Report to the Joint Minerals, Business, and Economic Development Interim Committee

Groundwater Impacts and Remediation Costs Wyoming Municipal Solid Waste Disposal Facilities

Wyoming Department of Environmental Quality

June 30, 2010

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List of Acronyms and Abbreviations

CAG	Citizens' Advisory Group on Solid Waste
DWEL	Drinking Water Equivalent Level
EPA	United States Environmental Protection Agency
FML	Flexible Membrane Barrier Layer
GDP	Gross Domestic Product
GPS	Groundwater Protection Standard
ISWM	Integrated Solid Waste Management
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MSW	Municipal Solid Waste
TDS	Total Dissolved Solids
VOC	Volatile Organic Compound

1.0 Introduction

Under W.S. § 35-11-522 the Department of Environmental Quality is tasked with providing a report to the Joint Minerals, Business, and Economic Development Interim Committee by June 30, 2010, which:

- Describes the extent to which municipal solid waste (MSW) disposal facilities cause or contribute to pollution of groundwater,
- Contains an estimate of the statewide groundwater remediation cost obligation faced by local governmental owners of these disposal facilities, and
- Recommends one or more ways to fund those costs.

This report is intended to fulfill the statutory obligations.

2.0 Executive Summary

In 2006, pursuant to W.S. §35-11-521, the Legislature allocated $7.97 million to the Department to provide grants to communities to conduct groundwater investigations at MSW landfills to improve our understanding of the potential groundwater contamination problem. Under the grant program, the Department has evaluated monitoring networks at 114 MSW landfills. Additional monitoring wells were needed at more than 70% of these landfills in order to detect groundwater pollution. Approximately 300 new monitoring wells have been installed state-wide with reimbursements to communities totaling approximately $2.24 million. A number of facilities have not yet applied for reimbursement and additional work will be needed to further assess the nature and extent of contamination at landfills where pollution has been detected. Therefore, the Department anticipates that the remaining fund balance of $5.73 million will be needed to provide reimbursement for work already conducted and complete supplemental investigations.

We believe that 76 of the 114 MSW landfills investigated now have the minimum number of wells needed to detect a release. Based on statistical evaluations, there is evidence of contamination at 73 (or 96%) of these 76 landfills. Contaminant concentrations exceed groundwater protection standards (GPS) at 69 (91%) of the 76 landfills. Of the remaining 38 landfills, five local governments chose not to install wells and additional data is needed at the other 33 before a determination regarding groundwater impacts can be made.

The Department considered a range of potential corrective actions to address landfill contamination from installing and improving landfill caps and monitoring systems to pumping groundwater to the surface for active treatment (pump and treat systems). Caps and monitoring are

considered to be at the low range of possible corrective action costs. Pump and treat systems are relatively high cost options, but may be more effective than other options at most sites depending on site-specific conditions.

For the purpose of estimating potential corrective action costs, landfills were divided into two categories. No additional action (beyond standard capping and monitoring requirements) was considered necessary at this time at 4 landfills where contaminant concentrations exceeded groundwater protection standards, but did not exceed maximum contaminant levels (MCLs). Cap improvements and additional monitoring only (no active groundwater remediation) were considered appropriate for 51 landfills where MCLs were exceeded, but not for volatile organic compounds (VOCs). Active groundwater remediation (in addition to cap improvements and additional monitoring) was believed necessary at 18 landfills where pollution exceeded MCLs for one or more VOCs.

Given the number of impacted sites and the assumed corrective action needs, the Department has estimated that the total potential statewide remediation cost obligation faced by local governments is approximately $164.4 million over 20 years for the 76 landfills where monitoring networks are currently capable of detecting a release. Extrapolating this estimate to the remaining 38 landfills where more data is needed indicates that an additional $62 million may be needed. Therefore, the total statewide cost over 20 years may be approximately $226 million.

This cost estimate reflects the additional expenses (new and/or improved caps, additional monitoring, and active remediation) which may potentially be needed to address pollution, but does not include routine operational costs. Cost estimations were used to determine potential costs to address pollution for the purposes of this report. Actual cleanup requirements at individual landfills will be based on site specific conditions and regulatory requirements.

Appendix A contains a summary sheet of miscellaneous landfill information and Appendix B contains maps indicating the status of MSW landfills statewide.

3.0 Background

In 2004, the Department, at the recommendation of Governor Freudenthal, convened a citizens' advisory group (the Advisory Group or CAG) to help identify the key problems with MSW management in Wyoming and to recommend solutions to these problems. As part of the CAG work, the Department estimated Wyoming had at least 130 existing MSW landfills. Fifty-two were currently operating, and 78 were closed, old or abandoned. In 2004, twenty-one landfills (16 open and 5 closed) were known to be leaking and contaminating groundwater. The Department predicted that as many as 65 of the 130 could require corrective action at a cost between $0.55 and $6.5 million per site. The total cost of corrective action was estimated to be at least $172 million. This cost estimate included the

cost to construct caps over disposal areas, construct and monitor additional wells, and construct and operate active groundwater remediation systems at all of these landfills. However, when these predictions were made, the majority of the 130 landfills either had no monitoring networks or the monitoring networks present were not adequate to detect a release.

To determine the potential groundwater impacts from landfills, the Legislature enacted W.S. §35-11-521 (Grants for municipal solid waste landfill monitoring). As part of the legislation, $7.97 million was allocated to the Department to provide grants to communities to conduct groundwater investigations at landfills to improve our understanding of the potential groundwater contamination problem.

The Department believes the $7.97 million allocated to the groundwater grant monitoring program has provided a reconnaissance level investigation adequate for the Department to describe the extent of the groundwater pollution problem, to estimate potential groundwater remediation costs, and to recommend ways to fund these costs. However, additional groundwater monitoring will be necessary at facilities where groundwater is impacted above GPSs to determine the nature and extent of contamination, to assess cleanup measures for each facility, and to evaluate the effectiveness of the implemented cleanup measure(s). These site-specific activities support sound decision-making on cleanup, but are additional costs to communities. The Department believes some, but not all, of the additional monitoring costs can be reimbursed through the groundwater monitoring grant program (see discussion at Section 5.2).

3.1 Landfills and the Groundwater Contamination Problem

Unlined landfills cause or contribute to groundwater pollution through two primary mechanisms. The first is formation of leachate which occurs when waste decomposes and when precipitation infiltrates into a landfill and interacts with waste. Leachate percolates through and out the bottom of a landfill (if unlined) downward to groundwater. The second common mechanism causing or contributing to groundwater pollution is through the formation and migration of landfill gas. Landfill gas forms as waste degrades and contains methane, carbon dioxide, and VOCs. When migrating landfill gas comes in contact with groundwater, VOCs can diffuse from the gas into groundwater causing groundwater pollution.

It was originally believed that Wyoming's semi-arid to arid climate was too dry to allow for formation of leachate and landfill gas, and that operating unlined landfills would not cause groundwater pollution. We now know this assumption was wrong and that leachate and landfill gas are generated in our arid environment in quantities large enough to cause groundwater pollution.

MSW is composed of typical household waste (e.g., paper, plastic, food waste, yard waste, diapers, pharmaceuticals, batteries, etc.) and of household "hazardous waste"– wastes typically associated with commercial and industrial activities (e.g., used oil, pesticides, paint, solvents and

degreasers, etc.). Because of exemptions in Wyoming and federal rules, these hazardous chemicals can be disposed legally at MSW landfills in household quantities, or in "conditionally exempt small quantities" by certain businesses. The Department estimates 3,000 – 6,000 tons per year of household hazardous waste is being disposed in Wyoming landfills. This highlights the fact that MSW landfill leachate from typical household and household hazardous wastes has the potential to be a highly concentrated mixture of various pollutants.

The problem is further exacerbated by the fact that unlined and improperly closed landfills represent a long-lived (decades) source of leachate and landfill gas that can contaminate groundwater. Contaminated groundwater will move away from the landfill, potentially to groundwater users, including residents, livestock, and commercial/industrial users. The extent and rate of groundwater contaminant plume migration are dependent on the size of the landfill (the source), and on geologic and hydrologic conditions. At some point, it is assumed the contaminant plume will reach equilibrium with respect to the source and the local groundwater system. However, it is difficult to predict when in time and where (how far) within the groundwater system this will occur.

3.2 Corrective Action Process

Once groundwater contamination at a landfill is documented, a process is initiated culminating in the implementation of appropriate groundwater cleanup measures. In brief summary, this process includes the following: 1) defining the nature and extent of groundwater contamination through completion of additional monitoring wells; 2) collecting additional data to support assessment of appropriate groundwater cleanup measures (these data could be collected when additional monitoring wells are completed); 3) implementing the selected cleanup measure(s); and 4) monitoring groundwater to verify the effectiveness of the implemented cleanup measure(s).

In consideration of the above background discussion, the remainder of this report describes the approach the Department used to evaluate groundwater data obtained during the landfill investigations, assesses the extent to which landfills contribute to groundwater pollution based on the available data, estimates statewide remediation costs, and recommends ways to fund those costs.

4.0 The Statewide MSW Landfill Investigation

The statewide MSW landfill investigation began in 2006, after the Legislature provided funding to reimburse local governments for up to 75% of the cost to conduct groundwater investigations. The grant program included the development of a reimbursement process whereby the Department provides draft reimbursement recommendations to the Water and Waste Advisory Board and the Board provides its own recommendations to the Director who makes a final determination and provides reimbursement funds to local governments.

4.1 The Number of Landfills Evaluated

The Department initially identified 146 MSW landfills state-wide. However, 32 were not included in the state-wide investigation for the following reasons:

- 2 had not yet been constructed
- 11 were not operated by local governments
- 1 excavated all waste and transported it to another facility
- 6 were previously told their post-closure care and monitoring could end
- 12 facilities had no clearly-responsible party who could be required to install wells, the reported landfill site could not be confirmed, or there were questions of land ownership and access

Therefore, investigations focused on 114 MSW landfills. Of the 114 facilities under consideration, more than 70% needed additional wells so that monitoring networks were capable of detecting a release. Five local governments chose not to install wells and additional monitoring data is needed at 33 landfills.

Based on work completed to date, the Department estimates that at least 76 of the 114 MSW landfills investigated now have monitoring networks capable of detecting a release. Appendix C summarizes the status of MSW landfill groundwater monitoring in Wyoming.

4.2 Reimbursement Program

Under the groundwater monitoring grants program, work plans have been received and approved from approximately 93% of the facilities needing additional wells. Drilling reports have been received from approximately 77% of the facilities needing additional wells. To date approximately 300 additional wells have been installed state-wide; an average of three per facility. The following represents an accounting of funds disbursed through April 14, 2010.

Beginning Balance	$7,970,000.00
Work plan grants	$161,552.63
Field investigation grants	$1,967,195.22
Sampling and analysis grants	$114,311.28
Total grants	$2,243,059.13
Remaining grant funds	$5,726,940.87

A number of facilities have completed work, but have not yet applied for reimbursement. The Department expects those facilities eventually to seek reimbursement. However, the Department can't

accurately estimate the amount of pending reimbursements because it isn't known for what activities reimbursement will be requested and whether all of the costs will be reimbursable. The Department also anticipates that facilities with pollution will seek reimbursement for future, additional work needed to further define the nature and extent of contamination. At this time, it is not possible to predict the additional amount of work needed to fully define the nature and extent of contamination at these facilities. However, the Department feels the remaining balance in the account will be needed to reimburse for completed and for future, additional work.

4.3 Investigation Methodologies and Limitations

In order to assess the extent to which MSW facilities cause or contribute to pollution of groundwater, landfill operators were asked to install the minimum number of wells necessary to detect a release. The conclusions in this report are based on the Department's assessment of the data provided by the operators. In some cases, landfill operators may not have complied with Department requests to install new wells. In other cases, a sufficient number of samples have not yet been collected to conduct statistical evaluations in time for this report. Monitoring will need to continue at a number of facilities until the operator has collected enough groundwater samples to enable a more thorough evaluation of the data.

The amount of groundwater data collected managed and used in statistical evaluations to determine the nature and extent of groundwater impacts was significant. This database consisted of 521 wells, monitored for up to 85 constituents per well for at least four (4) monitoring events resulting in over 363,000 individual data points.

Groundwater impacts were determined based upon a statistical analysis of the constituents detected in groundwater. Statistical evaluations are affected by factors such as the amount and quality of data and the statistical distribution of the data. The precision of statistical evaluations is enhanced when a larger amount of data can be evaluated and in some cases, more data would help improve the precision of the Department's determinations.

Prediction limits were used to compare downgradient groundwater quality to upgradient (background) groundwater quality. Because they are typically anthropogenic, organic constituents were assumed to provide more conclusive evidence of a release at a landfill relative to naturally occurring inorganic constituents. When statistically significant increases above background were detected for constituents commonly associated with leachate (pH, Total Dissolved Solids (TDS), Bicarbonate, Sulfate, Chloride, Nitrate, Ammonia and VOCs), the Department concluded that the landfill impacted groundwater.

At landfills with groundwater impacts, a statistical tolerance interval approach was then used to compare downgradient groundwater quality to GPSs. In many cases, the GPS is the MCL established by the United States Environmental Protection Agency (EPA). If an MCL has not been promulgated for a specific constituent, an alternative GPS was used. Alternate GPSs are health-based levels

meeting the requirements of Chapter 8 of the Water Quality Rules and Regulations or are drinking water equivalent levels (DWEL) calculated by the Department using available constituent-specific toxicological data and the methodologies found in Chapter 17 of the Water Quality Rules and Regulations. In general, when the background concentration for naturally-occurring constituents is greater than the GPS, the background concentration becomes the GPS.

4.4 Individual Facility Results

Appendix D contains individual summary sheets for each of the 114 landfills with sufficient data to review monitoring data, including an aerial photograph and a summary of the statistical evaluations conducted. Appendix C includes a summary sheet listing the status of the 146 landfills initially identified.

4.5 Number of Facilities with Evidence of Contamination

Groundwater status is reported as unknown when there is no data or insufficient/inconclusive data. A conclusion that groundwater contamination has not been detected is reported when the monitoring network is capable of detecting contamination, but no contamination is suspected or confirmed. Contamination is reported as suspected when leachate contaminants are present in downgradient wells, but there is not yet enough data to conduct a statistical evaluation.

As discussed in Section 4.3, the Department conducted statistical comparisons between background (upgradient) and downgradient monitoring wells. Statistically significant increases above background indicate the potential for a release from the landfill. However, in the absence of constituents commonly associated with landfill leachate, there may be some doubt that the statistical differences are from the landfill and not natural variation in groundwater quality. The Department did not conclude that a landfill had polluted groundwater unless there were statistically significant increases above background for one or more leachate indicators. Using this approach, groundwater contamination has been confirmed at 73 landfills which is 96% of those with monitoring networks capable of detecting a release.

Table 1
General Groundwater Status

Groundwater Status	Number of Landfills
Unknown	36
No evidence of contamination	3
Contamination suspected	2
Contamination confirmed	73

4.6 Number of Facilities Needing Some Form of Corrective Action

No additional action (beyond standard capping and monitoring requirements) was considered necessary at this time at 4 landfills where contaminant concentrations exceeded alternate GPSs, but did not exceed MCLs. Some form of corrective action was determined to be necessary at 69 facilities where contaminant concentrations exceeded MCLs. Corrective action was divided into two categories; cap improvements and additional monitoring only (no active groundwater remediation), or active groundwater remediation (in addition to cap improvements and additional monitoring).

Cap improvements and additional monitoring only (no active groundwater remediation) were considered appropriate for 51 landfills where MCLs were exceeded for non-organic constituents, but not for VOCs. Active groundwater remediation (in addition to cap improvements and additional monitoring) was believed necessary at 18 landfills where pollution exceeded MCLs for one or more VOCs.

5.0 Corrective Action Cost Estimates

Corrective action and its cost are a function of site-specific conditions such as facility size, subsurface conditions, surrounding land and groundwater use, and the nature and extent of contamination. Corrective action activities were divided into four categories to help estimate costs:

- Capping - improving existing caps and/or installing new caps over disposal areas
- Additional wells and investigations – installing wells to determine the nature and extent of contamination and assessing potential corrective measures
- Additional monitoring - 20 years of semi-annual monitoring of the new wells installed for corrective action
- Active remediation - installing and operating a groundwater “pump and treat” system for 20 years

For the purpose of estimating potential corrective action costs, landfills were divided into size categories because corrective action costs are partly a function of facility size. The following table lists the number of landfills that may need corrective action in each of four size categories. The facility size categories below are based on estimates of the acreage which may require active remediation and do not necessarily represent the total footprint of the landfill or the acreage that may only require capping. Finally, it is important to note that the corrective action cost estimates were based on cleanup activities occurring over a 20 year period.

Table 2
Potential Corrective Action Status and Landfill Size

Landfill Size	Landfills Potentially Needing Corrective Action
Very small (<1 acre)	0
Small (1≤ 5 acres)	12
Medium (5-15 acres)	19
Large (>15 acres)	38
Total	69

For each size category, the Department estimated the number of wells and monitoring that would be needed for investigating the nature and extent of contamination, for assessing corrective action measures, and for estimating the cost of long-term monitoring of the new wells. The average cost of active groundwater remediation was estimated for each size category. Groundwater data was then evaluated to determine which facilities would need just a cap and monitoring and which facilities would also need active groundwater remediation.

Finally, the Department considered which facilities ceased receipt of waste and closed before September 13, 1989, and which facilities chose to continue disposal after that time. This was done because new capping and monitoring requirements were not imposed on landfills that closed prior to September 13, 1989. Landfill operators who closed before this date did so expecting that they would not be obligated for new capping and monitoring costs. For the landfills that ceased receipt of waste before September 13, 1989, the Department included the cost of capping and monitoring as part of the overall remediation cost estimate.

On the other hand, new capping and monitoring rules did apply to all landfills that continued to receive waste after September 13, 1989. A large portion of the capping and monitoring cost for these landfills is required whether or not groundwater pollution is identified. Therefore, for these landfills, only the cost increase for flexible membrane barrier layer (FML) caps and additional monitoring that is required to address pollution were included in the overall remediation cost estimate. This provides a more accurate estimate of the added cost burden caused by groundwater pollution.

To estimate potential costs, the Department considered the actual cost of recent work conducted in Wyoming, including well installation and monitoring costs related to the groundwater monitoring grant program and actual capping costs from a Wyoming landfill. Information from recently completed Integrated Solid Waste Management (ISWM) Plans was also considered. Active remediation cost estimates from research done in 2004 (Appendix E) were reassessed and updated to account for inflation.

The Department developed a spreadsheet to calculate potential corrective action costs (Appendix F). The spreadsheet includes information about each landfill relative to size and the acres which may need to be capped. The cost for each of the four corrective action activities discussed below is included for each landfill. A potential cost for each landfill is calculated based on facility characteristics and the corrective measures expected to be needed. Statewide costs are summarized on page 5 of the spreadsheet. The Department used a similar spreadsheet (Appendix G) to estimate potential corrective action costs for landfills where additional information is needed before determining whether or not corrective action is needed.

5.1 Capping Cost Estimates

The purpose of installing caps is to prevent the infiltration of precipitation into waste, thereby minimizing the creation/mobilization of leachate. For the purpose of this report, it was assumed that all facilities where contaminant concentrations exceeded MCLs will need caps over any disposal area without a cap, and cap improvements over areas that have previously been capped with anything other than an FML cap. This conclusion is based on current technical information indicating that other cap designs are unlikely to minimize infiltration sufficiently to prevent further groundwater contamination at unlined landfills. FML caps are also assumed because, without site specific information, it is not possible to know if there are sufficient native materials on site to construct any other type of cap.

To estimate capping costs, MSW filled acreages were obtained from permit information for permitted operating and closed facilities. Acreages for historical facilities (those that ceased receipt of waste before 1989) with no data on file were obtained by observing disturbed areas on aerial photos and represent a “best estimate” by the Department.

Costs for installing an FML cap, including landfill gas controls, are based on recent cost data provided by the City of Casper. These costs were approximately $50,000.00 per acre. Gas control may not be required at all facilities or may be customized for site-specific conditions. Because none of the local governments that closed their landfills before September 13, 1989, anticipated this cost, the entire $50,000/acre cost was used to estimate the additional cost burden caused by pollution at these facilities. However, landfill capping is already required at landfills that remained open after 1989, whether or not corrective action is required. For these landfills, the difference in cost between a standard cap and an FML cap ($20,000/acre) was included as an additional corrective action cost to local governments who chose to maintain landfills after 1989. Actual costs may be lower if a cap other than an FML cap is approved and constructed. Based on the above considerations, the Department has estimated:

- $3.2 million as the cost for additional capping at landfills that ceased receipt of waste before September 13, 1989.
- $36.5 million as the cost for additional capping at landfills that continued to receive waste after September 13, 1989.

Therefore, the estimated total cost for additional capping is $40 million.

5.2 Corrective Action Monitoring Well Installation Costs

At impacted landfills, additional wells will be needed to further define the nature and extent of contamination, to evaluate potential corrective measures, and to assess the effectiveness of implemented corrective measures. The Department estimated the number of additional wells that would be needed as part of corrective action based on landfill size. Using data from the groundwater monitoring grant program, the Department evaluated the costs to install and monitor additional wells quarterly for one year. Additional monitoring well cost estimates included $4,500.00 for work plan preparation, $13,300.00 per well drilling costs, and 4 quarterly samples per well at $1,500.00 per sample.

The Department estimated the number of additional wells potentially needed as part of corrective action for each of the four facility size categories and deducted the average of three already installed via the grant program. The number of additional wells needed is:

- 1 for a very small facility
- 5 for a small facility
- 9 for a medium facility
- 13 for a large facility

The total estimated statewide cost for additional monitoring wells is $14.4 million. Of this total, $1.7 million is for pre 1989 landfills and $12.6 million is for post 1989 landfills. The number of new wells actually needed is a site-specific consideration and the number of wells estimated for this report may be high. This is because landfills may already have an adequate groundwater monitoring system and not need additional wells. As mentioned in Section 4.2., additional groundwater monitoring well costs may be reimbursable under the groundwater monitoring grant program.

5.3 Monitoring Costs During Corrective Action

Additional monitoring will be needed to assess the effectiveness of corrective measures at all landfills required to implement them. The Department estimated the cost for sampling to be approximately $1,500 per well and that 2 semiannual samples would be needed per well. The number of additional wells to be sampled was also estimated based on facility size, but the cost to sample the three wells already added via the grant program was considered to be a routine monitoring expense for landfills that continued to receive waste after September 13, 1989, not an additional cost related to corrective action. Therefore, the following well numbers were used to estimate the costs for monitoring over a 20 year corrective action timeframe.

For landfills that ceased receipt of waste prior to September 13, 1989:

- 1 for a very small facility
- 8 for a small facility
- 12 for a medium facility
- 16 for a large facility

The estimated cost for monitoring during the 20 year corrective action period at facilities that ceased receipt of waste prior to September 13, 1989, is approximately $336,000 per year or $6.7 million over 20 years.

For landfills that continued to receive waste after September 13, 1989:

- 1 for a very small facility
- 5 for a small facility
- 9 for a medium facility
- 13 for a large facility

The estimated cost for monitoring during the 20 year corrective action period at facilities that continued to receive waste after September 13, 1989, is approximately $1.9 million per year or $38.5 million over 20 years.

Therefore, over 20 years the estimated total cost for monitoring during corrective action is $45.2 million (or $2.3 million per year). Monitoring requirements during corrective action are a site specific determination. In reality, the number of constituents and wells monitored and the sampling frequency may be less than the assumptions used in deriving the above cost estimates. Therefore, the cost estimates may be high.

5.4 Active Groundwater Remediation Costs

In addition to capping and monitoring, active groundwater remediation may be necessary to address landfill impacts. Active groundwater remediation may include groundwater barrier walls, air sparging, phytoremediation, pumping groundwater for treatment (pump and treat), vapor extraction, and bioremediation. The selection of an appropriate remediation technology is a site-specific consideration and costs are variable. To estimate potential costs for this report, the Department selected the pump and treat option because this tends to be on the high cost end, but may be more effective than other options at most landfills.

Pump and treat cost estimates are based on cost estimates from research done in 2004 (Appendix E). These cost estimates were reevaluated and adjusted for 14% GDP inflation between 2004 and 2009. Cost estimates assume that active remediation will be conducted for 20 years. The actual methodology selected will depend upon the results of site specific nature and extent of contamination investigations and assessments of corrective measures. The actual duration of

remediation will depend on its ability to achieve site-specific remediation objectives as determined by groundwater monitoring.

The total estimated active groundwater remediation cost equals the sum of the estimated costs to install and/or improve landfill caps, install and monitor wells for nature and extent of contamination investigations and assess corrective measures, monitor additional wells for the time needed to complete remediation, and construct and operate an active remediation system over a 20 year corrective action time period.

For landfills needing active remediation, the Department estimates that over 20 years the cost will be approximately $65 million. This cost estimate does not include the 38 landfills where monitoring networks are not yet capable of detecting a release. At this time, it does not appear that active remediation will be needed at any of the landfills that ceased receipt of waste before September 13, 1989.

5.5 Total Statewide Remediation Cost

Currently, 76 landfills have monitoring networks capable of detecting a release. We expect that some form of corrective action will be needed at 69 of these landfills. The Department estimates that the statewide remediation cost obligation over an assumed 20 year corrective action time period for these 69 landfills will be approximately $164.4 million. Extrapolating this estimate to the remaining 38 landfills where more data is required indicates that an additional $62 million may be needed. Therefore, the total statewide cost obligation may be approximately $226 million.

6.0 Funding Options

The Department recommends that the Legislature consider the following options. Each has its own limitations and requirements; therefore a combination of sources may be needed.

Options for Landfill Operators

Landfill operators may need to raise funds through a variety of methods. In some cases, Solid Waste Disposal Districts and Joint Powers Boards may be needed to provide additional funding through mil levies or existing districts and boards may need to maximize their levies. Districts relying solely on mil levies may need to raise additional capital by implementing tipping fees. Joint Powers Boards can use their authority to issue bonds in order to secure loans which may assist in obtaining other funding (e.g., U.S. Department of Agriculture Rural Development loans/grants). Joint Powers Boards can help bridge political subdivisions and facilitate regional cost control measures, but legislation may be required so that Joint Powers Boards formed to manage solid waste may cross county lines and have the ability to raise funds through mil levies.

State lead

Under this option, the State would assume responsibility for leaking landfills. An option of this nature was recommended by the CAG in 2004. A portion of the Advisory Group's recommendations are reproduced here. In order to qualify, operating landfills should be required to do three things: (1) cease disposal of municipal solid waste in unlined cells; (2) if more economical, transfer waste to a lined regional facility; and (3) pay a fee into a "leaking landfill remediation account. Funding for this alternative could come from a combination of general funds and a statewide tipping fee charged to all operating landfills.

An advantage of this proposal is the potential to earmark the monies generated from tipping fees specifically for landfill groundwater remediation projects and this work would not need to compete with other municipal projects for limited funding provided by other means. In addition, like the state leaking underground storage tank (LUST) program, this approach would reduce the burden to communities because local governments would not need to screen and hire consultants, prepare investigation documents and reports, evaluate monitoring data, etc. This may be especially beneficial to local governments that may not have extensive in-house expertise in these matters. By eliminating the time needed for local government participation, this approach could save a considerable amount of time and address pollution more effectively. For small communities and facilities with no clearly defined responsible party this may be the most efficient and workable funding option.

State Guarantee Trust Account

Financial assurance for landfills is necessary to ensure that closure and post-closure activities are accomplished if the landfill operator is unable to carry out these responsibilities. Pursuant to W.S. §35-11-515, financial assurance is available to local governments through participation in the Guarantee Trust Account (Trust). Under the Trust, the State guarantees "that adequate monies will be available to close and conduct post-closure monitoring" at an MSW landfill if the operator is unable to carry out those responsibilities. If the Department uses Trust monies to complete closure or post-closure activities at participating facilities, the State is obligated to cost recover for expended funds. All local government landfill owners participate in Wyoming's landfill Trust.

The Trust may be a potential mechanism to cap and close MSW landfills, but not conduct active groundwater remediation. The Trust is funded through fees charged to landfill owners, who must pay at least 3% of the estimated cost of landfill closure and post-closure care into the account by the time their facility reaches capacity. Therefore, the Trust will contain only 3% of the estimated total closure and post-closure cost for a facility. The current balance in the Trust Account is approximately $350 thousand for closure costs and approximately $270 thousand for post-closure costs. Given recent cost estimates for capping and closure, this account cannot fund this work in its current form. Additional funds could be raised through an appropriation from the general fund, increasing the

minimum amount operating landfills must pay into the account, or a statewide tipping fee. Legislation would be needed to expand the purpose of the account if it were to be used to fund active groundwater remediation.

Wyoming Office of State Lands and Investments

Mineral Royalty Grant Program – For the 2011 – 2012 biennium there is approximately $33,000,000 available in grant funding within this program. Solid waste disposal projects have been interpreted historically as being "essential public service" and thus eligible for grants under this program.

Clean Water State Revolving Fund – Available funding within this program is currently at a level of some $35,000,000, available as loans at a 2.5% interest rate with a 20 year payment period. Supplemental groundwater investigations, capping and gas mitigation and remediation activities are all potentially eligible under this program. Also, Congress is proposing changes to the program that will provide additional subsidization consisting of principal forgiveness. Initial estimates show that $5,000,000 will be available for this aspect of the program for fiscal year 2011 with the potential for additional funds in 2012.

Joint Powers Act Board Loan Program – Available funding within this program is approximately $42,400,000. This program has been used previously to line new landfills with loan payments tied, in part, to landfill tipping fees. The interest rate for these loans is currently 5.17% and these loans can be amortized for up to 40 years depending on the life of the project. These loans are an option for currently operating facilities or closed facilities belonging to municipalities or viable solid waste districts, but they would not be of benefit for closed historical facilities whose responsible parties typically lack a mechanism tied to landfill usage to repay loans.

United States Department of Agriculture - Rural Development

Available funding within this program is approximately $18,870,000 for fiscal year 2010. The funding is typically available in the form of loan/grant combinations. Rural Development has indicated that supplemental groundwater investigations, capping and gas mitigation and remediation activities are all potentially eligible under this program.

The total pool of dollars available from currently existing Federal and State funding sources, beginning fiscal year 2010, is approximately $141,000,000. Although there is a fair amount of competition for these dollars this still represents an excellent avenue through which many governmental entities can fund groundwater remediation projects and, as the mechanisms for these funding sources are already in place, remediation work could begin relatively quickly.

7.0 Conclusions

This report has estimated the potential cost to address pollution at 69 MSW landfills where contaminant concentrations exceed an MCL. This represents approximately 90% of the 76 landfills with groundwater monitoring networks that are currently capable of detecting a release. The potential total statewide groundwater remediation cost for these 69 landfills may be approximately $164 million. We do not yet have sufficient data to determine whether or not groundwater is polluted at an additional 38 landfills. By extrapolating the occurrence of impacts from the 76 facilities with sufficient data and applying this to the 38 unknown facilities, the Department estimates that the cost could increase by approximately $62 million. Therefore, the total statewide cost obligation could total $226 million.

Waste management is just one of the many services that local governments are struggling to provide for residents. Recently completed ISWM Plans indicate that the cost of remediation is only a portion of the overall waste management cost obligation. The ISWM Plans show that, in the long run, regional approaches will help control rising waste management costs. However, in the short term, local governments don't have the funds needed to meet current obligations or implement needed changes. If these shortfalls are to be addressed successfully, the Department believes they should be addressed as a whole and in consideration of competing demands for limited financial resources.

The Department will continue to evaluate the state of solid waste management in Wyoming and will reach out to stakeholders on these important issues. The Department will build on the information in the CAG report by incorporating what has been learned through the ISWM planning process and the landfill groundwater investigations, and will evaluate other key factors impacting the management of solid waste. This consolidated approach will be important to inform future decision-making on solid waste issues and to understand existing and future obligations potentially faced by Wyoming communities.

The conclusions and cost estimates on corrective action in this report are based on landfill data available at this time. Specific corrective action requirements at individual landfills are dependent on site-specific circumstances and the requirements of Chapter 2, Section 8 of the Solid Waste Rules and Regulations. It is possible that the final cleanup measures implemented at any one landfill may deviate from those predicted in this report.

Appendix A
Miscellaneous Landfill Information

Miscellaneous Landfill Information

Total number of facilities identified.	146
Facilities omitted from consideration. These facilities were omitted for a variety of reasons including; post-closure care was previously terminated, waste was removed from the site, the landfill had not been constructed, remediation was occurring via the Voluntary Remediation Program, the location could not be confirmed, a responsible party could not be identified, or the landfill was not operated by a local government entity.	32
Facilities included in this report. These are facilities operated by local governments and eligible for reimbursement via the groundwater grant program.	114
Number of the 114 landfills investigated that now have monitoring networks capable of detecting a release.	76
Total facilities with groundwater impacts based on statistically elevated leachate indicators. This is 96% of the landfills where monitoring networks are capable of detecting a release.	73 (96%)
Total facilities where contamination in downgradient wells exceeds groundwater protection standards. This is 91% of the landfills where monitoring networks are capable of detecting a release.	69 (91%)
Total facilities where only new and/or improved caps and additional monitoring may be required.	51
Total facilities where active remediation, in addition to new and/or improved caps and monitoring, may be required.	18
Currently operating facilities (not including 1 private landfill and the new Casper landfill).	50
Currently operating facilities with groundwater impacts.	40 confirmed 10 unknown
Currently operating facilities where some form of corrective action may be required.	39
Facilities that ceased receipt of waste before 1989.	28
Facilities that ceased receipt of waste before 1989 that have evidence of pollution.	11
Facilities that ceased receipt of waste before 1989 that may require only new and/or improved caps and monitoring.	11
Facilities that ceased receipt of waste before 1989 that may require active remediation, in addition to new and/or improved caps and monitoring.	0
Potential cost of corrective action at facilities that ceased receipt of waste before 1989.	$11,727,200
Facilities that received waste after 1989.	86
Facilities that received waste after 1989 that have evidence of pollution.	62
Facilities that received waste after 1989 that may require only new and/or improved caps and monitoring.	40
Facilities that received waste after 1989 that may require active remediation, including new and/or improved caps and monitoring.	18
Potential cost of corrective action at facilities that received waste after 1989. (These costs are in addition to the capping, closure, and monitoring obligations already required at facilities that chose to continue receipt of waste after 1989.)	$152,676,980
Potential total state-wide cost for landfills needing only additional capping and monitoring.	$99,399,100
Potential total state-wide cost for landfills needing active remediation in addition to capping and monitoring.	$65,005,080
Potential total statewide groundwater remediation cost obligation faced by local government landfill owners for the 76 landfills with monitoring networks currently capable of detecting a release.	$164,404,180
Potential additional statewide groundwater remediation cost obligation faced by local government landfill owners for the 38 landfills where the groundwater status is currently unknown.	$62,285,060
Potential total statewide groundwater remediation cost obligation to local government landfill owners.	**$226,689,240**

Appendix B
Maps of Landfill Status Statewide

Basis for Remediation Cost Estimates at Municipal Solid Waste Landfills in Wyoming

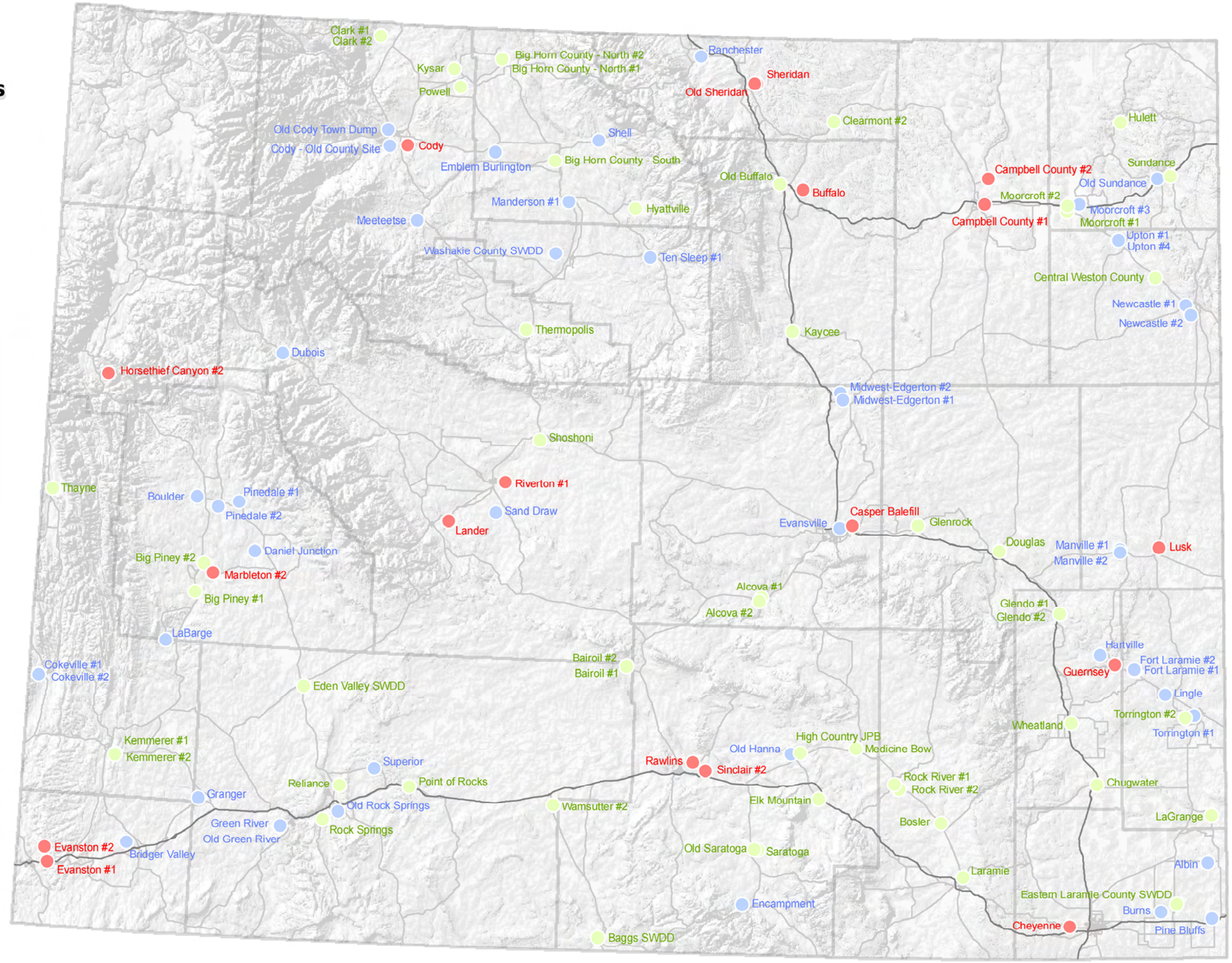
Legend

- Unknown or no action required at this time
- Improved cap & additional monitoring
- Improved cap, additional monitoring & groundwater remediation
- Interstate highways
- Primary roads

N
W E
S

0 10 20 40 60 80 Miles

This map was prepared by the Wyoming Department of Environmental Quality, Solid & Hazardous Waste Division (DEQ) in April of 2010 and reflects decisions made based on data provided to the DEQ by municipal landfill operators as of the date of this report. For detail on methods used, refer to report narrative.



Status of Groundwater Impacts and *MCL Exceedances at Municipal Solid Waste Landfills in Wyoming

Legend

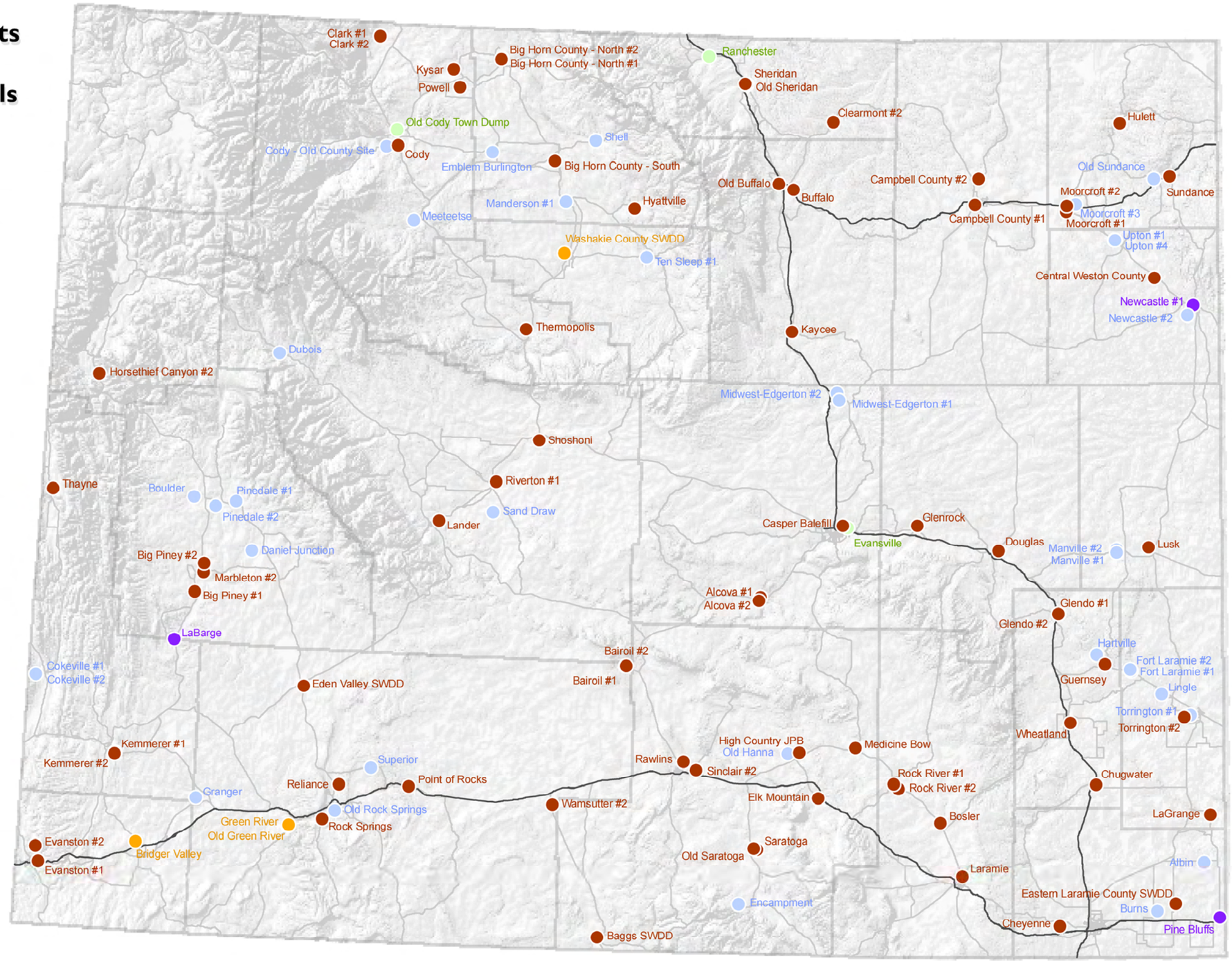
- Status unknown
- No impacts identified
- Impacts suspected
- Impacts indicated, MCLs not exceeded
- Impacts & MCL exceedances indicated
- Interstate highways
- Primary roads

N W E S

*MCL (Maximum Contaminant Level): Maximum allowable limits for contaminant concentrations established under the Federal Safe Drinking Water Act for public water supplies.

