water Resources
122 5th Ave. West
Gooding, ID 83330

RE: Mid-Snake Groundwater Plan

Bob:

Commissioner Paul Christensen told me that your organization has developed a groundwater protection plan on which you are going to conduct public hearings in the near future. If this is correct, would you please send me a copy of the plan so that our County Commissioners can review it prior to the hearings?

Thank you.

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Respectfully,

[signature]

Timothy A. Hurst

TAH/rb

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
230 Collins Road
Boise, Idaho 83702-4520

March 13, 2002

Bob Muffley
Middle Snake Regional Water
Resources Commission
124 5th Avenue West
Gooding, Idaho 83330

Dear Mr. Muffley:

This letter is a progress report for the Department of Environmental Quality (DEQ), U.S. Geological Survey (USGS), and Mid-Snake Counties cooperative study to assess the effects of nitrate loading from nonpoint sources on ground water in the Mid-Snake Region, South-Central Idaho. The report covers progress from October 31, 2001 to March 8, 2002.

Work during the review period focused on finalizing the contamination probability model and nitrate sources in the study area. In addition, the ground-water flow model for the Mid-Snake area was developed from an existing regional model of the eastern Snake River Plain (ESRP) aquifer system and nitrate transport models were developed using a MOC3D solute transport model (Konikow and others, 1996, Kipp and others, 1998).

The following discussion summarizes methods used, progress of the work for the review period, and plans for the next quarter.

PROGRESS REPORT (October 31, 2001 – March 8, 2002)

Study Objectives - A principal objective of the project is to improve our understanding of nitrate movement to and through the ground-water system of the six county study area: Gooding, Twin Falls, Jerome, Minidoka, Cassia, and Lincoln Counties. Additional objectives are to evaluate the utility of selected models incorporating the improved understanding in order to assess future effects of nitrate loading on ground water in the study area and potentially in other areas of the State.

GIS layers – Improvements to the GIS datasets include additional nitrate data, previous year crop residue loss calculations for the nitrate source layer, creation of a depth to water layer, and a relative ground-water velocity layer.

Additional nitrate well data were added to enhance the spatial distribution of wells throughout the study area. This also resulted in a better proportion of 'hit' to 'no hit' nitrate wells. The additional wells were selected from the Idaho USGS National Water Information System (NWIS) database. These wells are not restricted by the sampling date (previous wells were isolated to the summer months).

Nitrate source layer - The nitrogen input data layer was updated to account for nitrogen losses due to previous year crop residue. Tindall (1991) notes that small cereal grains use more nitrogen to decompose that other row crops like potatoes, whereas leguminous crops create nitrogen abundance in the soil. To account for nitrate removal the mean of the range used by Rupert (1996) was weighted by the percent of small cereal grains produced per county.

Relative ground-water velocity layer – In an attempt to compensate for the unequal ground-water flow regimes between the ESRP north of the Snake River and the tributary valley aquifers south of the Snake River a relative ground-water velocity layer was created. The velocity layer is an output product of the MODFLOW ground-water model utilized in the flow model portion of this project. Since the flow-model study area does not exactly match the nitrate probability study area, visual interpretation was used to help define aquifer boundaries, and ordinary kriging was used to statistically interpolate velocity values in the remaining areas of the probability model's study area, Figure 1. The velocity layer was intended to act as a type of dilution factor for the nitrate source layer. This would help describe why high nitrate inputs in the ESRP do not result in nitrate detections as occurs in the tributary valley aquifers.

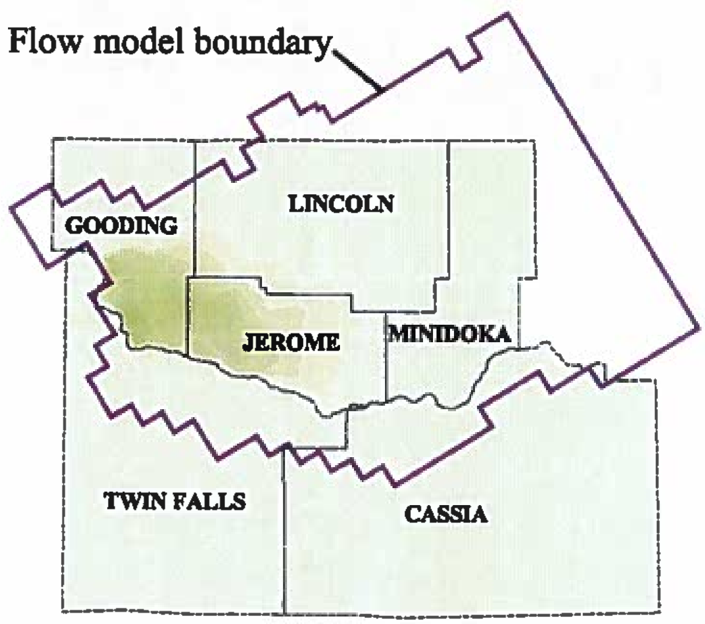

Figure 1. Location of probability and flow model study areas. Relative velocity increases with darker shading.

Depth to water layer – Previous probability models in the area (Rupert, 1998, and Donato, 2000) used the median value for well depth when creating the probability map from the statistical model. It was proposed instead to use the depth to water as a worst-case scenario for well depth, simulating a well drawing water from the top of the aquifer. This also results in a better representation of the actual data when compared to using a single value for well depth.

More than 1,000 water-level measurements were selected from the Idaho USGS NWIS database, following the methods of Maupin (1991). Ordinary kriging was used to interpolate water-level values at 800-meter grid intersections. The raster dataset was then converted to a vector coverage at 20-foot water level increments.

Statistical analysis results – New statistical analyses indicate that relative ground-water velocity, land use (Idaho Department of Water Resources), well saturated thickness or well depth, are the important variables for the probability map. While soil permeability is statistically also a good variable, scientifically its influence in the model is the inverse of what is theoretically expected. While well saturated thickness is slightly statistically better than well depth as a model variable, well depth can improve the model by using the depth to water as a worst case scenario in the map building stage. Both variations are being tested. Nitrogen input does not statistically improve the model with well depth; however, it does help the saturated thickness model. Previously, without the introduction of velocity, percent soil organic matter was a statistically significant variable. This previous model will be maintained throughout documentation to emphasize the effects velocity has on the probability model.

Development of computer simulation models for ground-water flow and nitrate transport – The ground-water flow model was modified and improved during the review period, including adjusting discharge and recharge sources and values to accommodate the refined model grid. Also during the review period, the nitrate source layer was incorporated into the MOC3D solute transport model and the flow model was run for time periods up to 300 years, to determine when approximate steady-state conditions were met. In most cases, especially in areas with larger velocity, steady state was reached within 20-40 years. Simulated nitrate concentrations from the solute transport model were compared with observed nitrate values plotted as a nitrate contour map created from the data used in developing the probability model. The magnitude of the nitrate source input was adjusted to develop a good correlation with the nitrate contour map. A good correlation was reached between the observed and simulated nitrate concentrations by incorporating the nitrate source layer into the solute transport model. Therefore, it was decided to try and incorporate the flow velocities from the flow model into the probability model resulting in the creation of the relative ground-water velocity layer.

PLANS THROUGH JUNE 2002

The probability model will be completed along with formal documentation of its development. Development of the "response function" approach based on the transport model output to evaluate potential future trends in nitrate concentrations in groundwater resulting from changes in nitrate loading at the surface will progress. Study area subregions will be defined based on land-use type and planning area boundaries. Less-complex management tools for the management and representation of loading of nitrate will be identified and obtained to compare utility of such tools to the more complex approach defined in the computer modeling phase of this study.

Please call me at (208) 387-1343 or email me at (kskinner@usgs.gov) if I can provide additional information.

Sincerely,

Kenneth D. Skinner

Kenneth D. Skinner
Hydrologist (student)

Enclosures

Copy to: Michael Thomas, IDEQ
Pat Lambert, USGS
Mary Donato, USGS
Dave Clark, USGS

REFERENCES

Donato, M.M., 2000, Probability of detecting atrazine/desethyl-atrazine and elevated concentrations of nitrite plus nitrate as nitrogen in ground water in the Idaho part of the western Snake River Plain: U.S. Geological Survey Water-Resources Investigations Report 00-4163, 25 p.

Kipp, K.L. Jr., Konikow, L.F., and Hornberger, G.Z, 1998, An implicit dispersive transport algorithm for the U.S. Geological Survey MOC3D solute-transport model: U.S. Geological Survey Water Resources Investigations Report 98-4234, 54 p.

Konikow, L.F., D.L. Goode, and G.Z. Hornberger, G.Z., 1996, A three-dimensional method of characteristics solute-transport model (MOC3D): U.S. Geological Survey Water-Resources Investigations Report 96-4267, 87 p.

Maupin, M.A., 1992, Depth to water in the eastern Snake River Plain and surrounding tributary valleys, southeastern Idaho, calculated using water levels from 1980 to 1988: U.S. Geological Survey Water-Resources Investigations report 90-4193, 1 sheet, scale 1:750,000.

Rupert, M.G., 1996, Major sources of nitrogen input and loss in the Upper Snake River Basin, Idaho and western Wyoming, 1990: U.S. Geological Survey Water-Resources Investigations Report 96-4008, 15 p.

Rupert, M.G., 1998, Probability of detecting atrazine/desethyl-atrazine and elevated concentrations of nitrate ($NO_2 + NO_3 - N$) in ground water in the Idaho part of the Upper Snake River Basin: U.S. Geological Survey Water-Resources Investigations Report 98-4203, 32 p.

Tindall, T.A., 1991, Fertilizer guides for southern Idaho: Moscow, University of Idaho, College of Agriculture, Cooperative Extension System, not paged.

IDAHO PUBLIC UTILITIES COMMISSION

Dirk Kempthorne, Governor

P.O. Box 83720, Boise, Idaho 83720-0074

Paul Kjellander, President
Marsha H. Smith, Commissioner
Dennis S. Hansen, Commissioner

February 12, 2002

Lew Pence, Chairman
Middle Snake Regional Water Resource Commission
122 5th Avenue West
Gooding, ID 83330

Dear Chairman Pence:

Thank you for your letter regarding Case No. GNR-E-02-1. The Idaho Public Utilities Commission appreciates your interest and values your input to these important cases that affect our state. Your comments have been directed to the Commissioners and staff for their review and will be included as part of the official public comment record. We are also adding your name and address to our "Interested Parties" list so you will receive a copy of any future notices and the final order.

Thanks again for taking the time to share your thoughts on this case.

Sincerely,

Jean Jewell

Jean Jewell
Commission Secretary

Located at 472 West Washington Street, Boise, Idaho 83702
Telephone: (208) 334-0300 Facsimile: (208) 334-3762

MIDDLE SNAKE REGIONAL WATER RESOURCE COMMISSION

Lew Pence, Chairman
Bob Muffley, Acting Executive Director
122 5th Ave. West
Gooding, Idaho 83330
208-934-4781
208-934-5648 fax

February 8, 2002

Idaho Public Utilities Commission
P.O. Box 83720
Boise, Idaho 83720-0074

RE: Case # GNR-E-02-01

Commissioners:

I am writing to lend my commissions support to the P.U.C ruling on small generating projects fueled by animal waste. Anaerobic digesters have been used successfully in Europe for many years and it's time that our power generating companies start to look at these and other alternatives. It is our belief that Idaho Power has been blowing smoke on this issue for a very long time and because of their attitude the consumer will be the ultimate looser. Why should we allow Idaho Power to purchase high price power from the grid when there remains a huge potential for new generating sources right here in Idaho. It has been estimated that in south central Idaho alone, animal waste could generate as much as 50 megawatts. The power generated by this source would ultimately be far less expensive to the consumer then the construction of new gas fired facilities or purchasing power for peeks loads from the grid.

A byproduct of generating power from animal waste is the betterment of the environment. The use of anaerobic digesters will do much to reduce the nutrient loading to our regions above ground and underground water resource. Many areas of our region are already approaching the unacceptable level of 10 parts per million of nitrogen in ground water. This trend must be reversed in the near future.

If the dairy industry, which is a big chunk of our local economy, is going to expand within this region, anaerobic digesters must be made a tool for managing dairy waste. Before it can become a tool, however, the Idaho Power Company must purchase the power generated from this source at a price that makes sense to the producer. Our investigation indicates that producers could easily afford the cost of putting in anaerobic digesters if the power could be sold for as little as 5.5 cents per kilowatt and this is the rate that we would recommend.

Sincerely
Lew Pence

Lew Pence, Chairman

Formed by a joint powers agreement between Cassia, Gooding, Jerome, Lincoln, Minidoka and Twin Falls counties in south central Idaho

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
230 Collins Road
Boise, Idaho 83702-4520

December 6, 2001

Bob Muffley
Middle Snake Regional Water
Resources Commission
124 5th Avenue West
Gooding, Idaho 83330

Dear Mr. Muffley:

This letter is a progress report for the Department of Environmental Quality (DEQ), U.S. Geological Survey (USGS), and Mid-Snake Counties cooperative study to assess the effects of nitrate loading from nonpoint sources on ground water in the Mid-Snake Region, South-Central Idaho. The report covers progress from April 16 to October 31, 2001. Work during the review period focused on defining nitrates sources in the study area and concepts of nitrate loading to the hydrologic system through the use of a statistical contamination probability model. The model exercise allows for the assessment of the relation of nitrate contamination to hydrologic setting and nitrate loading at the surface. Also, a preliminary computer ground-water flow simulation for the Mid-Snake area was also developed from an exiting regional model of the eastern Snake River Plain (ESRP) aquifer system.

The following discussion summarizes methods used, progress of the work for the review period and plans for the next two quarters.