Miles
0 10 20 40 60 80

This map was prepared by the Wyoming Department of Environmental Quality, Solid & Hazardous Waste Division (DEQ) in April of 2010 and reflects the data provided to the DEQ by municipal landfill operators as of the date of this report. For detail on methods used to make determinations represented in this map, please refer to the narrative contained in the report.



Operating Status of Municipal Solid Waste Landfills in Wyoming

Legend

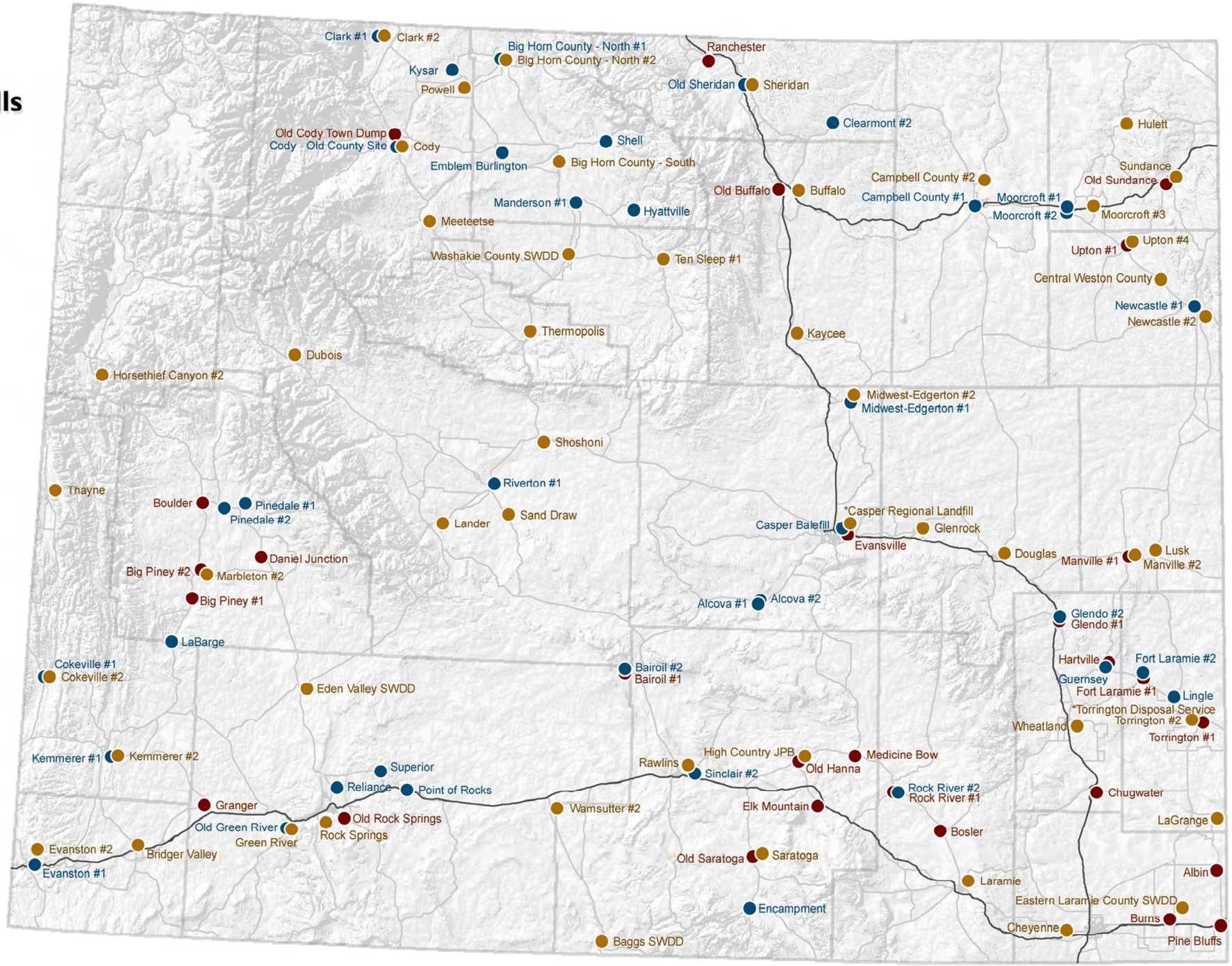
- Currently operating
- Ceased receipt of waste after 9/13/1989
- Ceased receipt of waste before 9/13/1989
- Interstate highways
- Primary roads

N
W E
S

*These two operating facilities were not included included in the remediation assessment because Torrington Disposal Service is privately owned and the Casper Regional Landfill has only recently opened.

0 10 20 40 60 80 Miles

This map was prepared by the Wyoming Department of Environmental Quality, Solid & Hazardous Waste Division (DEQ) in April of 2010 and reflects the operating status of municipal solid waste landfills as of the date of this report.



Appendix C
Status of MSW Landfill Groundwater Monitoring

Status of MSW Landfill Groundwater Monitoring

Facility Name	File Number	Status	Groundwater Impact Unknown	Groundwater Impact Not Detected	Groundwater Impact Suspected	Groundwater Impact Confirmed	Cap and Monitoring Improvements Needed	Active Remediation Required
Albin	10.005	historic	U					
Baggs SWDD	10.010	open				Y	Y	
Bairoil #1	10.014	historic				Y	Y	
Bairoil #2 - Transfer Station	10.015	closed				Y	Y	
Big Horn County - North #1	10.035	closed				Y	Y	
Big Horn County - North #2	10.036	open				Y	Y	
Big Horn County - South	10.025	open				Y	Y	
Big Piney #1	10.768	historic				Y	Y	
Big Piney #2	10.769	historic				Y	Y	
Bosler	10.045	historic				Y	Y	
Boulder	10.550	historic	U					
Buffalo #1	10.050	open				Y	Y	Y
Buffalo, Old Dump	10.759	historic				Y	Y	
Burns	10.060	historic	U					
Campbell County - Balefill #1	10.065	closed				Y	Y	Y
Campbell County - Balefill #2	10.066	open				Y	Y	Y
Casper Balefill	10.070	open				Y	Y	Y
Central Weston Co. SWDD, Osage	10.700	open				Y	Y	
Cheyenne Landfill	10.080	open				Y	Y	Y
Chugwater	10.088	historic				Y	Y	
City of Cody dump in town	10.751	historic		N				
Clearmont #2	10.091	closed				Y	Y	
Cokeville #1	10.335	closed	U					
Daniel Junction	10.555	historic	U					
Douglas	10.110	open				Y	Y	
Eastern Laramie Co. SWDD	10.330	open				Y	Y	
Eden Valley SWDD	10.115	open				Y	Y	
Elk Mountain	10.120	historic				Y	Y	
Emblem Burlington	10.130	closed	U					
Encampment	10.135	closed	U					
Evansville	10.137	historic		N				
Fort Laramie	10.145	historic	U					
Fort Laramie #2	10.146	closed	U					

Status of MSW Landfill Groundwater Monitoring

Facility Name	File Number	Status	Groundwater Impact Unknown	Groundwater Impact Not Detected	Groundwater Impact Suspected	Groundwater Impact Confirmed	Cap and Monitoring Improvements Needed	Active Remediation Required
Fremont Co. SWDD - Dubois	10.165	open	U					
Fremont Co. SWDD - Lander	10.190	open				Y	Y	Y
Fremont Co. SWDD - Sand Draw	10.195	open	U					
Fremont Co. SWDD - Shoshoni	10.220	open				Y	Y	
Glendo #1	10.225	historic				Y	Y	
Glendo #2	10.226	closed				Y	Y	
Glenrock #1	10.235	open				Y	Y	
Granger #1	10.245 U	historic	U					
Green River (old)	10.256	closed				Y		
Green River San #1	10.255	open				Y		
Guernsey	10.260	closed				Y	Y	Y
Hanna (Old Site File)	10.270	historic	U					
Hartville	10.275	historic	U					
High County Joint Powers Board - Hanna	10.280	open				Y	Y	
Horsethief Canyon #2 - Transfer Station	10.616	open				Y	Y	Y
Hulett #1	10.285	open				Y	Y	
Hyattville Landfill	10.300	closed				Y	Y	
Kaycee	10.305	open				Y	Y	
LaBarge - Transfer Station	10.310	closed	U					
LaGrange	10.315	open				Y	Y	
Laramie Landfill	10.320	open				Y	Y	
Lincoln Co. - Thayne (Transfer Station, Incinerator & C/D)	10.340	open				Y	Y	
Lincoln County - Cokeville #2	10.336	open	U					
Lincoln County - Kemmerer #1	10.345	closed				Y	Y	
Lincoln County - Kemmerer #2	10.346	open				Y	Y	
Lingle Municipal (10.350)	30.052	closed	U					
Lusk	10.360	open				Y	Y	Y
Manderson SAN #1	10.365	closed	U					
Manville #1	10.375	historic	U					
Manville #2	10.376	open	U					
Medicine Bow	10.385	historic				Y	Y	

Status of MSW Landfill Groundwater Monitoring

Facility Name	File Number	Status	Groundwater Impact Unknown	Groundwater Impact Not Detected	Groundwater Impact Suspected	Groundwater Impact Confirmed	Cap and Monitoring Improvements Needed	Active Remediation Required
Midwest-Edgerton #1	10.390	closed	U					
Midwest-Edgerton #2	10.391	open	U					
Moorcroft #1	10.394	closed				Y	Y	
Moorcroft #2	10.395	closed				Y	Y	
Moorcroft #3	10.396	open	U					
Natrona County Parks - Alcova #2	10.401	closed				Y	Y	
Natrona County Parks - Alcova Landfill	10.400	closed				Y	Y	
Newcastle #1	10.415	closed			S			
Newcastle #2	10.416	open	U					
Park County - Clark #1	10.430	closed				Y	Y	
Park County - Clark #2	10.431	open				Y	Y	
Park County - Cody	10.441	open				Y	Y	Y
Park County - Cody (Old Site)	10.440	closed	U					
Park County - Kysar	10.445	closed				Y	Y	
Park County - Meeteetse	10.450	open	U					
Park County - Powell	10.455	open				Y	Y	
Pine Bluffs	10.480	historic			S			
Pinedale #1	10.570	closed	U					
Pinedale #2 - Transfer Station	10.571	closed	U					
Ranchester dump	10.763	historic		N				
Rawlins	10.485	open				Y	Y	Y
Reliance, SWDD 1	10.590	closed				Y	Y	
Riverton #1	10.215	closed				Y	Y	Y
Rock River #1	10.490	historic				Y	Y	
Rock River #2	10.491	not receiving waste				Y	Y	
Rock Springs (old site)	10.594	historic	U					
Saratoga	10.515	open				Y	Y	
Saratoga, Old Community Dump	10.760	historic				Y	Y	
Shell	10.520	closed	U					
Sheridan #1 (Old Landfill)	10.525	closed				Y	Y	Y

Status of MSW Landfill Groundwater Monitoring

Facility Name	File Number	Status	Groundwater Impact Unknown	Groundwater Impact Not Detected	Groundwater Impact Suspected	Groundwater Impact Confirmed	Cap and Monitoring Improvements Needed	Active Remediation Required
Sheridan #2 (Expansion)	10.526	open				Y	Y	Y
Sinclair #2	10.541	closed				Y	Y	Y
Sublette Co. - Marbleton #2	10.561	open				Y	Y	Y
Sundance	10.580	open				Y	Y	
Sundance, Old Dump	10.761	historic	U					
Sweetwater Co. SWDD - Wamsutter #2	10.681	open				Y	Y	
Sweetwater Co. SWDD #1 - Point of Rocks	10.585	closed				Y	Y	
Sweetwater Co. SWDD #1 - Rock Springs	10.595	open				Y	Y	
Sweetwater Co. SWDD #1 - Superior (Transfer Station)	10.600	closed	U					
Ten Sleep SWDD #1	10.605	open	U					
Thermopolis	10.625	open				Y	Y	
Torrington #1	10.630	historic	U					
Torrington #2	10.631	open				Y	Y	
Uinta Co. - Bridger Valley	10.650	open				Y		
Uinta County - Evanston #1	10.655	not receiving waste				Y	Y	Y
Uinta County - Evanston #2	10.656	open				Y	Y	Y
Upton #1	10.660	historic	U					
Upton #4	10.663	open	U					
Washakie Co. SWDD - Worland #1 & #2	10.691, 10.692	open				Y		
Wheatland #2	10.706	open				Y	Y	
Totals			**36**	**3**	**2**	**73**	**69**	**18**
Facilities Not Included in the Investigation:								
Bitter Creek[1]	10.040	historic	X					
Casper Regional Landfill[1]	10.071	open, not constructed at time of study						
Dixon	10.105	closed	X					

Status of MSW Landfill Groundwater Monitoring

Facility Name	File Number	Status	Groundwater Impact Unknown	Groundwater Impact Not Detected	Groundwater Impact Suspected	Groundwater Impact Confirmed	Cap and Monitoring Improvements Needed	Active Remediation Required
Farson[1]	10.142	historic	X					
Frannie - Old Landfill[1]	10.154	historic	X					
Kirby[1]	10.758	historic						
Natrona County Parks - Pathfinder Reservoir[1]	10.410	closed/waste removed						
Osage - Old Dump[1]	10.425	historic	X					
Park County - Ralston[1]	10.465	closed	X					
Park County - Willwood[1]	10.470	closed	X					
Park County - Wood River[1]	10.767	historic	X					
South End Landfill, Lincoln Co.[1]	10.100	permitted, but never constructed						
Wamsutter #1, SWDD 2[1]	10.680	In VRP						
Yoder[1]	10.730	closed	X					
Alpine Junction[1]	10.750	historic						
Fremont Co. SWDD - Hudson #1 (now a transfer station)[2]	10.175	released from PC Monitoring						
Fremont Co. SWDD - Pavillion (now a transfer station)[2]	10.210	released from PC Monitoring						
Fremont Co. SWDD - Missouri Valley (now a transfer station)[2]	10.205	released from PC Monitoring						
Fremont Co. SWDD - Lysite (now a transfer station)[2]	10.200	released from PC Monitoring						
Fremont Co. SWDD - Jeffrey City (now a transfer station)[2]	10.180	released from PC Monitoring						
Fremont Co.SWDD - Atlantic City (now a transfer station)[2]	10.156	released from PC Monitoring						
YNP Firehole River Dump[3]	10.752	Historic/Park Service						
YNP Grebe Lake Dump[3]	10.755	Historic/Park Service						
YNP Indian Pond (Nee Squaw Lake) Dump[3]	10.757	Historic/Park Service						

Status of MSW Landfill Groundwater Monitoring

Facility Name	File Number	Status	Groundwater Impact Unknown	Groundwater Impact Not Detected	Groundwater Impact Suspected	Groundwater Impact Confirmed	Cap and Monitoring Improvements Needed	Active Remediation Required
YNP Rabbit Creek Dump[3]	10.762	Historic/Park Service						
YNP Tower Dump[3]	10.764	Historic/Park Service						
YNP Trout Creek Dump[3]	10.765	Historic/Park Service						
YNP West Thumb Dump[3]	10.766	Historic/Park Service						
GTNP Colter Bay[3]	63.395	Historic/Park Service						
GTNP Kelly[3]	63.397	Historic/Park Service						
Shirley Basin[3]	10.535	historic/provate			S		S	
Torrington Disposal Service, Inc.[3]	10.645	open/private				Y	Y	
Notes:								
U	=Unknown							
Y	= Concentrations are statistically above background, or groundwater protection standards and may also exceed health based standards							
S	= Pollution suspected; evidence suggests a release, but additional information is needed							
N	= No impact detected and there is an adequate monitoring network							
Omitted 1	= Omitted because no clear responsible party, waste was removed, or facility had not been constructed, or site was in the VRP							
Omitted 2	= Omitted because post-closure care previously terminated, but monitoring networks not evaluated							
Omitted 3	=Omitted because facility is not operated by local governments and therefore not eligible for reimbursement							

Appendix D
Analysis Summary Sheets for Individual Landfills

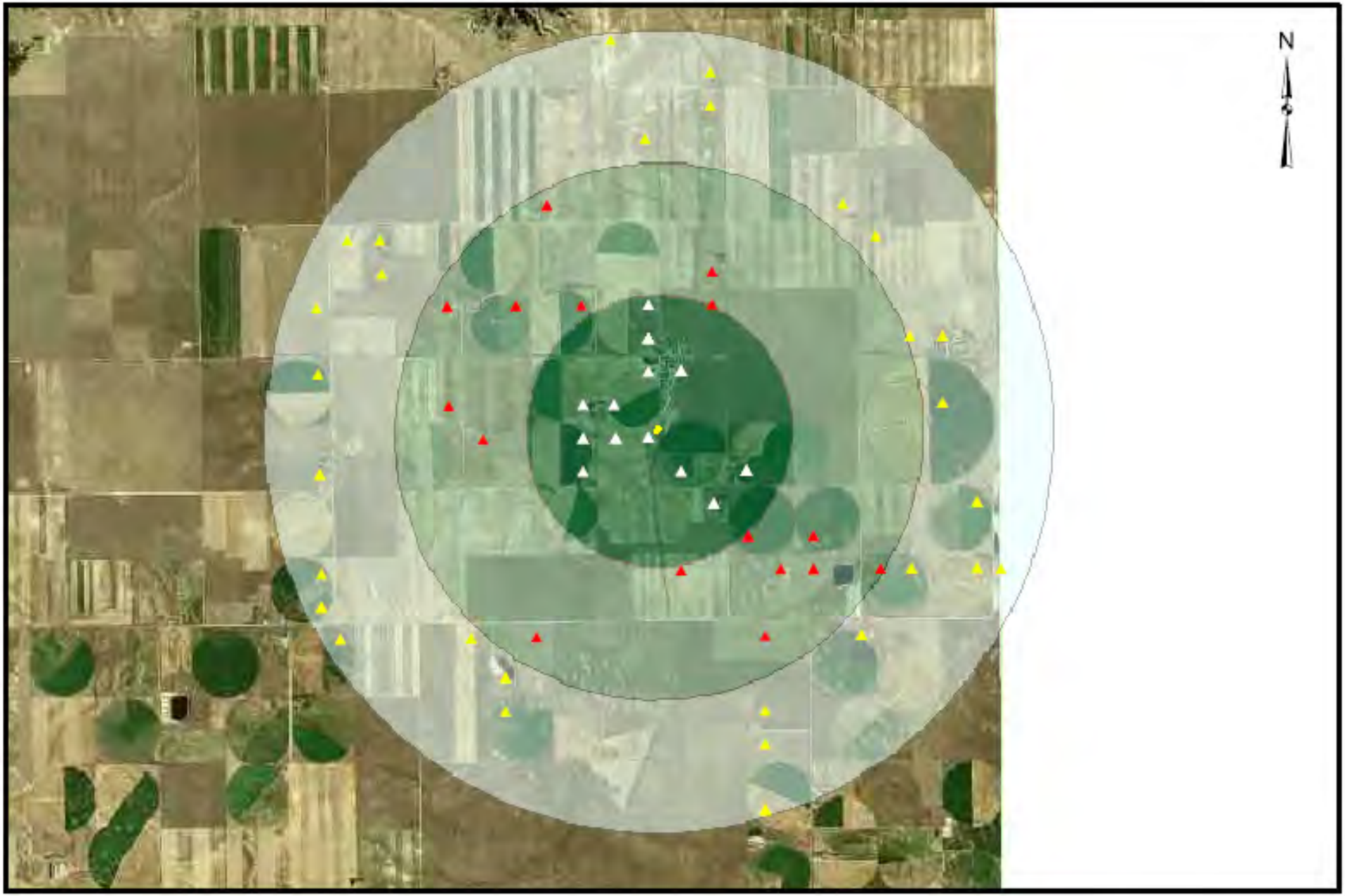
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Albin** **File Number:** **10.005**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **No wells installed.**



Water Supply Wells within 3 Miles of the Albin Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Baggs SWDD** **File Number:** **10.010**

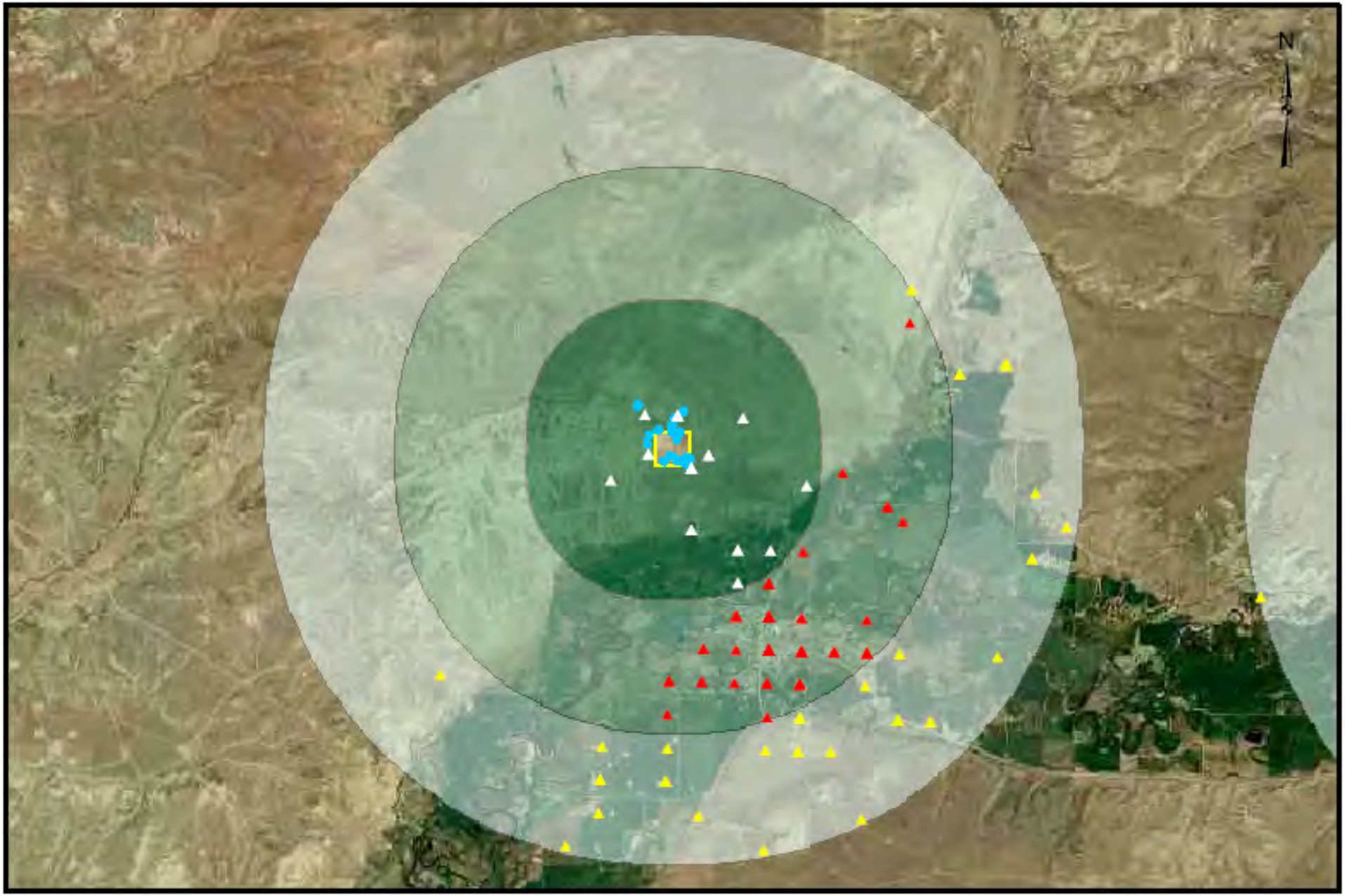
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 27, 2009.**

Comments:

Contaminants higher in downgradient wells:

Acetone
Bicarbonate as HCO3
Magnesium
Nitrogen, Nitrate+Nitrite as N
pH
Selenium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Baggs Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Bairoil #2** **File Number:** **10.015**

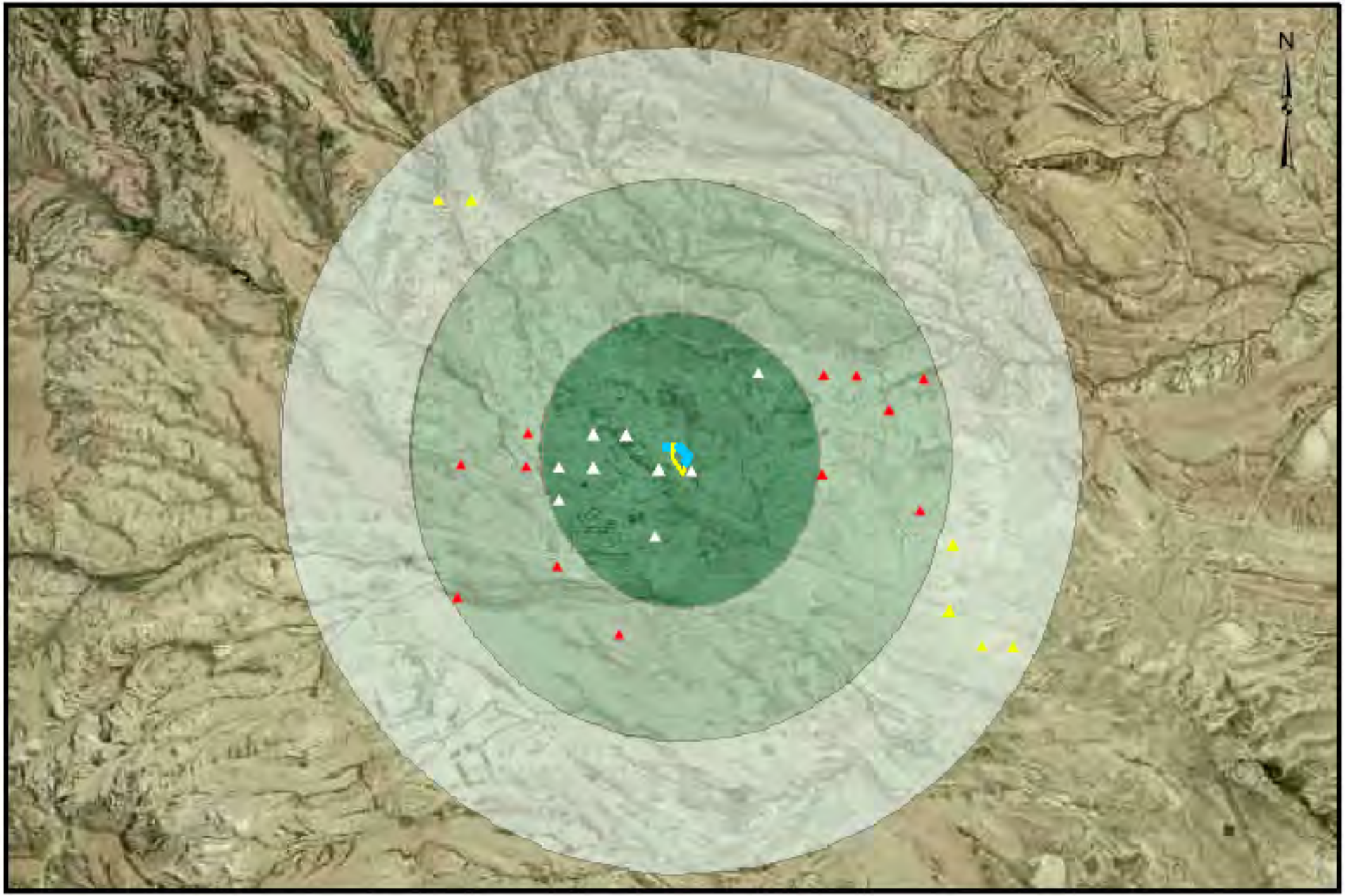
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through November 12, 2009.**

Comments: **Bairoil #1 and #2 Landfills were evaluated for groundwater impacts as a single facility due to their proximity to each other.**

Contaminants higher in downgradient wells:

Chloride
Cobalt
Copper
Fluoride
Iron
Magnesium
Manganese
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Bairoil #1 and #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Big Horn County - South** **File Number:** **10.025**

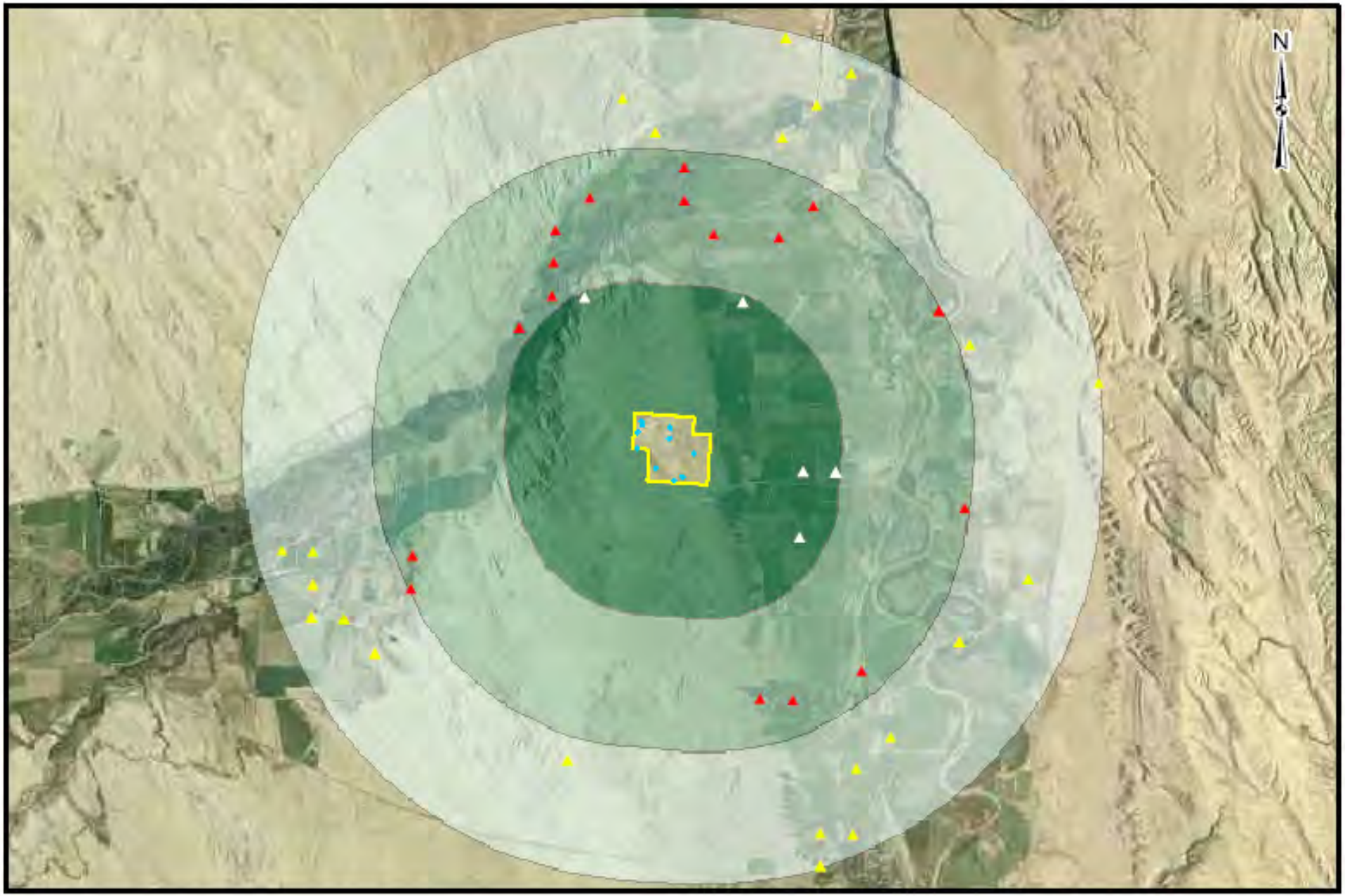
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through September 14, 2009.**

Comments:

Contaminants higher in downgradient wells:

Nitrogen, Ammonia as N
pH
Sodium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Big Horn County - South Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Big Horn County - North #1** **File Number:** **10.035**

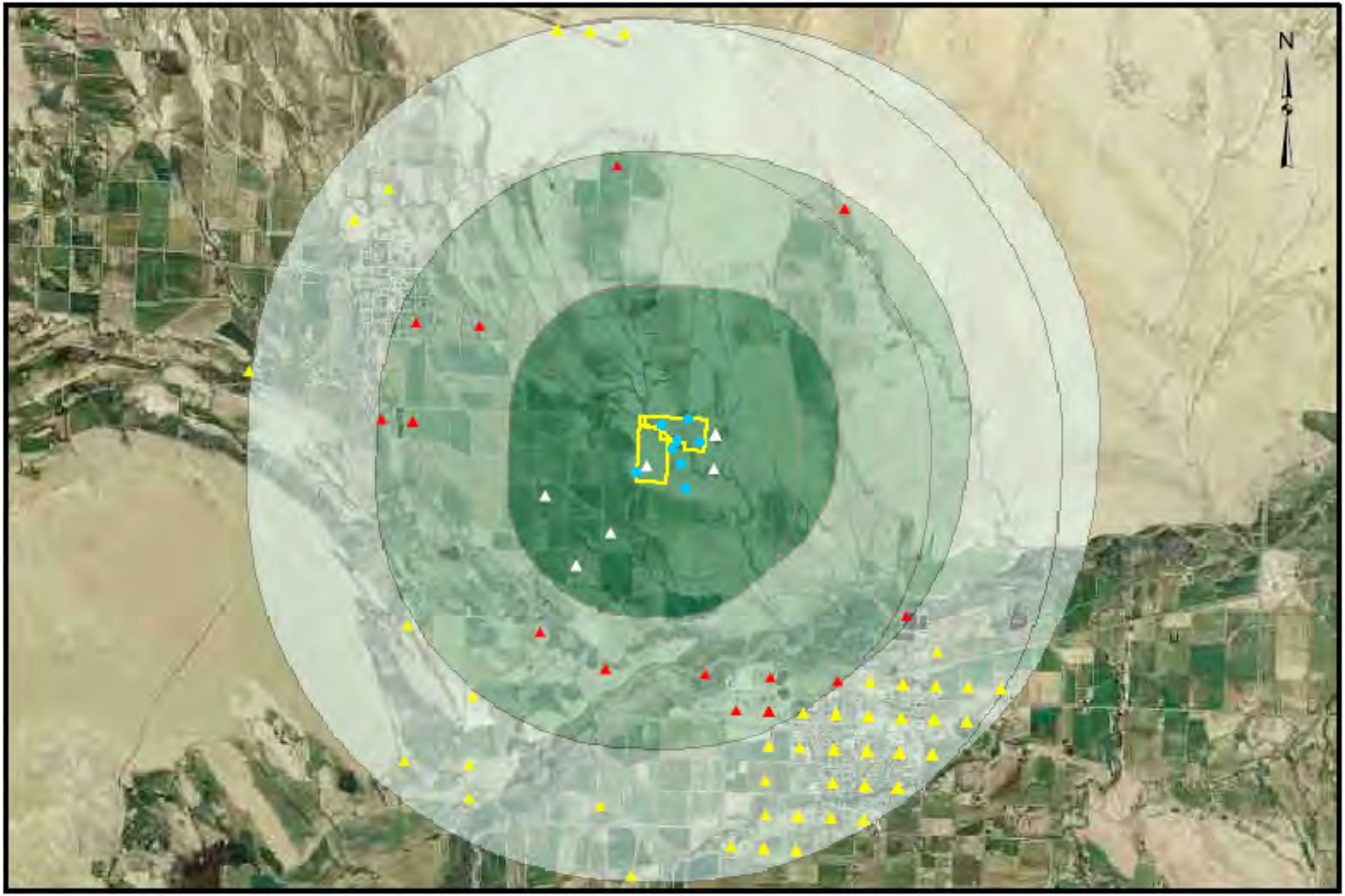
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through August 19, 2009.**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Chloride
Nitrogen, Ammonia as N

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Big Horn North #1 and #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Big Horn County - North #2** **File Number:** **10.036**

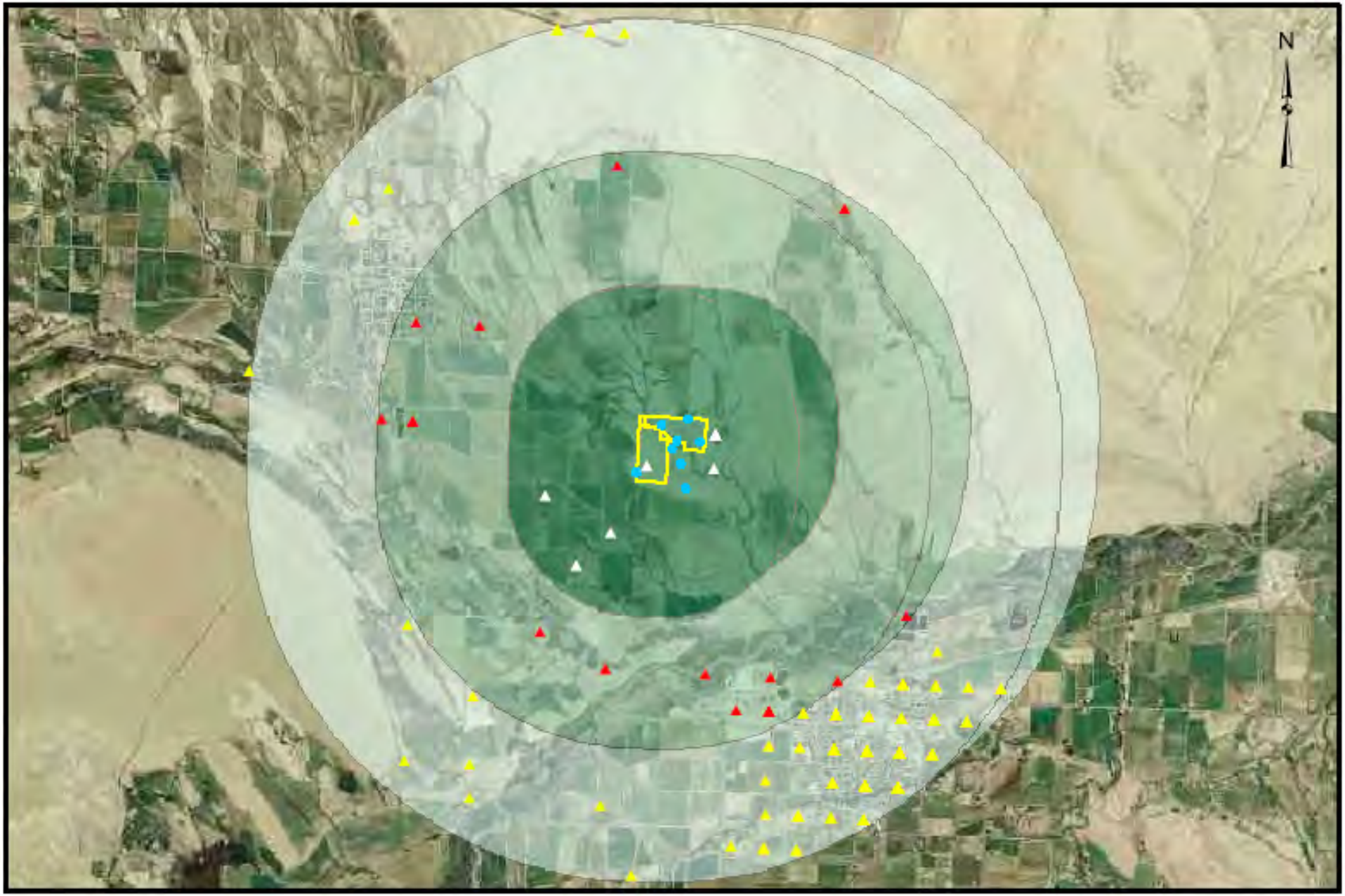
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through August 19, 2009.**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Barium
Beryllium
Bicarbonate as HCO3
Chloride
Cobalt
Cyanide, Total Automated
Iron
Lead
pH
Vanadium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Big Horn North #1 and #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Bosler** **File Number:** **10.045**

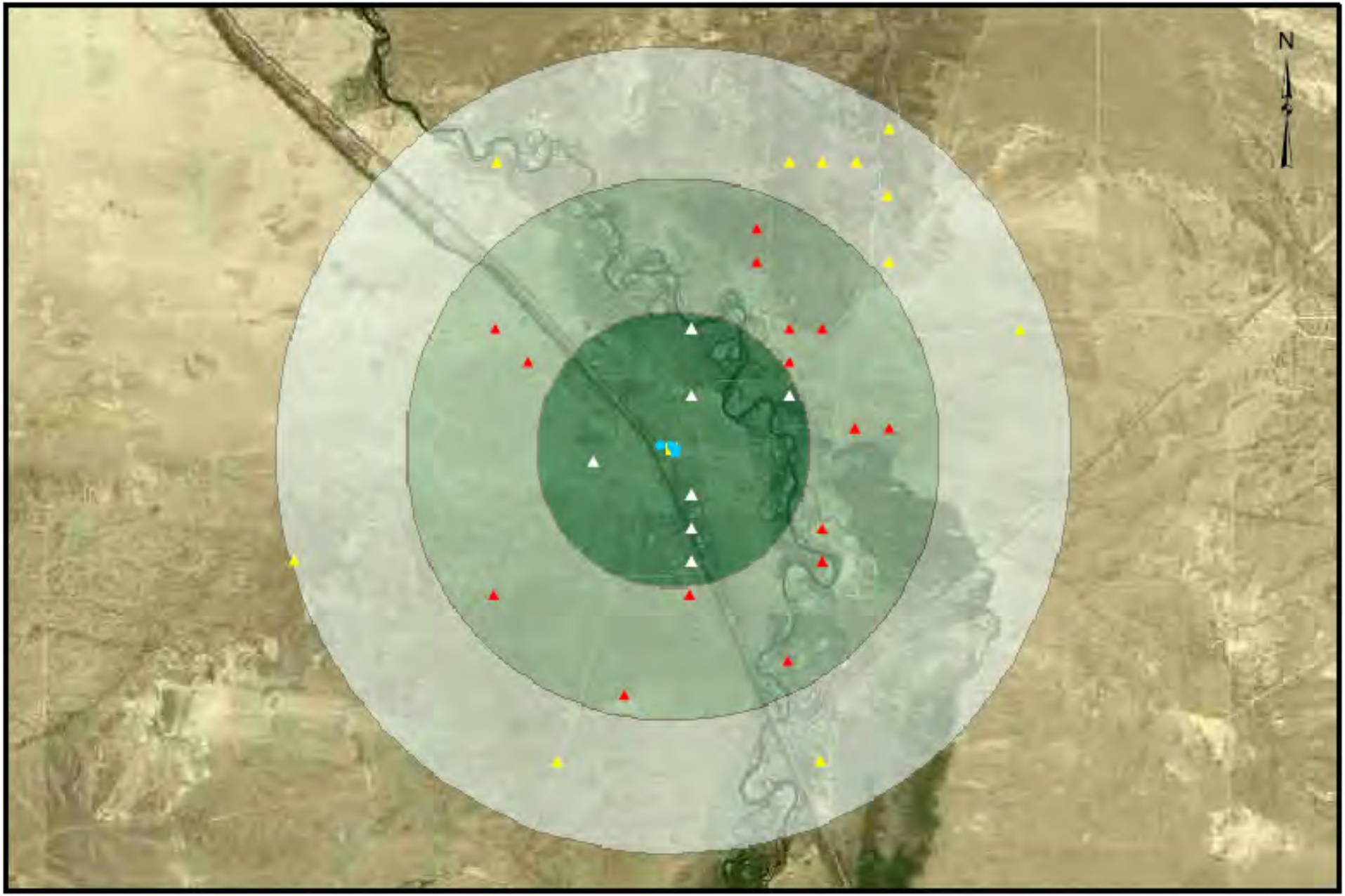
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through March 17, 2009.**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Arsenic
Barium
Bicarbonate as HCO3
Calcium
Chloride
Copper
Fluoride
Magnesium
Manganese
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Bosler Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Buffalo #1** **File Number:** **10.050**

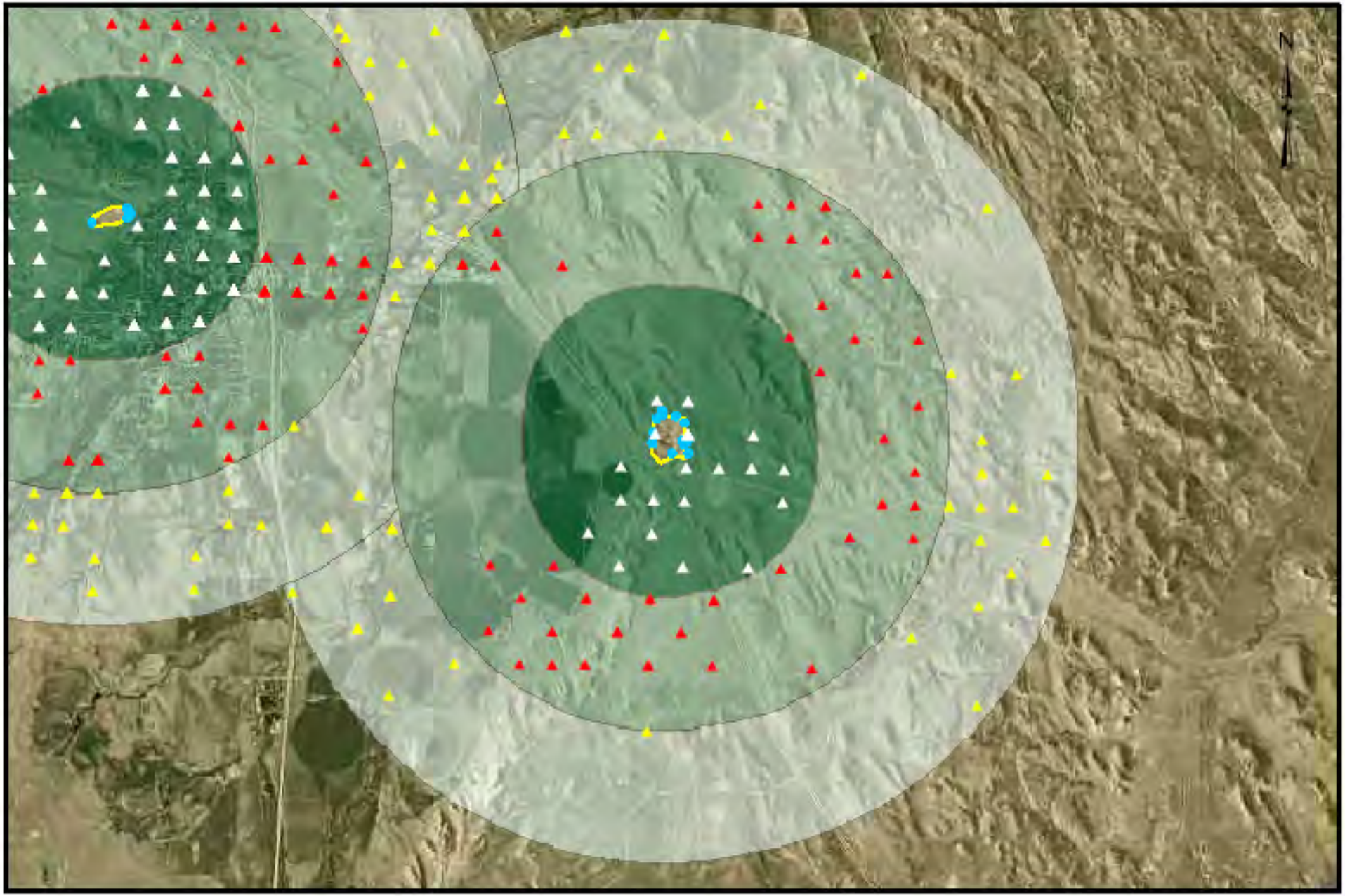
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 13, 2009.**

Comments:

Contaminants higher in downgradient wells:

Beryllium
Bicarbonate as HCO3
Calcium
Chloride
Chlorobenzene
Cobalt
Dichloroethene, cis-1,2-
Magnesium
Nitrogen, Nitrate+Nitrite as N
pH
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Tetrachloroethene

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Buffalo Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

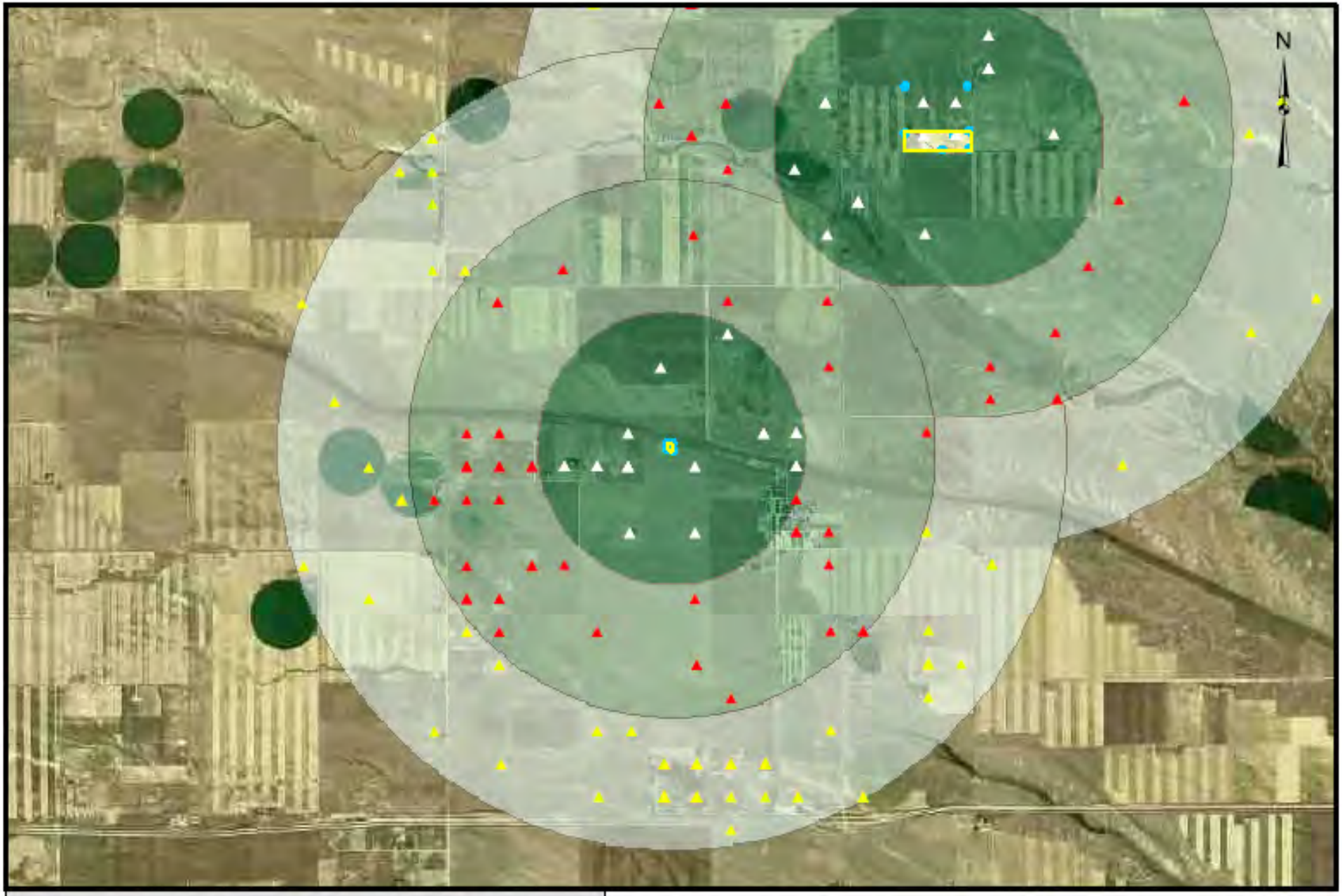
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Burns** **File Number:** **10.060**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **Inadequate number of sampling events had occurred by the date of this report.**



Water Supply Wells within 3 Miles of the Burns Landfill

- Landfill Boundary
- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Campbell County #1** **File Number:** **10.065**

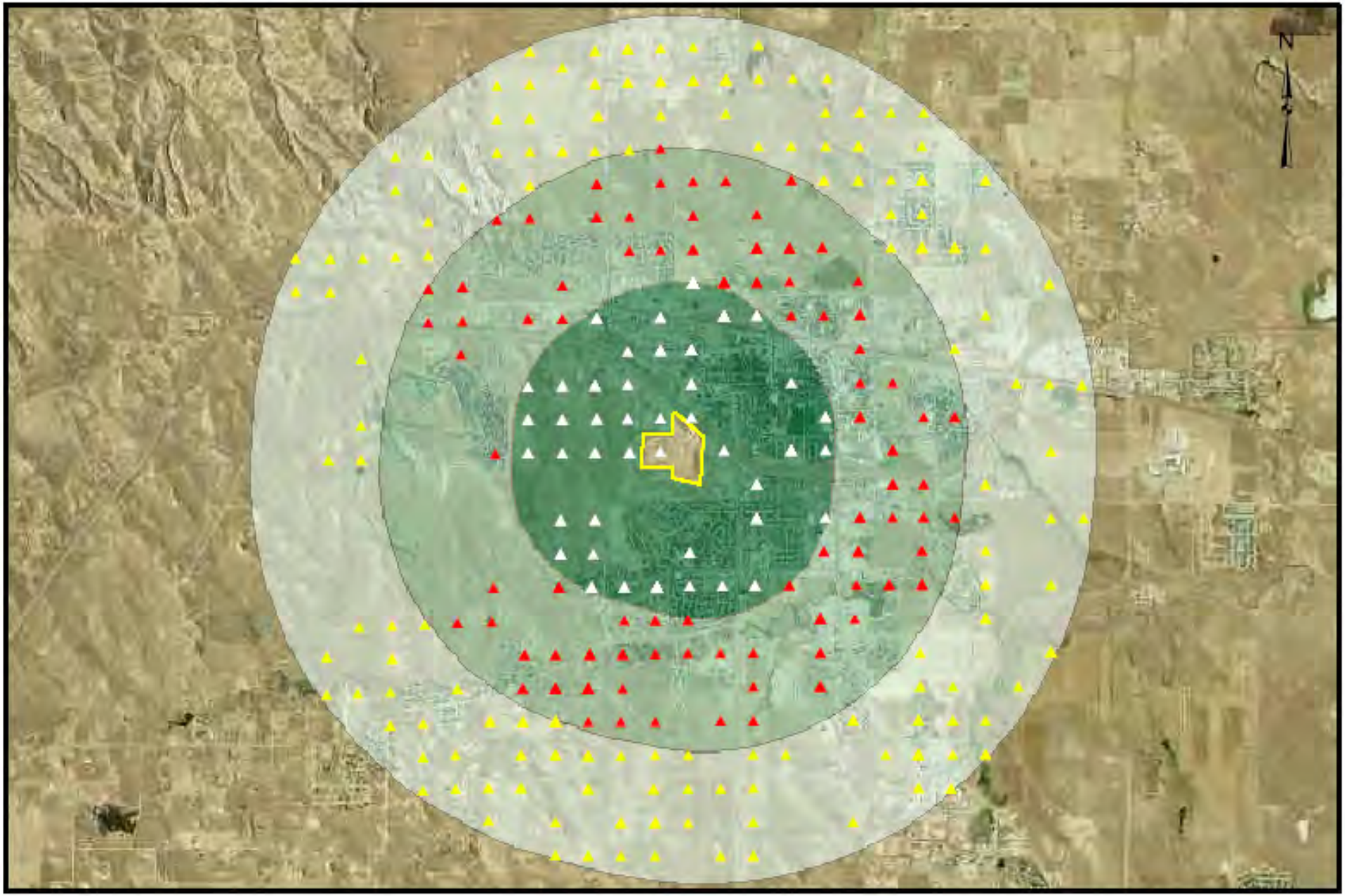
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 25, 2007.**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Barium
Beryllium
Bicarbonate as HCO3
Cadmium
Calcium
Chloride
Chromium
Cobalt
Copper
Dichlorodifluoromethane
Dichloroethane, 1,1-
Dichloroethene, 1,1-
Dichloroethene, cis-1,2-
Fluoride
Lead
Magnesium
Manganese
Methylene chloride
Nickel
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Selenium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Trichloroethane, 1,1,1-
Trichloroethene
Vanadium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Campbell County #1 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Campbell County #2** **File Number:** **10.066**

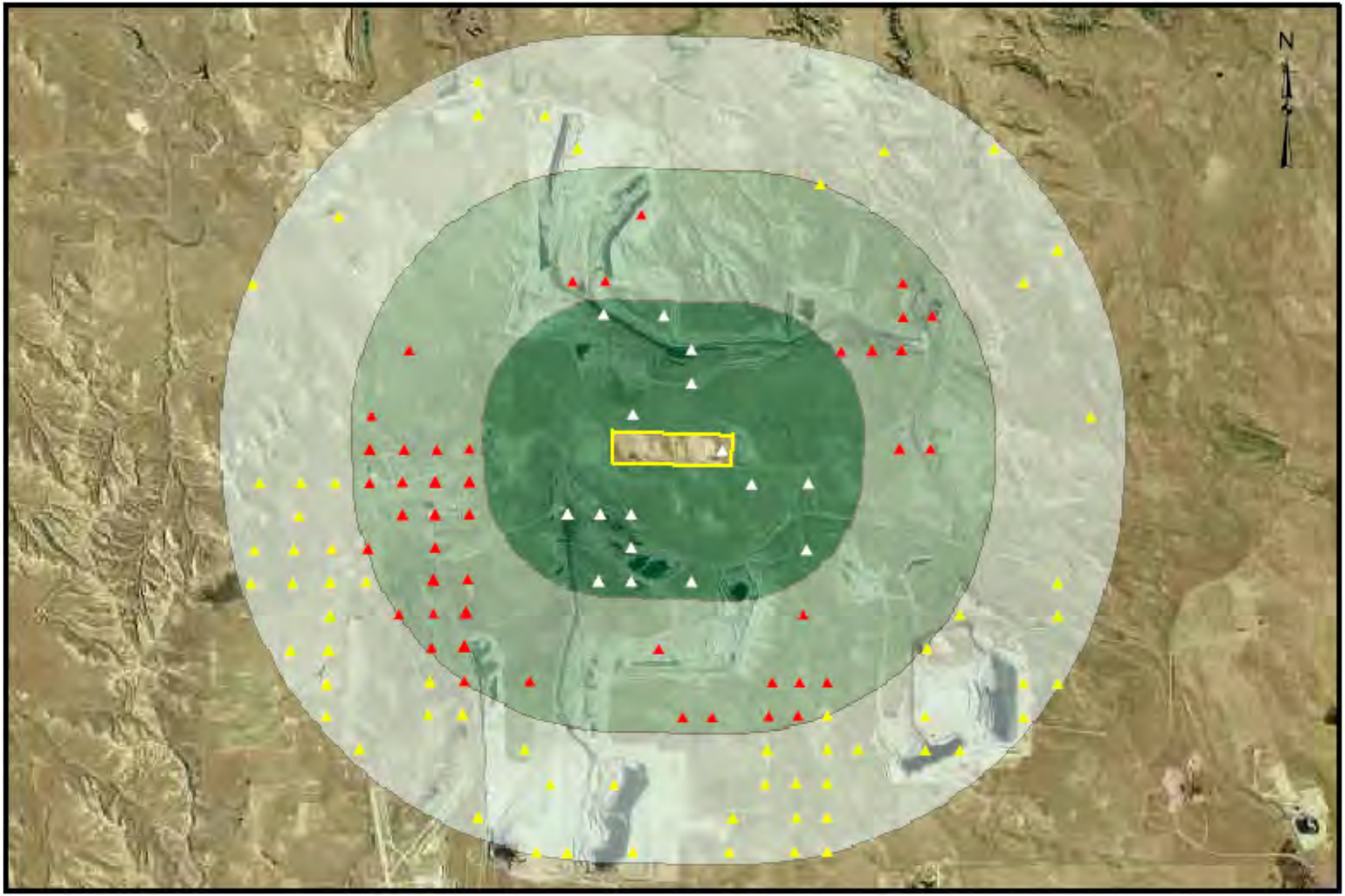
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 29, 2007.**

Comments:

Contaminants higher in downgradient wells:

Antimony
Arsenic
Barium
Bicarbonate as HCO3
Chloride
Chloroethane
Chromium
Dichlorodifluoromethane
Dichloroethane, 1,1-
Fluoride
Iron
Magnesium
Methylene chloride
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Campbell County #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Casper Balefill** **File Number:** **10.070**

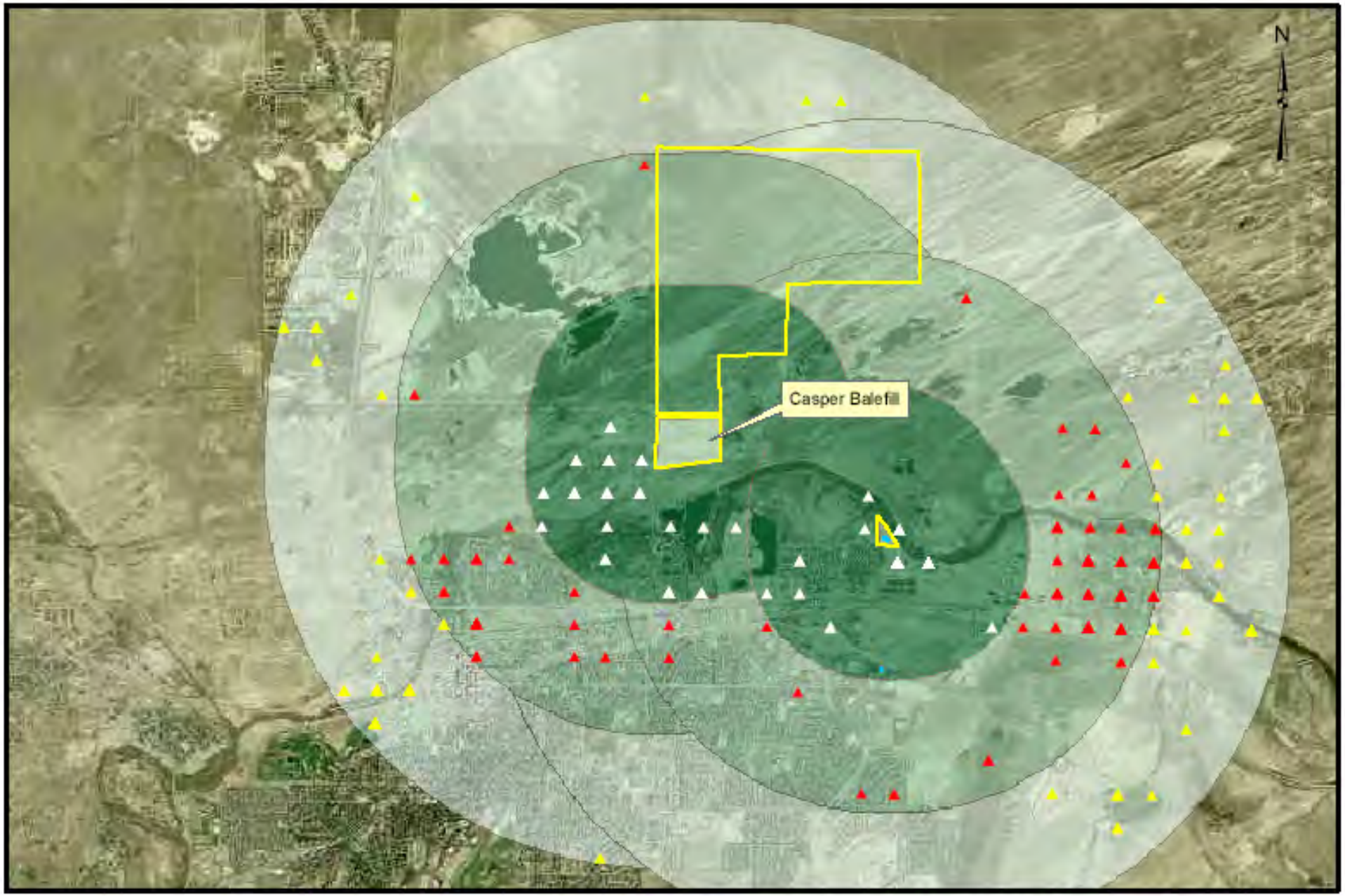
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through March 9, 2010.**

Comments:

Contaminants higher in downgradient wells:

Benzene
Chloride
Chloroethane
Dichlorodifluoromethane
Dichloroethene, cis-1,2-
Dichloroethene, trans-1,2-
Ethylbenzene
Magnesium
Naphthalene
Nitrogen, Ammonia as N
Potassium
Sodium
Sulfate
Tetrachloroethene
Trichloroethane, 1,1,1-
Trichloroethene
Vinyl chloride

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Casper Balefill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Cheyenne** **File Number:** **10.080**

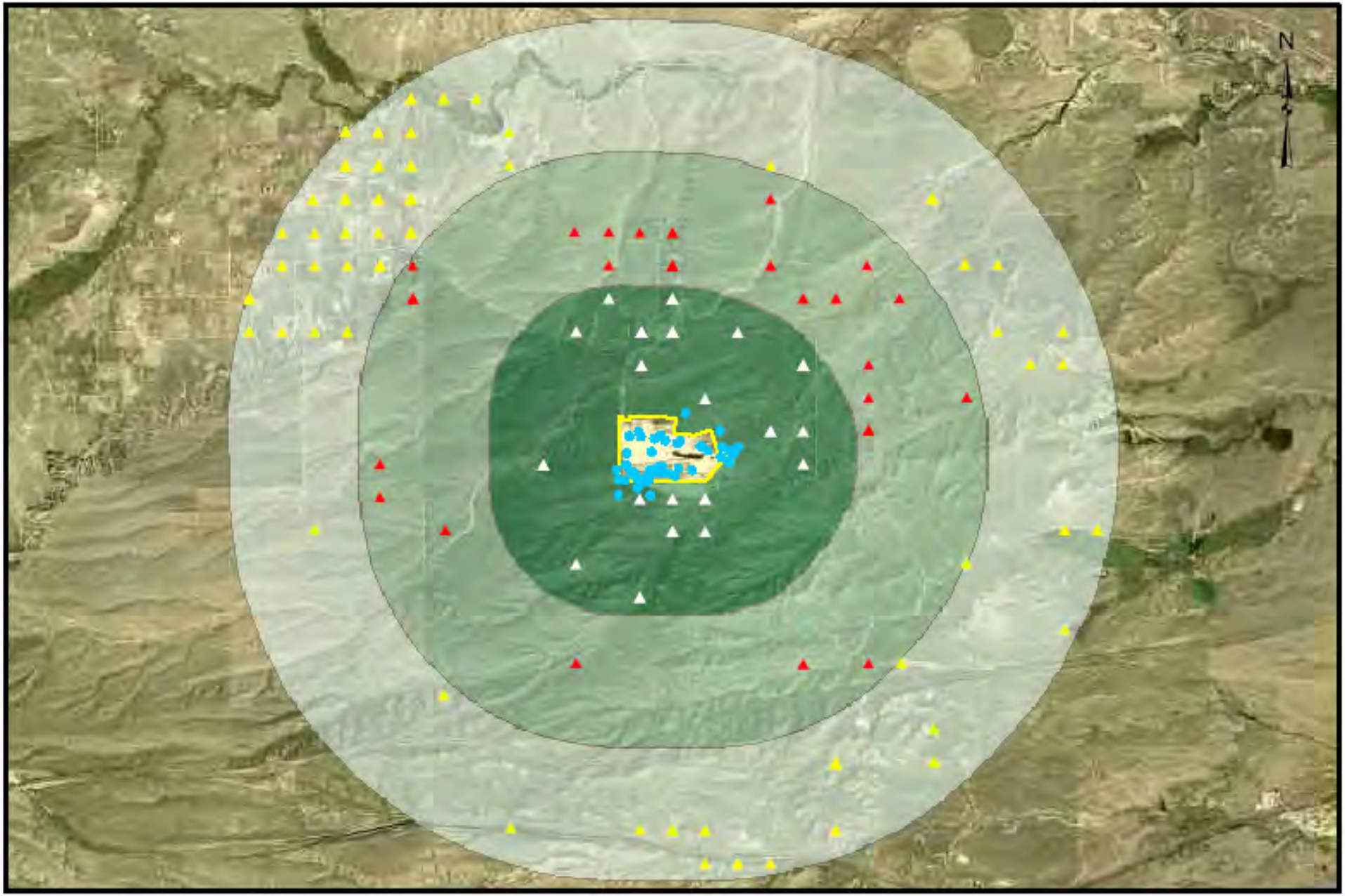
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 18, 2009.**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Barium
Bicarbonate as HCO3
Cadmium
Calcium
Chloride
Chloromethane
Copper
Cyanide, Total Automated
Dichlorodifluoromethane
Dichloroethane, 1,1-
Dichloroethene, cis-1,2-
Fluoride
Manganese
Methylene chloride
Nickel
Nitrogen, Ammonia as N
pH
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Tetrachloroethene
Trichloroethene
Trichlorofluoromethane
Vinyl chloride
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Cheyenne Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Chugwater** **File Number:** **10.088**

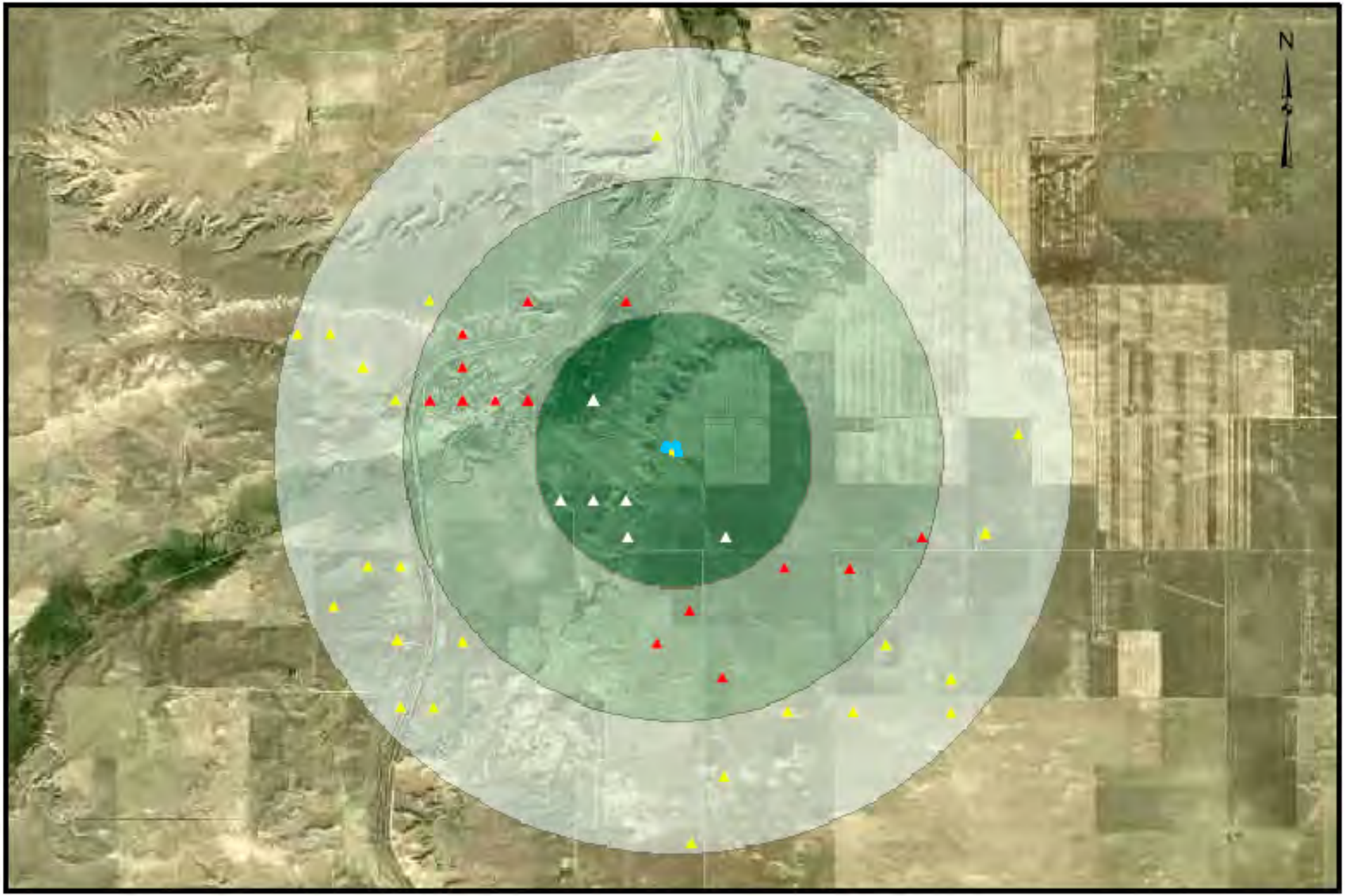
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 18, 2008.**

Comments: **Final monitoring event was not included in the statistical analysis due to concerns about the quality of data representing this monitoring event.**

Contaminants higher in downgradient wells:

Arsenic
Barium
Bicarbonate as HCO3
Calcium
Chloride
Copper
Cyanide, Total Automated
Iron
Lead
Magnesium
Nickel
Nitrogen, Ammonia as N
Potassium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Chugwater Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Clearmont #2** **File Number:** **10.091**

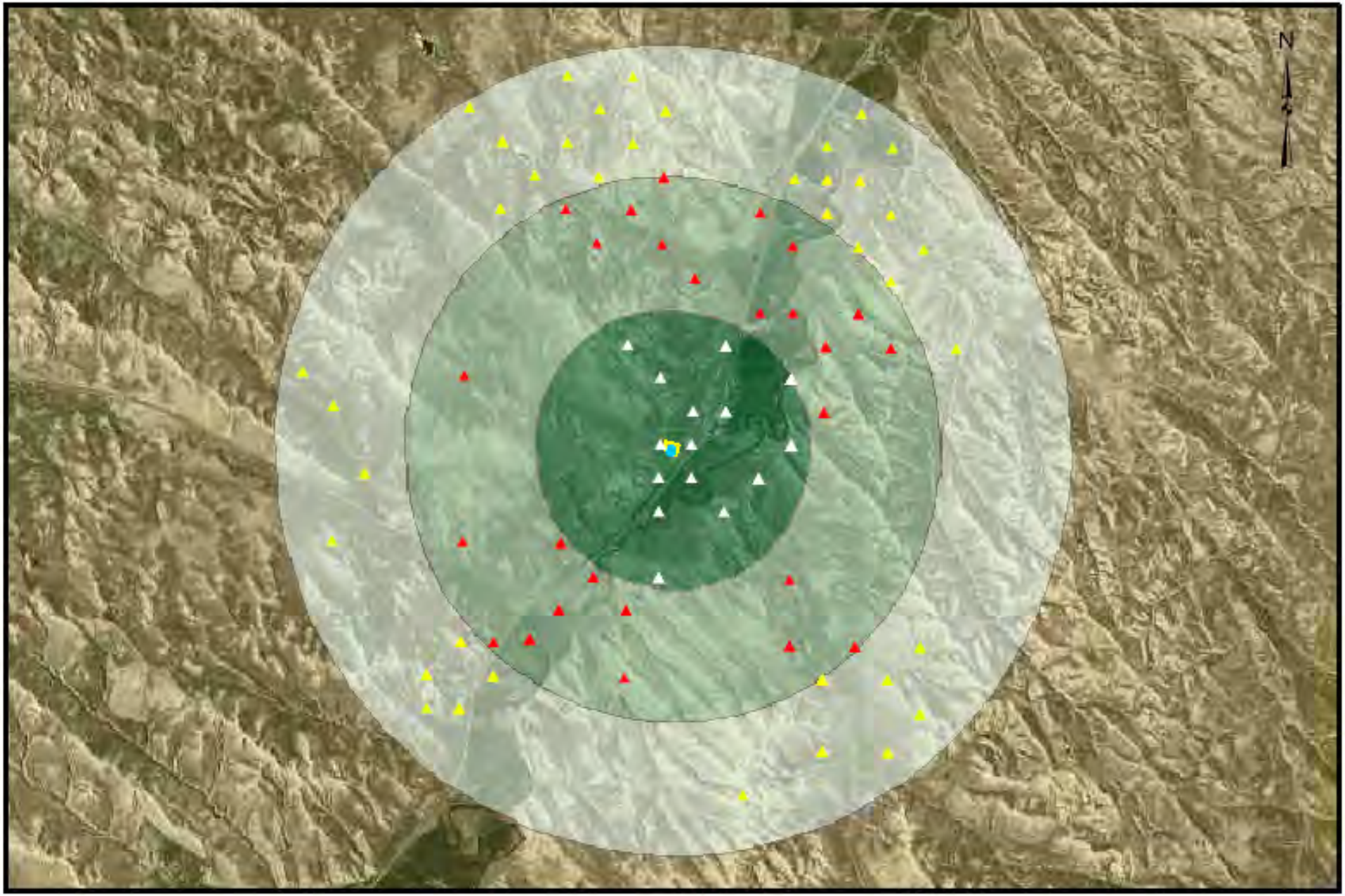
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 7, 2009.**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Chloride
Magnesium
Nickel
Nitrogen, Nitrate+Nitrite as N
Solids, Total Dissolved TDS @ 180 C

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Clearmont Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Douglas** **File Number:** **10.110**

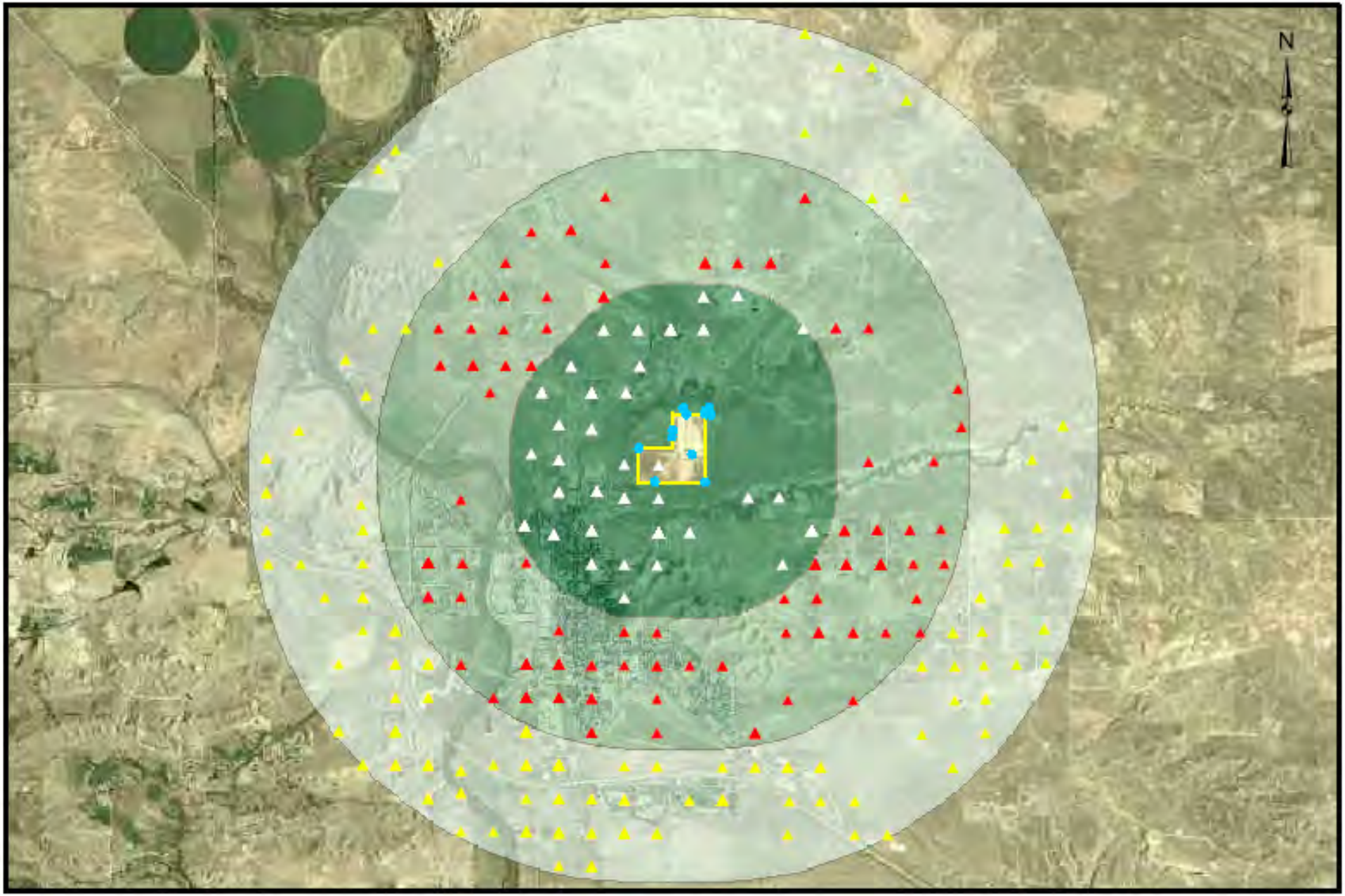
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 30, 2009.**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Calcium
Chloride
Fluoride
Magnesium
Nitrogen, Ammonia as N
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Douglas Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Eden Valley SWDD** **File Number:** **10.115**