PROGRESS REPORT (April 16 – October 31, 2001)

Study Objectives - The principal objectives of the project are to improve our understanding of nitrate movement to and through the ground-water system of the six county study area: Gooding, Twin Falls, Jerome, Minidoka, Cassia, and Lincoln Counties. Also to evaluate the utility of selected models that incorporate that understanding in assessing the future effects of nitrate loading on ground water in the study area and other areas of the State.

Nitrate source layer - The nitrogen input data layer created recently by a cooperative study by the USGS, Jerome County, and the Middle Snake Regional Water Resources Commission was updated to account for nitrogen losses due to storage, volatilization, denitrification, and availability of dairy and beef cattle. Estimates of nitrogen losses were summarized in a report (Rupert, 1996). The type of manure storage system determines the amount of loss that occurs, ranging from 80 percent in open lagoons to no loss by beef cattle grazing on the open range. Volatilization, denitrification, and availability losses do not differ for dairy and beef cattle. Volatilization losses occur during field application ranging from 5 to 30 percent. Denitrification losses (loss of inorganic nitrogen by biological conversion to nitrogen gas) range from 0 to 40 percent depending upon the soils' drainage properties. Nitrogen availability ranges from 45 to 90 percent depending on the amount of inorganic nitrogen available for plant uptake and (or) leaching. The mean of the range for each type of nitrogen loss was determined and subtracted from the nitrogen input data layer.

GIS layers The creation of the nitrate probability model follows the same procedures as Rupert (1998) and Donato (2000), except larger scale Geographic Information System (GIS) coverage were sought out since the model has a smaller study area.

Nitrate data was obtained from wells that were selected, sampled, and analyzed using similar methodology. The 205 wells compiled for use in the statistical model were all sampled between June and August from 1993 to 2000. The nitrate data was categorized as either having a nitrate 'hit' (2 mg/l or more) or 'no hit' (less than 2 mg/l). Information on well depth and water level was included in the data set.

There are two sets of land-use data that have been evaluated for use in the statistical model, one from the Idaho Department of Water Resources (IDWR) and one from the Bureau of Reclamation (BOR). The IDWR land-use data was combined from three maps showing differing vegetation types, sprinkler vs. gravity-fed irrigation, and dryland vs. irrigated agriculture. The BOR land-use data was made by digitizing high-altitude aerial photographs taken in 1987 and then field checking the data in 1992. The IDWR data is at a scale of 1:100,000 while the BOR data was mapped at a larger scale of 1:40,000.

Precipitation data for 1961 through 1990 incorporated in the model are from the Water and Climate Center of the Natural Resources Conservation Service at a scale of 1:250,000. Surficial geology was mapped by Whitehead in 1986 at a scale of 1:100,000 and later digitized into a GIS format.

The soils data used in the model were obtained from the Soil Survey Geographic (SSURGO) database by the Natural Resources Conservation Service (NRCS). SSURGO soil maps are made at scales ranging from 1:12,000 to 1:63,360 compared to the STATSGO soil database used by Rupert (1998) and Donato (2000) made at a scale of 1:250,000. Use of the SSURGO soils dataset is the main improvement over the probability models of Rupert and Donato.

Initial statistical analysis - Initial statistical analysis using logistic regression, the kruskal-wallis test, and the Spearman rank order test indicate that water depth, well depth, and nitrogen input are important variables for the probability map. Other variables including land use and soil drainage were not statistically significant in preliminary analysis. This may be due to the distribution of wells. For instance, the majority of wells occurs in agricultural areas and has nitrate 'hits', see Figure 1. With land use and soil properties being important variables in previously developed regional probability models, additional statistical analysis using several different approaches will be done to further examine the significance of these parameters to nitrate levels in ground water. One option is to add wells that did not meet the strict criteria used to select the current dataset. Another approach is to raise the nitrate hit/no-hit boundary above 2mg/l, which will better balance the hit/no-hit ratio.

<u>Development of computer simulation models for ground-water flow and nitrate transport</u> – A specific objective of the project is to evaluate the utility and limitations of applying computer models of nitrate loading and transport to assess the effects of land-use changes on nitrate concentrations in ground-water. The approach to achieving this objective included incorporating the concepts of nitrate loading and contamination described in the statistical model analysis with a set of numerical computer flow and transport models. During the review period, a ground-water flow model of the six-county study area was established from the USGS ground-water flow model of the eastern Snake River Plain aquifer (Garabedian, 1992). The regional model of the ESRP was retrieved from the Idaho District archive and incorporated in the ARGUS graphical user interface (GUI) for MODFLOW models. Regional model input data sets have been upgraded to the most recent version of MODFLOW. Model input was "clipped" from the regional model domain and rediscretized using a substantially finer finite-difference grid. Flow conditions at the boundaries of the new model were extracted from the regional Garabedian model and incorporate in the six-county model.

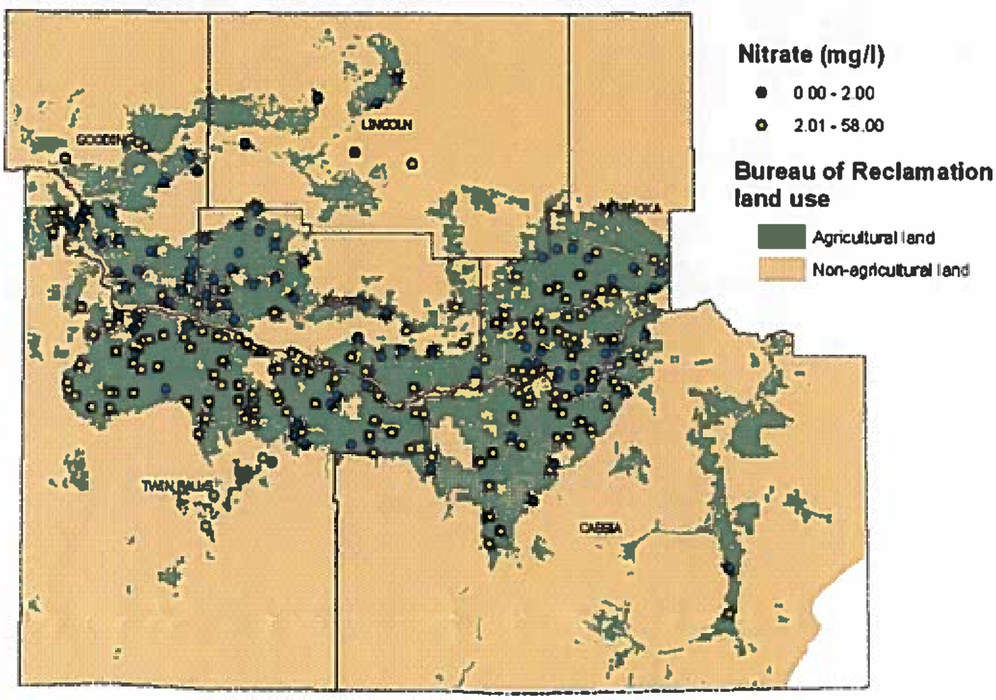

Figure 1. Study area with well and land use distribution.

PLANS THROUGH MARCH 2002

Work on the development of computer simulation tools will continue. The calibration of the rediscretized six-county models will be assessed using the original ESRP water-level and flow data set (Garabedian, 1992). Preliminary simulation models of nitrate transport will be developed using a MOC3D solute transport model (Konikow and others, 1996, Kipp and others,

1998) for MODFLOW models. Concepts of nitrate loading defined in the probability model phase of the study will be incorporated in the transport models. The new approaches will be assessed to finalize the probability model and begin formal documentation of its production. Specific methods to be used in the development of a "response function" approach based on transport model output to evaluate potential future trends in nitrate concentrations in groundwater resulting from changes in nitrate loading at the surface will be defined. Less-complex management tools for the management and representation of loading of nitrate will be identified and obtained to compare utility of such tools to the more complex approach defined in the computer modeling phase of this study.

Please call me at (208) 387-1343 or email me at (**kskinner@usgs.gov**) if I can provide additional information.

Sincerely,

Kenneth D. Skinner

Kenneth D. Skinner
Hydrologist (student)

Enclosures

Copy to: Michael Thomas, IDEQ
Steve Lipscomb, USGS
Pat Lambert, USGS
Mary Donato, USGS
Dave Clark, USGS

MIDDLE SNAKE REGIONAL WATER RESOURCE COMMISSION

Lew Pence, Chairman
Bob Muffley, Acting Executive Director
122 5th Ave. West
Gooding, Idaho 83330
208-934-4781
208-934-5648 fax

August 20, 2001

Karl Dreher, Director
Idaho Department of Water Resources
1301 North Orchard, Statehouse Mail
Boise, Idaho 83720-9000

Dear Mr. Dreher:

This Commission and the counties we represent have been following the water situation in southern Idaho very closely and have some concerns about recent articles published in the Times News of Twin Falls concerning possible future actions by your department to protect senior water right holders. The water quantity plan which was adopted by our six counties in 1996 specifically addresses the water situation that we find ourselves in. This plan was created with the help of a cross section of water interests from throughout our region, including representatives from the IDWR, and all interests agreed to the fairness of the document. I have attached a copy of the region's water quantity plan for your review. I do, however, want to point out a few portions of the plan which are of special concern to the counties we represent. Our first concern is the continued economic viability of our region. Economic data gathered by the University of Idaho for our region consistently shows the dependence of our regional economy on agriculture. Even our most populace county, Twin Falls, is estimated to be 56% dependent, while our smaller counties show as much as an 80% dependency. Because of this, our counties cannot afford to sit on the sideline during one of the worst droughts in our history.

This Commission agrees that if the drought continues through next year, tough decisions will need to be made. We want to caution the Department, however, about your need to minimize the economic impact to our region. Our plan states, "Encourage the establishment of rules for conjunctive management that recognize the constitutional provision of FIRST IN TIME IS FIRST IN RIGHT unless, in the short term, strong scientific evidence and/or local economic data suggest that a call for water by a senior right is futile." The counties would strongly oppose the protection of a senior holder or holders if the cure to the problem is worse for our economy than the problem itself.

The third objective in our plan promotes the equitable management of the region's water resources. Strategy (d) states, "Support percentage decreases phased in by priority date, for ground water pumping based on the reasonably anticipated average rate of future natural recharge, which the counties recognize is the recharge from tributary basins, precipitation, Snake River losses, tributary streams and canal losses." We believe that this policy, economically, is the most viable solution. If senior holders are receiving less than their share of water, pumpers should also have their withdrawals limited. This can't be done after the fact, however. Pumpers should have been restricted this year, especially since it was known very early in the year that senior holders would have a limited supply. If the Department institutes such a policy each year there would be no question as to the fairness of such a stipulation by either senior or junior right holders. We maintain that such a policy, if instituted, would be the best way to preserve the regional economy during dry years.

Strategy (e) of objective three states, "Support conjunctive management rules that apply to conflicts between senior and junior ground water users, as between senior surface water right holders and junior surface water users." Pumpers should enjoy the same protection as above ground water users. We must ask why senior pumpers may be curtailed prior to those pumpers who are junior in time.

Thanks, and we look forward to hearing from you on this most important issue.

Sincerely

Lew Pence

Lew Pence, chairman

cc Governor Dirk Kempthorn
Senator Laird Noh
Representative Bruce Newcomb

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Water Resources Division
230 Collins Road
Boise, Idaho 83702-4520

August 20, 2001

Bob Muffley
Middle Snake Regional Water
Resources Commission
122 5th Avenue West
Gooding, Idaho 83330

Dear Mr. Muffley:

As requested in our meeting on August 13, we have enclosed the Joint Funding Agreements (JFA) between the U.S. Geological Survey (USGS) and the six Mid-Snake area counties (Cassia, Gooding, Jerome, Lincoln, Minidoka, and Twin Falls) covering contributions to the study to assess the effects of nitrate loading on ground water in the Mid-Snake region, south-central Idaho. Please deliver these agreements to the appropriate county officials for review and signature. We have attached a cover letter and project study proposal to each agreement. As noted on the cover letter, county officials can address any questions they have concerning the study proposal or JFA to me (208 387-1383, or email plambert@usgs.gov).

Sincerely,

Patrick M. Lambert
Assistant District Chief
For Scientific Investigations

Copy to: Derrill Cowing, USGS
Dave Clark, USGS

State of Idaho
DEPARTMENT OF WATER RESOURCES
1301 North Orchard Street, Boise, ID 83706 - P.O. Box 83720, Boise, ID 83720-0098
Phone: (208) 327-7900 Fax: (208) 327-7866 Web Site: www.idwr.state.id.us

DIRK KEMPTHORNE
Governor
KARL J. DREHER
Director

July 18, 2001

Lew Pence, Chairman
Middle Snake Regional Water Resource Commission
122 5th Ave. West
Gooding, ID 83330

Dear Lew:

We read with interest the comments about recharge made by Bill Hazen in the June 20th meeting minutes. There are a few items of clarification we would like to offer.

Bill correctly stated that the Lower Snake River Aquifer Recharge District (LSRARD) is the only formal recharge project currently located on the north side of the Snake River. It diverts water from the Milner-Gooding canal roughly two miles northwest of Shoshone. In the Middle Snake region there are also projects located on Cottonwood Creek in Cassia County and at the Dry Creek/Murtaugh Lake area.

In recent years, IDWR and several local entities have been working to identify locations that offer potential for development as recharge sites. Nine of these sites have been identified as the most promising and we have drilled monitoring wells at those locations. Included are two sites north of Lake Walcott, Wilson Lake, Mile Post 31 on the Milner-Gooding canal north of Eden, Sugar Loaf and K-Canal on the Northside canal, a site east of Highway 75 on the Milner-Gooding canal. Devil's Headgate on the Richfield canal, and a site near Shelley on the Great Western canal. The LSRARD monitoring wells have also been reworked. Most of these wells were sampled for baseline water quality in June, and all are instrumented for continuous water level measurement. The LSRARD and Devil's Headgate wells will be sampled in September.

We are not aware of the two recharge wells in the Eden area and are interested to know more about them. Our initial thoughts are that Bill might be referring to the two monitoring wells at Mile Post 31 but we would like to confirm that. If there are two recharge wells we would like to know more about the well history and locations.

IDWR appreciates the efforts of the Middle Snake Regional Water Resource Commission and the opportunity to participate in the planning process. If you desire any additional information on managed recharge, we will be happy to provide speakers from the Department and whatever reports we have available.

Sincerely,

Lin Campbell, PG
Technical Hydrogeologist

Jerome Veterinary Hosp.,P.A.
1025 North Lincoln
Jerome, Idaho 83338

May 30, 2000

Middle Snake Regional Water Resource Commission
122 5th Ave. West
Gooding, Idaho 83330

Dear Commission,

This letter is to serve as my official notice of resignation from the Middle Snake River Water Resource Commission. At present, I have served longer that my appointed term. I feel that the goals I set out to accomplish have been completed with the training of the regions P&/Z offices in ARC view and the installation in the Jerome Count Building of the hardware to run the program. At present, my schedule has become too busy to take on the region ground water planning effort.

Sincerely

Richard D. Allen, D.V.M.

Richard D. Allen, D.V.M.

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
230 Collins Road
Boise, Idaho 83702-4520

April 3, 2001

Mr. Bob Muffley
Middle Snake Regional Water
Resources Commission
124 5th Avenue West
Gooding, Idaho 83330

Dear Mr. Muffley:

As you requested in our last phone conversation, I have enclosed a copy of a U.S. Geological Survey (USGS) project proposal to assess the effects of nitrate loading on ground water in the Mid-Snake region, South-Central Idaho. The study approach combines the results of recent studies of nitrate sources in the region (phases one and two of the three-phase USGS/Middle Snake Regional Water Resources Commission (MSRWRC) nitrate contamination probability study) with modeling tools to begin to evaluate concepts of nitrate loading and transport in Mid-Snake region aquifers.

The study would be conducted by the USGS in cooperation with the six Mid-Snake area counties (Cassia, Gooding, Jerome, Lincoln, Minidoka, and Twin Falls) and the Idaho Department of Environmental Quality (IDEQ). Specific study objectives are to (1) define nitrate sources to the ground-water system and evaluate the probability of nitrate contamination in ground water as a function of nitrate availability and hydrogeologic characteristics of the source area, (2) evaluate conceptual models of nitrate loading to and transport in ground water using computer simulation models, and (3) evaluate the utility of applying computer nitrate loading and transport models to assess the effects of land use changes on nitrate concentrations in ground water. The first objective above represents phase 3 of the original USGS/MSRWRC nitrate contamination probability study. The proposed study extends the scope of the original USGS/MSRWRC study to include assessing concepts of nitrate movement in ground water using computer models and evaluating the application and limitations of those models in land-use planning and resource-management activities.

Because of uncertainties in USGS fiscal year 2002 and 2003 budgets, the USGS contribution listed in the proposal is only an approximation and is subject to change depending on the availability of USGS funds. The proposal has been tentatively approved for funding by IDEQ and work could begin on the project this month if funding agreements can be made with the cooperating counties. Please review the attached proposal and distribute to it county planners as appropriate. Please contact me (208 387-1383 or email plamgert@usgs.gov) if you have any questions about the proposed study.

Sincerely,

Patrick M. Lambert
Assistant District Chief
For Scientific Investigations

Enclosure

Copy to: Derrill Cowing, USGS
Mark Hardy, USGS
Dave Clark, USGS

Assessing the Effects of Nitrate Loading from Nonpoint Sources on Ground Water in the Mid-Snake Region, South-Central Idaho

A proposal from the U.S. Geological Survey, Boise, Idaho

PROBLEM: In response to rising nitrate levels in increasing numbers of public- and domestic-use wells in Idaho, the Idaho Department of Environmental Quality (IDEQ) has begun a program to study nitrate loading impacts and to develop planning tools to aid local managers in assessing the potential effects of land-use decisions on nitrate concentrations in ground water. The IDEQ has recently identified 33 areas (Water-Quality Management Areas) where nitrate has significantly degraded ground-water quality and are now prioritizing these areas for focused assistance in improving land-use planning and nitrogen monitoring and management. IDEQ and local resource managers are in need of detailed information concerning the migration of nitrate to and through ground-water systems in priority areas to better understand the causes of nitrate contamination and to support the development and assessment of land-use planning and resource-management tools.

IDEQ and local managers are considering various methods and tools for assessing the potential effects of changes in nitrate loading on water quality in priority ground-water systems, including use of simplified analytical nitrate loading models. The models could be used by local managers with little adaptation from one system to another. These models incorporate concepts of nutrient management and budgeting for various land uses and general principles of solute movement, but they do not incorporate the unique characteristics of the hydrologic systems where planning is taking place. In some areas of the State, hydrologic and water-quality data are available to make more detailed assessments of nitrate movement and to develop more complex modeling tools. These robust models, however, are more difficult to develop, require higher levels of expertise to use, and would not, in most cases, be transferable to other areas of the State. IDEQ and local managers need information on the utility and limitations of the range of available modeling approaches and tools that could be used to evaluate the effects of nitrate loading from land use on aquifer systems.

To assist in this program, the U.S. Geological Survey (USGS) will investigate the effects of nitrate loading and movement from surface sources on ground water in the Mid-Snake region in south-central Idaho (fig. 1). The selected study region contains priority Water-Quality Management Areas and is experiencing continued growth in some agricultural industries associated with the discharge of nitrogen to the environment. The proposed study will provide detailed information to IDEQ and local managers on nitrate movement in priority regions of concern for nitrate contamination. The study also will provide the basis for evaluating the utility of computer nitrate loading and routing models of varying complexity in assessing the effects of land-use changes on nitrate concentrations in ground water.

OBJECTIVES: The principal objectives of the study are to improve our understanding of nitrate movement to and through the study area ground-water system and to evaluate the utility of selected models that incorporate that understanding in assessing the future effects of nitrate loading on ground water in the study area and other areas of the State. Specific objectives include:

(1) Define nitrate sources to ground-water in the study area and evaluate relative loading from those sources as a function of nitrate availability and hydrogeologic characteristics of the source area.

(2) **Evaluate conceptual models of nitrate loading to and transport in ground water using computer simulation models.**

(3) **Evaluate the utility and limitations of applying computer nitrate loading and transport models to assess the effects of land-use changes on nitrate concentrations in ground water.**

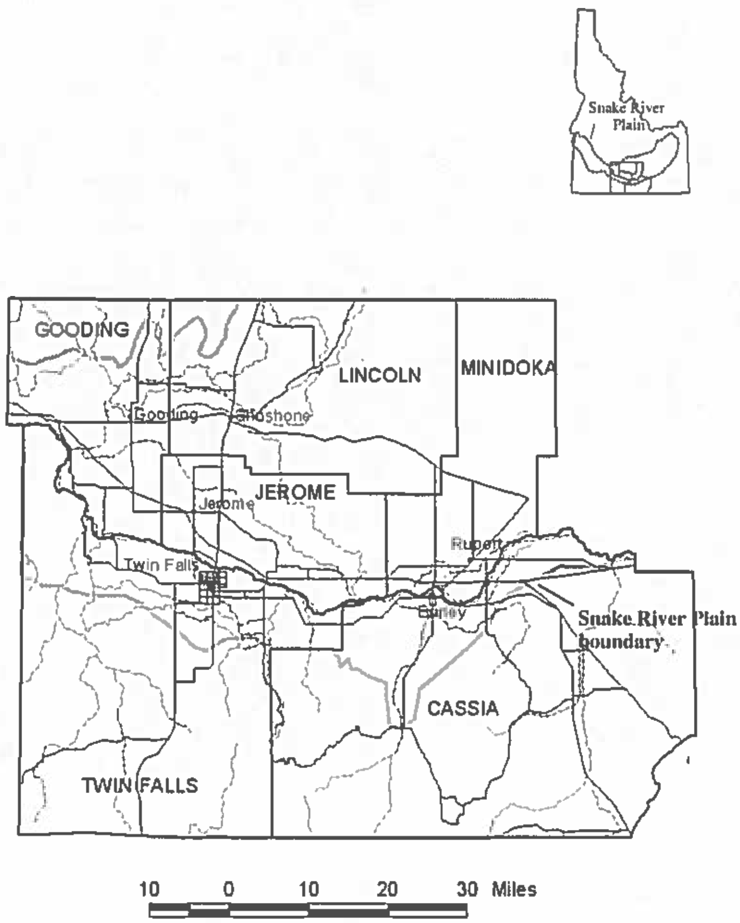

Figure 1. Location of study area.

APPROACH: The water resources of the Mid-Snake region have been studied previously in investigations of regional and local hydrologic systems of Idaho. These studies include investigations of the Snake River Plain in southern Idaho that were part of the U.S. Geological Survey (USGS) Regional Aquifer-System Analysis (RASA) and National Water-Quality Assessment (NAWQA) programs. The RASA and NAWQA programs in southern Idaho have produced an assemblage of geologic, hydrologic, and water-quality information and computer simulation models for the area's ground-water systems. The study will use this information, augmented with data collected during ongoing water-quality assessments of the area[1], to develop and evaluate conceptual models of nitrate loading and transport and simulation tools that can be used to assist with land-use and nutrient-management issues.

Define nitrate sources to the ground-water system and evaluate loading from those sources as a function of nitrate availability and hydrogeologic characteristics – Several nitrate sources in the Mid-Snake region were quantified as part of a recent cooperative study by the USGS, Jerome County, and the Middle Snake Regional Water Resources Commission. Five major sources of nitrogen were considered: fertilizer, cattle manure (dairy and beef), septic systems, atmospheric deposition (precipitation), and legume crops. Source areas were mapped using a Geographic information system (GIS) to create a nitrate-source data layer. No nitrate losses, such as those resulting from volatilization, crop uptake, or denitrification, were considered in that study. These losses to the nitrate budget will be estimated during this study, and the nitrate-source data layer will be updated to define nitrate available for input to ground water.

Animal feeding operations in the region, including land application of animal waste, will be mapped during this study by IDEQ using a GIS. The mapping will include lands associated with nutrient management plans of the Natural Resource Conservation Service and Idaho State Department of Agriculture and lands associated with other animal feeding operations. IDEQ will develop default values for waste flow for these facilities from the literature and agriculture waste-management models. This information will be used to update the nitrate-source data layer described in the previous paragraph.

Recent studies by the USGS of the relative vulnerability of aquifer systems in the Snake River Plain to nitrate contamination have indicated that the probability of nitrate contamination in ground water in a given area is not solely dependent on land-use type but also can be related to precipitation and hydrologic and organic content characteristics of soils (Rupert, 1997). These vulnerability studies were based on a statistical method to calibrate nitrate contamination probability models developed by the NAWQA program for the upper Snake River Basin. During this study, the potential for nitrate loading to the Mid-Snake region ground-water system will be further evaluated using a variation of the NAWQA statistical method. Relations between nitrate concentrations and surface characteristics will be quantified using a GIS and statistical tests such as logistic regression, principal components analysis, and(or) Wilcoxon rank-sum tests. The result will be a conceptual model of the distribution of nitrate loading to ground water represented in a GIS data-layer (nitrate-input data layer).

Evaluate conceptual models of nitrate loading to and transport in ground water using computer simulation models – Concepts of nitrate loading to the aquifer, developed in the study component described, and other hypotheses for the observed distribution of nitrate in ground water will be evaluated in a three-dimensional ground-water flow and transport computer model. The computer model will be a simplified representation of the ground-water system and nitrate input. A regional, three-dimensional ground-water flow model of the eastern Snake River Plain (ESRP model) (Garabedian, 1992), developed and calibrated during the USGS RASA program, will be used as a modeling environment for the subregional model of the study area (fig. 2). Flow boundary conditions and initial estimates of aquifer properties for the new model will be derived from the calibrated ESRP model. Initial development of the Mid-Snake region model from the

[1] The USGS recently completed an assessment of nitrate sources and water quality analyses for 70 sites in the Mid-Snake Region (USGS, Jerome County, and the Middle Snake Regional Water Resources Commission cooperative study) and is currently compiling nitrate concentration data for the region from State and other agency networks for trend analyses (USGS and IDEQ cooperative study).

ESRP model will be facilitated by procedures and computer programs for telescopic mesh refinement for MODFLOW models developed by Leake and Claar (1999).

Calibration of the Mid-Snake region flow model to long-term average hydrologic conditions in the region will be assessed in steady-state simulations using (1) the concepts and parameter estimates incorporated in the RASA regional ESRP model and (2) a refined conceptual model incorporating data collected or compiled during more recent and ongoing studies. Testing of conceptual models in the computer simulation model and model calibration and evaluation will be facilitated using parameter estimation and post-processing programs of MODFLOW-2000 (Hill and others, 2000).