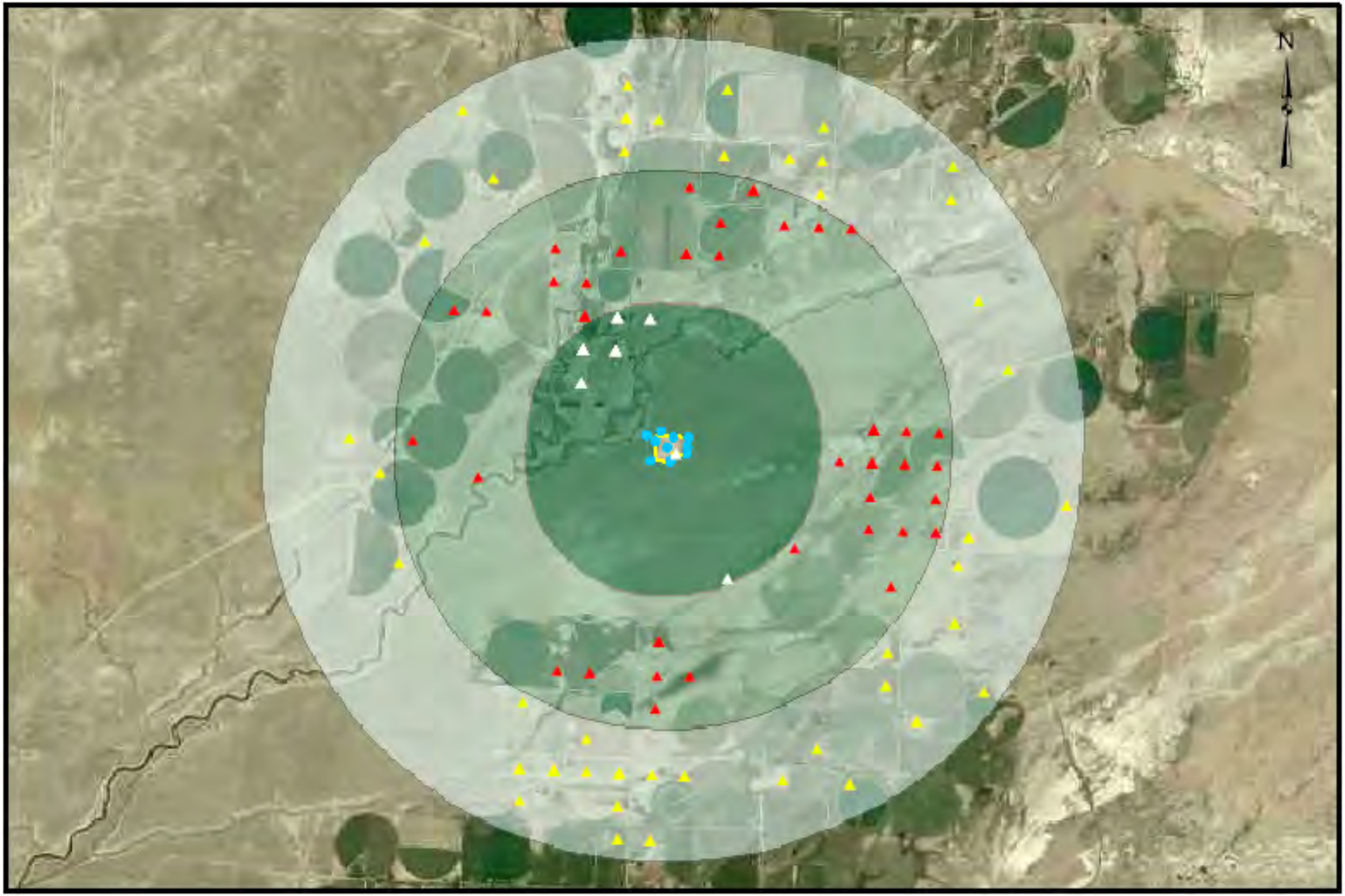
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 21, 2010.**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Bicarbonate as HCO3
Chloride
Nitrogen, Nitrate+Nitrite as N
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Eden Valley Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Elk Mountain** **File Number:** **10.120**

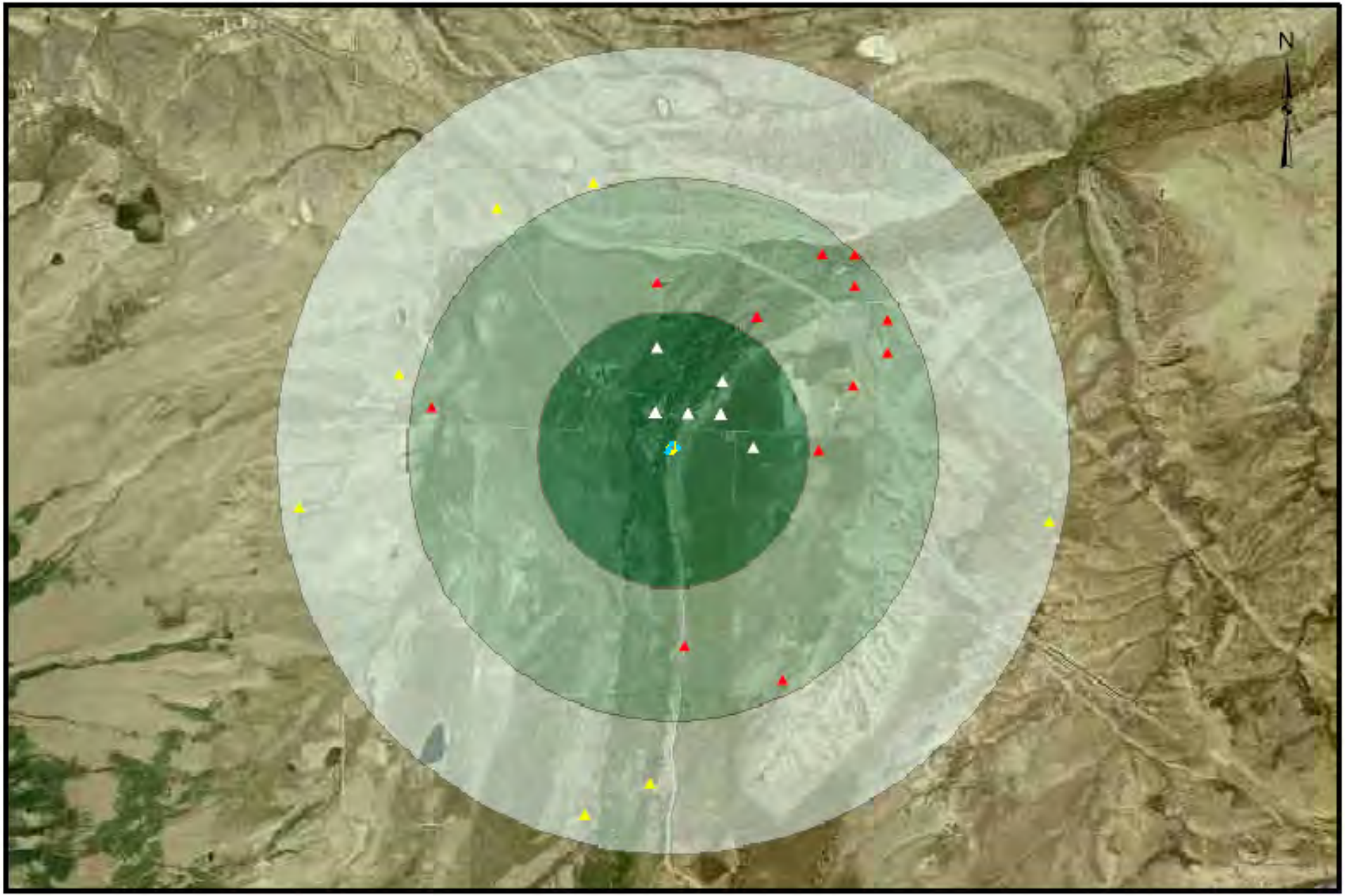
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through March 3, 2010.**

Comments:

Contaminants higher in downgradient wells:

Chloride
Nitrogen, Ammonia as N
Potassium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Elk Mountain Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

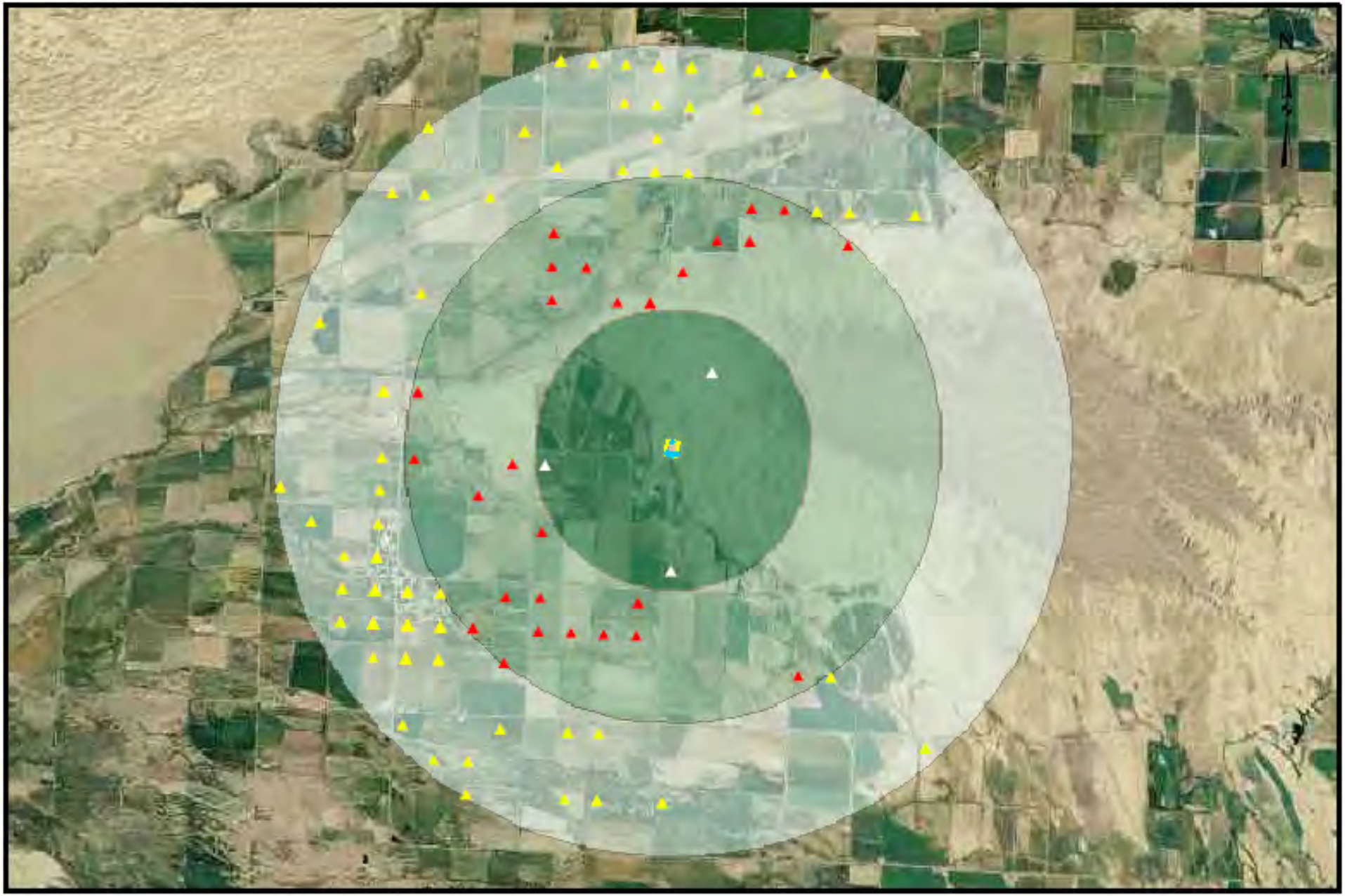
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Emblem Burlington** **File Number:** **10.130**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Emblem Burlington Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

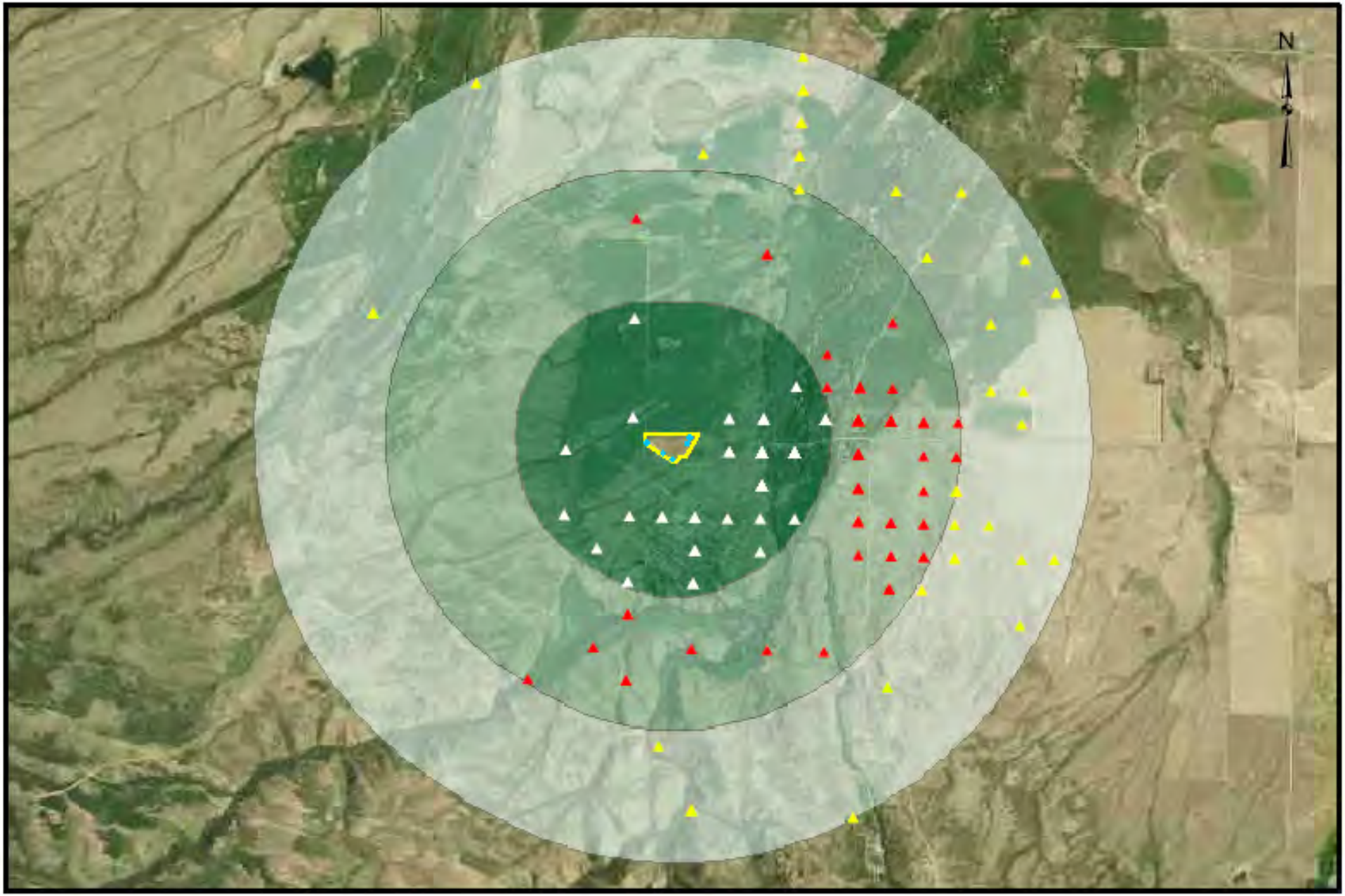
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Encampment** **File Number:** **10.135**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **Insufficient number of samples and inadequate well coverage to evaluate, as of the date of this report.**



Water Supply Wells within 3 Miles of the Encampment Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

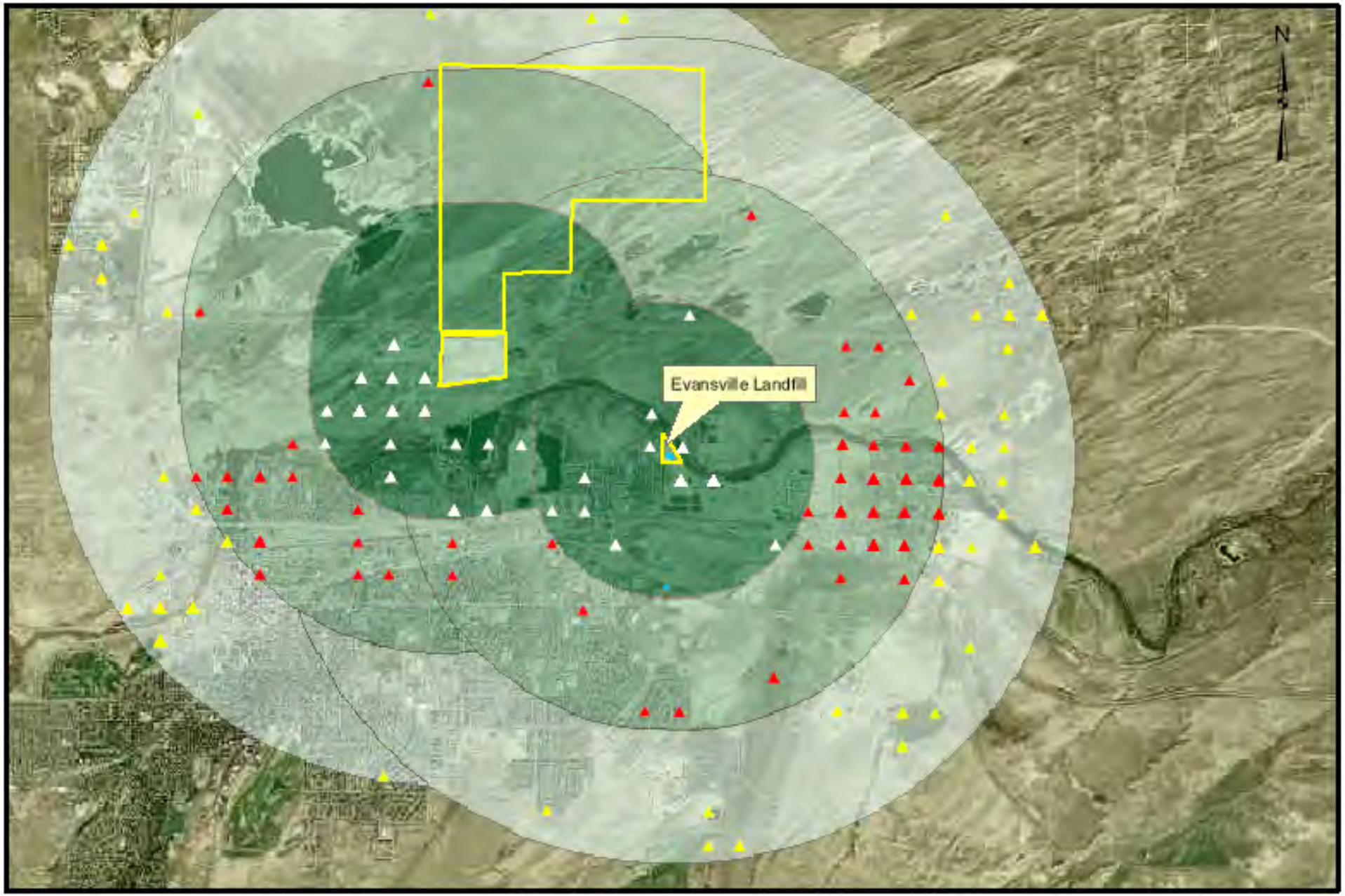
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Evansville** **File Number:** **10.137**

Groundwater Status: **No difference in constituent concentrations in wells upgradient and downgradient of landfill.**

Comments: **Data evaluated include samples collected through December 29, 2009.**



Water Supply Wells within 3 Miles of the Evansville Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

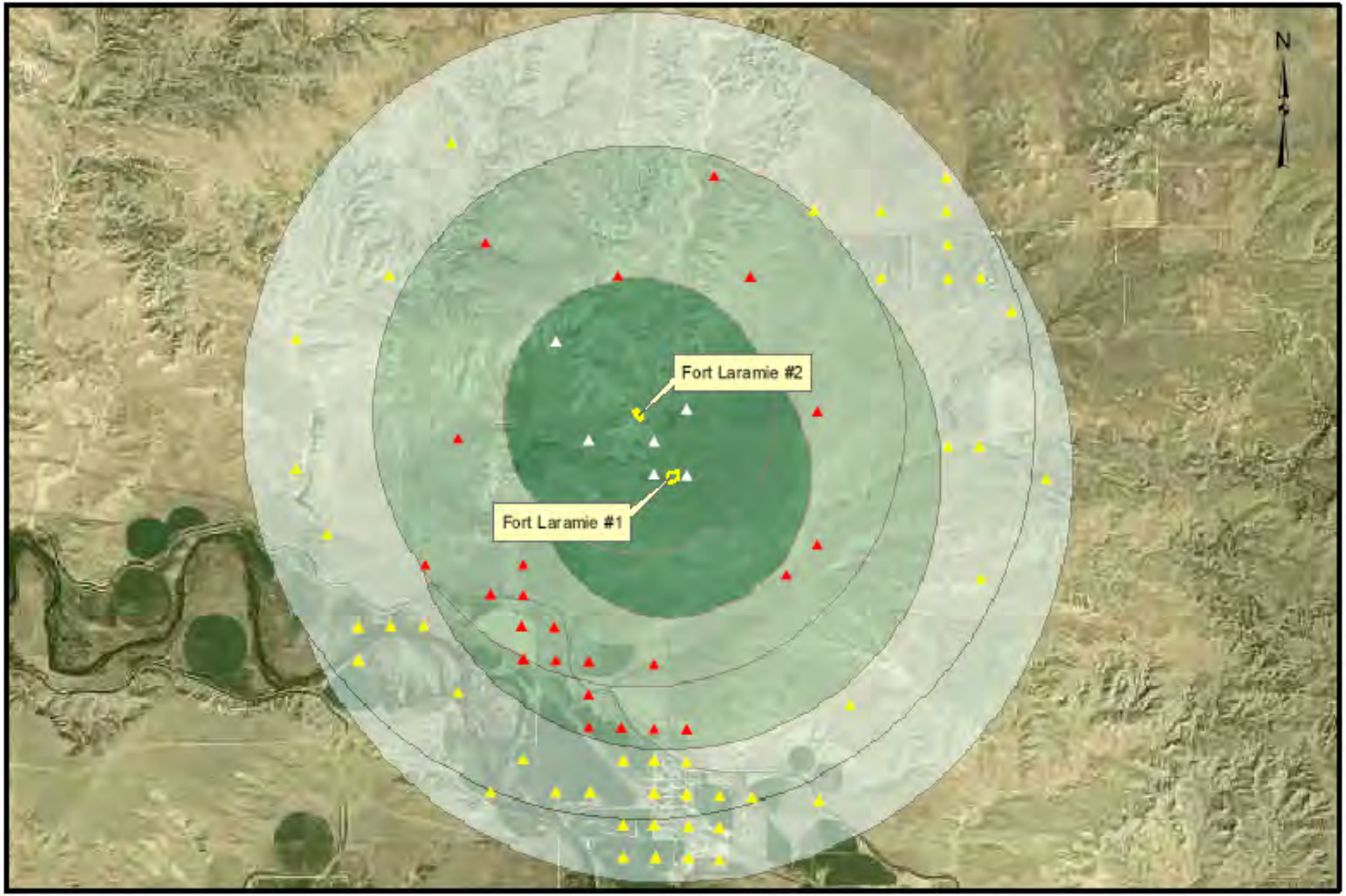
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Fort Laramie #1** **File Number:** **10.145**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **No wells installed.**



Water Supply Wells within 3 Miles of the Fort Laramie #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

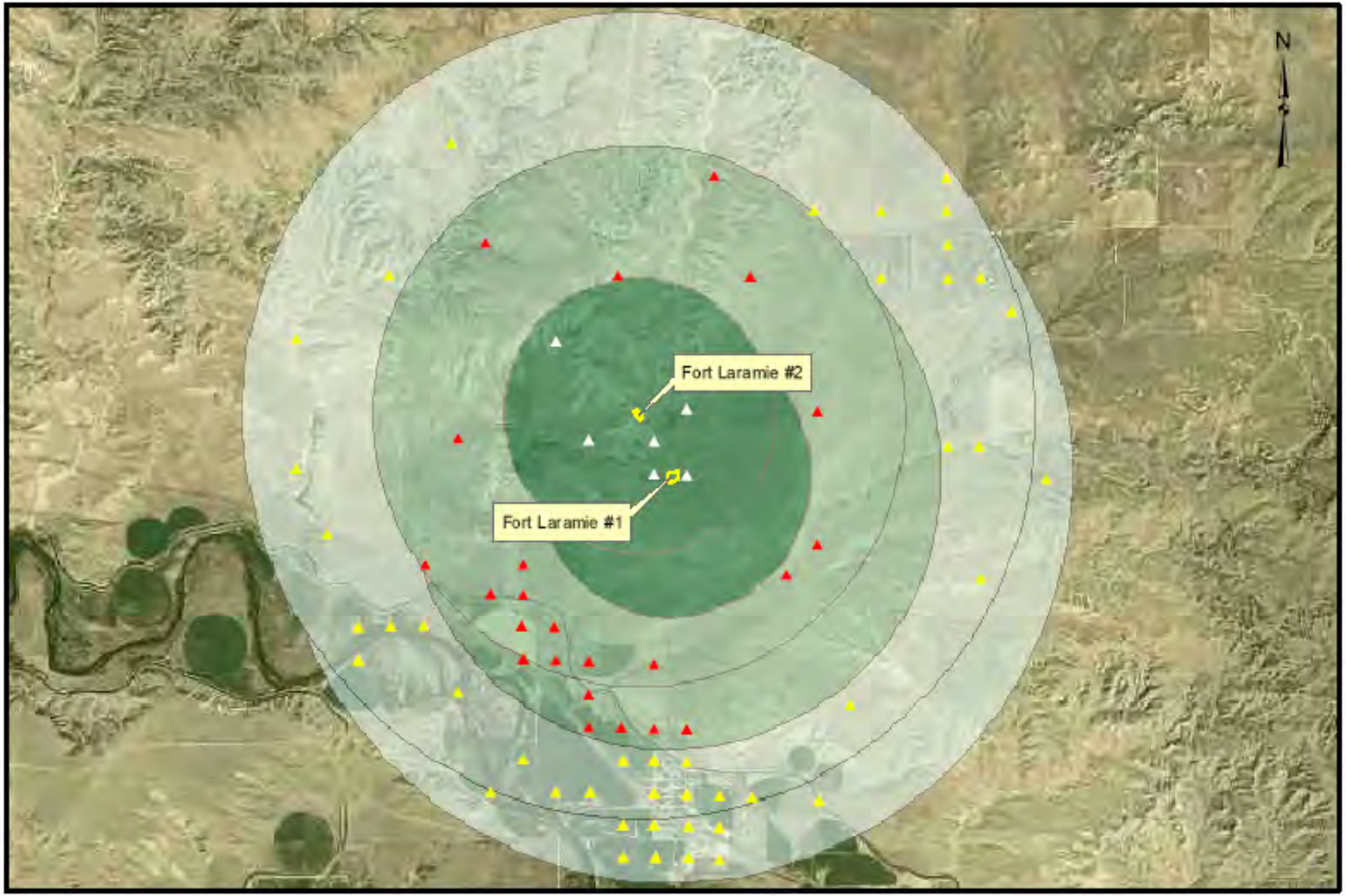
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Fort Laramie #2** **File Number:** **10.146**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **No wells installed.**



Water Supply Wells within 3 Miles of the Fort Laramie #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

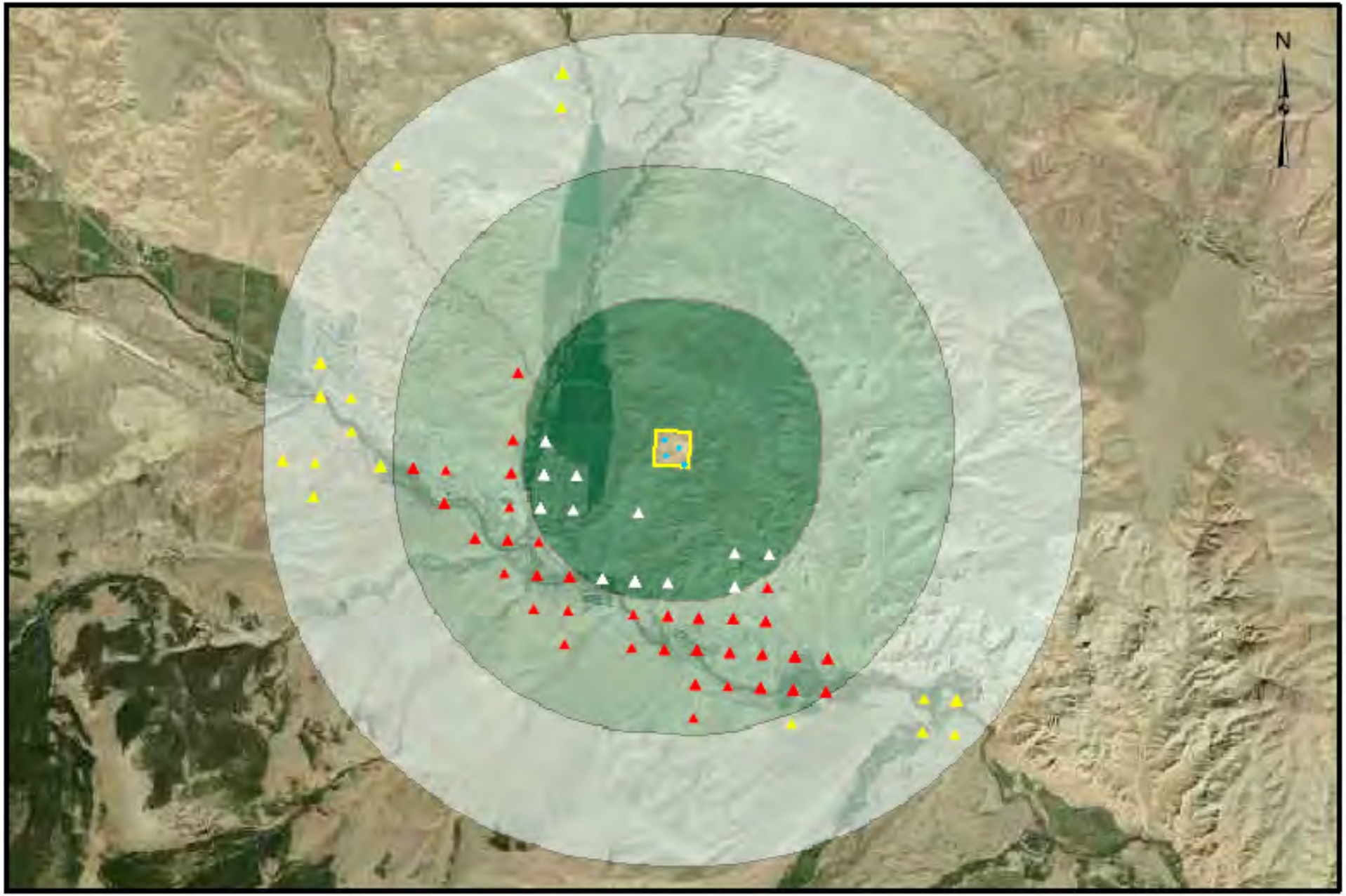
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Dubois** **File Number:** **10.165**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Dubois Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Lander** **File Number:** **10.190**

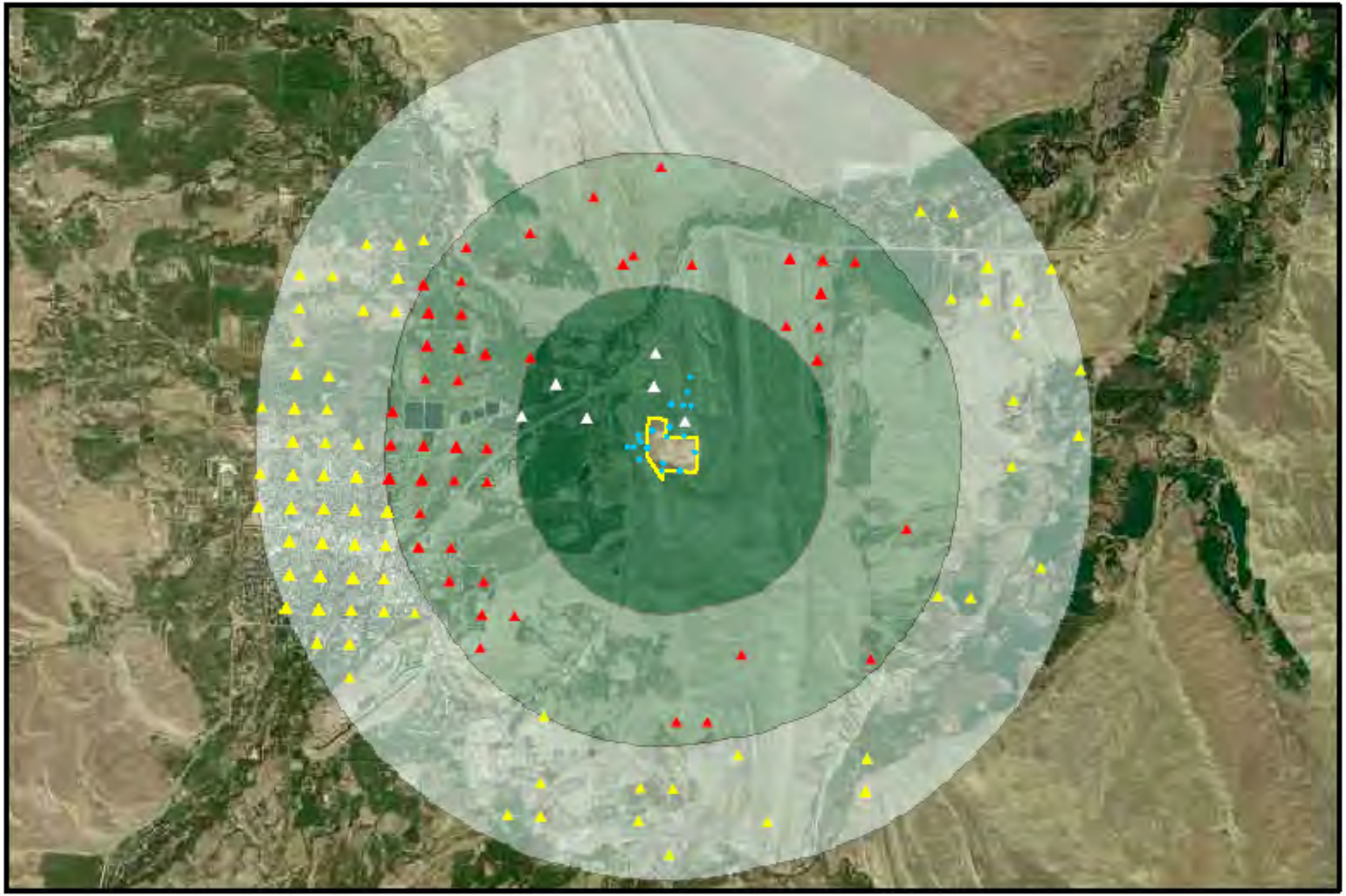
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 27, 2010.**

Comments:

Contaminants higher in downgradient wells:

Dichloroethane, 1,1-
Dichloroethene, cis-1,2-
Nickel
Tetrachloroethene
Vinyl chloride

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Lander Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Sand Draw** **File Number:** **10.195**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:

Water Supply Wells within 3 Miles of the Sand Draw Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Riverton #1** **File Number:** **10.215**

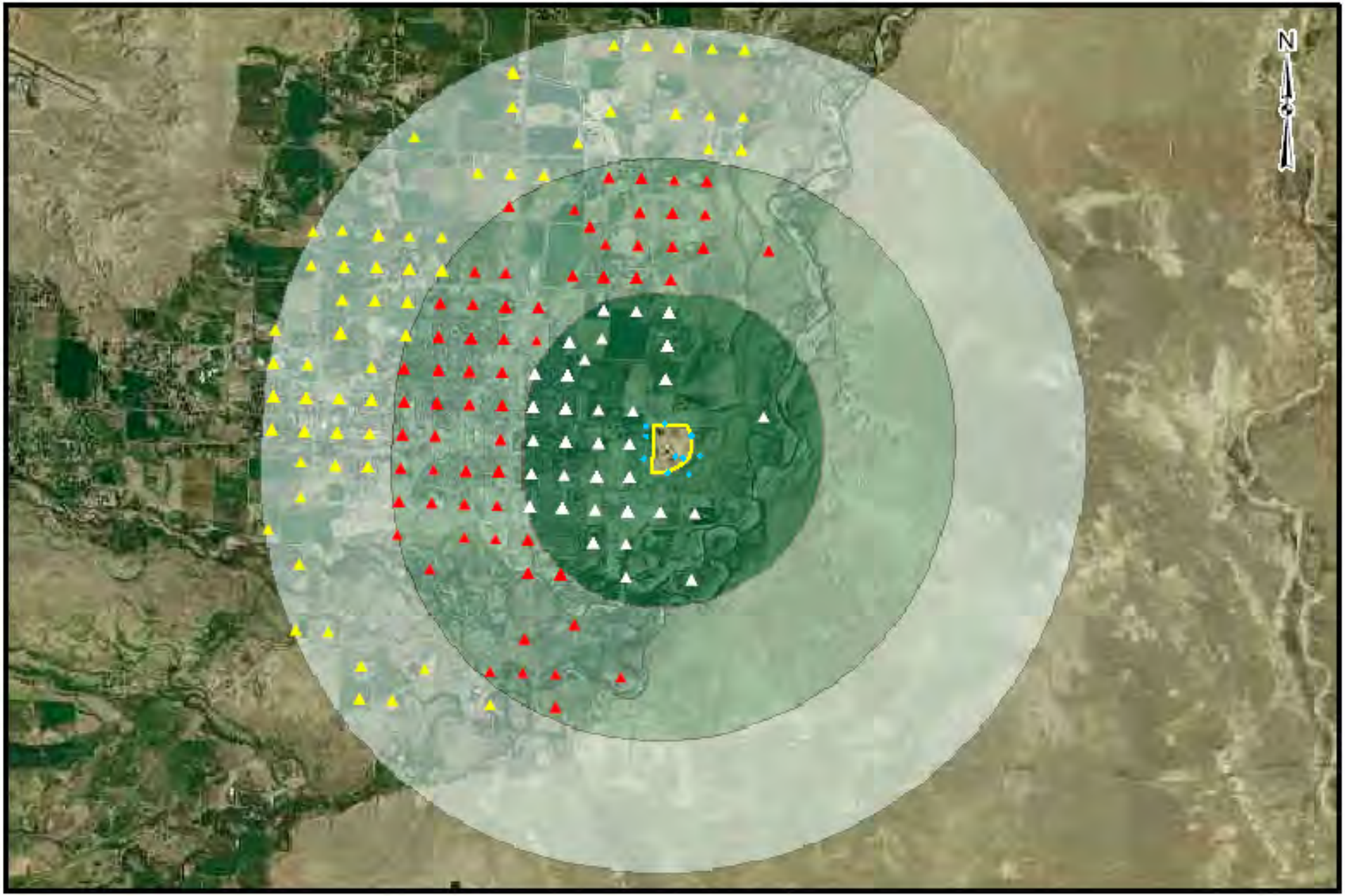
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through May 11, 2009.**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Beryllium
Bicarbonate as HCO3
Calcium
Chloride
Cobalt
Copper
Dichloroethane, 1,1-
Iron
Magnesium
Manganese
Nickel
Nitrogen, Ammonia as N
pH
Potassium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Sulfide
Vinyl chloride
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Riverton Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Shoshoni** **File Number:** **10.220**

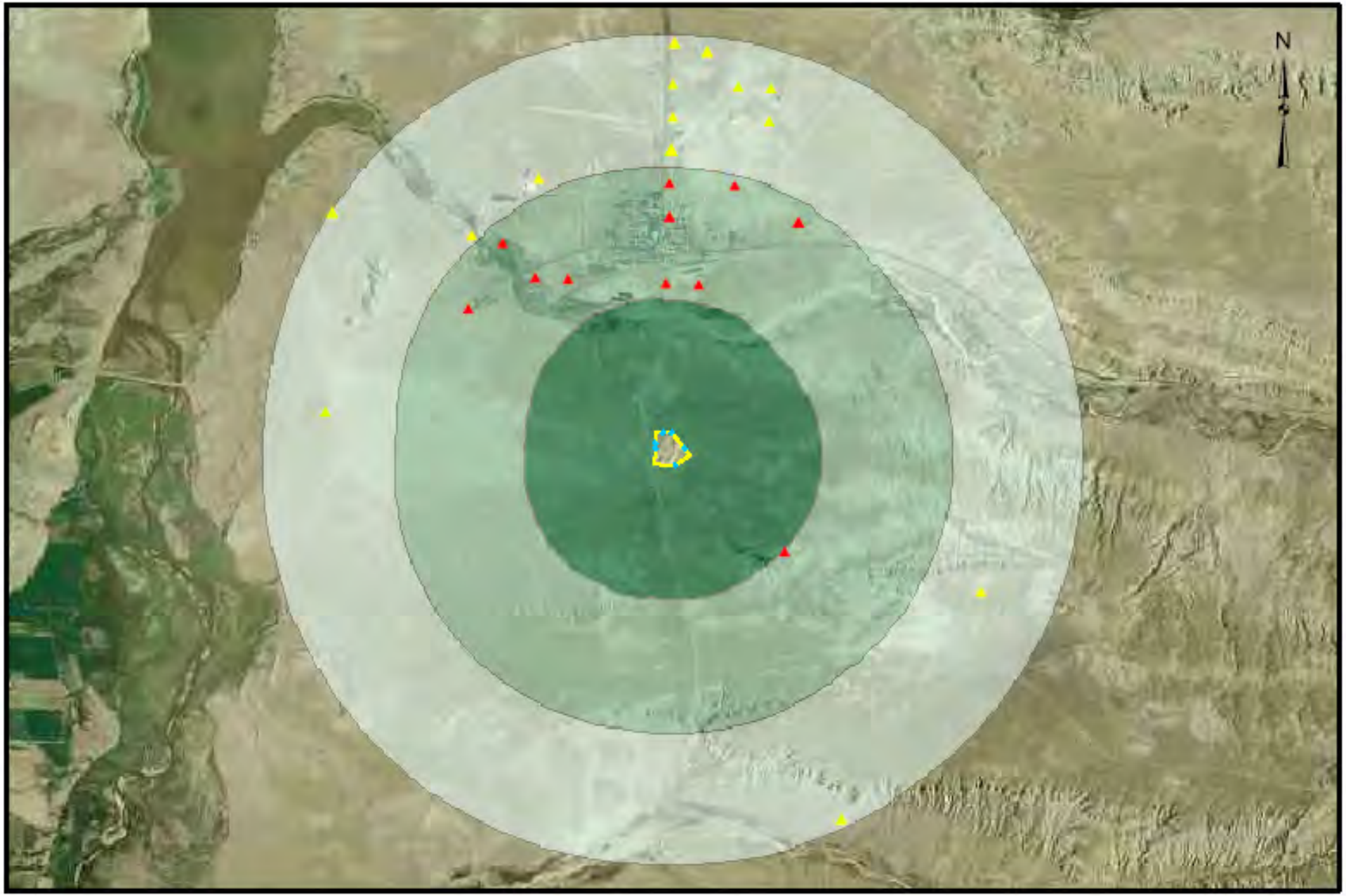
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 16, 2009.**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Arsenic
Barium
Beryllium
Bicarbonate as HCO3
Calcium
Chloride
Chloroform
Chromium
Cobalt
Copper
Fluoride
Iron
Lead
Magnesium
Manganese
Vanadium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Shoshoni Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Glendo #2** **File Number:** **10.226**