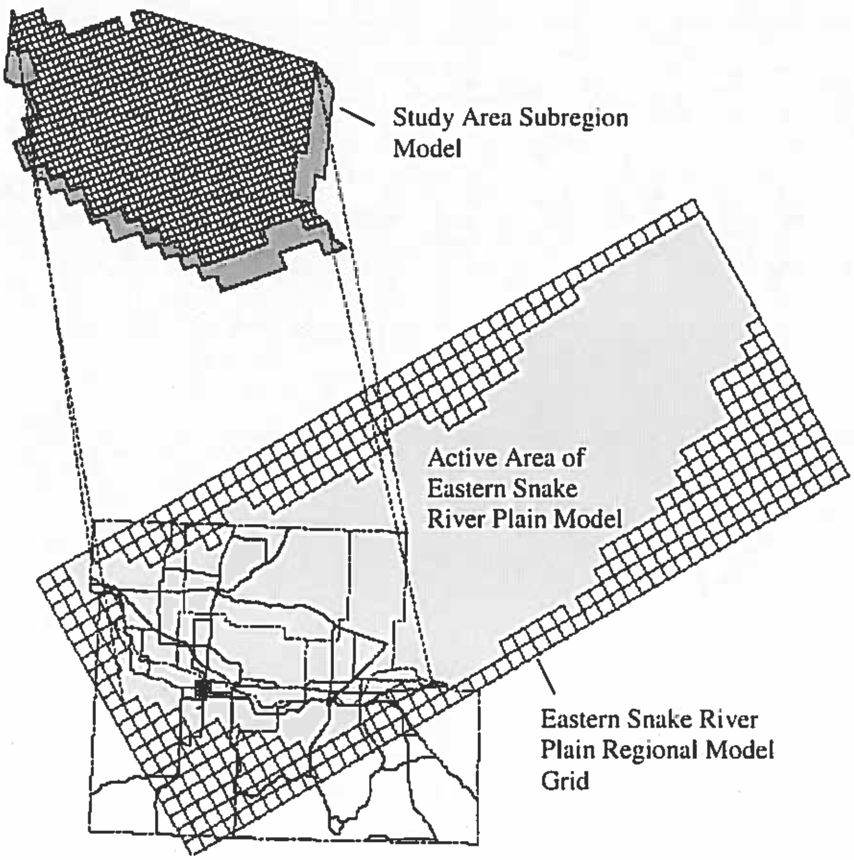

Figure 2. Generalized diagram of the extent of a subregion ground-water flow model of the Mid-Snake region within the eastern Snake River Plain regional model environment.

The transport of dissolved nitrate in the ground-water system will be simulated using the USGS three-dimensional solute-transport model MOC3D (Konikow and others, 1996, Kipp and others, 1998) developed for use with MODFLOW. The conceptual model of nitrate input (represented in the GIS nitrate-input data layer) will be used to help define nitrate flux at the surface in the flow and transport model (fig. 3). Data collected or compiled during recent and ongoing studies that define ground-water nitrate and tritium concentrations will be used to refine the new model and evaluate model calibration. Tritium concentration data, which can be used to assess relative ages of ground water, from about 70 wells will be used to evaluate the accuracy of the model-simulated ground-water flow patterns and velocities.

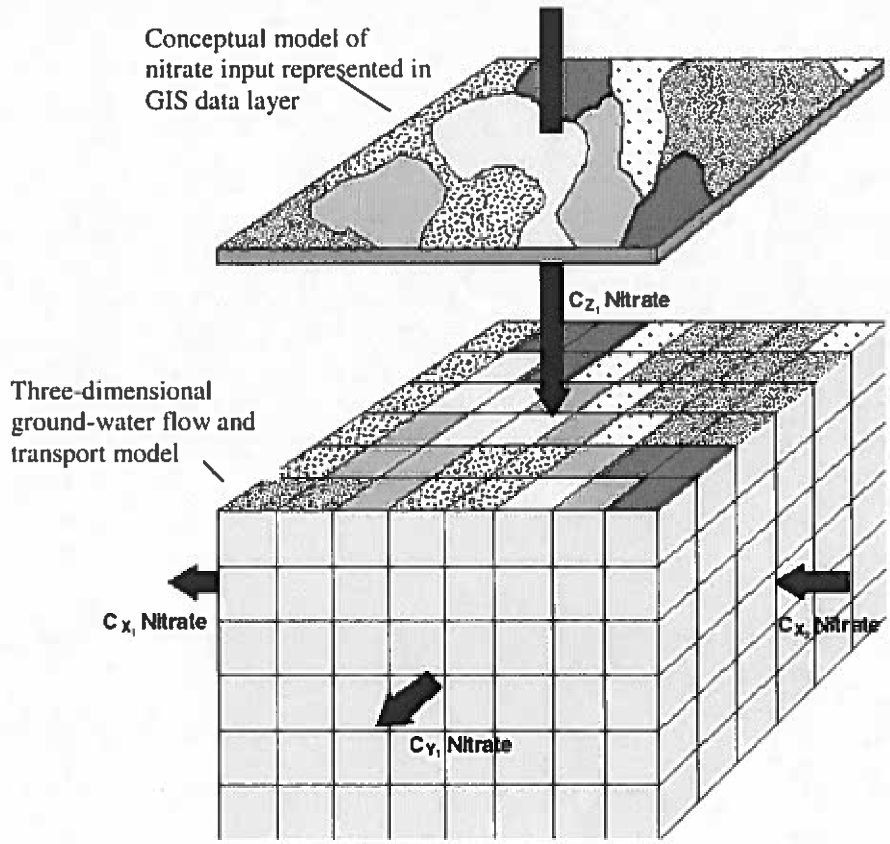

Figure 3. Generalize diagram showing the incorporation of conceptual model of nitrate input in a 3-dimensional computer simulation of ground-water flow and nitrate transport.

The scope of computer model development and assessment in this component of the study will be limited to evaluating conceptual models of nitrate loading, transport, and distribution in the ground-water system. General spatial and temporal observed trends in nitrate concentrations will be compared with those estimated by the simulation model to evaluate the model's ability to represent loading and transport characteristics of the system.

Evaluate the utility of applying computer nitrate loading and transport models to assess the effects of land use on nitrate concentrations in ground water – The results of previous studies in the Mid-Snake region, including USGS RASA and NAWQA programs, allow for the development and assessment of detailed conceptual and computer simulation models. These data and regional-scale RASA ground-water flow models are available for much of the Snake River Plain and, thus, the approach used in this study is one potential assessment option for nitrate contamination issues in other areas of southern Idaho. The accuracy of such models will be limited, however, as a result of simplifying assumptions used in the models and uncertainty in model parameters. These limitations must be understood and considered when applying the model to resource-management issues. Limitations of the Mid-Snake region model will be assessed in the final component of the study and used to define and test appropriate applications of the model to immediate land-use and nitrate-management problems. Also, areas will be identified where additional data collection and assessment would substantially improve conceptual and computer representations.

Planned tests of possible application of the Mid-Snake region model will include a demonstration and assessment of a "response function" approach to evaluate potential future trends in nitrate concentrations in ground water resulting from changes in nitrate loading at the surface. Response functions defined on the basis of computer model simulations, typically have been used to express the relation between head or flow in an aquifer and changes in a stress on the aquifer such as ground-water pumping. The approach has also been applied, although less frequently, to predict changes in solute concentration resulting from changes in solute input (Gorelick and others, 1984, Ahlfeld and others, 1986, Alley, 1986, and Lefkoff and Gorelick, 1990). The approach will be adapted for this study to express relations that define the changes in ground-water nitrate concentration that occur after selected periods of time as a result of changes in nitrate loading at the surface. Subregions of nitrate input in the model area will be defined on the basis land-use type and planning area boundaries. Nitrate input will be adjusted in the model over the subregions in multiple simulations and resulting changes in computed nitrate concentration will be recorded at selected locations in the model. The resulting response functions can be used to estimate the system response to changes in nitrate load at one or multiple locations at the surface. This application would incorporate simplifying assumptions including that nitrate moves conservatively in the system and that ground-water flow velocities are not substantially affected by changes in nitrate load at the surface. The appropriateness of these assumptions and their effect on the utility of the response functions will be evaluated. If the affects of these assumptions are found to be substantial for some loading scenarios, regression functions[2] (Alley, 1986) may be substituted for response functions derived directly from model simulations. Model simulations used to define response or regression functions will be made using a reasonable range of flow and transport parameters defined during model calibration

Data, time, and funding limitations make it unfeasible to apply the assessment approach proposed here to the numerous areas of concern for nitrate contamination in the State. Simpler models and nutrient-management tools may be useful in other areas if their accuracy and limitations are understood. To aid IDEQ in qualifying the relative utility of these tools, the results of Mid-Snake model simulations and the response-function analysis described above will be compared with analyses made using a set of less complex models and management tools that are currently being considered for use by the State.

PRODUCTS: Study products include:

(1) Conceptual model and data layers describing nitrate sources and nitrate available for input to ground water for the Mid-Snake region. A report will be published documenting this work.

[2] Regression functions would be developed by performing multiple regression on numerous solutions to nitrate transport generated by the Mid-Snake region transport model. The regression functions would be used to represent the nonlinear nature of the response functions that may result from substantial changes in recharge or pumpage and thus flow velocities.

(2) GIS data layers associated with nitrate source and input mapping and susceptibility/probability modeling. These data are particularly useful for county planning and zoning personnel, who can interactively examine data for any area of interest using GIS software such as ARC/INFO or ARCVIEW.

(3) Ground-water flow and nitrate-transport model of the study area and data layers associated with model input and output. A report will be prepared documenting the results of modeling activities, model limitations, and the utility of the model as a tool for testing concepts of nitrate loading and transport. The report will discuss priority information requirements for similar assessments in other areas of the State and identify areas where additional data would substantially improve model representation of the ground-water system in the Mid-Snake region. The report will discuss possible applications of the model to assess future trends in nitrate concentration in ground water, including the use of model-computed response functions, and will compare the utility of the model to that of less complex nitrate-loading and resource-management planning tools.

BENEFITS AND RELEVANCE: Resource managers are in need of better information and planning tools to address the issue of rising nitrate levels in increasing numbers of public- and domestic-use wells in Idaho. Various assessment approaches and planning tools could be used to address this issue, depending on the availability of data that define ground-water systems, and on time and funding limitations. Information that describes principal ground-water systems in the State that underlie priority Water-Quality Management Areas, particularly in southern Idaho, has been obtained in previous investigations by the USGS, IDEQ, and other entities. Data from these studies, however, are not currently organized in an easily accessible framework that could be used to assess the effects of nitrate loading on ground-water resources. The proposed study will provide detailed information to IDEQ and local managers on nitrate movement in a priority region of concern for nitrate contamination (Mid-Snake region) and also will allow for an assessment of the utility of computer models of varying complexity that could be used in the study area and in other regions to predict the effects of land-use changes on nitrate concentrations in ground water.

Specific benefits include:

(1) Improvement of our understanding of the cumulative effects of nitrate loading to ground water in the Mid-Snake region.

(2) Improvement of our understanding of the utility and limitations of computer models in assessing the effects of land-use decisions on water quality.

Although the principal modeling tool developed in this study is specific to the Mid-Snake region, the concepts defined in the study and the evaluation and comparison of model planning tools of varying complexity will provide valuable information for developing assessment approaches and management tools for other regions of the State.

WORKPLAN: Possible time periods for specific study tasks are defined in the following table:

Task	4-5/01	7-9/01	10-12/01	1-3/02	4-6/02	7-11/02
Data compilation and analysis	X					
Development of nitrate source/availability data layer and loading concepts.	X	X				
Development of conceptual and computer flow and transport models for Mid-Snake regions		X	X	X		
Test of application of model to assess future ground-water nitrate concentrations and comparison with other planning and management models				X	X	
Product preparation, information dissemination, and reporting		X	X		X	X

The schedule for study tasks shown above is one possible scenario; the schedule can be adjusted to account for availability and timing of funding.

BUDGET: The estimated project cost is $209,000.

Work Element	FY01	FY02	FY03
Personnel	$48,000	$116,000	$5,200
Product preparation –Reporting - Publication		$17,900	$7,900
Supplies - Miscellaneous	$7,000	$6,100	$900
***Total**	**$55,000**	**140,000**	**$14,000**

The study costs by year are based on the workplan described in the previous table and can be adjusted to account for timing of funding. **The USGS, the IDEQ, and the six counties in the Mid-Snake Region (Cassia, Gooding, Jerome, Lincoln, Minidoka, and Twin Falls Counties) will share costs under the Federal-State Cooperative Program. Depending on the availability of USGS funding, the USGS will contribute $74,500 to the cost of the study (IDEQ will contribute $74,500 and Mid-Snake Region Counties will contribute $60,000).** Planned financial contributions by year are indicated in the table below

Cooperating Entity	FY01	FY02	FY03	Total
USGS	$27,500	$40,000	$7,000	$74,500
IDEQ	$27,500	$40,000	$7,000	$74,500
Mid-Snake Region Counties		$60,000		$60,000
Total	$55,000	$140,000	$14,000	$209,000

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United States Department of the Interior

U.S. GEOLOGICAL SURVEY

Water Resources Division
230 Collins Road
Boise, ID 83702

January 16, 2001

Mr. Bob Muffley
Middle Snake Regional Water Resources Commission
122 5th Avenue West
Gooding, Idaho 83330

Dear Mr. Muffley,

As I described to you on the phone last week, an error was discovered in the preliminary nitrogen input data that I sent to you in August. This error was discovered and pointed out to me by Mr. Rex Schorzman, and I'm grateful to him for uncovering the problem.

The error is in the input data for legume crops (Table 3). The error also is reflected in the map showing total annual nitrogen input. As I reported previously, nitrogen input from legumes was estimated using county-level alfalfa and dry bean crop data from the Idaho State Department of Agriculture for 1998. The number of acres of alfalfa and dry beans in each county was multiplied by 194.5 lb/ac and 53.7 lb/ac, respectively, and those numbers were summed to yield the total amount of nitrogen due to legume crops. Next, the sum was divided by the total number of acres planted in legumes to yield the number of pounds per "legume-acre" in the county. This number then should have been multiplied by the fraction of agricultural land actually planted in legumes, but this step was mistakenly omitted. Instead the raw number was applied to all agricultural land in each county. As a result, the data appear to be saying that all agricultural land in each county is planted only in legume crops! Clearly this is not the case!

The error has been corrected by multiplying the original figure by the estimated fraction of land planted in legumes (legume acres / total agricultural acres). The resulting numbers are substantially lower than those previously reported.

I have corrected the figures in Table 3 and have applied the corrected figures to the GIS coverage for the input map. Corrected versions of the table, GIS coverage, and map are enclosed. Please replace the old versions of these items with the corrected ones.

Once again, please remember that the data reflect only input of nitrogen to the system and have not been adjusted for losses due to volatilization, denitrification, crop uptake, and other processes. In addition, the data have not undergone the USGS review process and are still in the preliminary stages.

I apologize for this error and for any confusion or misinterpretation this may have caused. Please don't hesitate to call me if you have any questions.

Sincerely,

Mary

Mary M. Donato
Geologist

cc: Mr. Rex Schortzman

Enclosures

Table 3. Nitrogen fixed annually by legumes, by county

(revised January, 2001)

	Total acres in legumes	Acres alfalfa	Acres dry beans	N fixed* by alfalfa (lb)	N fixed by dry beans (lb)	Total N legumes (lb)	Total N (lb/acre of legumes)	Fraction of agricultural land in legumes#	Total N (lbs/agriculatural acre)
Cassia	61,600	56,700	4,900	11,028,150	263,130	11,291,280	183	0.21	38
Gooding	41,200	39,500	1,700	7,682,750	91,290	7,774,040	189	0.31	58
Jerome	55,200	41,900	13,300	8,149,550	714,210	8,863,760	161	0.30	46
Lincoln	19,800	19,600	200	3,812,200	10,740	3,822,940	193	0.21	41
Minidoka	36,400	28,500	7,900	5,543,250	424,230	5,967,480	164	0.18	28
TwinFalls	114,400	71,400	43,000	13,887,300	2,309,100	16,196,400	142	0.36	49

Sources:
Goolsby and others (1999)
Idaho Agricultural Statistics, 1998

*194.5 lb/ac for alfalfa and 53.7 lb/ac for dry beans.

Acres in legumes / total agricultural acres

Preliminary data -- for MSRWRC use only

Memo

Middle Snake Regional

Water Resource Commission
122 5th Ave. West
Gooding, Idaho 83330
(208) 934-4781 (208)934-5648 FAX

TO: Duane Smith, County Clerk
SUBJECT: USGS map
ATTENTION:
DATE:6/18/01
FROM: Bob Muffley

I received your memo dated June 15th concerning the USGS map and I guess there is still some confusion. We didn't ask for a vote on the amount to cover the probability map for the region, we were only seeking a consensus from the counties and a willingness, if all the counties agreed, to put the amount into next years budget. We assumed, and maybe we shouldn't have, from our conversation with your Commissioners on 1/22/01 that they were in favor of getting the map produced and that if the other counties agreed, they would include the amount in their budget for next year.

I apologize for causing the confusion, but I sincerely hope that the Commissioners will agree to fund their share of the probability map since it is extremely important to Minidoka County and indeed the entire region.

Pleaslet me know if the Commissioners have any further questions concerning this matter.

SERVING THE PEOPLE OF

MINIDOKA COUNTY

DUANE SMITH
CLERK OF THE DISTRICT COURT
EX-OFFICIO AUDITOR AND RECORDER
436-7111 • P.O. BOX 368
RUPERT, IDAHO
83350

June 15, 2001

Dear Bob

I thought I'd send this short note to clear up some confusion.

Some time back Commissioner Handy relayed a statement to me.... that we had already submitted a payment to you ($8000) for our share of the cost of the USGS map. Upon checking our records I found that we had not, which is a good thing since no one here felt that such a decision had been made.

Now we receive a copy of the Minutes of your May 23 meeting which states that "Minidoka County was the first county.... that agreed that it needed to be done." Minidoka County Commissioners may have supported the need, but they did not agree to share in the cost (our Minutes attached).

Sincerely,
Duane Smith

Jan. 22, 2001

Public Defender Conflict Cases' Contract

Stan Holloway met with the Board to request having the Public Defender Conflict Cases' Contract to the law firm of Byington and Holloway. The current contract is held by David Haley and he has just been hired by the Cassia County Prosecutor's Office. The Board unanimously approved a **MOTION** assigning the contract to Byington and Holloway effective January 2, 2001.

Mid-Snake Water Resource Commission

Bob Muffley and Lou Pence, representing the Mid-Snake Water Resource Commission, met with the Board to report on their organization's activities. They are currently working on a Groundwater Protection Plan for the region…their last plan dealt mainly with surface water. He indicated that the original plan of the group was to establish a "vulnerability" map. However, such an undertaking will cost approximately $130,000 of which the USGS will pay one-half. They are requesting $8,000 from Minidoka County to help cover the other half. The Board made no decision at this time and they are still deliberating on paying the annual dues of $2,871.00.

Don Murray is the County's representative on their Board, but they requested one of the commissioners be appointed to serve on their Executive Board which meets annually to set the budget. The Board unanimously approved a **MOTION** appointing Larry Harper to the position.

Bills and Payroll

The following bills were examined, approved and ordered paid and the warrants may be seen at the Auditor's Office.

University of Idaho
Cooperative
Extension System

Twin Falls County Office
246 3rd Avenue East
Twin Falls, Idaho 83301
Phone: (208) 734-9590
Fax: (208) 733-9645

June 14, 2001

Bob Muffley
122 5th Avenue West
Gooding, ID 83330

Bob:

As per our discussion on the phone regarding the GIS system that is owned by the Mid Snake River Resource Commission, I am requesting that the commission consider moving the equipment to the Twin Falls County Planning and Zoning Office.

At this time, it is apparent that Art Brown is too busy with his duties in Jerome County to become proficient in the use of the equipment. Bill Crafton and I are both interested in the capabilities that the equipment would provide to us in accomplishing our jobs.

While Bill's area of responsibility is confined to Twin Falls County, I have responsibilities for livestock education programs throughout the area covered by the commission. As you know, I have also worked with local planning and zoning committees, as well as the commission, in the development of planning documents and county ordinances. The information that the system is capable of providing to this process would be of tremendous value.

As per our discussion on the phone, I would be glad to provide education to the appropriate people within the counties covered by the commission as to type of information available through the system.

Between our planning and zoning office and my office, we would be available to assist other counties in obtaining from the system any information they want to meet their needs. We would train several people in our offices to operate the equipment in order to serve the needs of those within the area covered by the commission.

Thank you for your consideration of this request.

Sincerely,

Robert Ohlensehlen

Robert Ohlensehlen
Extension Educator
Twin Falls County

College of Agriculture

Memo

Middle Snake Regional
Water Resource Commission
122 5^{th} Ave. West
Gooding, Idaho 83330
(208) 934-4781 (208)934-5648 FAX

TO: Neal
SUBJECT: Application for Committee membership
ATTENTION:
DATE: 2/22/01
FROM: Bob Muffley

This is just a formality, but I need you to complete the enclosed application. You may not have been told that members of the Commission are voted on by all six sets of county commissioners within our region. When I receive the completed application, I will be sending it, along with a voting ballot to all six counties. It is tradition for the counties to approve an application submitted by a sponsoring county, but the application helps to familiarize them with you.

Please return the application as soon as you can and if you have any questions, let me know.

Thanks

GOODING COUNTY
BOARD OF COUNTY COMMISSIONERS
P O BOX 417
GOODING, IDAHO 83330

Carolyn Elexpuru Dist I 934-8355
Tom Faulkner Dist II 352-4346
Rob Sauer Dist III 536-2141
Helen P. Edwards, Clerk 934-4221

Mr. Bob Muffley,
Acting Executive Director
Middle Snake Regional
Water Resource Commission
122 5th Avenue West
Gooding ID 83330

Re: Gooding County Representative

Dear Mr. Muffley,

Please be notified that the liaison member from the Gooding County Board of Commissioners to the Mid Snake Regional Water Resource Commission is Commissioner Tom Faulkner. Commissioner Faulkner's mailing address is 1636 Clover Creek Road; Bliss ID 83314. His home phone number is 352-4346.

Thank you,

Helen P. Edwards

Helen P. Edwards
Clerk to the Board

MIDDLE SNAKE REGIONAL WATER RESOURCE COMMISSION

Lew Pence, Chairman
Bob Muffley, Acting Executive Director
122 5th Ave. West
Gooding, Idaho 83330
208-934-4781
208-934-5648 fax

TO: Veronica Lierman, Jerome County Commissioner

FROM: Bob Muffley, Executive Director

RE: Agenda's and minutes

Date: 1/11/01

I get to be the first to welcome you back to the Middle Snake commission. It's going to be like old times with you back on board. The Commission has been working, since 1995, on developing a groundwater protection plan for the 6 county region. The problem we've had, however, is a lack of groundwater data and money. We planned, from the beginning, to produce a groundwater vulnerability map for the region. We believe that this is critical information for county planning and zoning commissions. The map would help them in properly zoning their respective counties and in determining if special use permits for certain land uses should be allowed. The cost of developing the map and other necessary items approached $300,000 and we were unable to get funds from the legislature to proceed. We decided to break the project into phases to pay for things as we could afford them. The first thing we needed to do was get better nutrient loading information in portions of Twin Falls and Cassia counties. The cost of this was $35,000 which was paid for with a grant from the EPA. The second phase involved the compiling of all the necessary groundwater data into the GIS format. The cost of this phase was also about $35,000. The USGS paid half of this phase and we picked up the other half. We are now ready to build the vulnerability map, but the cost of this phase is $120,000. The USGS has agreed to pay half of the amount, but we are unable to come up with the other half. The USGS, however, is trying to find us some help. We were hoping to have the vulnerability map prior to beginning our groundwater protection planning process, but decided last year that we probably had enough information to proceed without it. The actual planning process began in October of last year and the planners include this commission, one member from each P & Z and industry and environmental representative. I am enclosing the minutes from the planners last three meeting as well as an agenda for both our next commission meeting and planning meeting.

If you find the time we would love to see you there.

934-5302

FACSIMILE TRANSMISSION COVER PAGE

****

TO: Lew Pence

FROM: Veronica Lierman

FACSIMILE PHONE: 934-4781

ORGANIZATION:

DATE: 1-10-01

PAGE(S): 1 (including cover sheet)

CONTENTS:
I have been appointed
Please send mailings to my
home address
35 S. 150 W Jerome
pager # 736-7891
Looking forward to
working with you once again.

If this transaction has not been received to completion, please call the sending individual at (208) 324-8811 (fax 208-324-2719).

* * CONFIDENTIALITY NOTICE * *

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MIDDLE SNAKE REGIONAL WATER RESOURCE COMMISSION

Lew Pence, Chairman
Bob Muffley, Acting Executive Director
122 5th Ave. West
Gooding, Idaho 83330
208-934-4781
208-934-5648 fax

TO: Chairman, Cassia County Planning and Zoning Commission

FROM: Lew Pence, Chairman

RE: Proposed Big Sky hog farm

DATE: 12/4/00

It is the understanding of this commission that Big Sky is proposing a large hog operation in your county. We feel it is important that you have the most current information that has been produced by the USGS concerning nitrate loads in south central Idaho. You may or may not be aware that this commission has been working with the USGS for several years in hopes of developing a nitrate probability map for our region. As part of this process we have contracted with the USGS to develop additional information concerning nitrates in ground water and to incorporate that data with data collected from other sources. The results of this work, so far, has led to the production of a nitrate loading map for the region as well as a depth to ground water map. Both of these maps are attached. It is our understanding that the proposed hog facility will be located in an area of your county that has average to low concentrations of nitrogen input, but the sheer size of the operation raises some flags. Our sole purpose in giving you the information, at this time, is to give you the best and most timely information possible for your decision making process.

As I stated earlier, we have been working on the ground water quality issue for several years. While we have learned a great deal about the resource we are still unable to provide you with much help in the situation you find yourselves in. We do, however, have the following recommendations:

1. Farm management, if they haven't already done so, should provide you with a soil profile and a geology report concerning the bedrock in the area of the proposed development.

2. Farm management should provide you with a study of the soils on the proposed site indicating the amount of nitrates already in the soil at various depths. This would be done by taking random soil samples of the site and then having those samples analyzed at a lab. This tells you how much nitrate is already locked in the soil and possibly migrating to the aquifer. If concentrations are already high, the site may not be the best place to locate their facility.

3. Before approval, farm management should agree to periodically furnish you and other

United States Department of the Interior

U.S. GEOLOGICAL SURVEY

Water Resources Division
230 Collins Road
Boise, ID 83702

Nov. 9, 2000

Mr. Bob Muffley
Middle Snake Regional Water Resources Commission
122 5th Avenue West
Gooding, Idaho 83330

Dear Mr. Muffley,

I apologize if I left out part of the documentation for the nitrate input layer. I'm happy to provide more information on the method used to estimate the input of nitrogen from dairy cattle manure.

As stated previously, the basis of the estimate is data provided by Idaho State Department of Agriculture on locations and generalized number of animals for 429 dairies in the study area. The list of dairies is not complete, according to ISDA. Note that the exact number of cows at each dairy is not available; only a range of values is reported for reasons of confidentiality. I used the midpoint of the range for my calculations (e.g. 201-500 became 350). For the "greater than 2000" category, I used 2500. Using the point shapefile provided by ISDA, a map showing the density of dairy cattle (in animals per square kilometer) was produced in ArcView using the built-in capabilities of the Spatial Analyst extension. The density map (enclosed) was made using a search radius of approximately 4.1 km. The resulting densities are displayed in intervals of 50 animals per square kilometer, shown in different shades of purple. The lighter shades stand for lower densities of animals. Note that the area surrounding a single dairy where 2500 animals are located (the largest category) will still be represented by the lightest shade, because there is far less than 1 animal **per square kilometer** within a radius of 4.1 km of that dairy. However, where dairies are clustered near to each other, as in southern Gooding County, the density of animals per square kilometer is much higher (as high as

500 in the darkest areas). I am enclosing a copy of the density map produced at this stage.