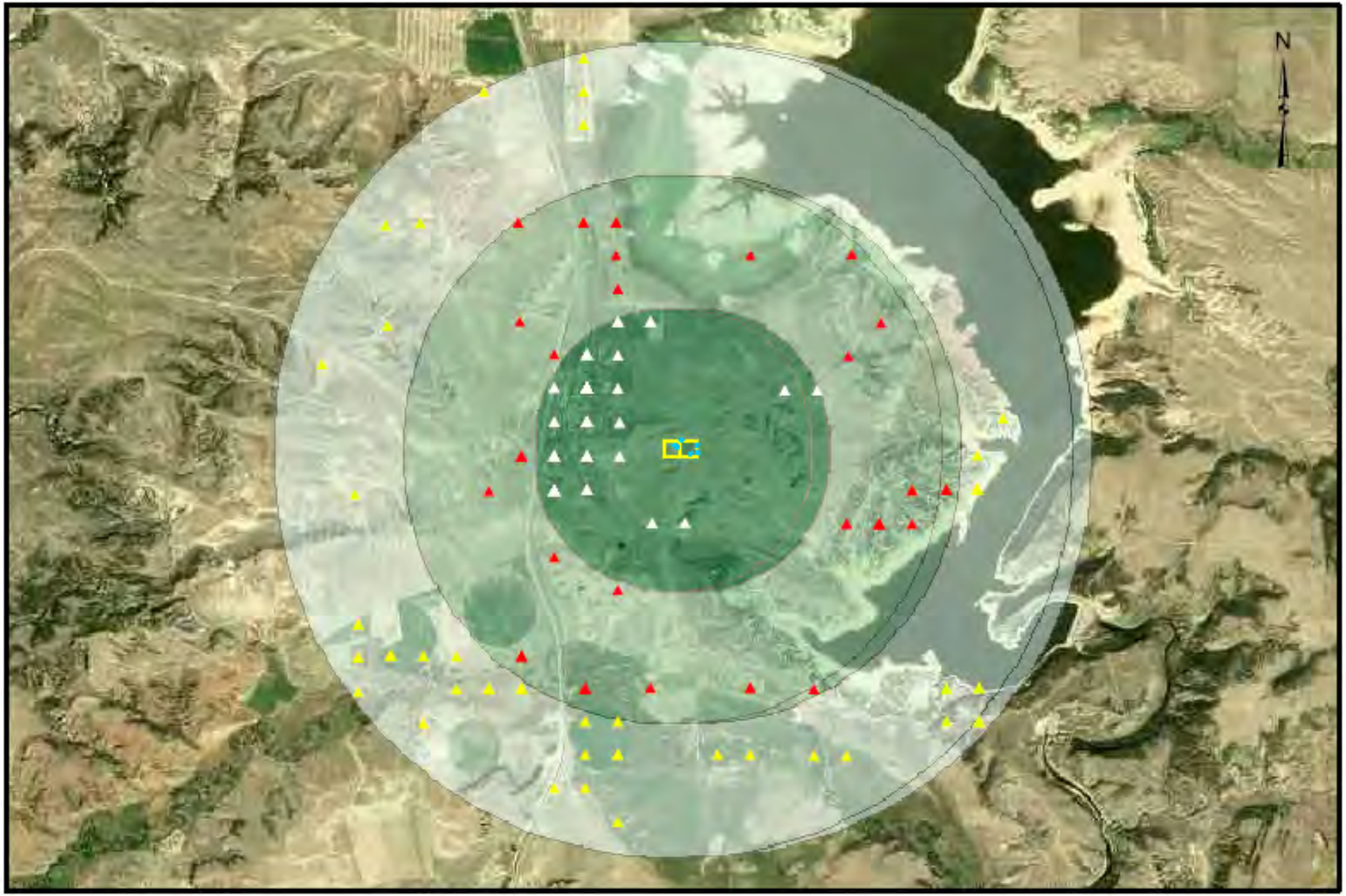
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through April 15, 2009.**

Comments: **Glendo #1 and #2 Landfills were evaluated for groundwater impacts as a single facility due to their proximity to each other.**

Contaminants higher in downgradient wells:

Chloride
Cyanide, Total Automated
Nitrogen, Nitrate+Nitrite as N
pH
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Glendo #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Glenrock #1** **File Number:** **10.235**

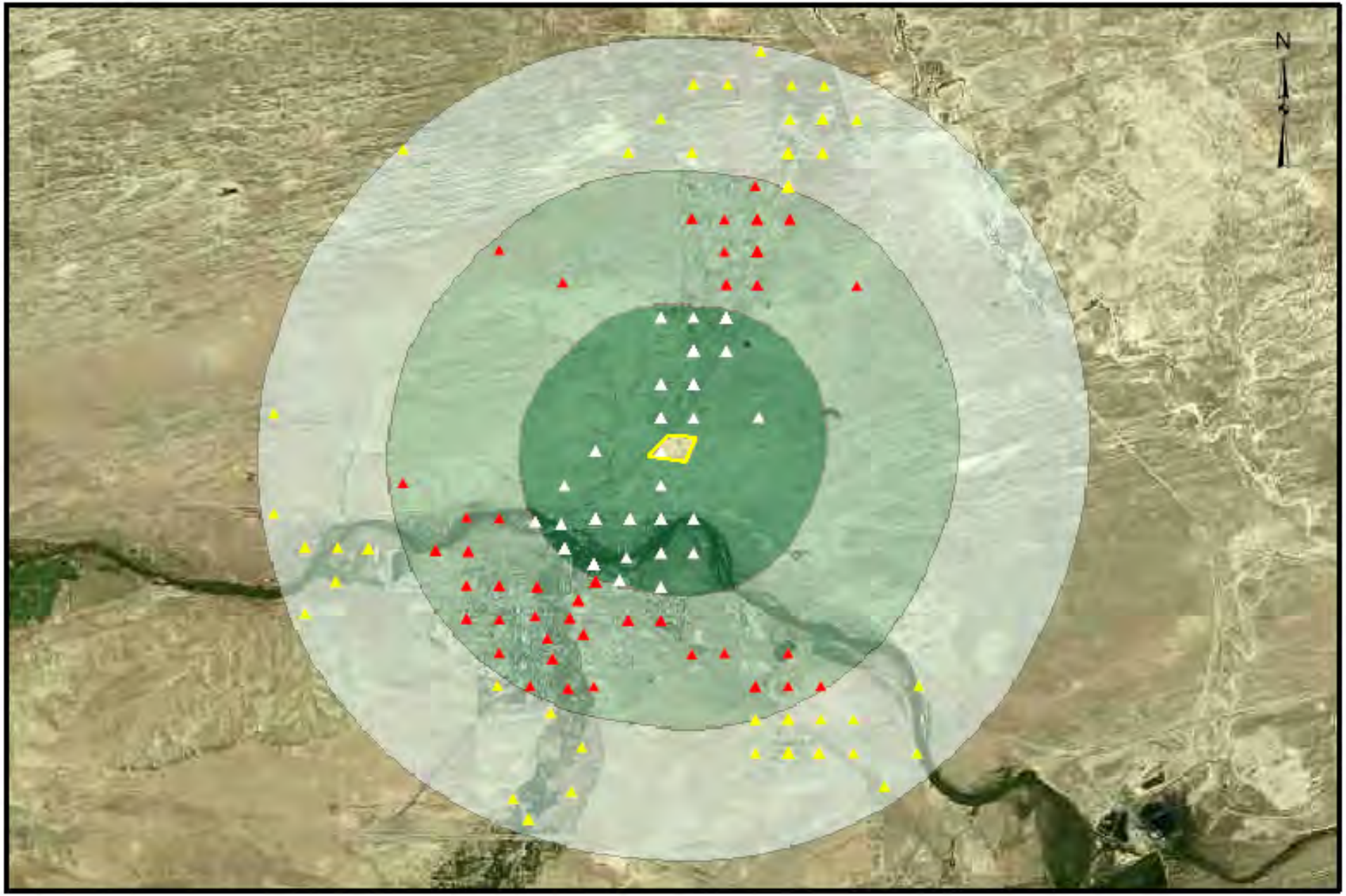
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 4, 2009.**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Cadmium
Chromium
Fluoride
Magnesium
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL was exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Glenrock Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

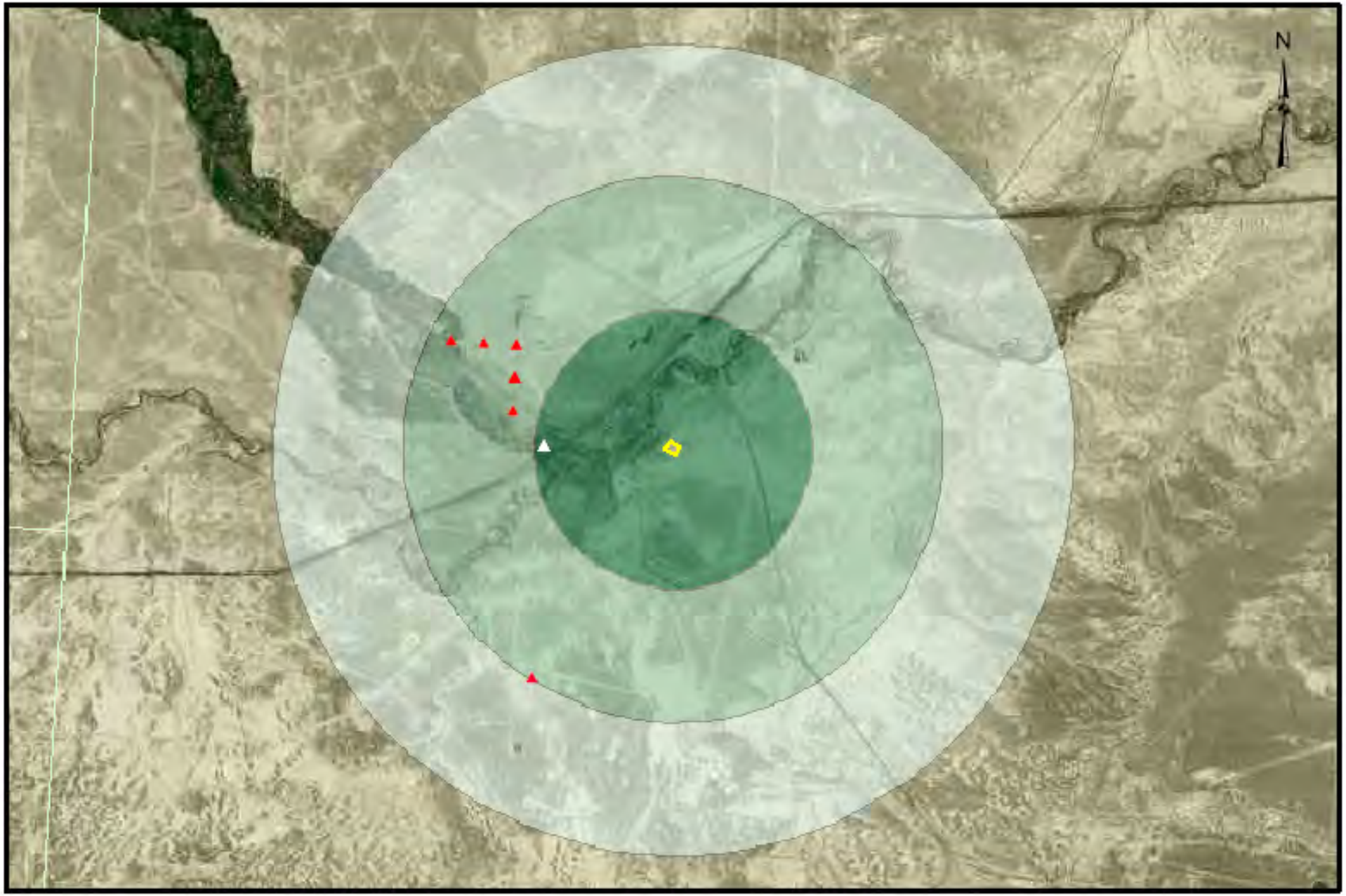
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Granger** **File Number:** **10.245**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **No wells installed. Located on private property.**



Water Supply Wells within 3 Miles of the Granger Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Green River #2** **File Number:** **10.255**

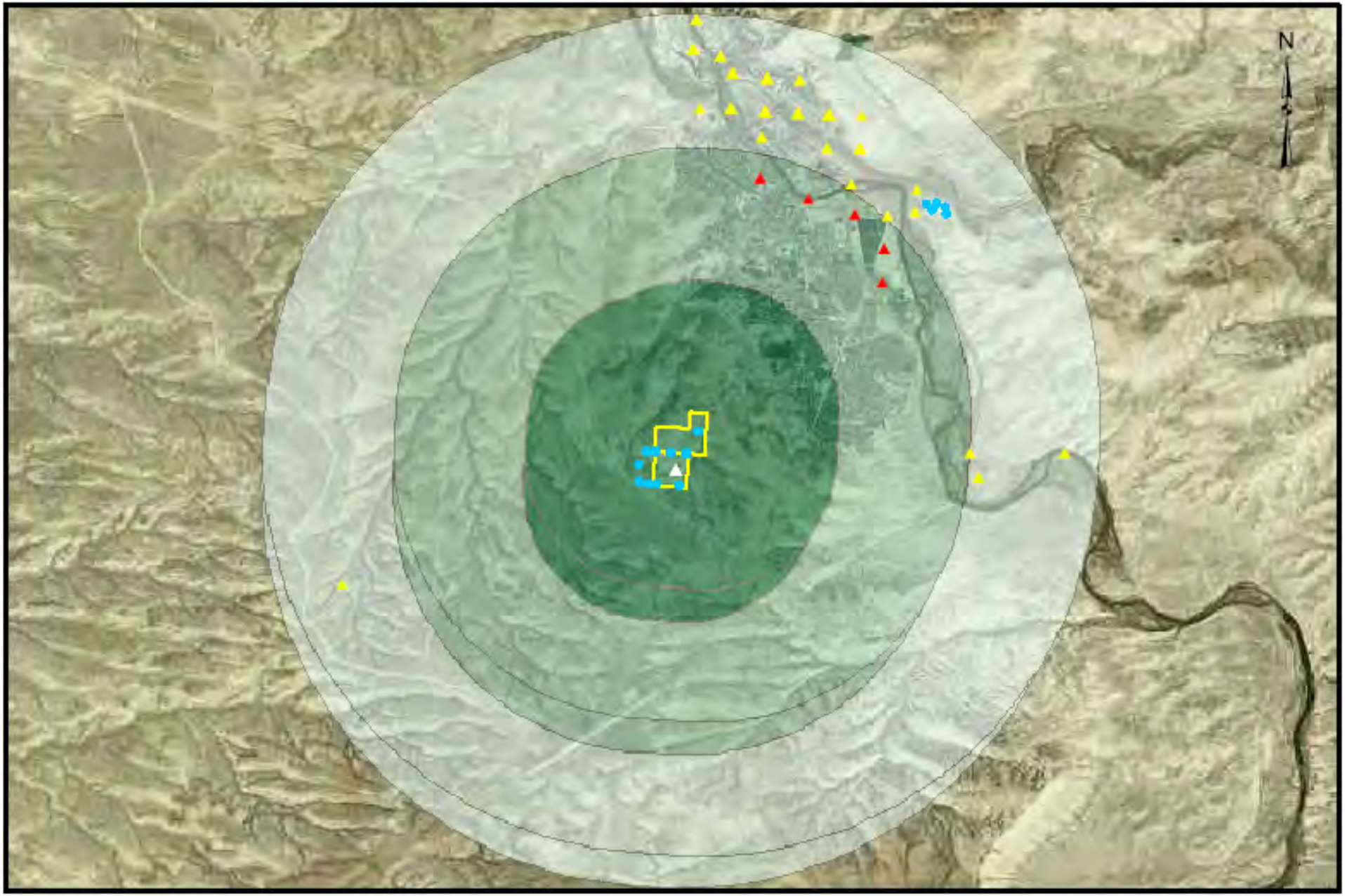
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 19, 2010**

Comments: **Green River #1 and Old Green River Landfills were evaluated for groundwater impacts as a single facility due to their proximity to each other.**

Contaminants higher in downgradient wells:

Calcium
Chloride
Fluoride
Magnesium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Green River #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Guernsey** **File Number:** **10.260**

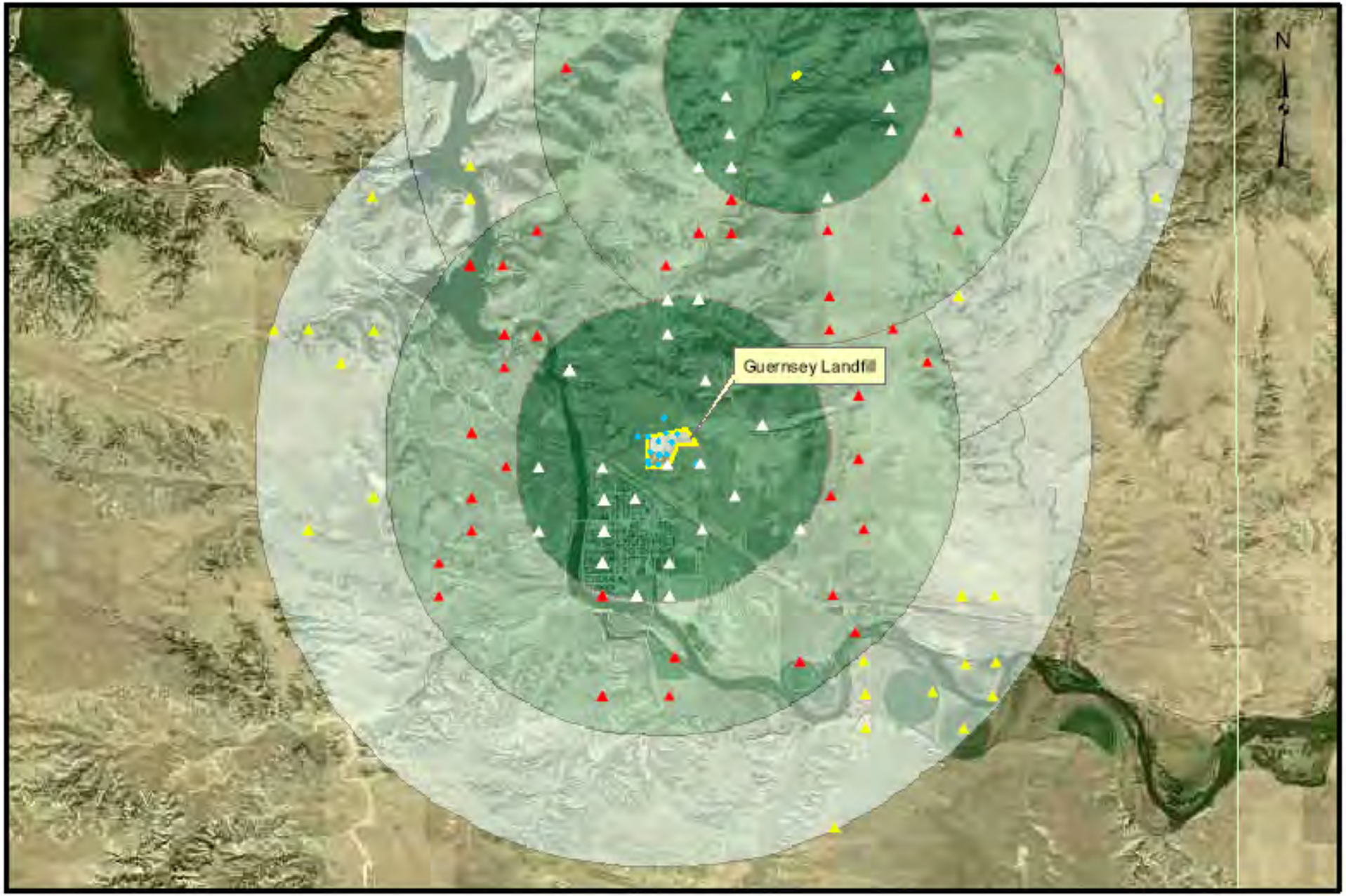
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 17, 2009**

Comments:

Contaminants higher in downgradient wells:

Antimony
Arsenic
Barium
Beryllium
Bicarbonate as HCO3
Chloride
Chloroethane
Chromium
Dichlorobenzene, 1,4-
Dichloroethane, 1,1-
Dichloroethene, cis-1,2-
Fluoride
Iron
Magnesium
Manganese
Methylene chloride
Nickel
Nitrogen, Nitrate+Nitrite as N
Sodium
Solids, Total Dissolved TDS @ 180 C
Tetrachloroethene
Vanadium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Guernsey Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

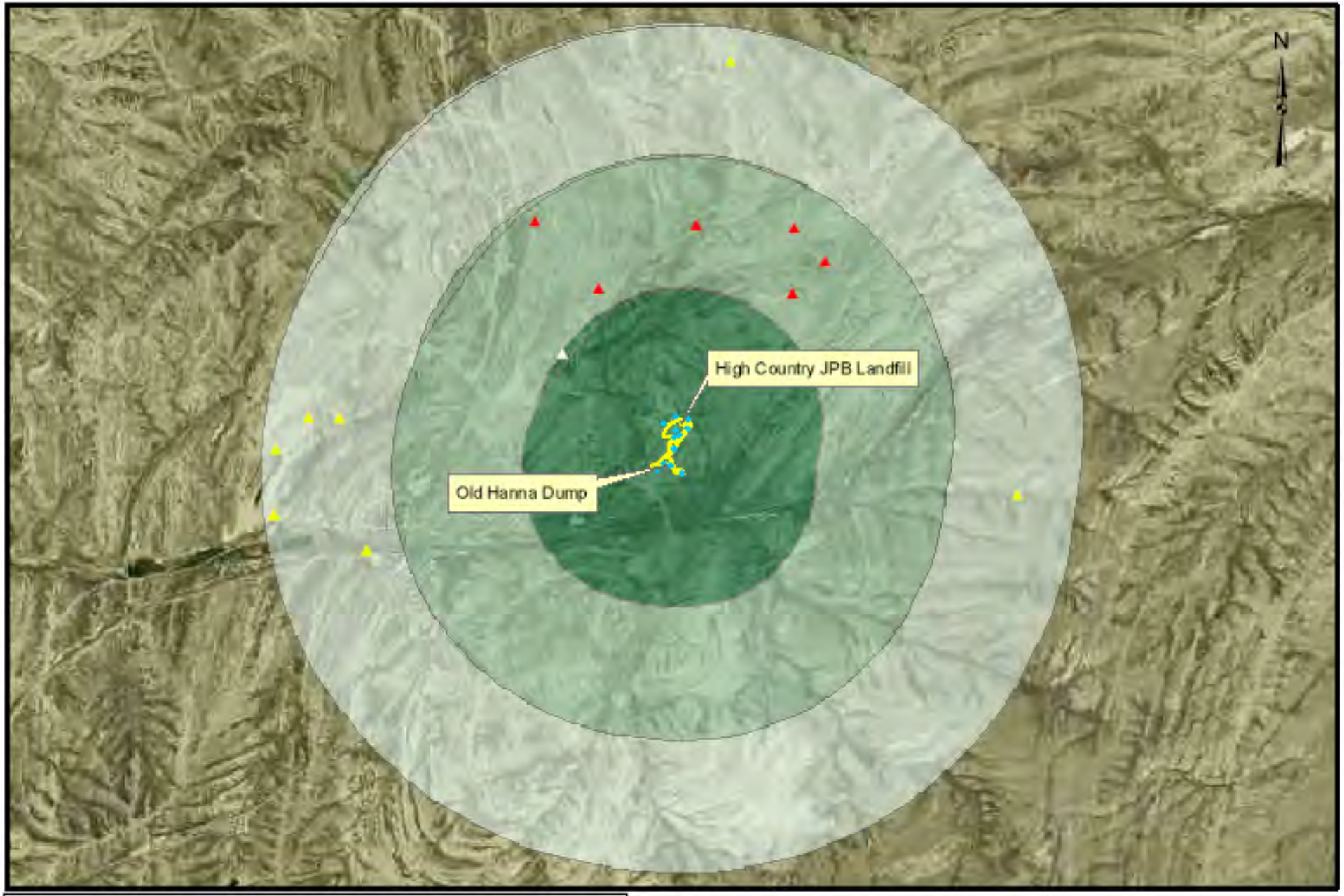
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Hanna** **File Number:** **10.270**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **Insufficient number of samples collected to evaluate, as of the date of this report.**



Water Supply Wells within 3 Miles of the Old Hanna Dump & High Country JPB Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

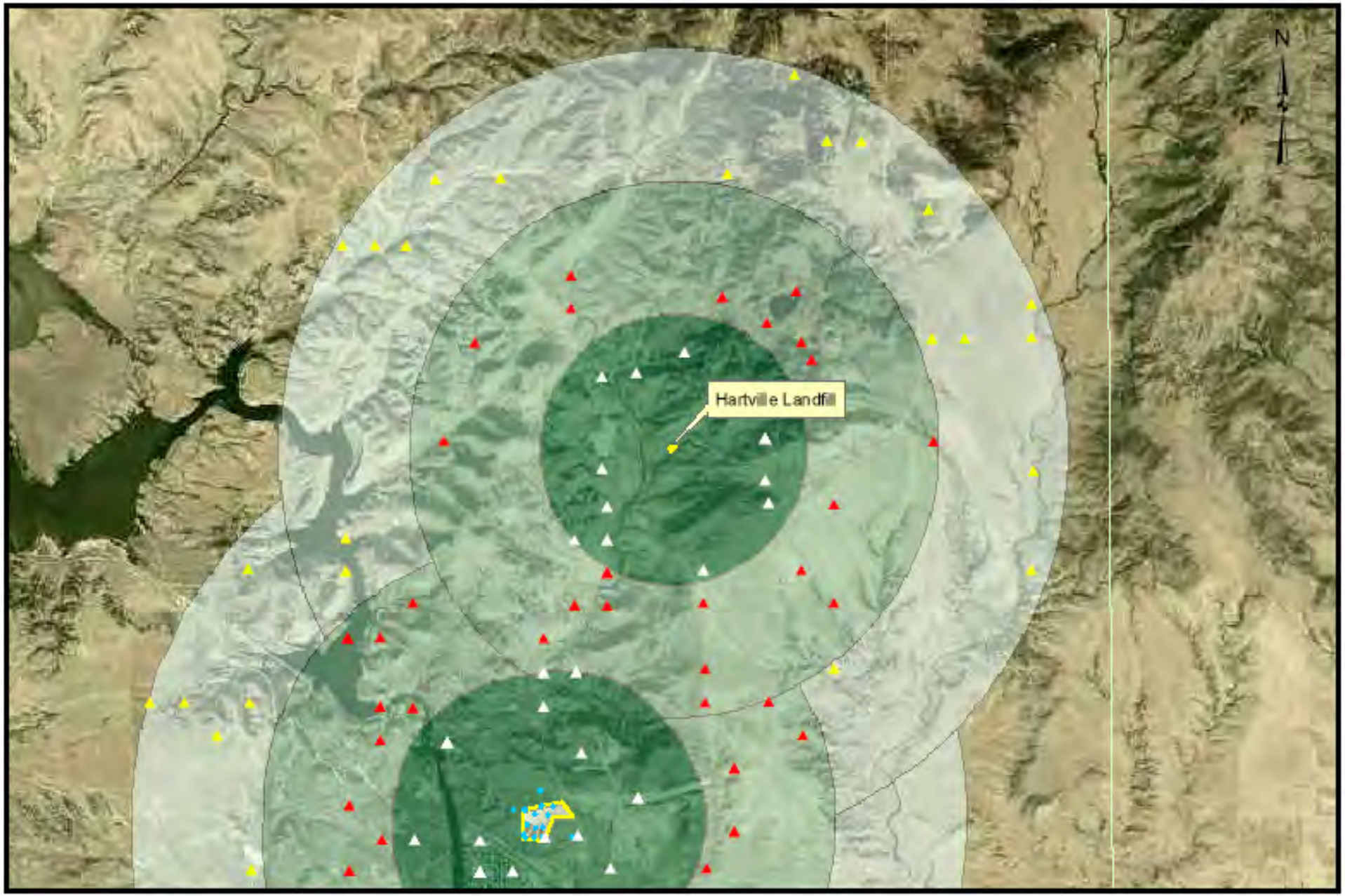
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Hartville** **File Number:** **10.275**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **No wells installed.**



Water Supply Wells within 3 Miles of the Hartville Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **High Country JBP** **File Number:** **10.280**

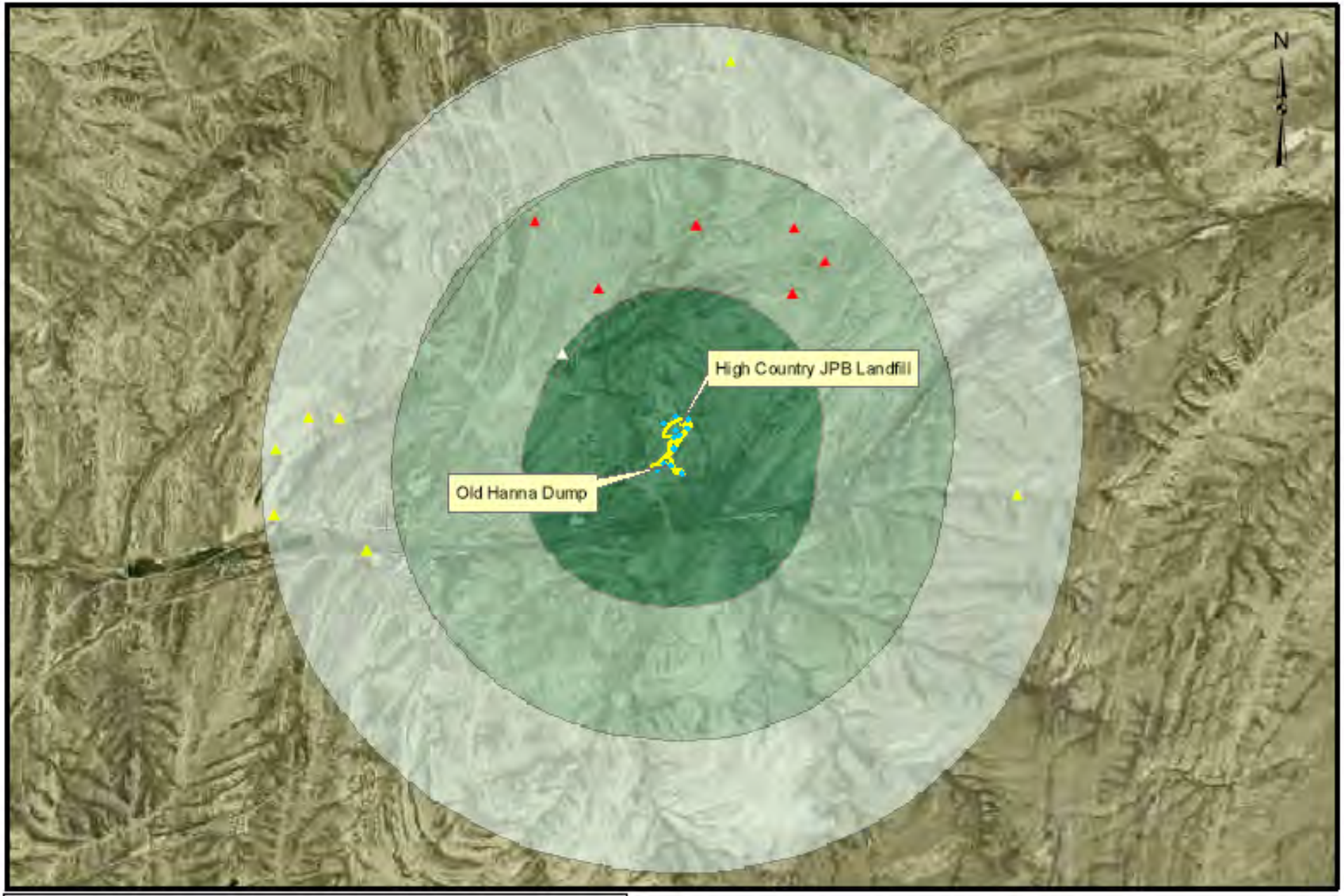
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through September 3, 2009**

Comments: **No recent organic analyses have been conducted for samples from this site.**

Contaminants higher in downgradient wells:

Arsenic
Barium
Calcium
Chloride
Iron
Manganese
Nitrogen, Nitrate+Nitrite as N

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Old Hanna Dump & High Country JPB Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Hulett #1** **File Number:** **10.285**

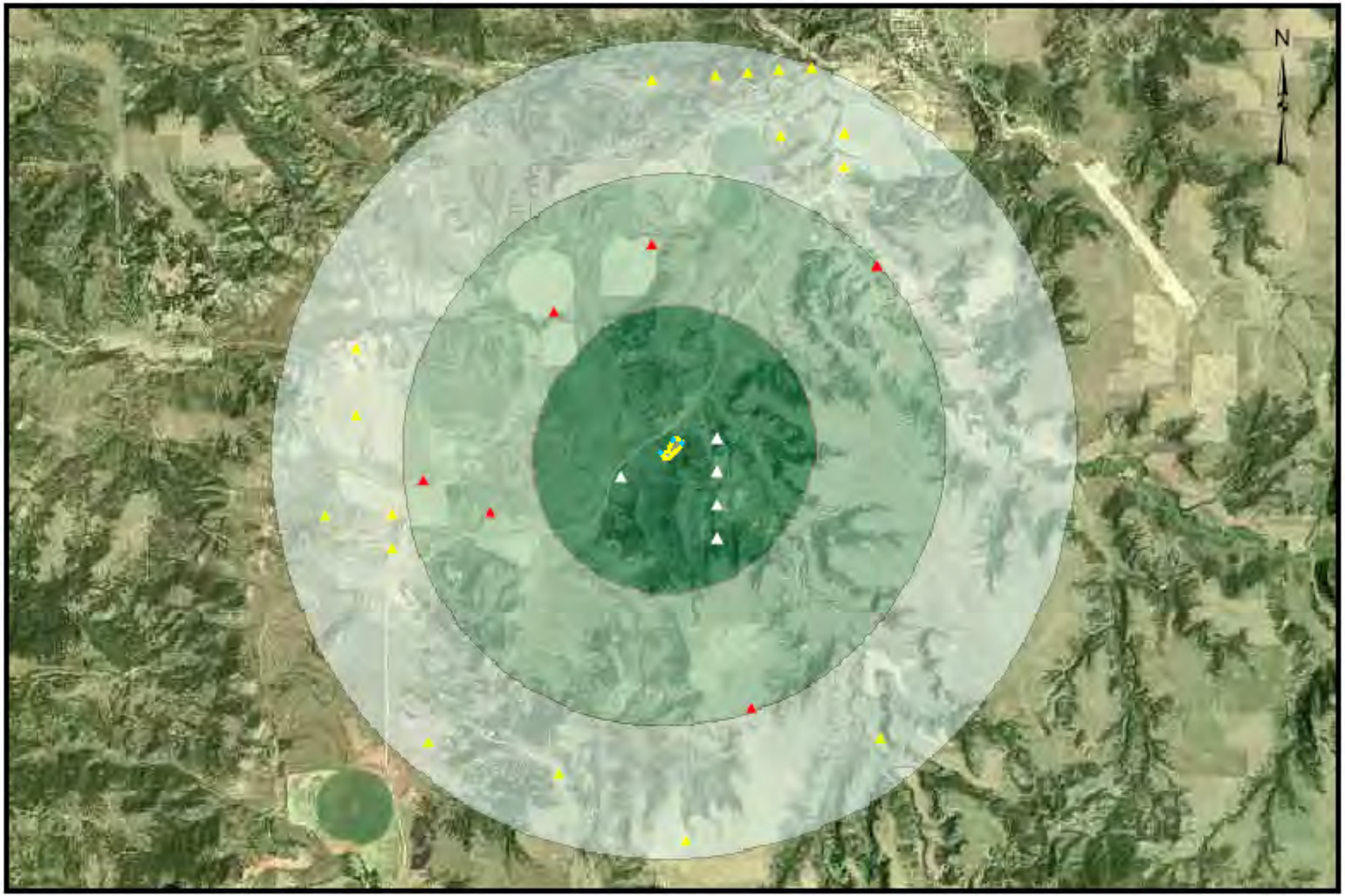
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through August 31, 2009**

Comments:

Contaminants higher in downgradient wells:

Calcium
Chloride
Fluoride
Lead
Magnesium
Nitrogen, Nitrate+Nitrite as N
Potassium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Hulett Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Hyattville** **File Number:** **10.300**

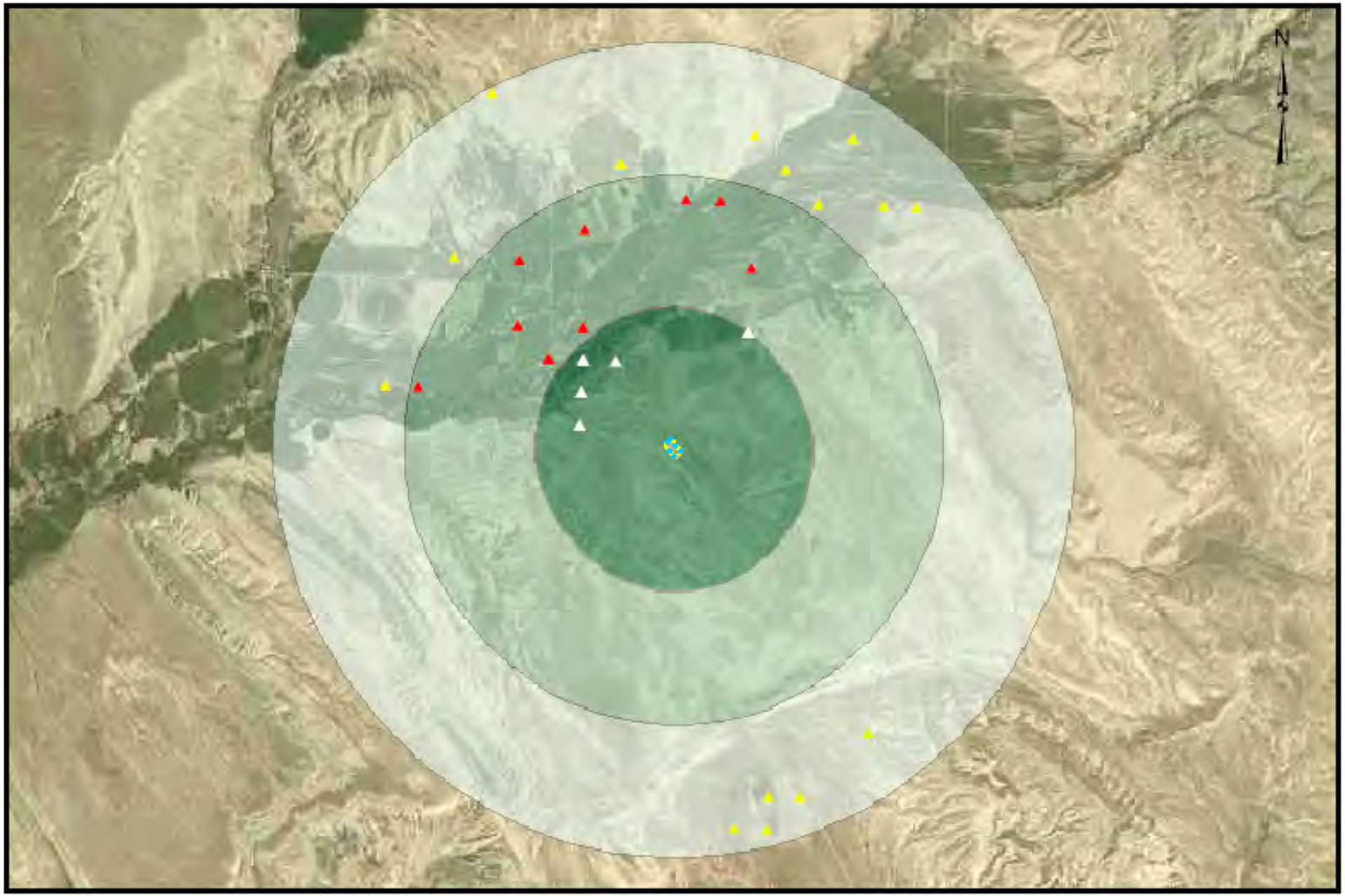
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through August 18, 2009**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Calcium
Chloride
Magnesium
Nitrogen, Nitrate+Nitrite as N
pH
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Hyattville Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Kaycee** **File Number:** **10.305**