From this map, which is composed of small pixels, a contour map showing the average density of dairy cattle per square kilometer, in intervals of 50, from 1 to 450, was generated (see enclosed contour map). This is essentially the same map as the density map, but in a polygon format rather than pixel format. This map has a table that holds values for each polygon on the map, including density of animals per square kilometer, called "cowcontur" in the table. A polygon with a "cowcontur" value of 1 will have between 1 and 50 animals per sq km, 50 indicates 50 to 99 animals, etc. From this information, the pounds of nitrogen per year per acre were calculated, using this formula:

D x 0.45 lb N/animal x 365 days/yr x 0.004 sq km/acre = lb N/acre,

where D = number of animals/sq km ("cowcontur" field in shapefile).
Because the value of "cowcontur" shown in the table is the low end of a range of values, the final lbN/acre is a low estimate, but I have added figures representing the high end of the range (e.g. using 49 instead of 1 animal for the lowest category). For the high end of the highest category (450 and greater) a value of 500 was used. A printout of the table associated with this polygon coverage and the values contained within it is enclosed. These results range up to 329 lb per acre, but could be higher because we do not know the number of animals at the largest dairies. This map was integrated with the overall nitrogen input coverage as described previously; the low end of the range was used, but this could be adjusted to a midpoint between high and low for the final analysis.

Finally, this information was merged with the other nitrogen input data from other sources in ArcView, as described previously.

The soil map I showed at the meeting a few weeks ago was simply taken from the NRCS soil coverages – no interpretation involved here. To be honest, I can't remember which map I showed, but I'm enclosing another copy of (I think) the same map – or at least a similar one. The different colors represent different soil map units, and I showed this simply to demonstrate that a great deal of detail is now available in the newly-released

SSURGO soil maps. For your information, the GIS soil coverages are available in ArcInfo format (readable with ArcView) from the Idaho NRCS website: http://id.nrcs.usda.gov/ (click on green "soils" button at left).

I hope this answers your questions about the dairy estimates and the soil map. Please don't hesitate to call if I can be of further assistance.

Sincerely,

Mary

Mary M. Donato
Geologist

enclosures
- Disk with updated Arcview files for dairy layer
- Density map of dairies
- Contour map of dairies
- Table from "daricontur.dbf"
- Table from "isdadairies.dbf"

Table showing relevant columns in attribute table "daricontur.dbf"

COWCONTUR	CONTURLOW	CONTURHIGH	LOLBN_YR	HILBN_YR
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
1	1	49	1	32
50	50	99	33	65
50	50	99	33	65
50	50	99	33	65
50	50	99	33	65
50	50	99	33	65
50	50	99	33	65
50	50	99	33	65
50	50	99	33	65
50	50	99	33	65
50	50	99	33	65
100	100	149	66	98
100	100	149	66	98
100	100	149	66	98
150	150	199	99	131
150	150	199	99	131
200	200	299	131	196
200	200	299	131	196
300	300	349	197	229
300	300	349	197	229
300	300	349	197	229
300	300	349	197	229
350	350	449	230	295
450	450	500	296	329
450	450	500	296	329

COWCONTUR	Category representing number of animals per square kilometer from density map
CONTURLOW	Low end of range of animals per square kilometer
CONTURHIGH	High end of range of animals per square kilometer
LOLBN_YR	Low estimate of pounds of nitrogen per acre per year: CONTURLOW*0.45*365*0.004
HILBN_YR	High estimate of pounds of nitrogen per acre per year CONTURHIGH*0.45*365*0.004

DAIRY_	DAIRYID	COUNTY	COMPANY	NUMBERANGE
898	DY16310252	CASSIA	JUNIPER DAIRY FARMS INC.	1-200
845	DY16310382	CASSIA	WEBB BASIN DAIRY	501-750
846	DY16310383	CASSIA	INAWALK DAIRY	201-500
847	DY16310384	CASSIA	WEBB BROTHERS DAIRY L.L.C.	1001-2000
848	DY16310385	CASSIA	A LAZY J DAIRY	1-200
849	DY16310386	CASSIA	HEINER DAIRY INC	1-200
850	DY16310387	CASSIA	SUNSTAR DAIRY	1001-2000
851	DY16310388	CASSIA	HURST DAIRY	1-200
852	DY16310389	CASSIA	TURNER DAIRY	1-200
853	DY16310390	CASSIA	DAVIS DAIRY	1-200
854	DY16310391	CASSIA		1-200
855	DY16310392	CASSIA	SUNRISE DAIRY	1-200
856	DY16310393	CASSIA	HANKS DAIRY	unknown
899	DY16310435	CASSIA		1-200
900	DY16310436	CASSIA	DURFEE DAIRY	1-200
901	DY16310437	CASSIA	WILLETT DAIRY	201-500
902	DY16310438	CASSIA	WARR BROTHERS	1-200
903	DY16310439	CASSIA	P BAR S DAIRY	501-750
904	DY16310440	CASSIA		201-500
905	DY16310441	CASSIA		1-200
906	DY16310442	CASSIA		1-200
907	DY16310443	CASSIA		201-500
908	DY16310444	CASSIA	DARRINGTON DAIRY	1-200
909	DY16310445	CASSIA	HURST DAIRY	201-500
910	DY16310446	CASSIA	MOO MOUNTAIN MILK	>2000
911	DY16310447	CASSIA	R&W DAIRY	unknown
912	DY16310448	CASSIA	POVERTY PALACE	unknown
913	DY16310449	CASSIA	MOO VIEW COW PALACE	1-200
914	DY16310450	CASSIA	ZOLLINGER DAIRY	201-500
915	DY16310451	CASSIA	BOWEN DAIRY	1-200
916	DY16310452	CASSIA	W. LAZY F. DAIRY	1-200
917	DY16310453	CASSIA	ANTELOPE HILLS INC	201-500
918	DY16310454	CASSIA	CARSON DAIRY	1-200
919	DY16310455	CASSIA	MOOSMAN DAIRY	1-200
920	DY16310456	CASSIA	SEARLE DAIRY	1-200
921	DY16310457	CASSIA	HEWARD DAIRY	1-200
922	DY16310458	CASSIA		1-200
923	DY16310459	CASSIA	THOMAS DAIRY	1-200
924	DY16310460	CASSIA		1-200
925	DY16310461	CASSIA	HINES DAIRY	1-200
926	DY16310462	CASSIA	IDA GOLD DAIRY #2	1001-2000
927	DY16310463	CASSIA	IDA GOLD DAIRY	201-500
928	DY16310464	CASSIA	HEWARD BROTHERS DAIRY	1-200
929	DY16310465	CASSIA	K & G INC.	1-200
930	DY16310466	CASSIA	WARD DAIRY	1001-2000
931	DY16310467	CASSIA	SEARLE BROS. DAIRY	1-200
932	DY16310468	CASSIA		1-200
933	DY16310469	CASSIA	WARM CREEK DAIRY	201-500
197	DY16470561	GOODING	CANYON VIEW DAIRY	201-500

159	DY16470563	GOODING	CANYONSIDE DAIRY	751-1000
160	DY16470564	GOODING	AARDEMA #5	>2000
161	DY16470565	GOODING	AARDEMA DAIRY #2	751-1000
162	DY16470566	GOODING	BOER DAIRY	1001-2000
163	DY16470567	GOODING		1-200
164	DY16470568	GOODING		unknown
165	DY16470569	GOODING	WRIGHT INC.	201-500
166	DY16470570	GOODING	T3 DAIRY	201-500
167	DY16470571	GOODING	BIG SKY SOUTH	1001-2000
168	DY16470572	GOODING	DEWIT DAIRY	501-750
169	DY16470573	GOODING	STOUDER HOLSTEINS	501-750
170	DY16470574	GOODING	LAWTON DAIRY	1-200
171	DY16470575	GOODING	DEWIT DAIRY II	1001-2000
172	DY16470576	GOODING	TULIP DAIRY	501-750
173	DY16470577	GOODING		1-200
174	DY16470578	GOODING		201-500
175	DY16470579	GOODING		unknown
176	DY16470580	GOODING		1001-2000
177	DY16470581	GOODING	BUTTE DAIRY #2	201-500
178	DY16470582	GOODING	BUTTE DAIRY #1	1001-2000
179	DY16470583	GOODING		201-500
180	DY16470584	GOODING	KAUFFMAN DAIRY	201-500
181	DY16470585	GOODING	GOEDHART & GOEDHART	751-1000
182	DY16470586	GOODING	THOMPSON #2	501-750
183	DY16470587	GOODING	AARDEMA & HEIDA DAIRY #1	1001-2000
184	DY16470588	GOODING	AARDEMA & HEIDA DAIRY #2	>2000
185	DY16470589	GOODING		1001-2000
186	DY16470590	GOODING		1-200
187	DY16470591	GOODING	HILLTOP DAIRY	751-1000
188	DY16470592	GOODING		1-200
189	DY16470593	GOODING	SOUTHFIELD DAIRY	>2000
190	DY16470594	GOODING	SOUTHFIELD DAIRY #2	>2000
191	DY16470595	GOODING		201-500
192	DY16470596	GOODING	PARISH DAIRY	unknown
193	DY16470597	GOODING		1-200
194	DY16470598	GOODING	BETTENCOURT #6	751-1000
195	DY16470599	GOODING	BETTENCOURT #5	751-1000
196	DY16470600	GOODING	VANDERVEGT DAIRY	1001-2000
198	DY16470602	GOODING	V & L DAIRY	501-750
199	DY16470603	GOODING		1-200
200	DY16470604	GOODING	COLEMAN DAIRY	501-750
201	DY16470605	GOODING		201-500
202	DY16470606	GOODING		201-500
203	DY16470607	GOODING		unknown
204	DY16470608	GOODING		1-200
205	DY16470609	GOODING	VEENSTRA DAIRY #2	1-200
206	DY16470610	GOODING	VEENSTRA DAIRY #1	201-500
207	DY16470611	GOODING		unknown
208	DY16470612	GOODING	V & L DAIRY #2	1001-2000
209	DY16470613	GOODING	NUNES BROTHERS	501-750

210	DY16470614	GOODING		1-200
211	DY16470615	GOODING	SYBESMA DAIRY	501-750
212	DY16470616	GOODING	SOARES #2	1-200
213	DY16470617	GOODING	VERBREE #3	751-1000
214	DY16470618	GOODING	VERBREE DAIRY #1	1001-2000
215	DY16470619	GOODING	HILT DAIRY	201-500
216	DY16470620	GOODING	CIOCCA DAIRY	751-1000
217	DY16470621	GOODING	VERBREE DAIRY #2	201-500
218	DY16470622	GOODING	BETTENCOURT DAIRY #3	unknown
219	DY16470623	GOODING	V & C DAIRY	751-1000
220	DY16470624	GOODING		1-200
221	DY16470625	GOODING		unknown
222	DY16470626	GOODING		201-500
223	DY16470627	GOODING	T & F DAIRY	501-750
224	DY16470628	GOODING		1-200
225	DY16470629	GOODING	WALLIS LAND INC	501-750
226	DY16470630	GOODING	DEELSTRA II	751-1000
227	DY16470631	GOODING	DOUBLE H DAIRY #2	751-1000
228	DY16470632	GOODING	J & J DAIRY	>2000
229	DY16470633	GOODING	MIRKIN DAIRY	201-500
230	DY16470634	GOODING		1-200
231	DY16470635	GOODING	A & U JERSEYS	201-500
232	DY16470636	GOODING	ROCHA DAIRY	1001-2000
233	DY16470637	GOODING	SCARROW DAIRY	1001-2000
234	DY16470638	GOODING		1-200
235	DY16470639	GOODING	DIAMOND B DAIRY	unknown
236	DY16470640	GOODING	BRANDSMA DAIRY	501-750
258	DY16470641	GOODING	BUSMAN DAIRY	501-750
238	DY16470642	GOODING	BEUKERS DAIRY	>2000
239	DY16470643	GOODING	VAN DYKE DAIRY #2	201-500
240	DY16470644	GOODING	VAN DYKE #3	501-750
241	DY16470645	GOODING		201-500
242	DY16470646	GOODING	RIETKERK DAIRY	201-500
243	DY16470647	GOODING	REITKIRK #2	1-200
244	DY16470649	GOODING	BETTENCOURT #4	501-750
244	DY16470649	GOODING	BETTENCOURT #4	751-1000
246	DY16470651	GOODING		201-500
247	DY16470652	GOODING	T & S DAIRY	751-1000
248	DY16470653	GOODING	HILT DAIRY	201-500
249	DY16470654	GOODING		1-200
250	DY16470655	GOODING		501-750
251	DY16470656	GOODING		1001-2000
252	DY16470657	GOODING	BIG SKY DAIRY	>2000
253	DY16470658	GOODING		201-500
254	DY16470659	GOODING		501-750
255	DY16470660	GOODING		1-200
256	DY16470661	GOODING	R & R HOLSTEINS	unknown
257	DY16470662	GOODING	R & R DAIRY #2	1-200
237	DY16470663	GOODING		201-500
259	DY16470664	GOODING	POSTMA DAIRY	501-750