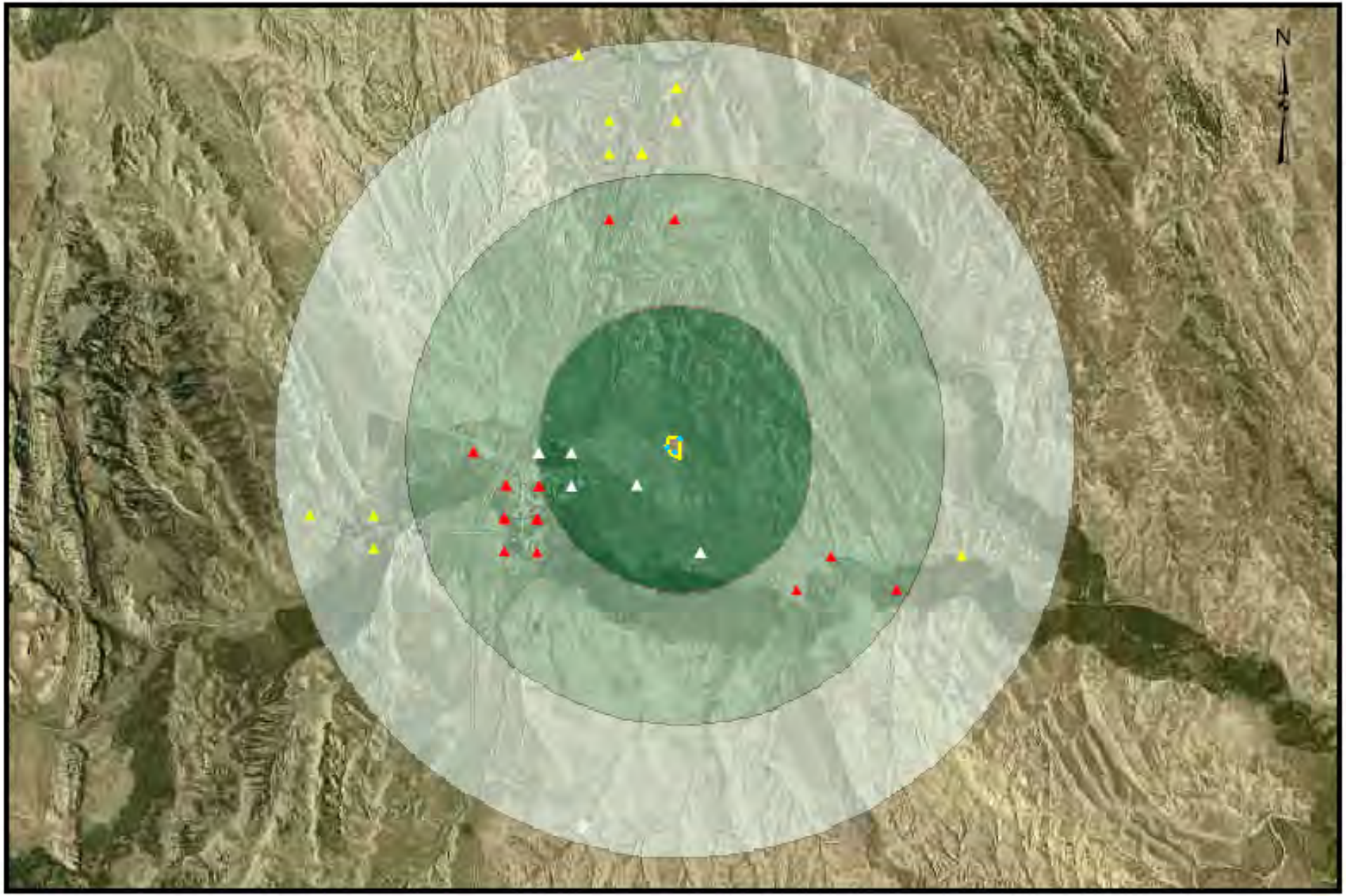
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through September 14, 2009**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Fluoride
Magnesium
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
pH
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Thallium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Kaycee Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **LaBarge** **File Number:** **10.310**

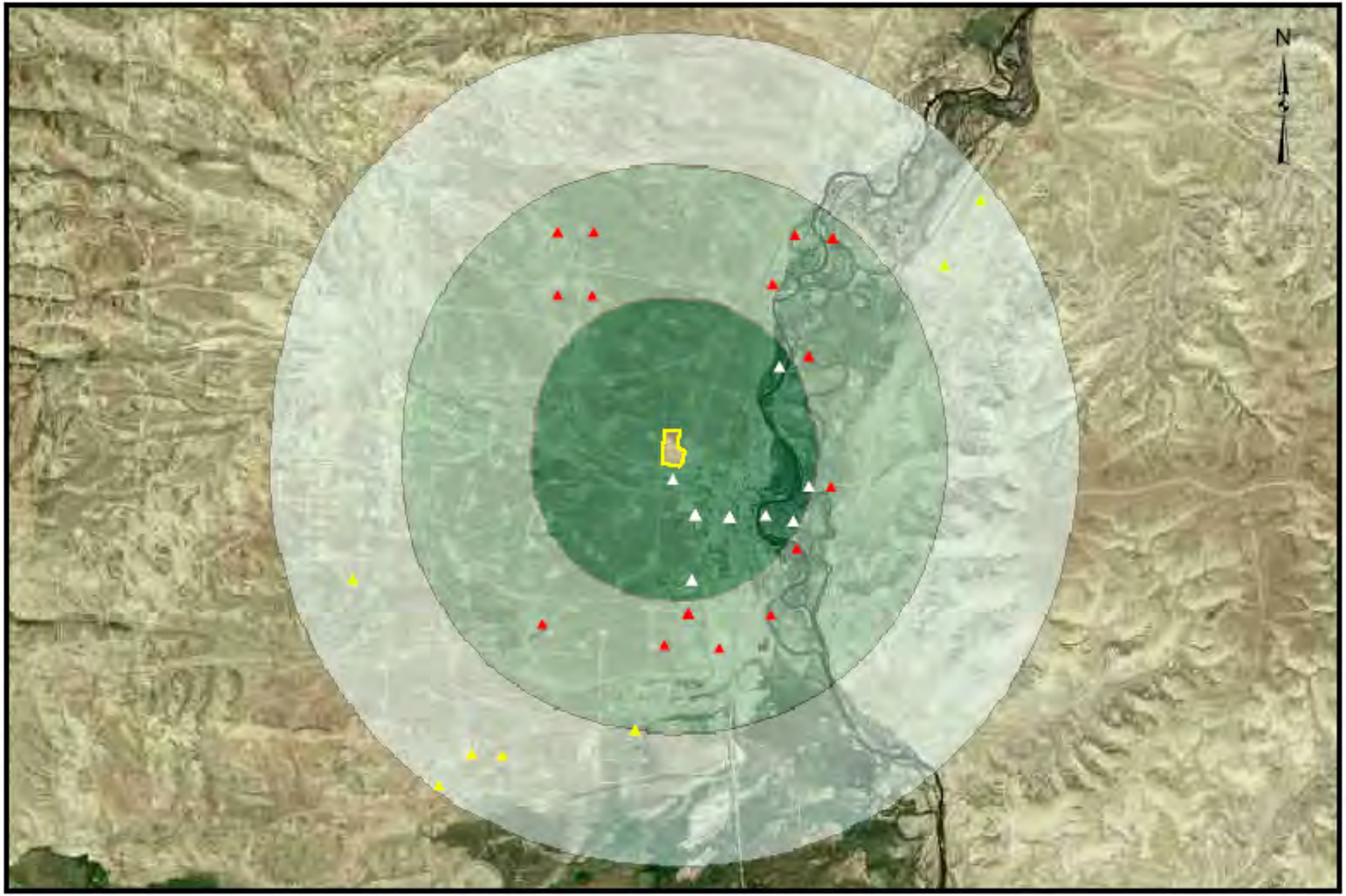
Groundwater Status: **Inadequate data to conduct statistical analysis or inadequacies of monitoring system introduce significant uncertainty. Data suggest that contamination may be present based on sampling results conducted through .**

Comments:

Contaminants higher in downgradient wells:

Chloride
Chloroethane
Methylene chloride
Trichloroethene
Tetrachloroethene
Sulfate
Solids, Total Dissolved TDS @ 180 C
Dichloroethane, 1,1-
Bicarbonate as HCO3

*NOTE: **Bold** blue text indicates groundwater protection standard is suspected of being exceeded for this constituent.*



Water Supply Wells within 3 Miles of the LaBarge Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **LaGrange** **File Number:** **10.315**

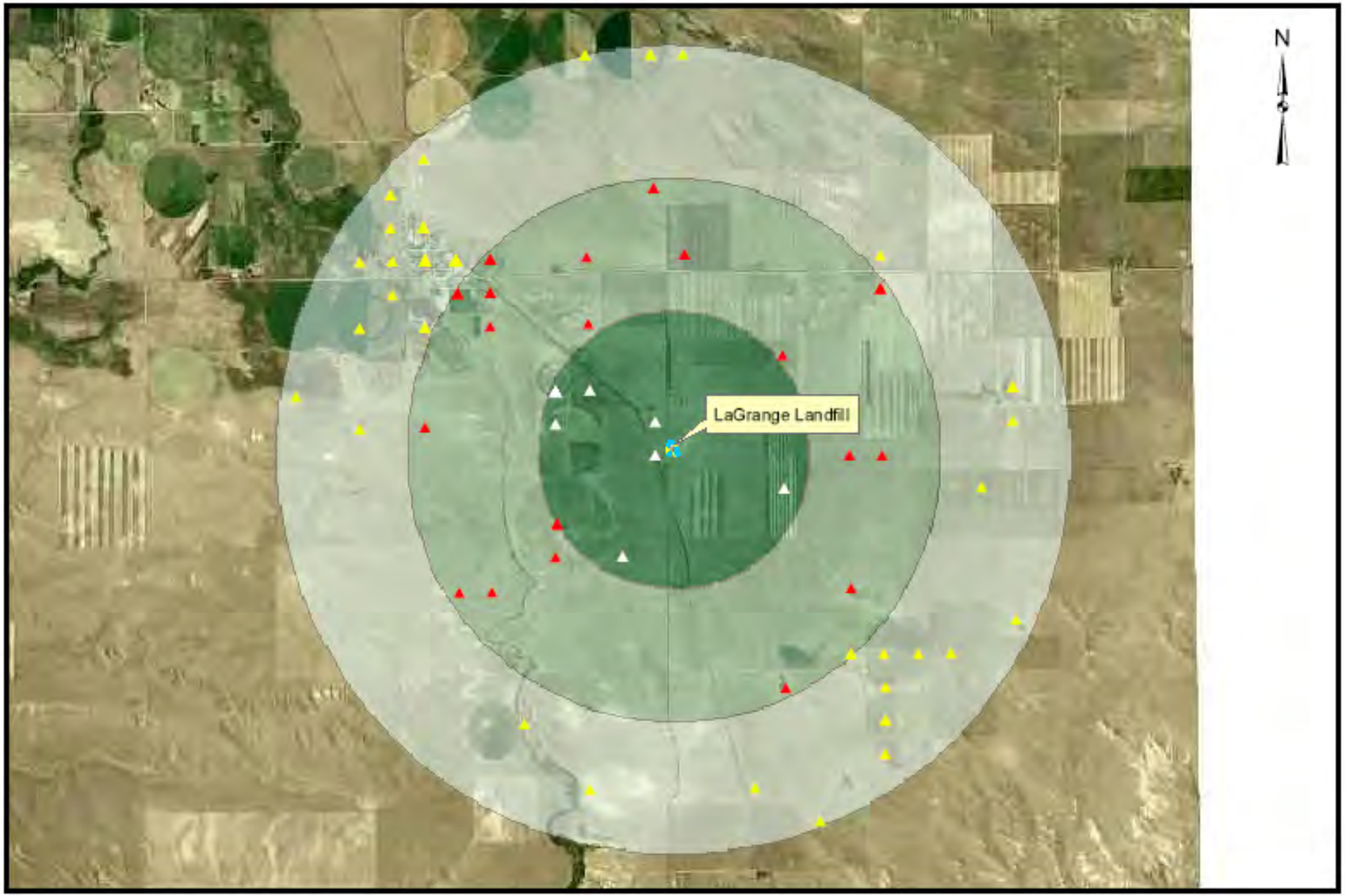
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 16, 2009**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Barium
Bicarbonate as HCO3
Calcium
Chloride
Fluoride
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the LaGrange Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Laramie** **File Number:** **10.320**

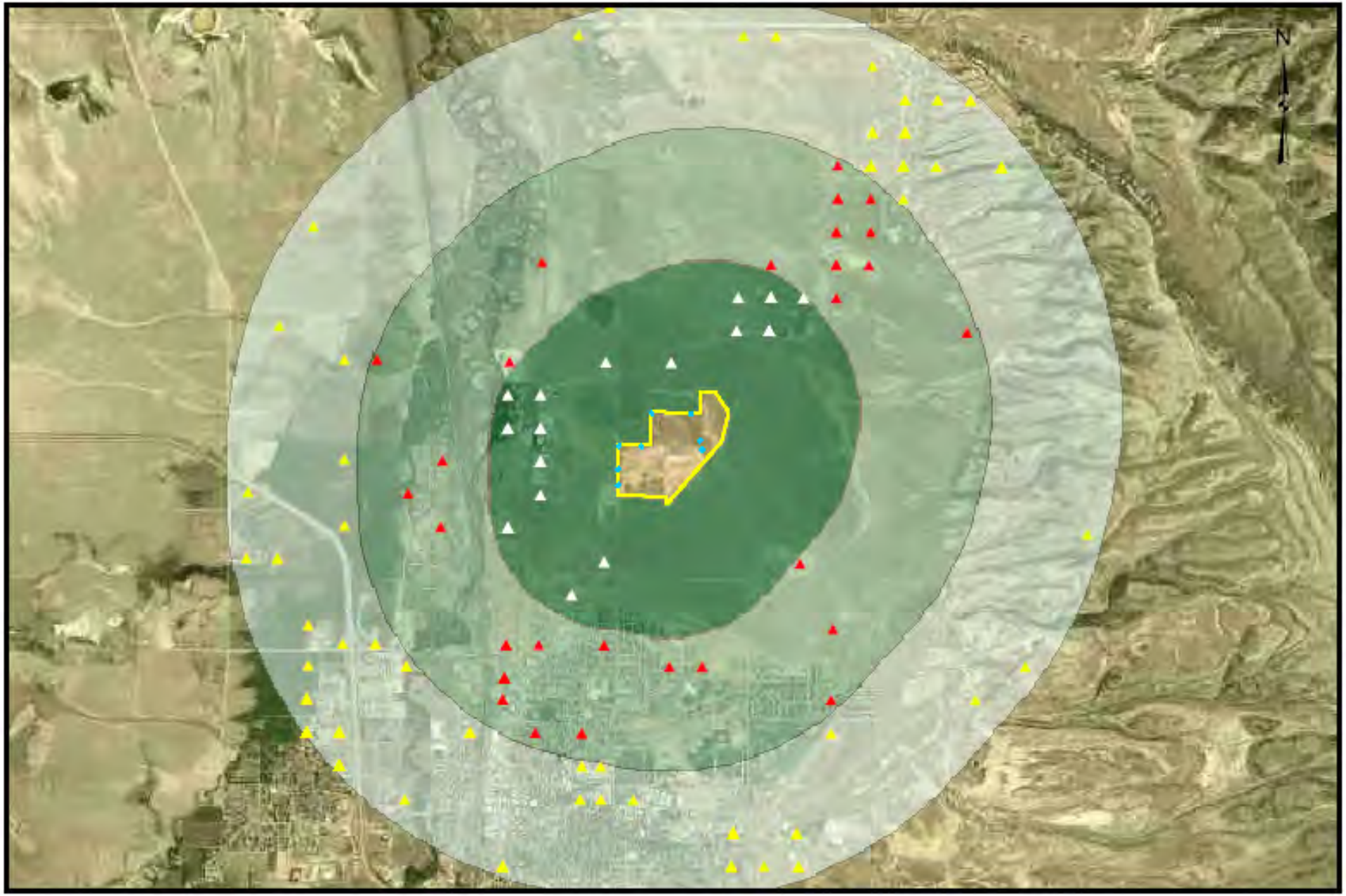
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 8, 2009**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Barium
Beryllium
Bicarbonate as HCO3
Calcium
Chloride
Copper
Fluoride
Iron
Lead
Magnesium
Manganese
Nickel
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
pH
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Tetrachloroethene
Trichloroethane, 1,1,1-
Trichlorofluoromethane
Vanadium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Laramie Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Eastern Laramie County SWDD** **File Number:** **10.330**

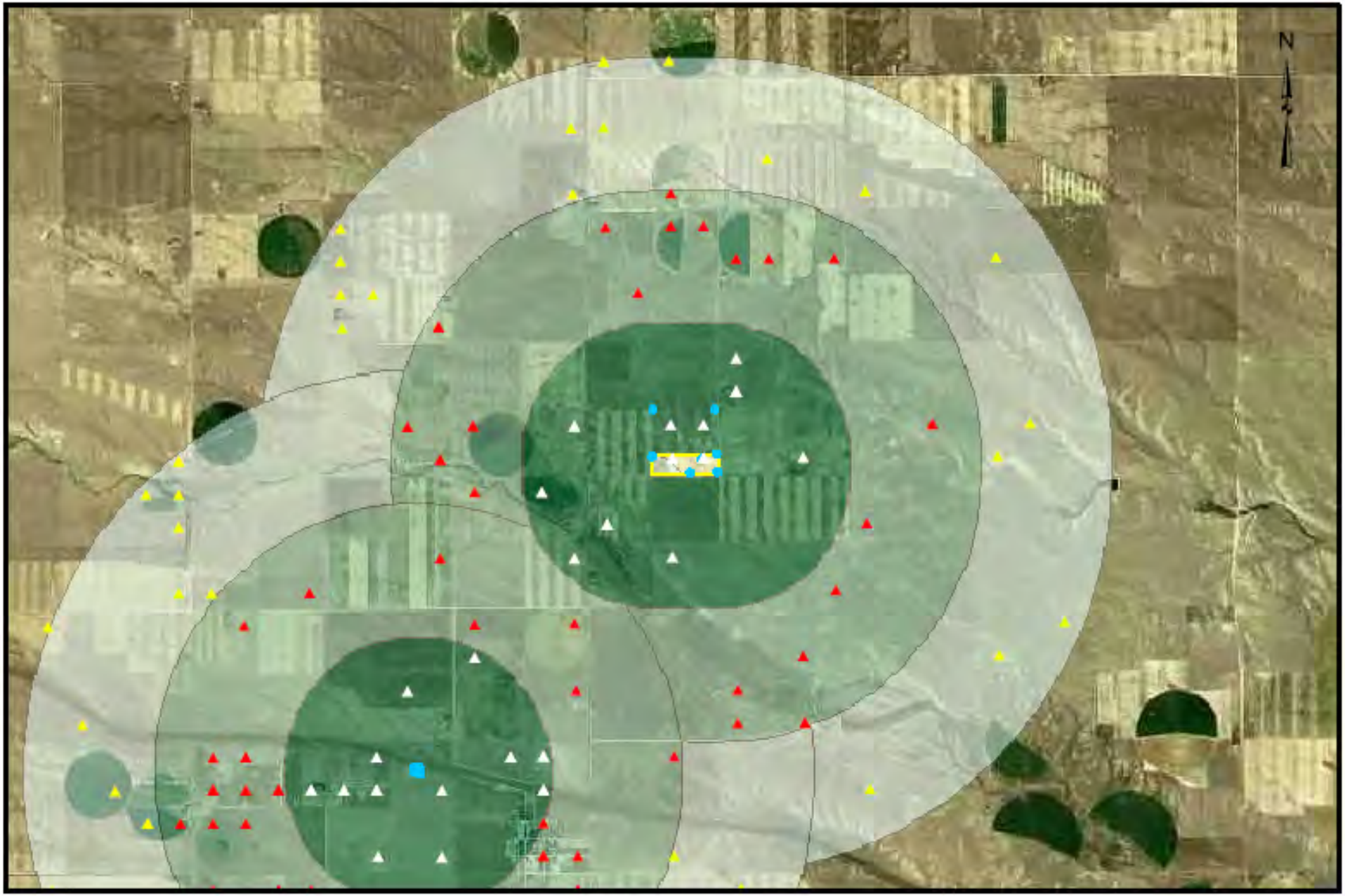
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 29, 2009**

Comments: **Recent data representing upgadient conditions not available due to accumulation of silt in upgradient well. Data quality concerns associated with analyses as a result of accumulation of silt in a number wells which prevented collection of samples from all wells.**

Contaminants higher in downgradient wells:

Barium
Bicarbonate as HCO3
Chloride
Magnesium
Nitrogen, Nitrate+Nitrite as N
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Eastern Laramie County SWDD Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

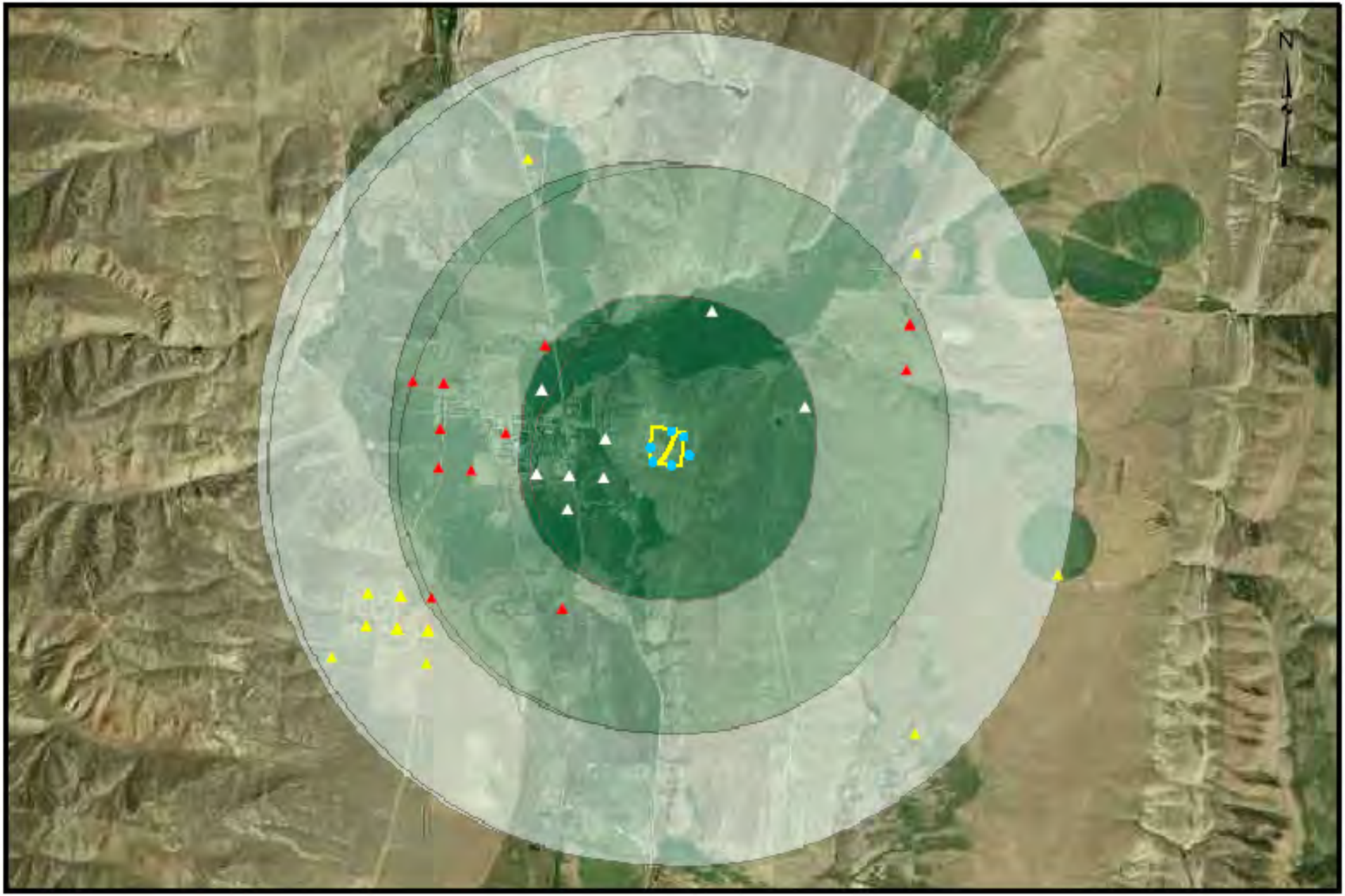
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Cokeville #1** **File Number:** **10.335**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Cokeville #1 and #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

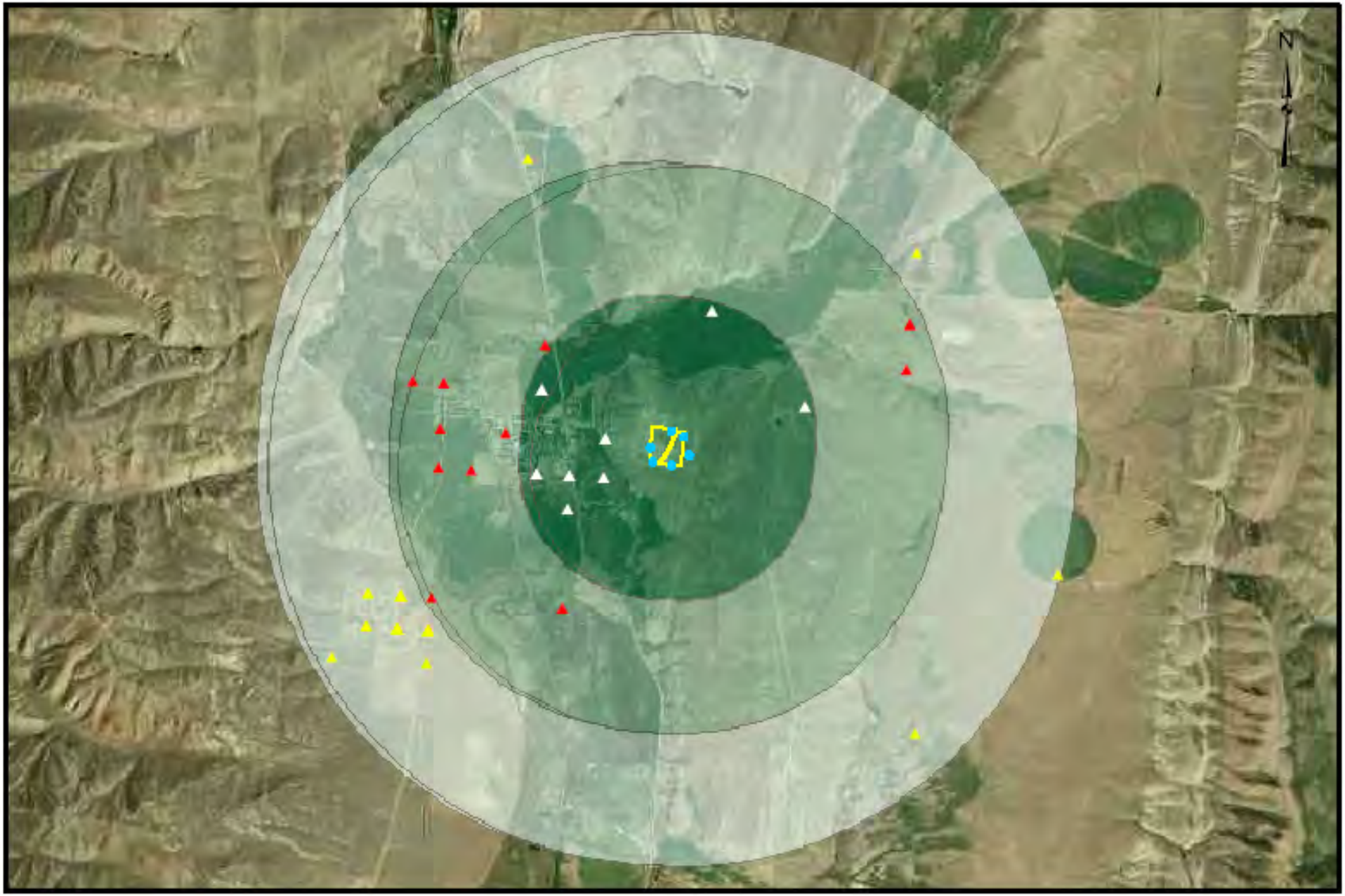
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Cokeville #2** **File Number:** **10.336**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Cokeville #1 and #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Thayne** **File Number:** **10.340**

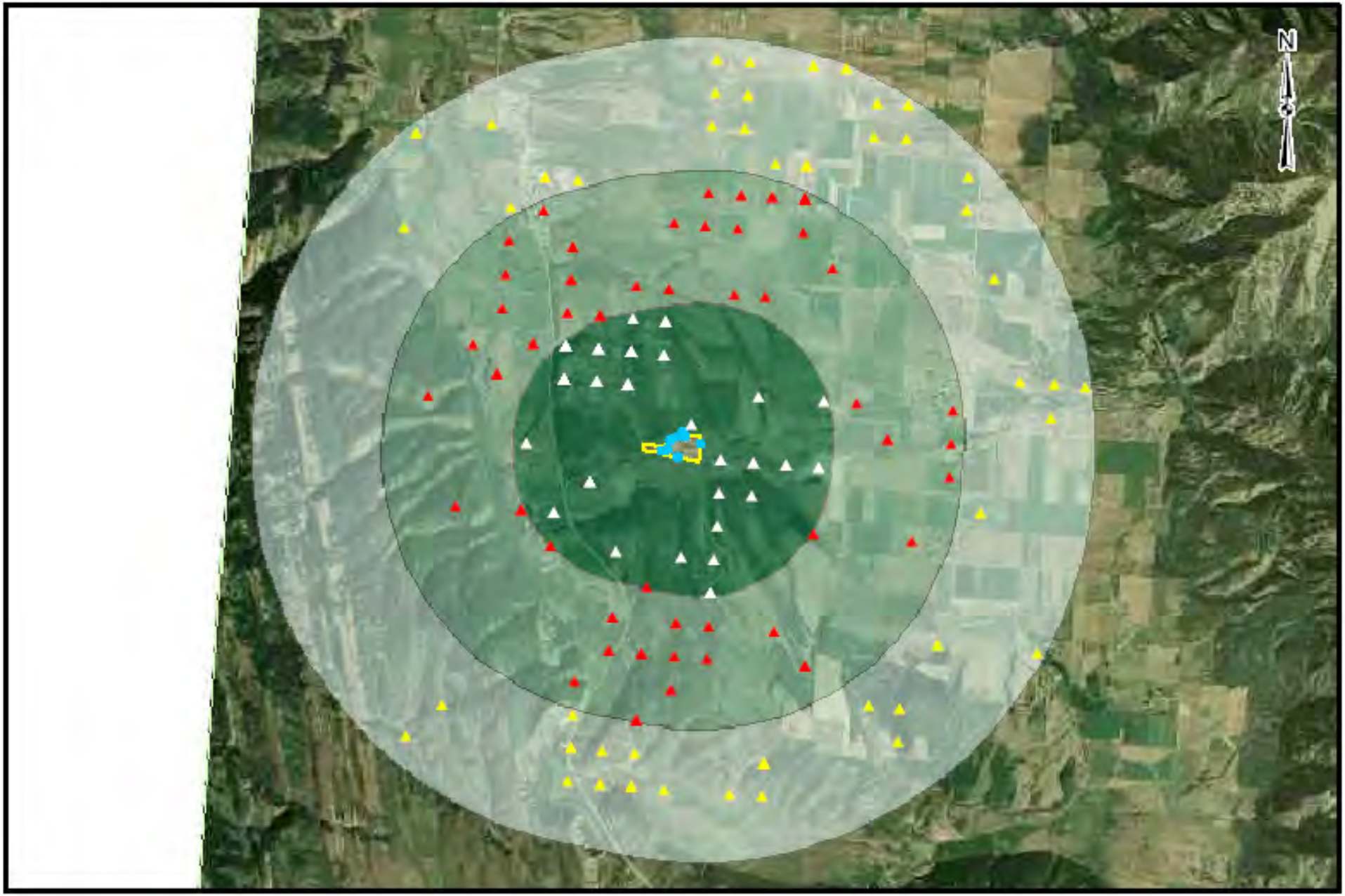
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 2, 2009**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Cadmium
Calcium
Chloride
Cobalt
Magnesium
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Sodium
Solids, Total Dissolved TDS @ 180 C

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Thayne Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Kemmerer #1** **File Number:** **10.345**

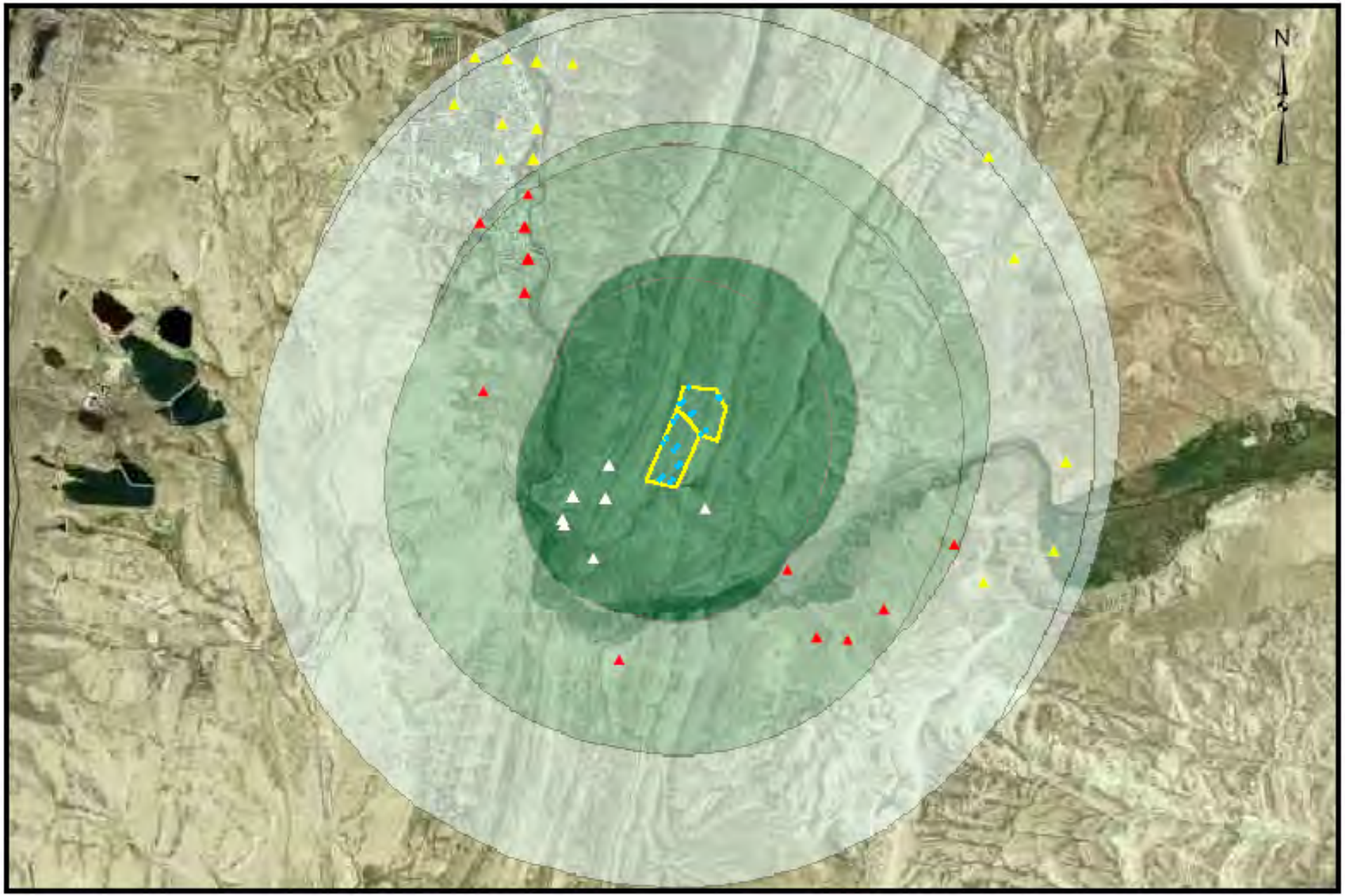
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through**

Comments:

Contaminants higher in downgradient wells:

Barium
Beryllium
Cadmium
Calcium
Chloride
Chromium
Cobalt
Copper
Dichloroethane, 1,1-
Dichloroethene, 1,1-
Hardness
Iron
Lead
Magnesium
Manganese
Methylene chloride
Nickel
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
pH
Potassium
Selenium
Solids, Total Dissolved TDS @ 180 C
Thallium
Trichloroethane, 1,1,1-
Vanadium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Kemmer #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Kemmerer #2** **File Number:** **10.346**

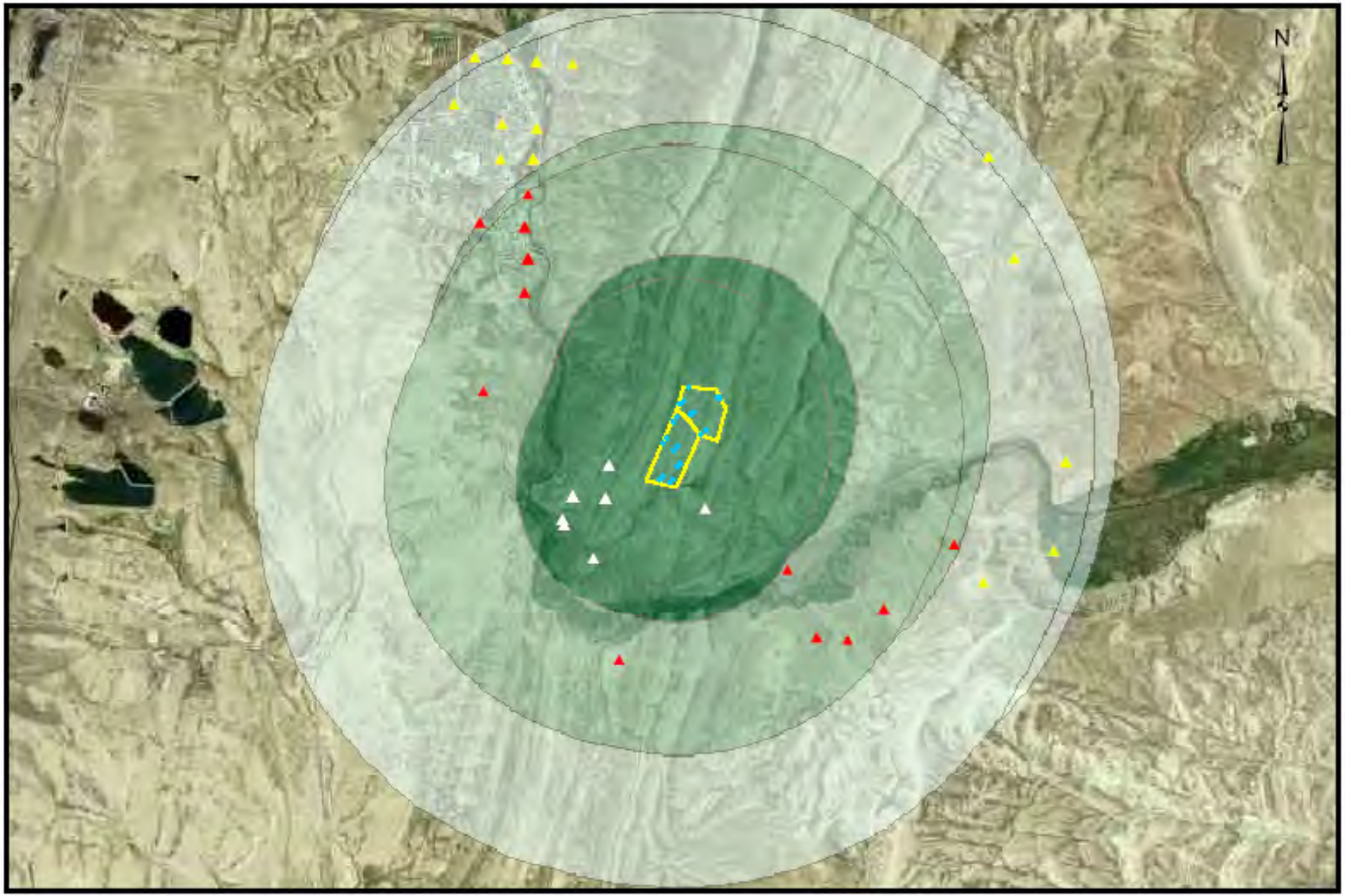
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 3, 2009**

Comments:

Contaminants higher in downgradient wells:

Beryllium
Bicarbonate as HCO3
Iron
Lead

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Kemmer #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: Lusk **File Number:** 10.360

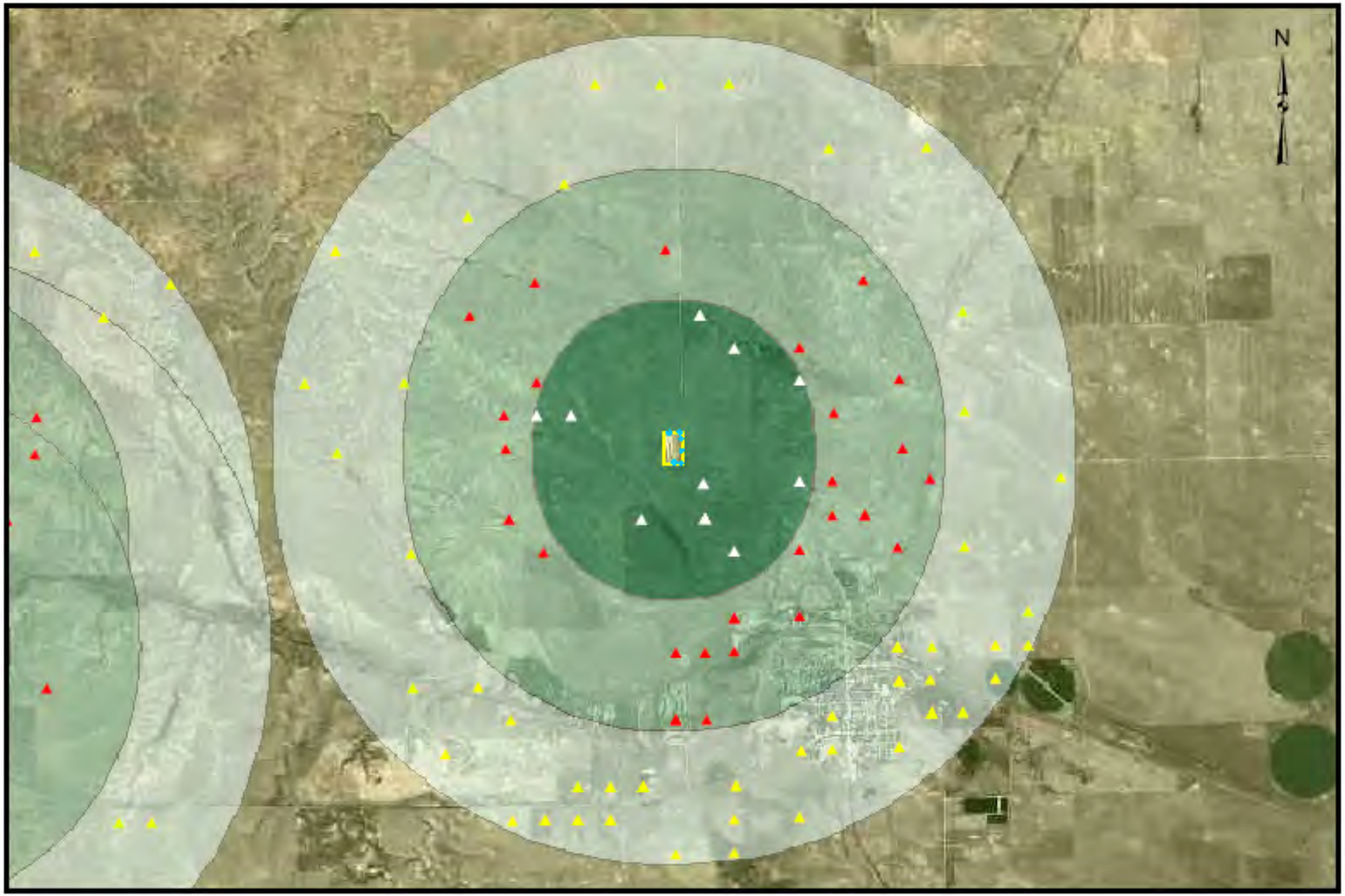
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 19, 2009**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Barium
Bicarbonate as HCO3
Calcium
Chloride
Cobalt
Dichlorobenzene, 1,4-
Dichloroethene, cis-1,2-
Iron
Magnesium
Methylene chloride
Nitrogen, Nitrate+Nitrite as N
pH
Potassium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Tetrachloroethene
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Lusk Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