260	DY16470665	GOODING	GORZEMAN DAIRY	201-500
261	DY16470666	GOODING		1-200
262	DY16470667	GOODING		1-200
263	DY16470668	GOODING		1-200
264	DY16470669	GOODING	POCKET RANCH DAIRY	201-500
265	DY16470670	GOODING		1-200
266	DY16470671	GOODING		1-200
267	DY16470672	GOODING	BALLARD FAMILY DAIRY	1-200
268	DY16470673	GOODING	C & M DAIRY	1-200
269	DY16470674	GOODING		1-200
270	DY16470675	GOODING		unknown
271	DY16470676	GOODING		201-500
272	DY16470677	GOODING		1-200
273	DY16470678	GOODING	N-VEE DAIRY	1-200
273	DY16470678	GOODING	N-VEE DAIRY	unknown
274	DY16470679	GOODING	GARCIA DAIRY	1-200
274	DY16470679	GOODING	GARCIA DAIRY	unknown
275	DY16470680	GOODING		1-200
275	DY16470680	GOODING		unknown
0		GOODING	BLISSFUL DAIRY	1-200
0		GOODING	BOX CANYON #3	1-200
0		GOODING	TULIP DAIRY	1-200
857	DY16530394	JEROME	TJ CAN DAIRY	1-200
858	DY16530395	JEROME	NORMAN DAIRY	1-200
84	DY16530488	JEROME		1-200
85	DY16530489	JEROME	DIAMOND S DAIRY	1-200
86	DY16530490	JEROME	SUNRISE ORGANIC FARMS	>2000
87	DY16530491	JEROME	BROWN DAIRY	201-500
88	DY16530492	JEROME	STELLINGWERF & SON	unknown
89	DY16530493	JEROME		1001-2000
90	DY16530494	JEROME	RIVERVIEW DAIRY	unknown
91	DY16530495	JEROME	IDALEE DAIRY	201-500
92	DY16530496	JEROME	GILTNER DAIRY LLC	501-750
93	DY16530497	JEROME	GULICK DAIRY	201-500
94	DY16530498	JEROME	TOLMAN DAIRY INC	201-500
95	DY16530499	JEROME	SI-ANN DAIRY	501-750
96	DY16530500	JEROME		751-1000
97	DY16530501	JEROME		501-750
98	DY16530502	JEROME	VANDERVEGT DAIRY	201-500
99	DY16530503	JEROME	VANBEEK #2	unknown
100	DY16530504	JEROME	DEJONG DAIRY	201-500
101	DY16530505	JEROME		1-200
102	DY16530506	JEROME		1-200
103	DY16530507	JEROME	DOUBLE A DAIRY	1001-2000
104	DY16530508	JEROME	K & W DAIRY	1001-2000
105	DY16530509	JEROME	VANBEEK DAIRY	1001-2000
106	DY16530510	JEROME	AARDEMA DAIRY I	751-1000
107	DY16530511	JEROME	AARDEMA DAIRY IV	1001-2000
108	DY16530512	JEROME	SWEET BRIAR DAIRY	1-200
109	DY16530513	JEROME		1-200

110	DY16530514	JEROME		501-750
111	DY16530515	JEROME	ANDERSON BROS.	201-500
112	DY16530516	JEROME	DEKRUYF DAIRY	1001-2000
113	DY16530517	JEROME		unknown
114	DY16530518	JEROME	DEGROOT DAIRY	201-500
115	DY16530519	JEROME	C BAR M DAIRY	1001-2000
116	DY16530520	JEROME	MILLER DAIRY	201-500
117	DY16530521	JEROME	LONGVIEW DAIRY	1001-2000
118	DY16530522	JEROME	L BAR M DAIRY	751-1000
119	DY16530523	JEROME		unknown
120	DY16530524	JEROME	DOUBLE H DAIRY	751-1000
121	DY16530525	JEROME	CIRCLE B DAIRY	201-500
122	DY16530526	JEROME	VANDERHAM DAIRY	751-1000
123	DY16530527	JEROME	WALTERS #2	201-500
124	DY16530528	JEROME	VANDERSTILT FAMILY DAIRY	201-500
125	DY16530529	JEROME	M & M DAIRY	751-1000
126	DY16530530	JEROME	THE UDDER DAIRY	1001-2000
127	DY16530531	JEROME	ANDRESEN & BOER	201-500
128	DY16530532	JEROME	T & B DAIRY	501-750
129	DY16530533	JEROME		unknown
130	DY16530534	JEROME	VAN DYKE DAIRY	751-1000
131	DY16530535	JEROME	VAN VLIET DAIRY	201-500
132	DY16530536	JEROME	NORTHSIDE DAIRY #2	201-500
133	DY16530537	JEROME	NORTHSIDE DAIRY	1001-2000
134	DY16530538	JEROME		1-200
135	DY16530539	JEROME	SLEGERS DAIRY	201-500
136	DY16530540	JEROME		1-200
137	DY16530541	JEROME	PETTERSON DAIRY	1-200
138	DY16530542	JEROME	PETTERSON DAIRY BARN #2	501-750
139	DY16530543	JEROME	G & G DAIRY	751-1000
140	DY16530544	JEROME		1-200
141	DY16530545	JEROME	GLENDENNING DAIRY	501-750
142	DY16530546	JEROME	STANDING 16 RANCH, INC.	201-500
143	DY16530547	JEROME	UR FARMS	501-750
144	DY16530548	JEROME	NORTHSIDE #3	1001-2000
145	DY16530549	JEROME	BETTENCOURT DAIRY	unknown
146	DY16530550	JEROME	GERMAN DAIRY	201-500
147	DY16530551	JEROME	BETTENCOURT DAIRY II	1001-2000
148	DY16530552	JEROME	BORGES DAIRY	201-500
149	DY16530553	JEROME		201-500
150	DY16530554	JEROME		201-500
151	DY16530555	JEROME		1-200
152	DY16530556	JEROME	D & J DAIRY	>2000
153	DY16530557	JEROME		1-200
154	DY16530558	JEROME		1-200
155	DY16530559	JEROME	NELSEN DAIRY	201-500
156	DY16530560	JEROME		1001-2000
157	DY16530561	JEROME		1-200
158	DY16530562	JEROME	SI-ELLEN DAIRY	>2000
1	DY16630284	LINCOLN		1-200

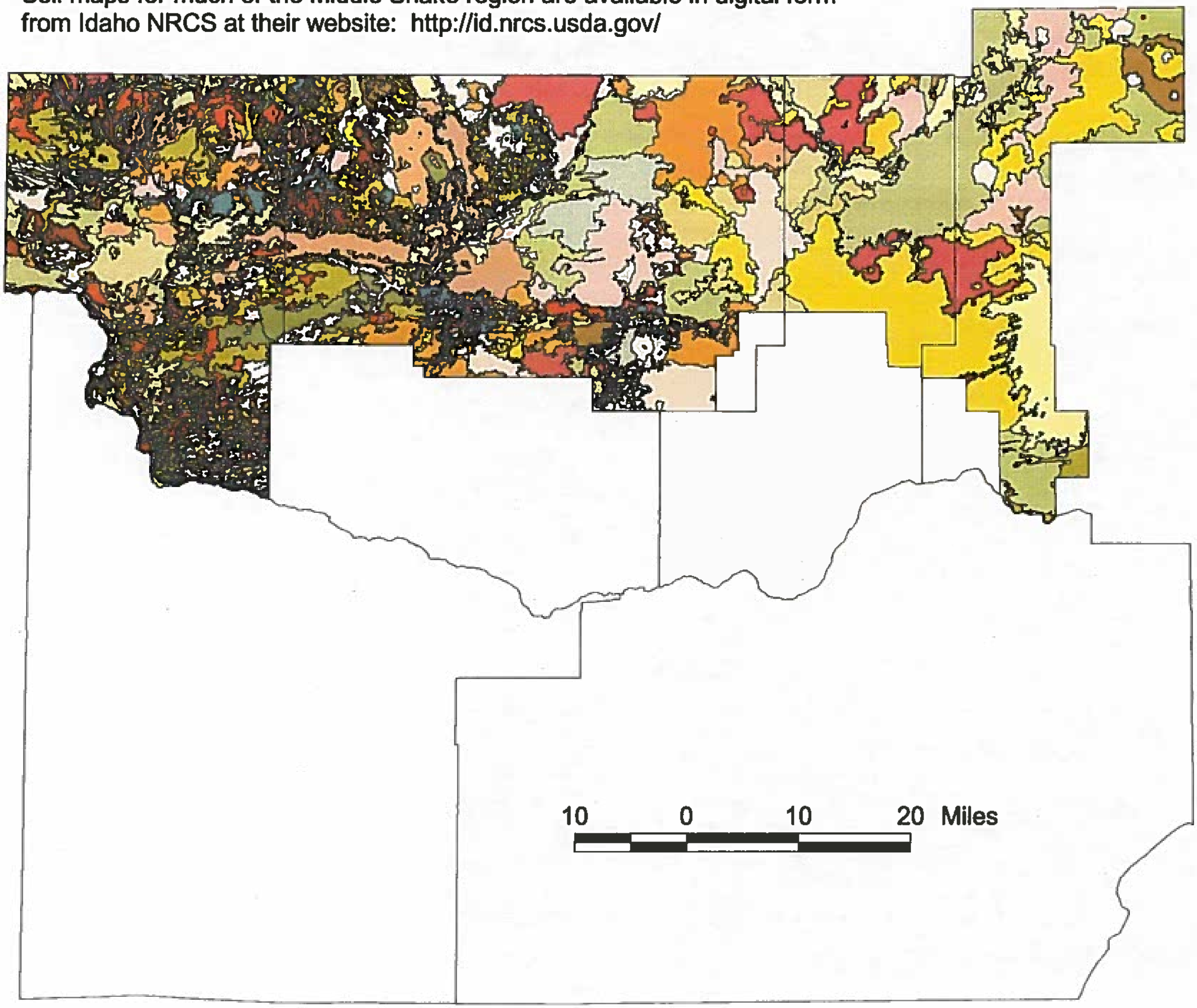
2	DY16630285	LINCOLN		1-200
3	DY16630286	LINCOLN		1-200
4	DY16630287	LINCOLN		1-200
5	DY16630288	LINCOLN	DIAMOND K RANCH	1-200
6	DY16630289	LINCOLN		unknown
7	DY16630290	LINCOLN	RAFTER S, INC.	1-200
8	DY16630291	LINCOLN	NORTH SLOPE RANCH	201-500
9	DY16630292	LINCOLN		1-200
10	DY16630293	LINCOLN		1-200
11	DY16630294	LINCOLN		1-200
12	DY16630295	LINCOLN	DOMDE DAIRY	unknown
13	DY16630296	LINCOLN		1-200
14	DY16630297	LINCOLN		1-200
15	DY16630298	LINCOLN		1-200
16	DY16630299	LINCOLN	ROBINSON & SORENSEN	1-200
17	DY16630300	LINCOLN	MORNING STAR DAIRY	1-200
17	DY16630300	LINCOLN	MORNING STAR DAIRY	1-200
18	DY16630301	LINCOLN		1-200
19	DY16630302	LINCOLN	BUENA VISTA DAIRY	201-500
20	DY16630303	LINCOLN		1-200
21	DY16630304	LINCOLN		1-200
22	DY16630305	LINCOLN	BOOT JACK DAIRY II	201-500
23	DY16630306	LINCOLN	D K & R DAIRY	unknown
24	DY16630307	LINCOLN	FOUR BROS DAIRY #2	1001-2000
25	DY16630308	LINCOLN	FOUR BROTHERS DAIRY INC.	1001-2000
26	DY16630309	LINCOLN		1-200
27	DY16630310	LINCOLN		1-200
28	DY16630311	LINCOLN		1-200
29	DY16630312	LINCOLN		1-200
30	DY16630313	LINCOLN	JC JERSEY'S	201-500
31	DY16630314	LINCOLN		1-200
32	DY16630315	LINCOLN		unknown
33	DY16630316	LINCOLN		201-500
34	DY16630317	LINCOLN	R G & T DAIRY	1-200
35	DY16630318	LINCOLN	HI-LINE FARMS	unknown
36	DY16630319	LINCOLN		1-200
812	DY16630320	LINCOLN	HIDDEN VALLEY DAIRY	1-200
37	DY16630321	LINCOLN	DONLEY FARMS	201-500
38	DY16630322	LINCOLN		1-200
39	DY16630323	LINCOLN		1-200
40	DY16630324	LINCOLN		1-200
41	DY16630325	LINCOLN		201-500
42	DY16630326	LINCOLN		1-200
43	DY16630327	LINCOLN		1-200
44	DY16630328	LINCOLN		201-500
45	DY16630329	LINCOLN		1-200
859	DY16670396	MINIDOKA	IDA WOOD FARMS	1-200
860	DY16670397	MINIDOKA	APAULO DAIRY	1-200
861	DY16670398	MINIDOKA	SNAKE RIVER JERSEYS	501-750
862	DY16670399	MINIDOKA		1-200