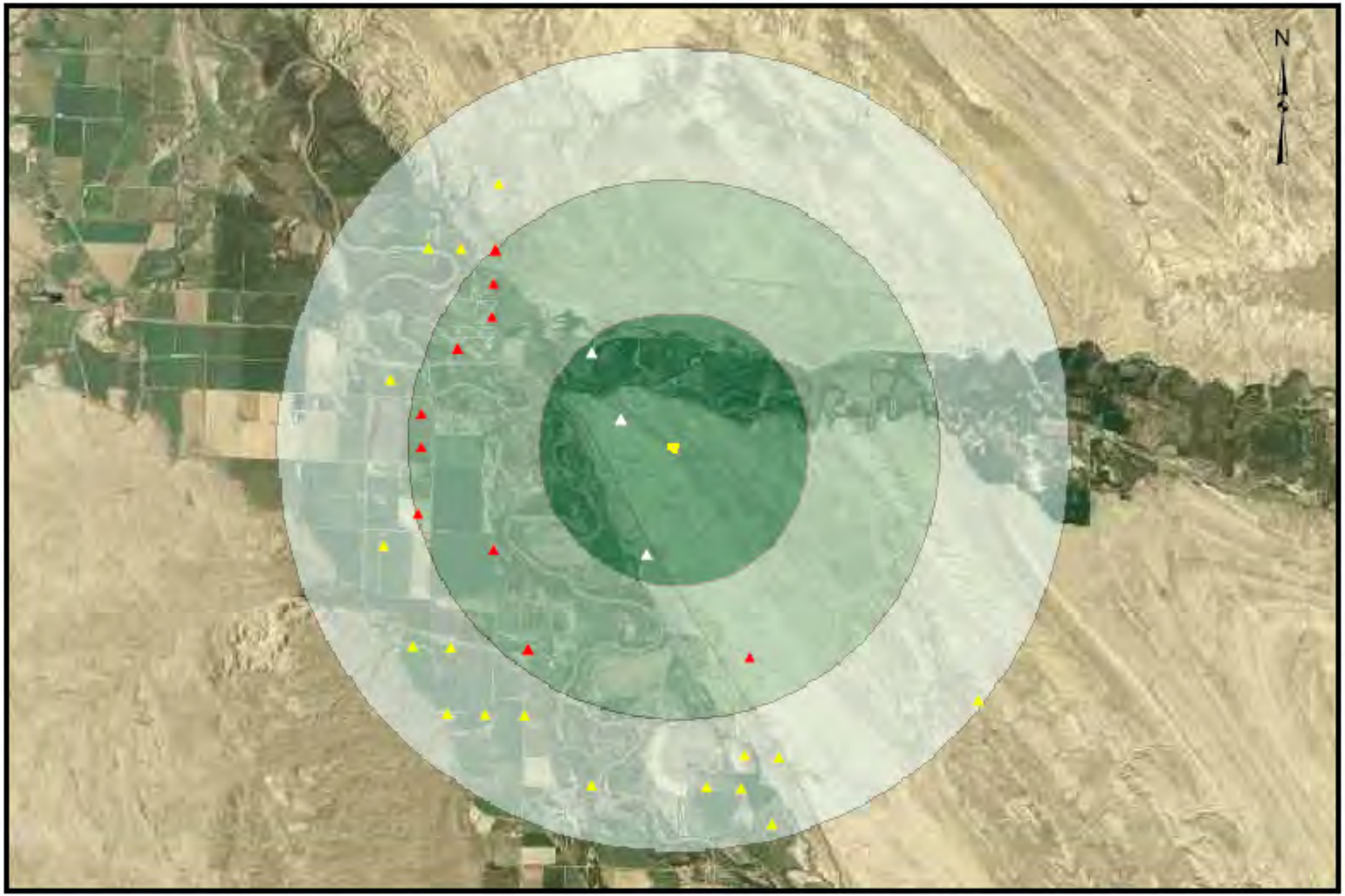
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Manderson #1** **File Number:** **10.365**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Manderson Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

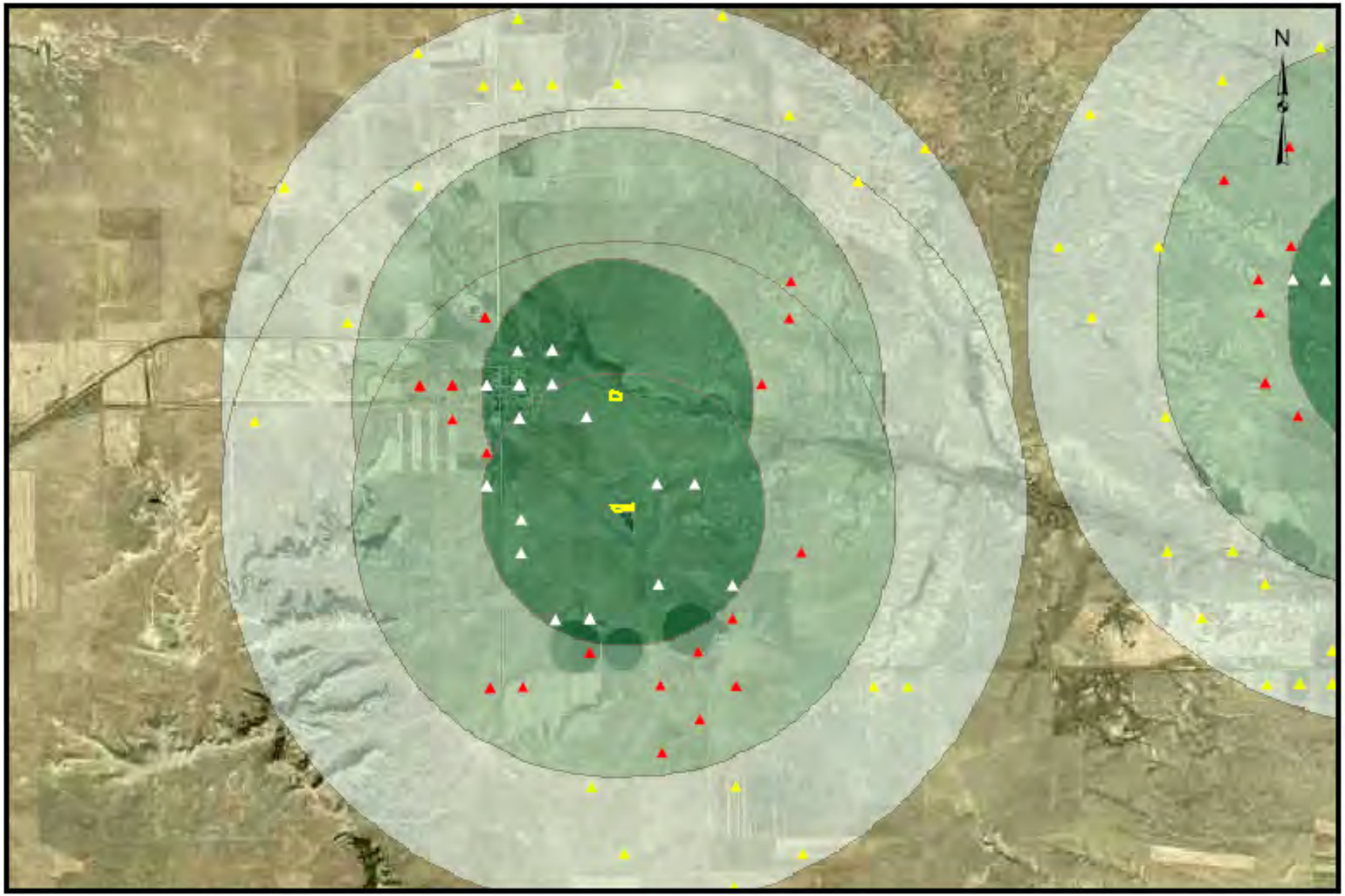
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Manville #1** **File Number:** **10.375**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **No wells were installed.**



Water Supply Wells within 3 Miles of the Manville #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

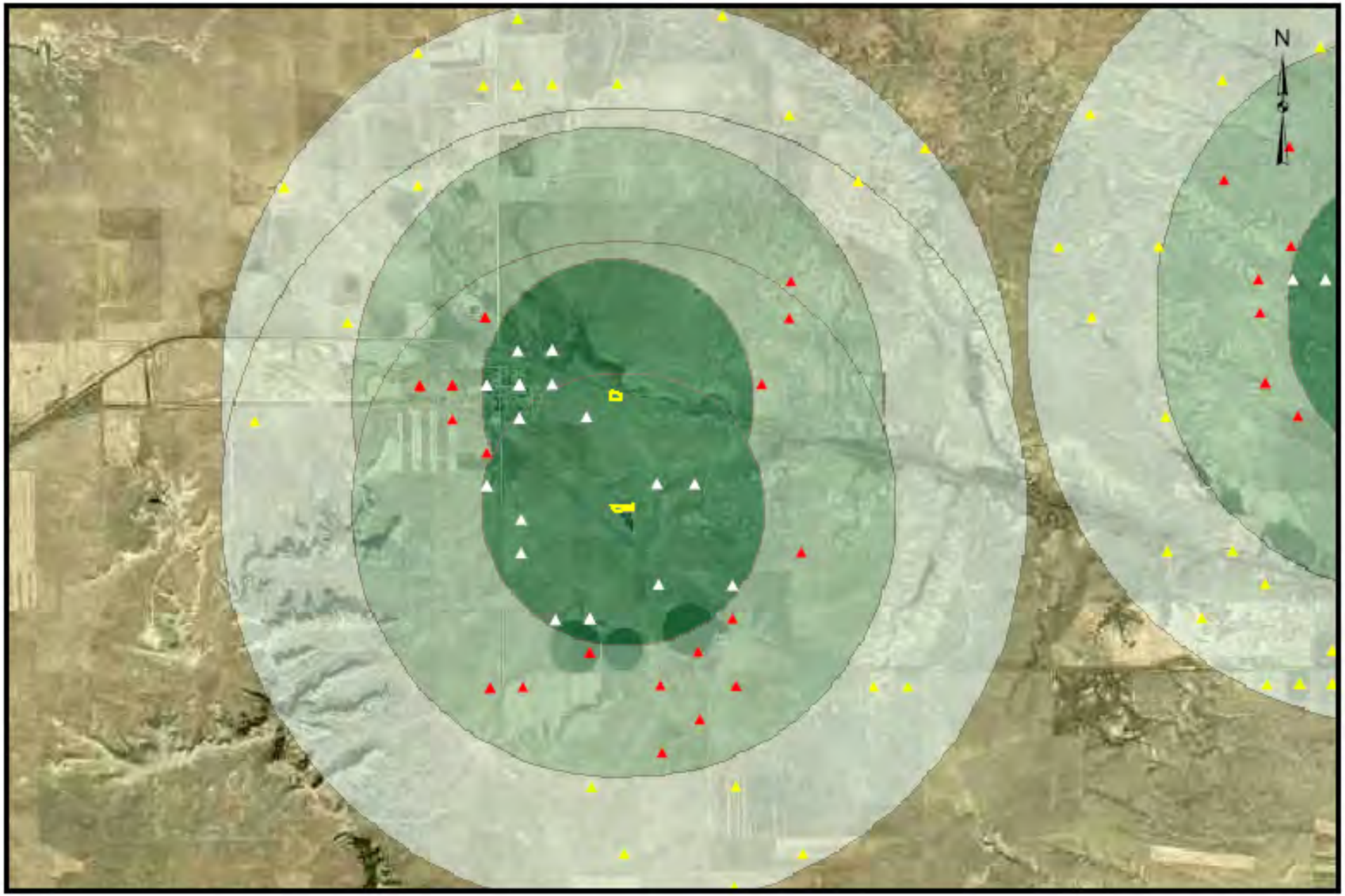
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Manville #2** **File Number:** **10.376**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **Data evaluated include samples collected through October 26, 2009.**



Water Supply Wells within 3 Miles of the Manville #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Medicine Bow** **File Number:** **10.385**

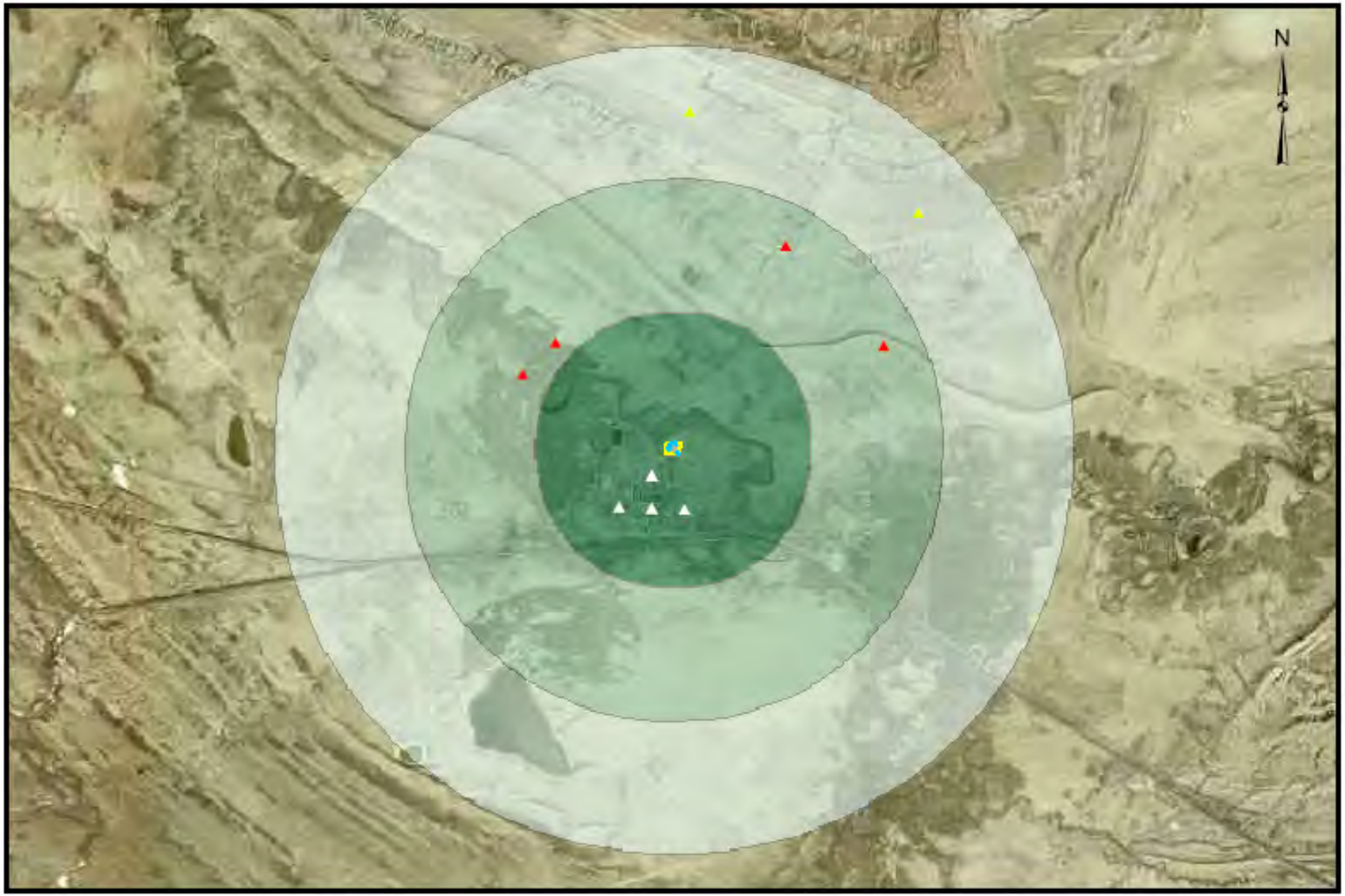
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through February 23, 2009**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Bicarbonate as HCO3
Cadmium
Chloride
Cobalt
Iron
Magnesium
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Potassium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Medicine Bow Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

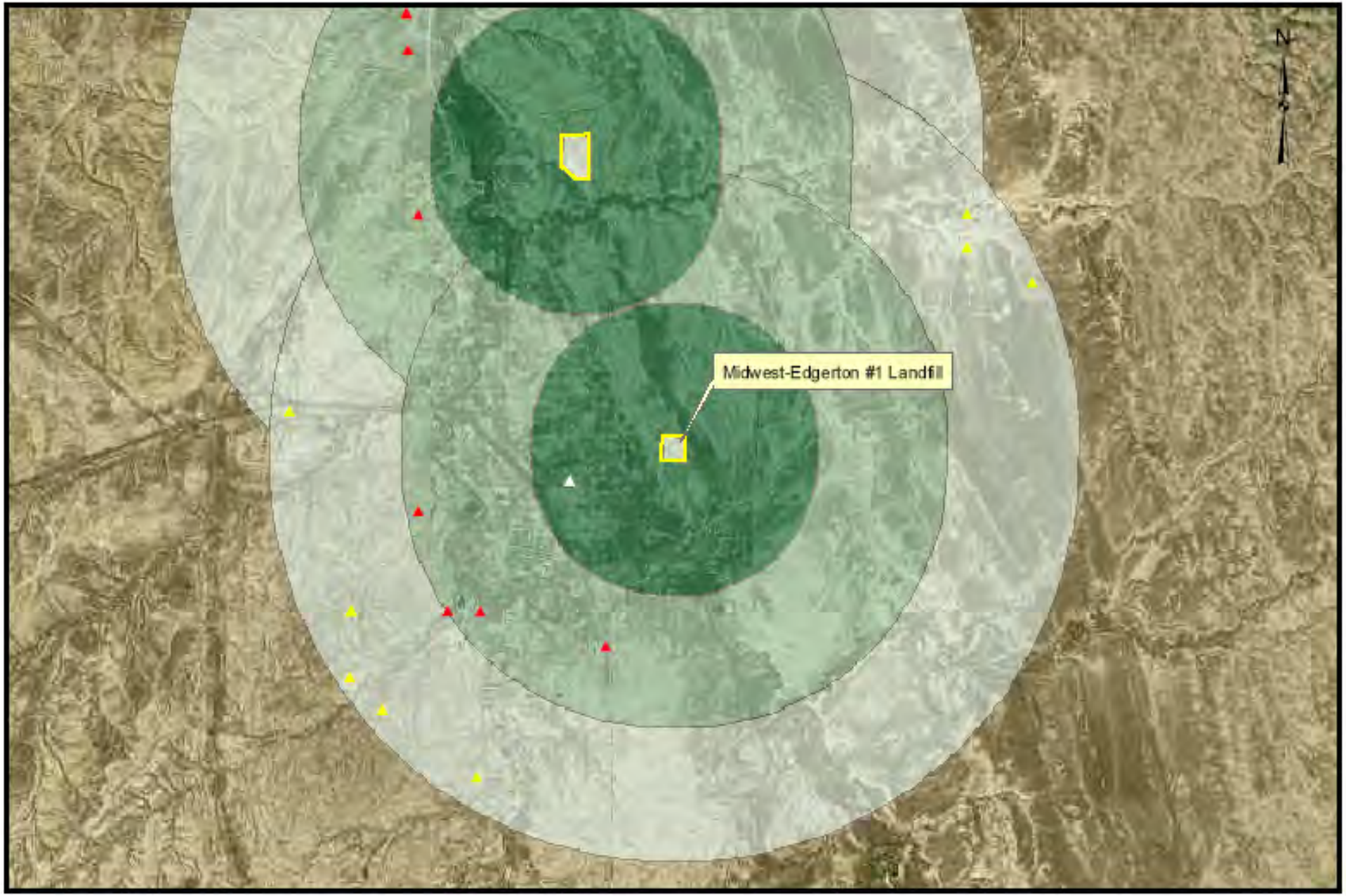
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Midwest-Edgerton #1** **File Number:** **10.390**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Midwest-Edgerton #1 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

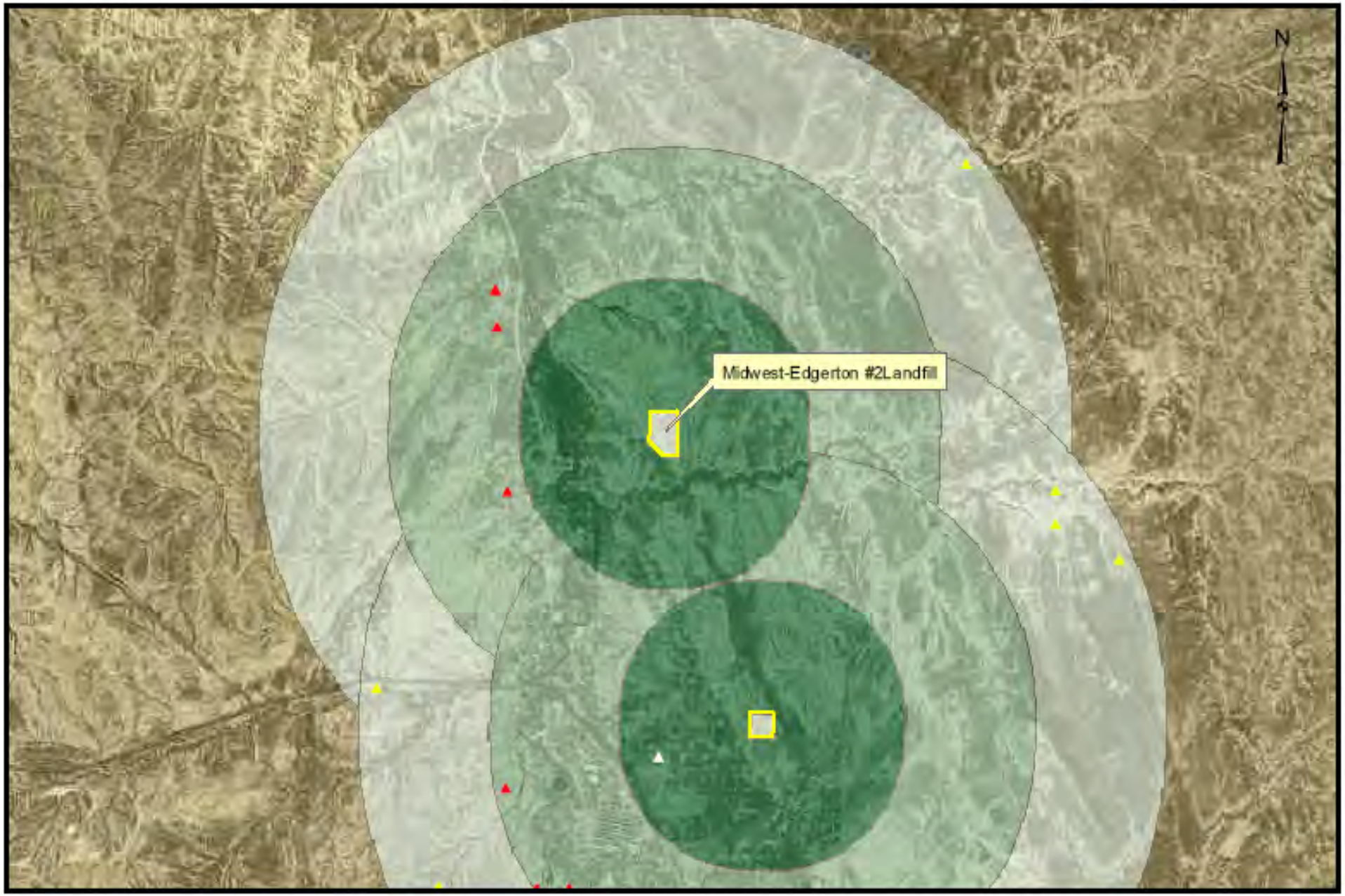
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Midwest-Edgerton #2** **File Number:** **10.391**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Midwest-Edgerton #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Moorcroft #1** **File Number:** **10.394**

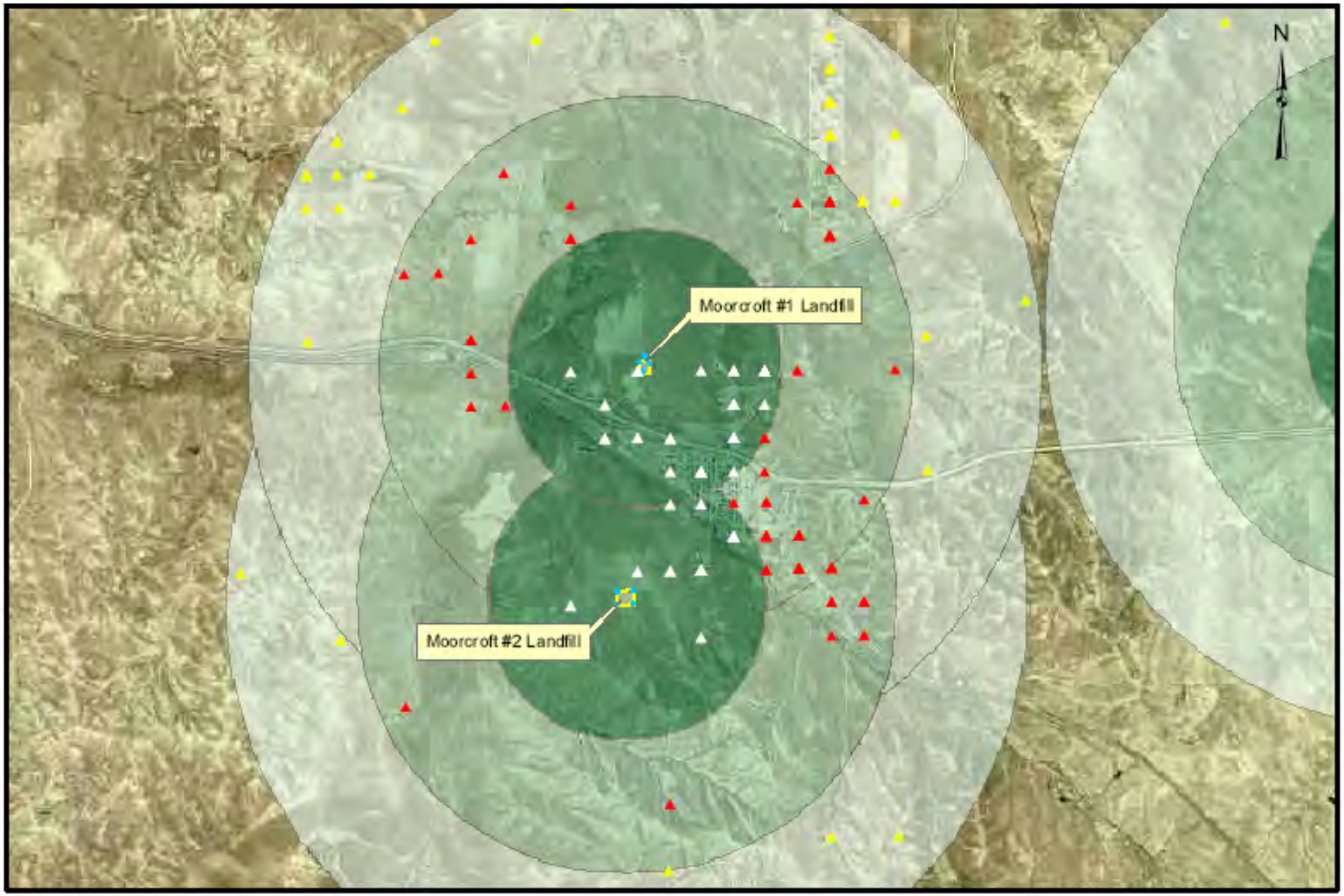
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through July 20, 2009**

Comments:

Contaminants higher in downgradient wells:

Calcium
Chloride
Lead
Magnesium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Moorcroft #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Moorcroft #2** **File Number:** **10.395**

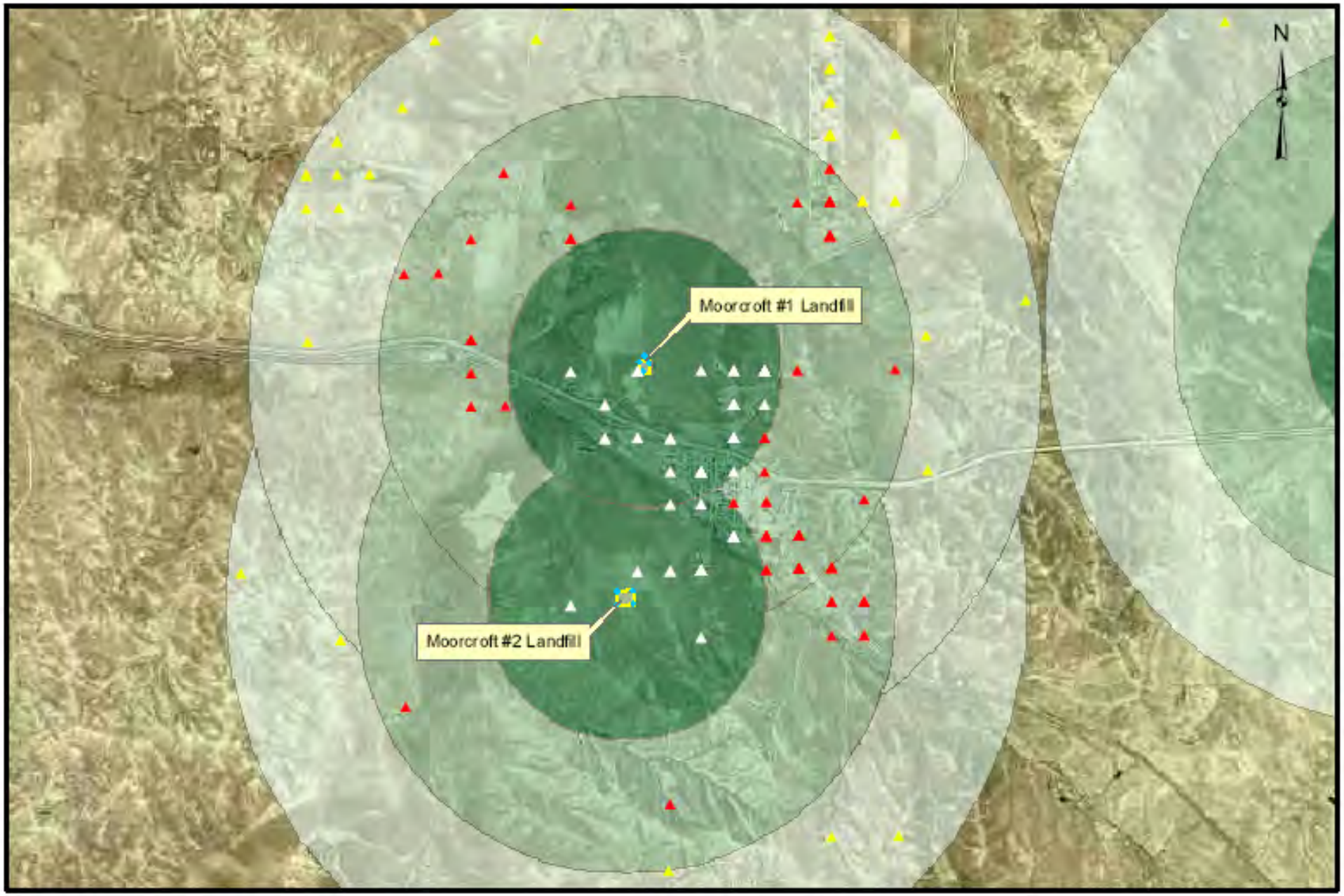
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through July 20, 2009**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Bicarbonate as HCO3
Chloride
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Potassium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Moorcroft #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

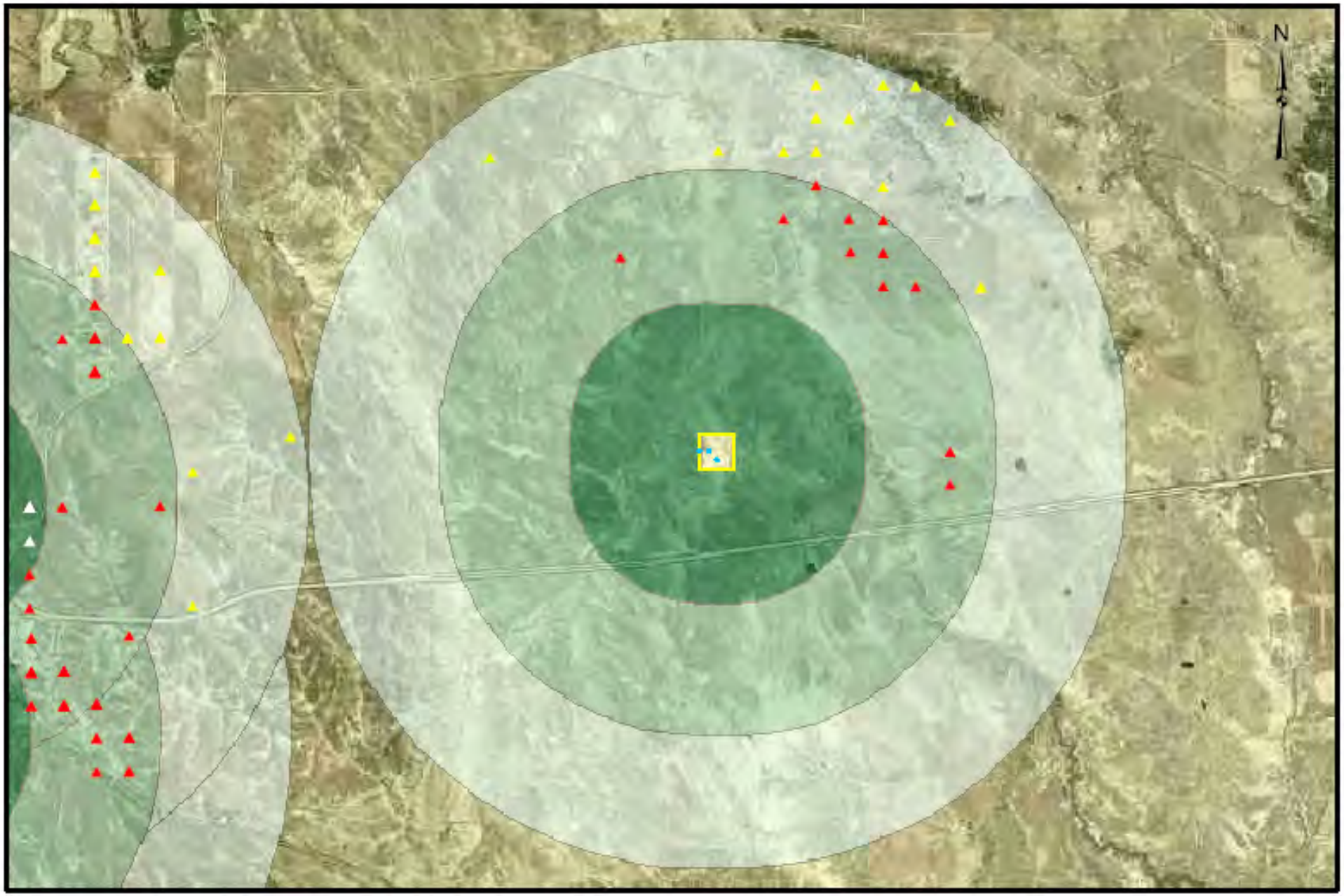
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Moorcroft #3** **File Number:** **10.396**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Moorcroft #3 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Natrona County Parks - Alcova #1** **File Number:** **10.400**

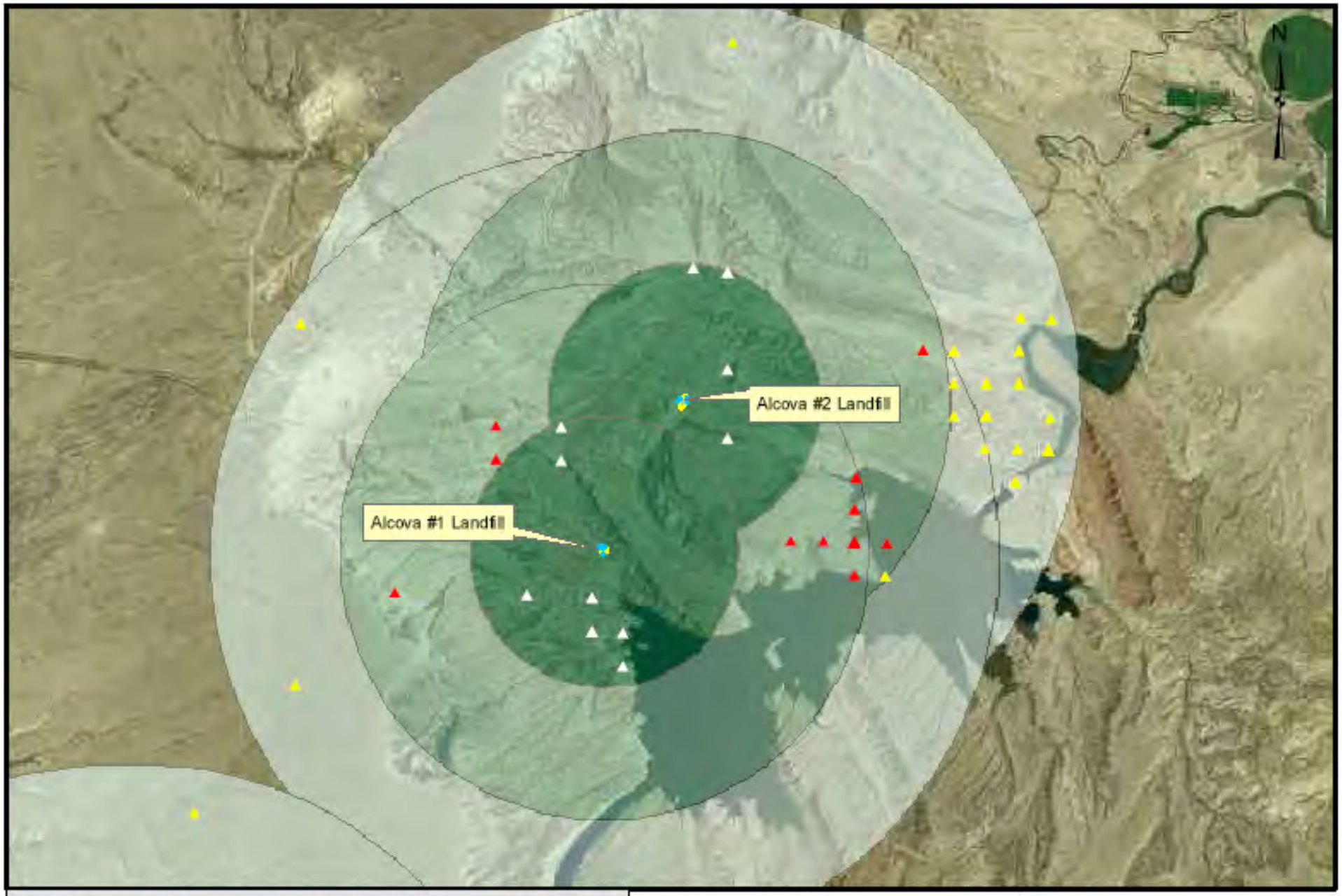
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through November 19, 2009**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Bicarbonate as HCO3
Chloride
Fluoride
Nitrogen, Nitrate+Nitrite as N
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Natrona County Parks - Alcova #1 and #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Natrona County Parks - Alcova #2** **File Number:** **10.401**