863	DY16670400	MINIDOKA		1-200
864	DY16670401	MINIDOKA	BOTT DAIRY	1-200
865	DY16670402	MINIDOKA	SNAKE RIVER JERSEYS #2	unknown
866	DY16670403	MINIDOKA		1-200
867	DY16670404	MINIDOKA	T-R DAIRY	1-200
868	DY16670405	MINIDOKA	MAGIC VUE DAIRY	unknown
869	DY16670406	MINIDOKA		unknown
870	DY16670407	MINIDOKA	BRICE DAIRY	201-500
871	DY16670408	MINIDOKA	PETERSON DAIRY	1-200
872	DY16670409	MINIDOKA	WILLOW HILLS DAIRY	201-500
873	DY16670410	MINIDOKA	RIVERVIEW DAIRY, INC.	1-200
874	DY16670411	MINIDOKA		1-200
875	DY16670412	MINIDOKA	RIVERSIDE DAIRY INC	1-200
876	DY16670413	MINIDOKA	T-W SUNDERLAND AND SONS IN	1-200
877	DY16670414	MINIDOKA		1-200
878	DY16670415	MINIDOKA	BASELINE FARMS	1-200
879	DY16670416	MINIDOKA	BRADSHAW DAIRY	1-200
880	DY16670417	MINIDOKA		1-200
881	DY16670418	MINIDOKA		201-500
882	DY16670419	MINIDOKA		201-500
883	DY16670420	MINIDOKA	SHAW DAIRY	unknown
884	DY16670421	MINIDOKA	HRUZA DAIRY	1-200
885	DY16670422	MINIDOKA	NAYLOR DAIRY	1-200
886	DY16670423	MINIDOKA	WILDROSE DAIRY	201-500
887	DY16670424	MINIDOKA		1-200
888	DY16670425	MINIDOKA	WHITESIDES DAIRY	1001-2000
889	DY16670426	MINIDOKA	SANDERS DAIRY	1-200
890	DY16670427	MINIDOKA	IDAHO ACRES DAIRY	1-200
891	DY16670428	MINIDOKA		1-200
892	DY16670429	MINIDOKA	THAIN DAIRY	201-500
893	DY16670430	MINIDOKA		unknown
894	DY16670431	MINIDOKA		1-200
895	DY16670432	MINIDOKA		1-200
896	DY16670433	MINIDOKA	B & B DAIRY LLC	501-750
897	DY16670434	MINIDOKA	HANSEN'S QUALITY JERSEYS	201-500
46	DY16830362	TWIN FALLS	KOWZ-R-US	1001-2000
46	DY16830362	TWIN FALLS	KOWZ-R-US	1001-2000
47	DY16830363	TWIN FALLS	COUNTRY ROADS DAIRY	1-200
47	DY16830363	TWIN FALLS	COUNTRY ROADS DAIRY	1-200
48	DY16830364	TWIN FALLS		1-200
48	DY16830364	TWIN FALLS		1-200
49	DY16830365	TWIN FALLS	NATURE'S BEST DAIRY	1-200
49	DY16830365	TWIN FALLS	NATURE'S BEST DAIRY	1-200
50	DY16830366	TWIN FALLS	M & J MACHADO	201-500
50	DY16830366	TWIN FALLS	M & J MACHADO	201-500
51	DY16830367	TWIN FALLS		201-500
52	DY16830368	TWIN FALLS	ROTARY DAIRY	>2000
53	DY16830369	TWIN FALLS		1-200
54	DY16830370	TWIN FALLS		1-200
55	DY16830371	TWIN FALLS	JEM VIEW DAIRY	1-200

56	DY16830372	TWIN FALLS		201-500
57	DY16830373	TWIN FALLS	SOUTH HILLS DAIRY	751-1000
58	DY16830374	TWIN FALLS		1-200
59	DY16830375	TWIN FALLS	BOKMA DAIRY	201-500
60	DY16830376	TWIN FALLS	SUDIK DAIRY	1001-2000
61	DY16830377	TWIN FALLS		501-750
62	DY16830378	TWIN FALLS	MAGIC MILK CO	1001-2000
63	DY16830379	TWIN FALLS	FOOTHILL DAIRY	unknown
64	DY16830380	TWIN FALLS	FUNK DAIRY	>2000
65	DY16830381	TWIN FALLS	K & J FARMS INC.	1-200
276	DY16830681	TWIN FALLS		1-200
277	DY16830682	TWIN FALLS		1-200
278	DY16830683	TWIN FALLS	MASON DAIRY	201-500
279	DY16830684	TWIN FALLS	IMAGINE DAIRY	unknown
280	DY16830685	TWIN FALLS	CANYON VIEW DAIRY	501-750
281	DY16830686	TWIN FALLS	PEARSON DAIRY	unknown
282	DY16830687	TWIN FALLS	VANDENBERG DAIRY	201-500
283	DY16830688	TWIN FALLS	AZEVEDO DAIRY	501-750
284	DY16830689	TWIN FALLS		1-200
285	DY16830690	TWIN FALLS		1-200
286	DY16830691	TWIN FALLS	WIERSMA DAIRY INC	1001-2000
287	DY16830692	TWIN FALLS		unknown
288	DY16830693	TWIN FALLS	SILVA & SONS DAIRY	201-500
289	DY16830694	TWIN FALLS		201-500
290	DY16830695	TWIN FALLS		1-200
291	DY16830696	TWIN FALLS		1-200
292	DY16830697	TWIN FALLS	BROWER FAMILY DAIRY	1-200
293	DY16830698	TWIN FALLS		201-500
294	DY16830699	TWIN FALLS		201-500
295	DY16830700	TWIN FALLS	DEMELO DAIRY	201-500
296	DY16830701	TWIN FALLS	ARROYO DAIRY	201-500
297	DY16830702	TWIN FALLS	TRIPLE C DAIRY	1-200
298	DY16830703	TWIN FALLS	SOUTHSIDE DAIRY	201-500
299	DY16830704	TWIN FALLS	PAX DAIRY FARM	201-500
300	DY16830705	TWIN FALLS	AVELAR'S DAIRY	1001-2000
301	DY16830706	TWIN FALLS	TRIPLE J DAIRY	501-750
302	DY16830707	TWIN FALLS		201-500
303	DY16830708	TWIN FALLS	KNOTT-RUN HOLSTEINS	1-200
304	DY16830709	TWIN FALLS	DEVRIES DAIRY #2	201-500
305	DY16830710	TWIN FALLS	FAR AWAY FARMS	201-500
306	DY16830711	TWIN FALLS		1-200
307	DY16830712	TWIN FALLS	BOKMA DAIRY	1001-2000
308	DY16830713	TWIN FALLS		751-1000
309	DY16830714	TWIN FALLS	GREEN RIVER DAIRY	1-200
310	DY16830715	TWIN FALLS	WIERSMA DAIRY #2	201-500
311	DY16830716	TWIN FALLS		unknown
312	DY16830717	TWIN FALLS		1-200
313	DY16830718	TWIN FALLS		1-200
314	DY16830719	TWIN FALLS	FAIRVIEW DAIRY #2	201-500
315	DY16830720	TWIN FALLS		1-200

316	DY16830721	TWIN FALLS		1-200
317	DY16830722	TWIN FALLS	HERITAGE FARMS	1001-2000
318	DY16830723	TWIN FALLS	CARDOZA DAIRY	201-500
319	DY16830724	TWIN FALLS	FAIRVIEW DAIRY	501-750
320	DY16830725	TWIN FALLS	SCHILDER DAIRY	751-1000
321	DY16830726	TWIN FALLS	PETTER DAIRY	751-1000
322	DY16830727	TWIN FALLS		1-200
323	DY16830728	TWIN FALLS	ROCKRIDGE DAIRY	>2000
324	DY16830729	TWIN FALLS	SCHMIDT DAIRY	1-200
325	DY16830730	TWIN FALLS		201-500
326	DY16830731	TWIN FALLS		201-500
327	DY16830732	TWIN FALLS	AZEVEDO DAIRY	201-500
328	DY16830733	TWIN FALLS	FRONTIER DAIRY	201-500
328	DY16830733	TWIN FALLS	FRONTIER DAIRY	201-500
329	DY16830734	TWIN FALLS	H & H DAIRY	1001-2000
329	DY16830734	TWIN FALLS	H & H DAIRY	>2000
330	DY16830735	TWIN FALLS	WRIGHT DAIRY INC.	201-500
331	DY16830736	TWIN FALLS	WILL-O-DELL	1-200
332	DY16830737	TWIN FALLS		1-200
333	DY16830738	TWIN FALLS	HIGHWAY TO HEAVEN DAIRY	1-200
334	DY16830739	TWIN FALLS	VIERSTRA DAIRIES	751-1000
335	DY16830740	TWIN FALLS		1-200
336	DY16830741	TWIN FALLS	PK ACRES	unknown
337	DY16830742	TWIN FALLS	CLASSIC DAIRY	501-750
338	DY16830743	TWIN FALLS		1-200
339	DY16830744	TWIN FALLS	WESTSIDE DAIRY	1-200
340	DY16830745	TWIN FALLS	QUESNELL RANCHES INC.	1-200
341	DY16830746	TWIN FALLS		1-200
342	DY16830747	TWIN FALLS	ASLETT DAIRY	201-500
343	DY16830748	TWIN FALLS	HEIDEMANN DAIRY	501-750

SSURGO soil map example. Different colors represent different soil map units. Soil maps for much of the Middle Snake region are available in digital form from Idaho NRCS at their website: http://id.nrcs.usda.gov/



Mark Daily
2944S 1175E
Hagerman, ID 83332

To:	Bob Muffley	**Fax:**	208-934-5648
From:	Mark Daily	**Date:**	10/2/00
Re:	Aquaculture Group Member	**Pages:**	1
CC:	[Click here and type name]		

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

[illegible]n has agreed to serve as the voting member from aquaculture on the regional [illegible]p.

[illegible] Lemmon
[illegible] S 1050 E
[illegible]n, ID 83332
[illegible]7-4808

Gary Lemmon
2775 S 1050 E
Hagerman, Id. 83332
837-4808

If there is anything else I can do for you, please let me know.

Sincerely,

Mark E. Daily
President , Idaho Aquaculture Association

MIDDLE SNAKE REGIONAL WATER RESOURCE COMMISSION

Lew Pence, Chairman
Bob Muffley, Acting Executive director
122 5th Ave. West
Gooding, Idaho 83330
Phone: 208-934-4781 FAX: 208-934-5648

TO: Gooding Planning and Zoning Commission

FROM: Lew Pence, Chairman

RE: Proposed waste treatment system for Jerome Cheese Co.

DATE: September 27, 2000

It is the understanding of this commission that the Jerome Cheese Company is proposing to locate a waste treatment system for their Jerome facility in the southern part of Gooding county. We feel it is important that you know about some information that was recently produced by the USGS concerning the southern portion of your county. You may or may not be aware that this commission has been working with the USGS for several years in hopes of developing a nitrate probability map for the region. As part of this process we have contracted with the USGS to develop additional information concerning nitrates in ground water and to incorporate this data with data collected from other sources involving this region. The results of this work, so far, has led to the production of a nitrate loading map for the region as well as a depth to ground water map. Both of these maps are attached. You will notice the map indicates that the southern part of your county has some of the highest nitrate loading in the region. This may or may not be as bad as it looks since we still have no data on the uptake of nitrates by various crops in the area. This does raise a flag, however. I must caution you that the USGS report and resulting maps may not be final since the data collection process is still going through the scientific peer review process. Our sole purpose in giving you the information, at this time, is to give you the best and most timely information possible for your decision making process.

As I stated earlier, we have been working on the ground water quality issue for several years. While we have learned a great deal about the resource we are still unable to provide you with much help in the situation you find yourselves in. We do, however, have the following recommendations:

1. Plant management should provide you with a soil profile and a geology report concerning the bedrock in the area of the proposed development. Much of the southern part of your county is made up of fractured basalt and if the soil is thin it can create a direct path for future nitrate contamination.

2. Plant management should provide you with a study of the soils on the proposed site indicating the amount of nitrate already in the soil at various depths. This would be done by taking random soil samples of the site and then having those samples analyzed at a lab. This tells you how much nitrate is already locked in the ground and possibly migrating to the aquifer. If concentrations are already high, the site may not be the best place to locate their facility.

3. Before approval, plant management should agree to periodically furnish you and other concerned agencies with test results form randomly taken soil samples.

4. Based on the results of the soil samples a crop rotation and fertilizing plan should be approved by the Idaho Department of Agriculture and the Department of Environmental Quality. Legume crops such as hay, beans and peas can actually add nutrients to the soil.

I hope this information helps you in your decision making process and if you have any questions please let me know.

TWIN FALLS COUNTY
PLANNING AND ZONING ADMINISTRATION
246 3RD AVENUE EAST
TWIN FALLS, ID 83301
734-9490

September 26, 2000

Bob Muffley
Middle Snake Regional Water Resource Commission
122 5th Avenue West
Gooding, Idaho 83330

Dear Mr. Muffley:

The Planning and Zoning Commission has appointed Jack Thornborrow to represent Twin Falls County at the monthly meetings. To contact Mr. Thornborrow, his address is 1676 E 3600 N, Buhl, Idaho 83316 or home phone, (208) 543-5030.

Sincerely,

Bill

Bill Crafton
Planning and Zoning Director

USDA NRCS
Natural Resources Conservation Service

9173 W. Barnes Drive
Suite C
Boise, ID 83709-1574

September 21, 2000

Lew Pence, Chair
Middle Snake Regional Water Resource Commission
122 5th Avenue West
Gooding, Idaho 83330

Dear Lew:

This is in response to your letter of September 7, regarding the Middle Snake Regional Water Resource Commission and your request for NRCS representation on the technical advisory committee.

We have appointed Rich Yankey, NRCS District Conservationist at Twin Falls to serve on the technical advisory committee.

Rich Yankey
District Conservationist
USDA NRCS
1441 Fillmore Street, Suite A
Twin Falls, Idaho 83301-3380
Phone: (208) 733-5380
Fax: (208) 734-5138
Email: richard.yankey@id.usda.gov

Please coordinate directly with Rich on committee meetings, activities, etc.

Sincerely,

Richard Sims

RICHARD SIMS
State Conservationist

cc: Gary Pfiefle, Assistant State Conservationist (Operations), NRCS, Boise
Rich Yankey, District Conservationist, NRCS, Twin Falls