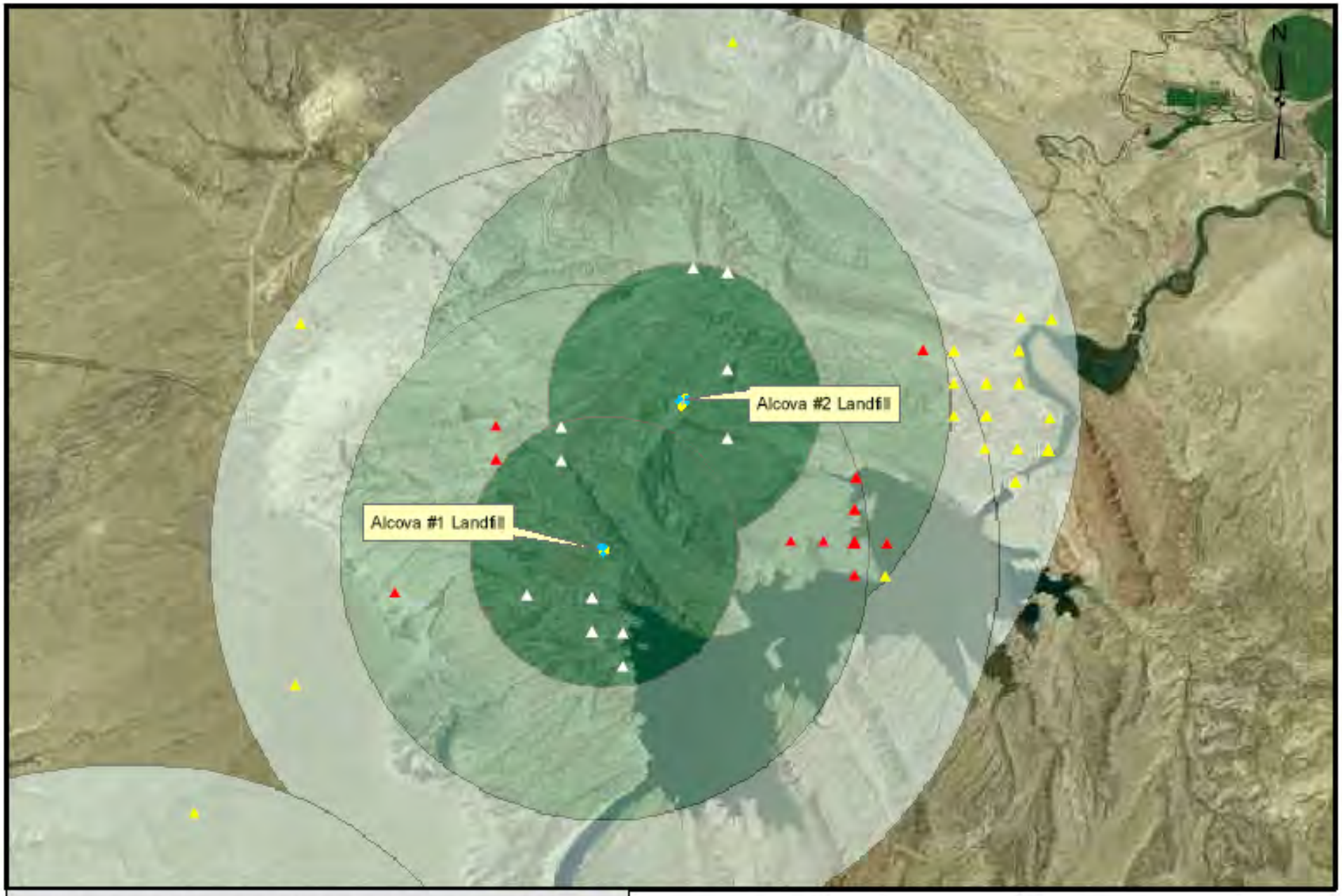
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through November 19, 2009**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Bicarbonate as HCO3
Chloride
Fluoride
Nitrogen, Nitrate+Nitrite as N
Selenium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Natrona County Parks - Alcova #1 and #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Newcastle #1** **File Number:** **10.415**

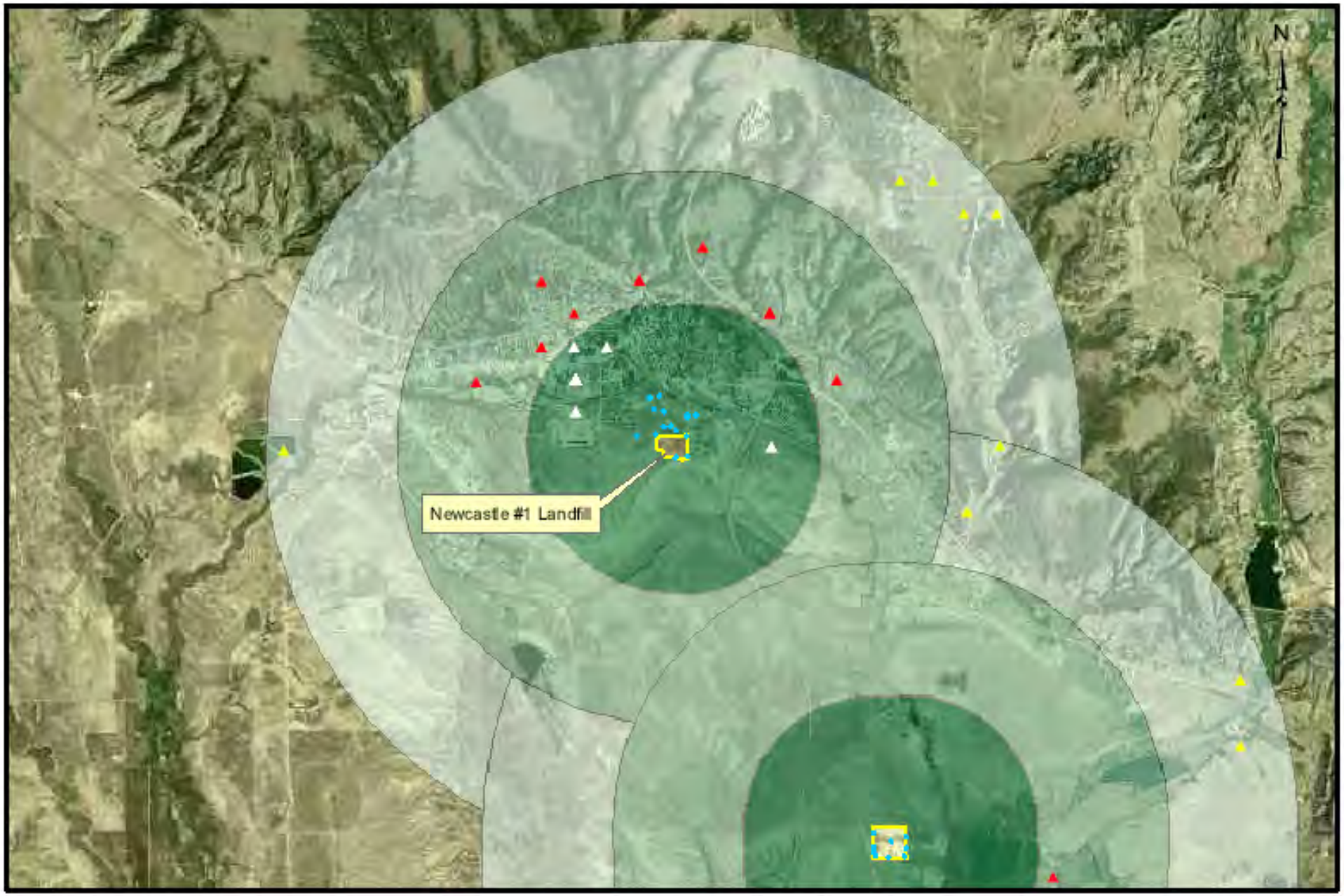
Groundwater Status: **Inadequate data to conduct statistical analysis or inadequacies of monitoring system introduce significant uncertainty. Data suggest that contamination may be present based on sampling results conducted through October 27, 2009.**

Comments:

Contaminants higher in downgradient wells:

Chloride
Nitrogen, Ammonia as N
Solids, Total Dissolved TDS @ 180 C
Sulfate
Acetone
Potassium
Selenium
Benzene
Oxygen Demand, Chemical [COD]
Nitrogen, Nitrate+Nitrite as N

*NOTE: **Bold** blue text indicates groundwater protection standard is suspected of being exceeded for this constituent.*



Water Supply Wells within 3 Miles of the Newcastle #1 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

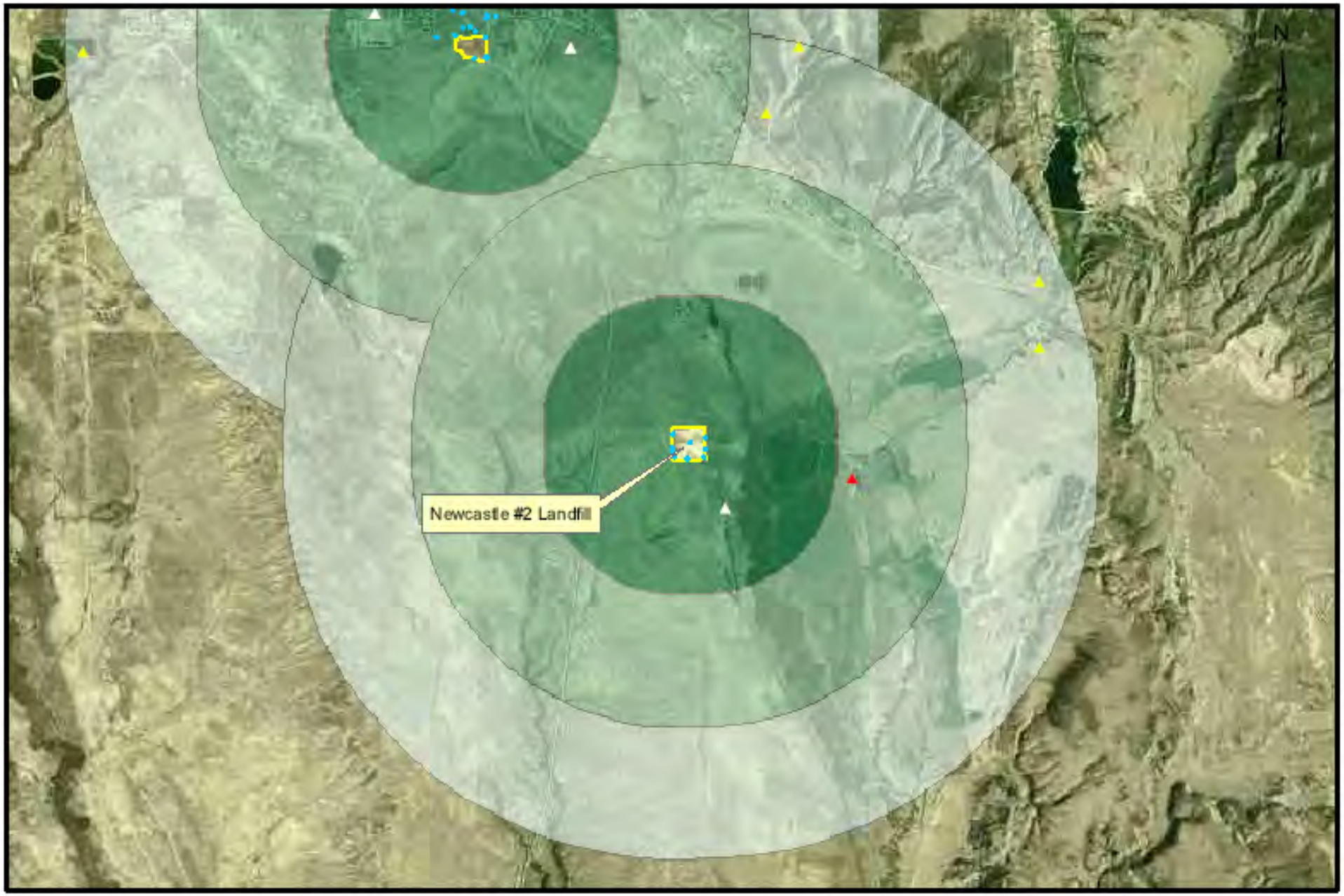
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Newcastle #2** **File Number:** **10.416**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Newcastle #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Park County SWDD - Clark #1** **File Number:** **10.430**

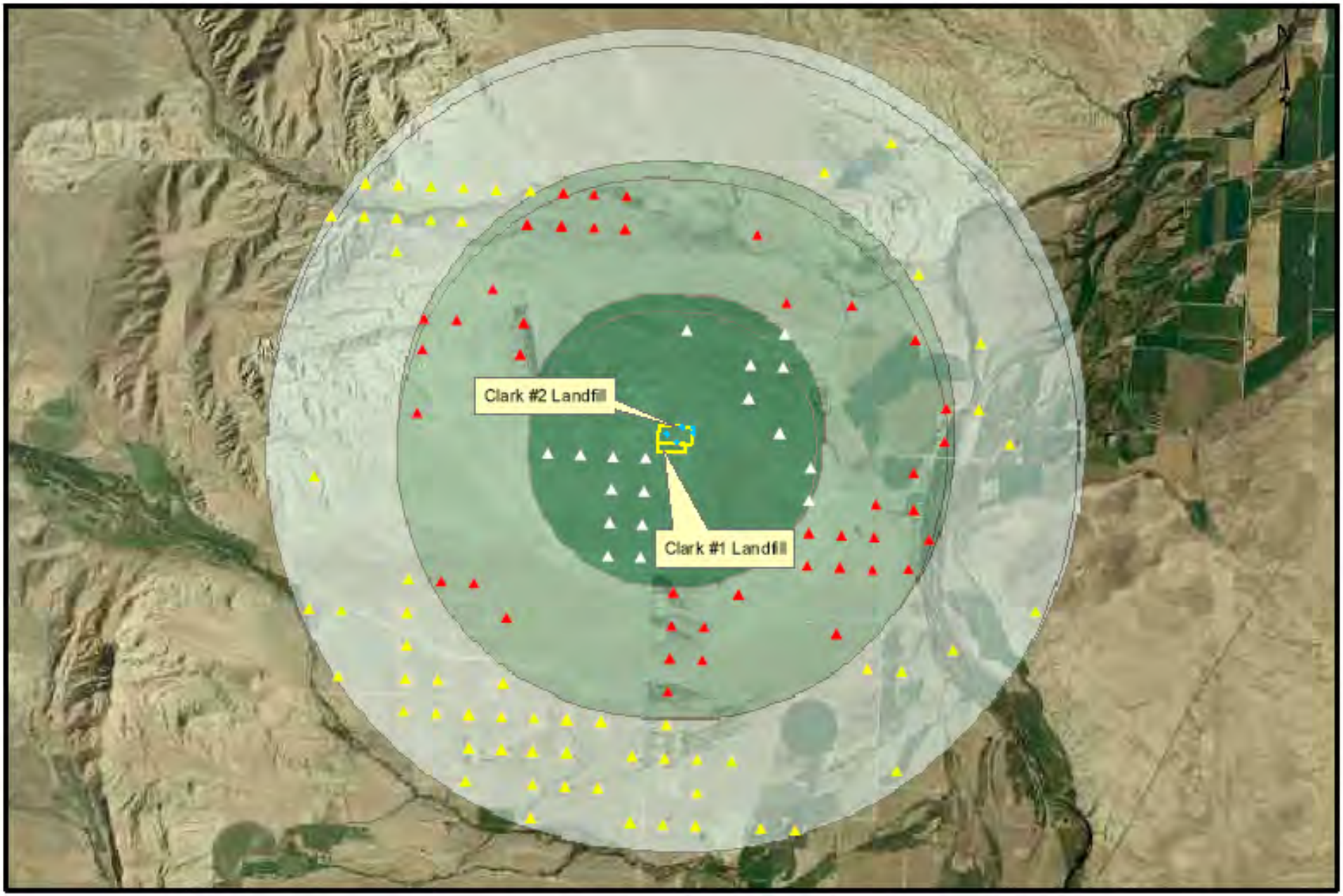
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through April 22, 2009**

Comments:

Contaminants higher in downgradient wells:

Bromoform
Calcium
Chloride
Magnesium
Nitrogen, Nitrate+Nitrite as N
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Clark #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Park County SWDD - Clark #2** **File Number:** **10.431**

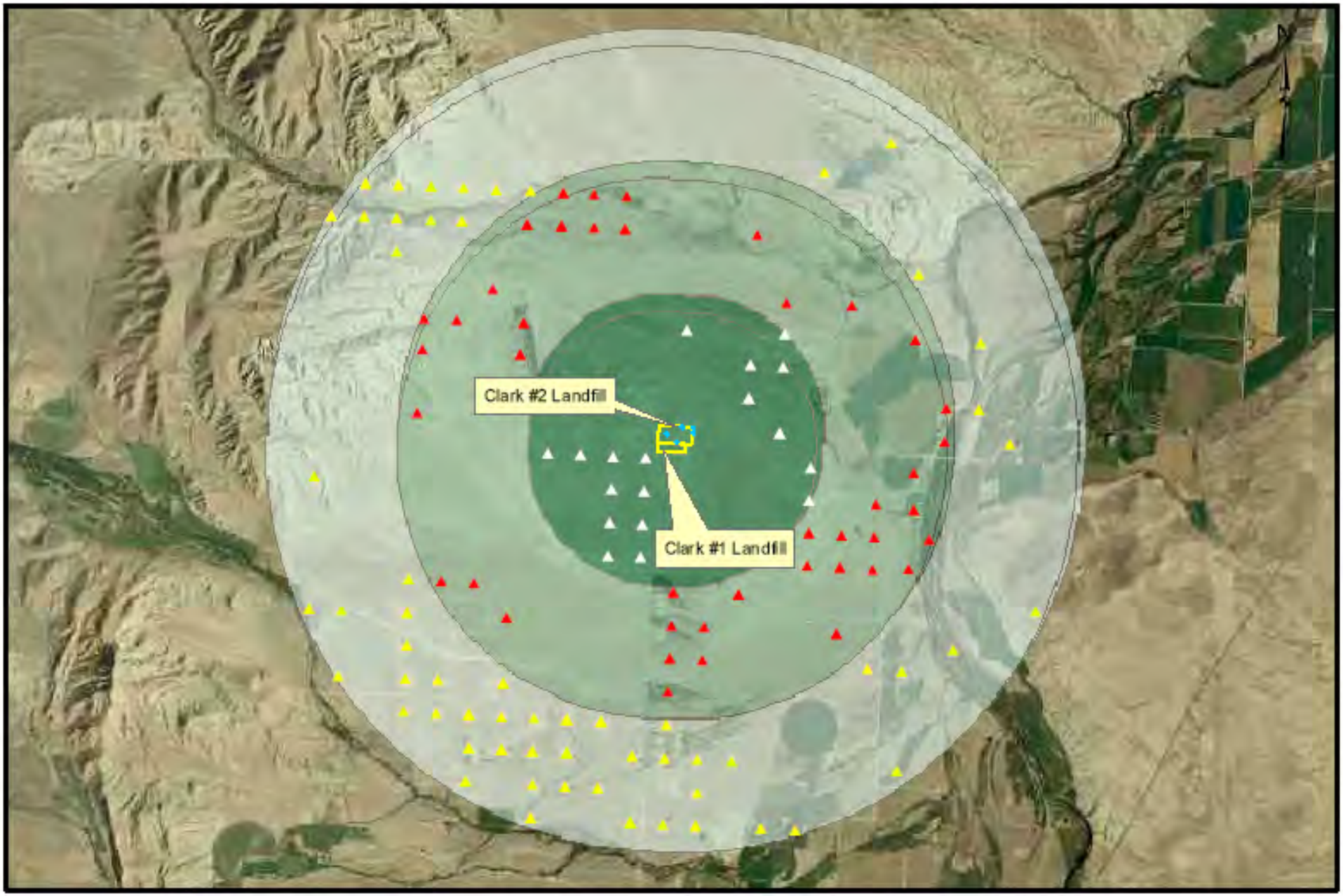
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through April 22, 2009**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Calcium
Carbonate as CO3
Chloride
Magnesium
Sodium
Solids, Total Dissolved TDS @ 180 C

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Clark #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

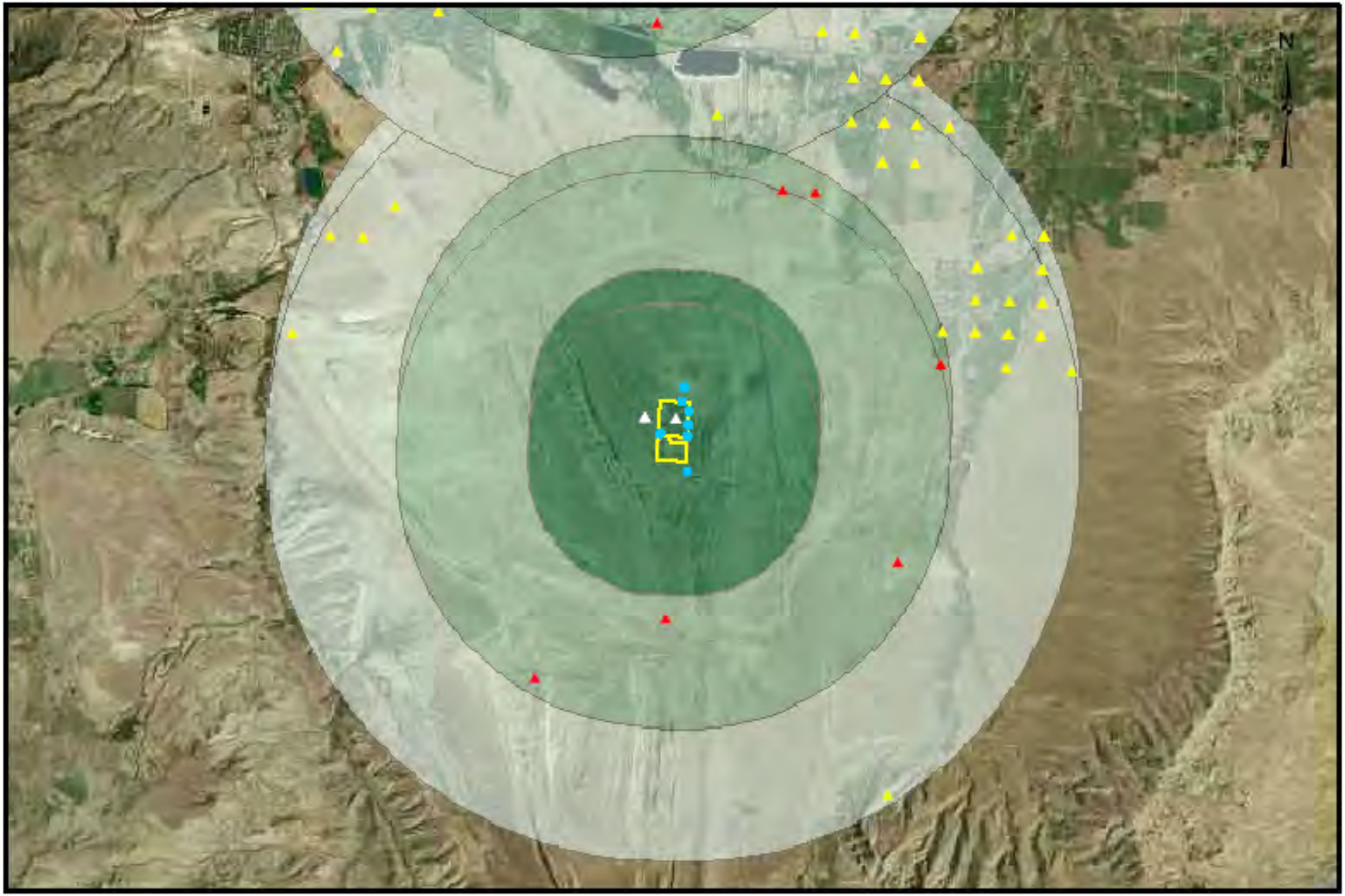
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Park County - Cody (Old Site)** **File Number:** **10.440**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Cody & Old Site Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Park County SWDD - Cody** **File Number:** **10.441**

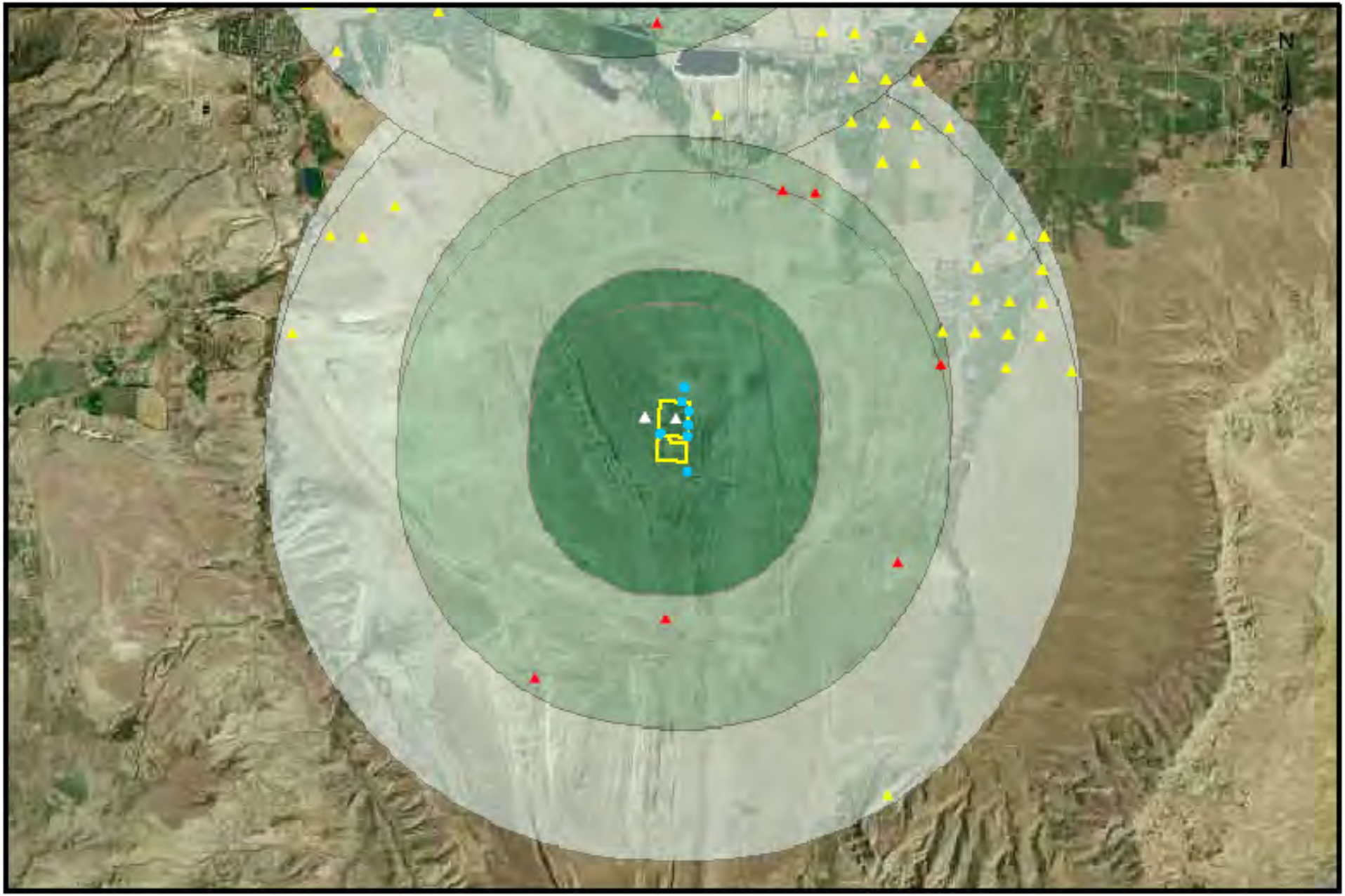
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through July 22, 2009**

Comments:

Contaminants higher in downgradient wells:

Benzene
Chloride
Chromium
Copper
Dichloroethane, 1,1-
Iron
Vanadium
Vinyl Chloride

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Cody & Old Site Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Park County SWDD - Kysar** **File Number:** **10.445**

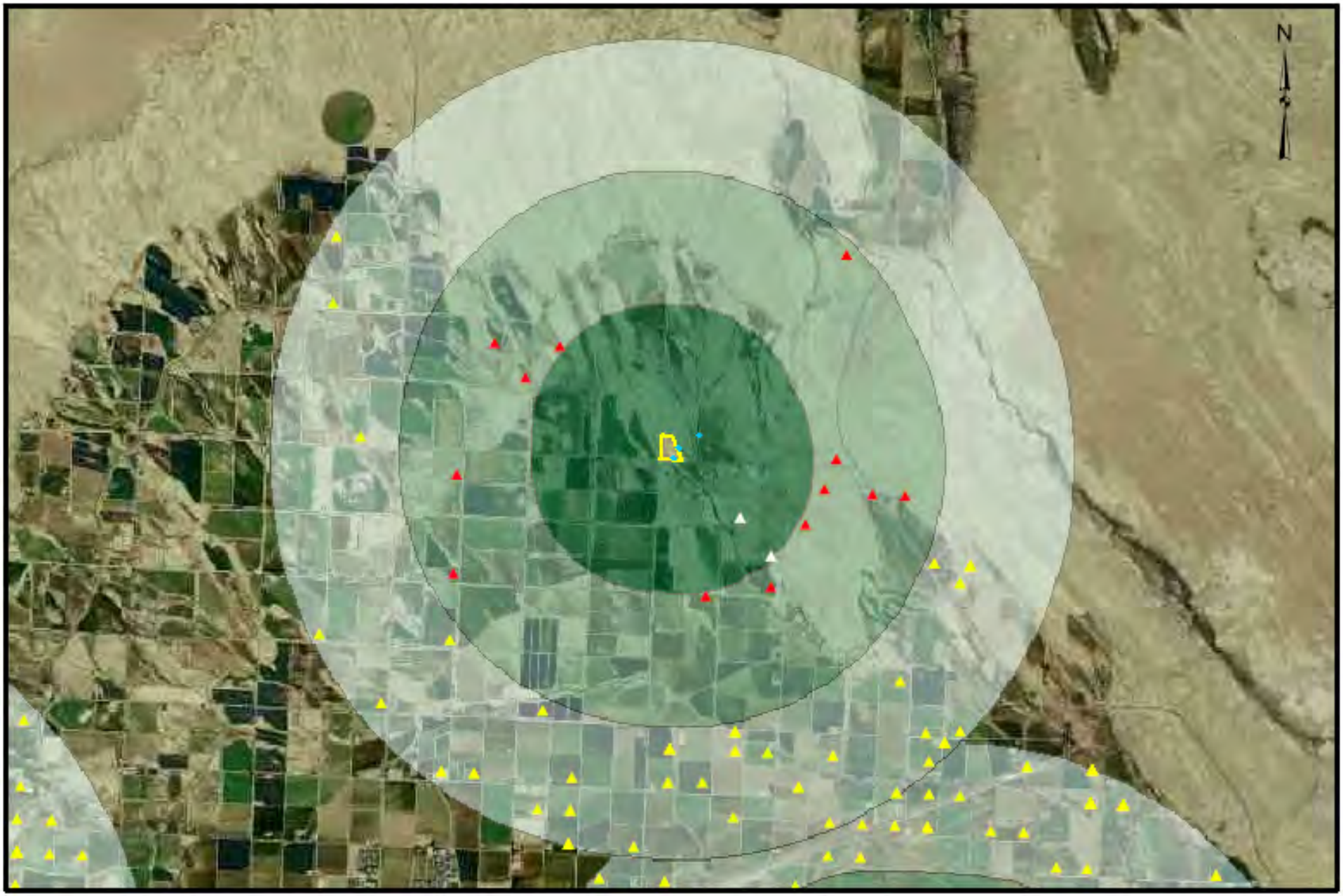
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 7, 2008**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Barium
Bicarbonate as HCO3
Calcium
Chloride
Lead
pH

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Kysar Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

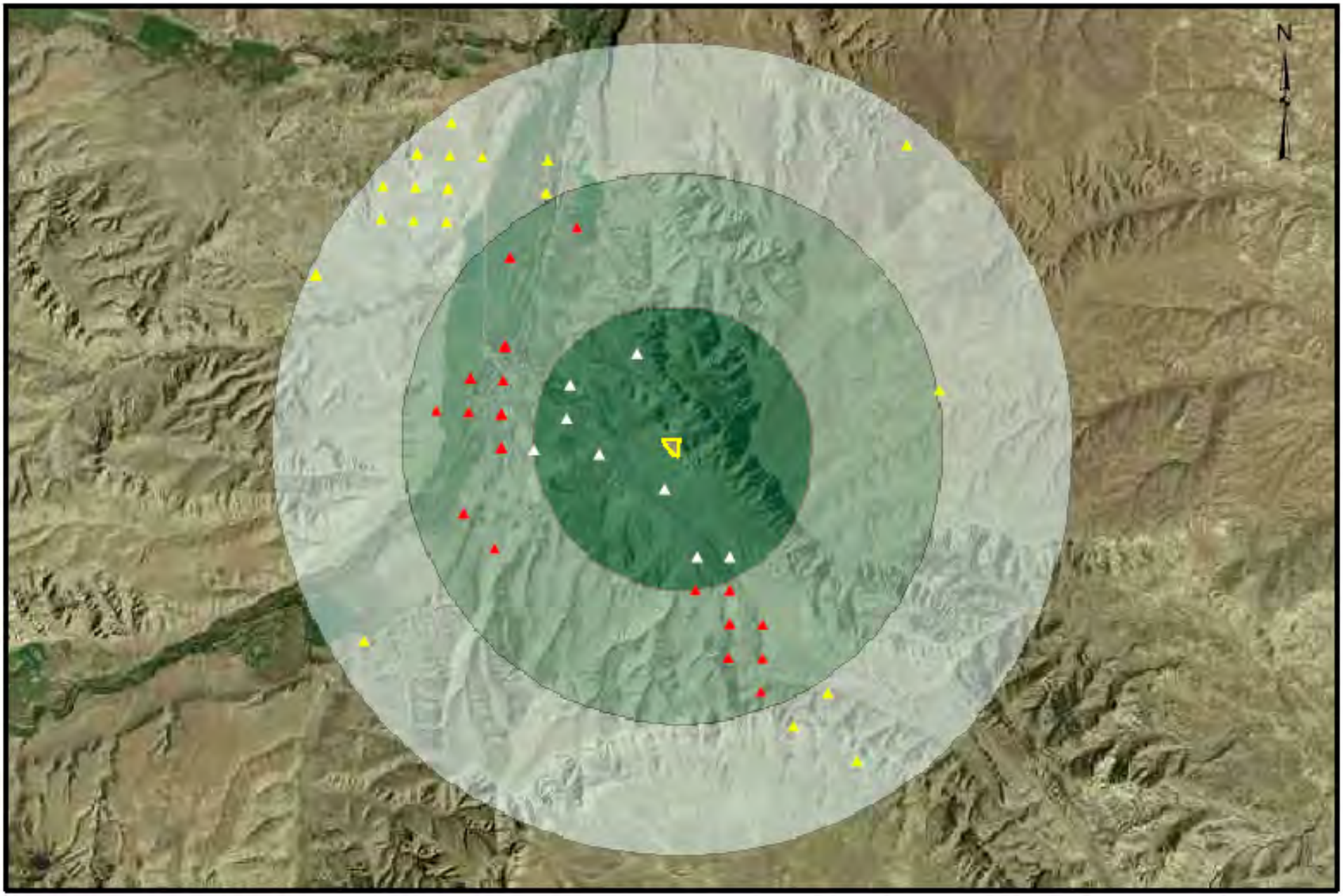
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Park County SWDD - Meeteetse** **File Number:** **10.450**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Meeteetse Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Park County SWDD - Powell** **File Number:** **10.455**

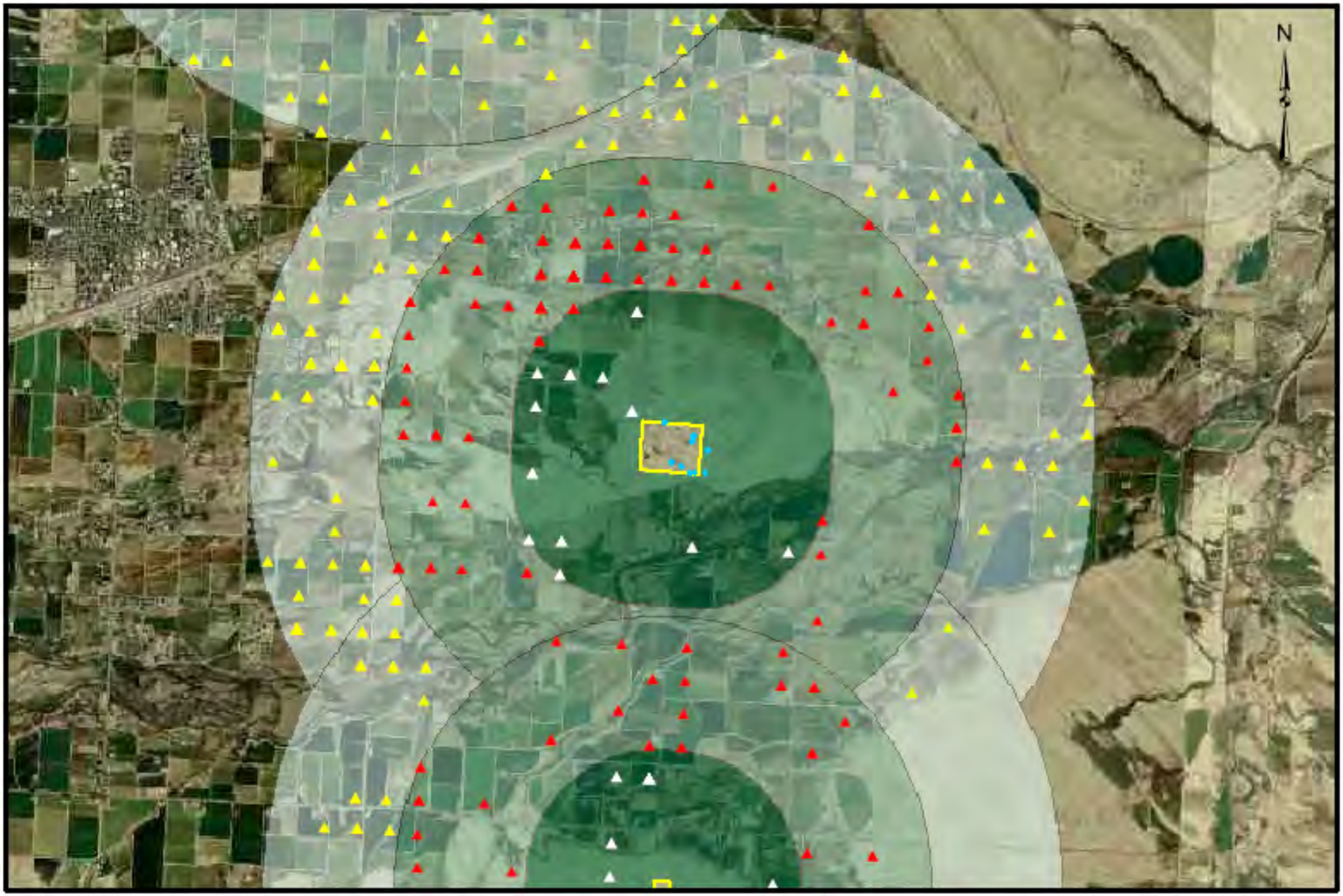
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through July 23, 2009**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Calcium
Chloride
Chloroform
Dichloroethane, 1,1-
Dichloroethene, cis-1,2-
Magnesium
Nickel
Nitrogen, Nitrate+Nitrite as N
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Powell Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Pine Bluffs** **File Number:** **10.480**

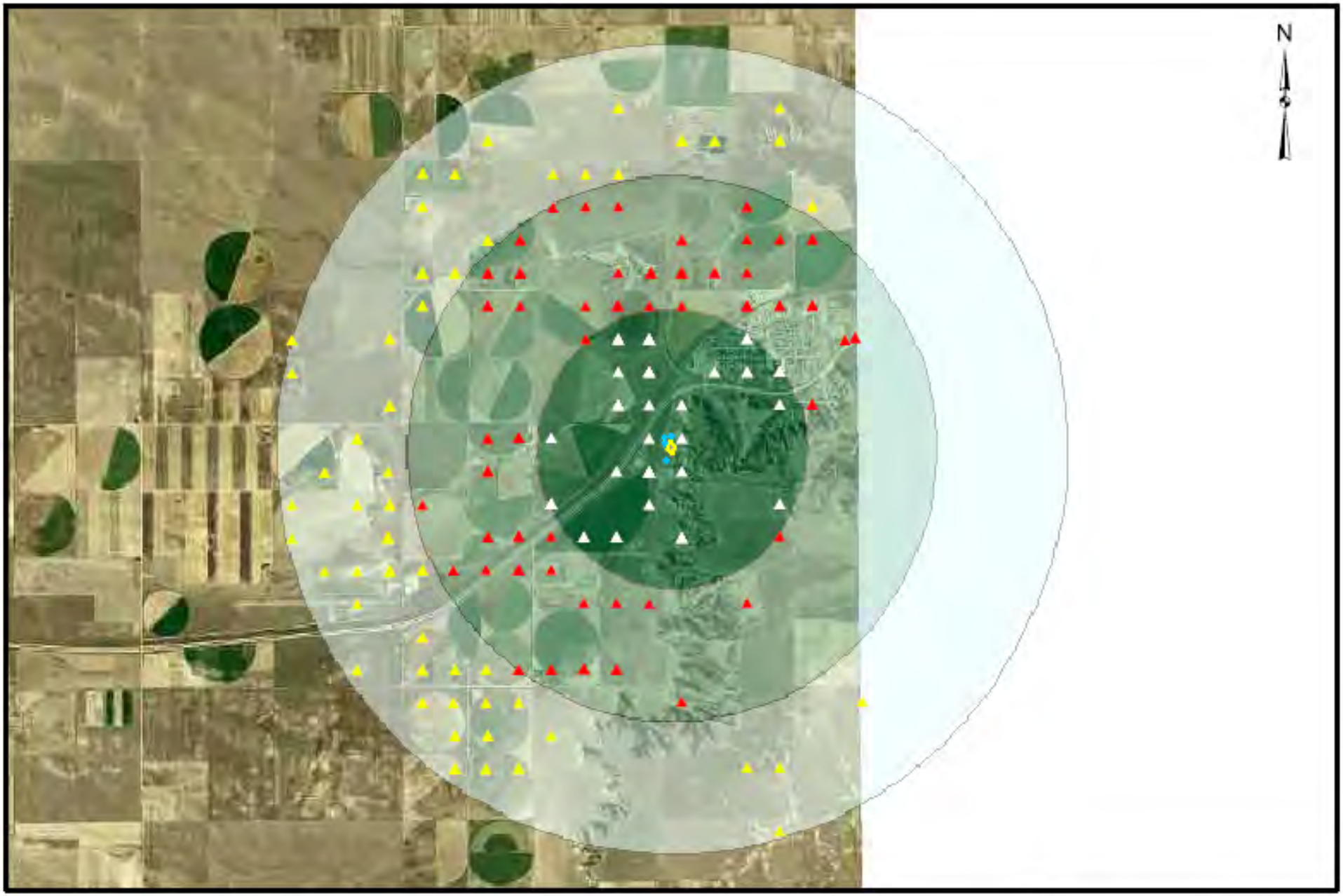
Groundwater Status: **Inadequate data to conduct statistical analysis or inadequacies of monitoring system introduce significant uncertainty. Data suggest that contamination may be present based on sampling results conducted through March 12, 2010.**

Comments: **Because of the complexity of geology and uncertainties associated with the adequacy of the representation of upgradient conditions, it is not possible with available data to conclude whether or not impacts are present at this facility.**

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Arsenic
Nitrogen, Nitrate+Nitrite as N
Sodium
Sulfate

NOTE: ***Bold*** *blue text indicates groundwater protection standard is suspected of being exceeded for this constituent.*



Water Supply Wells within 3 Miles of the Pine Bluffs Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Rawlins** **File Number:** **10.485**

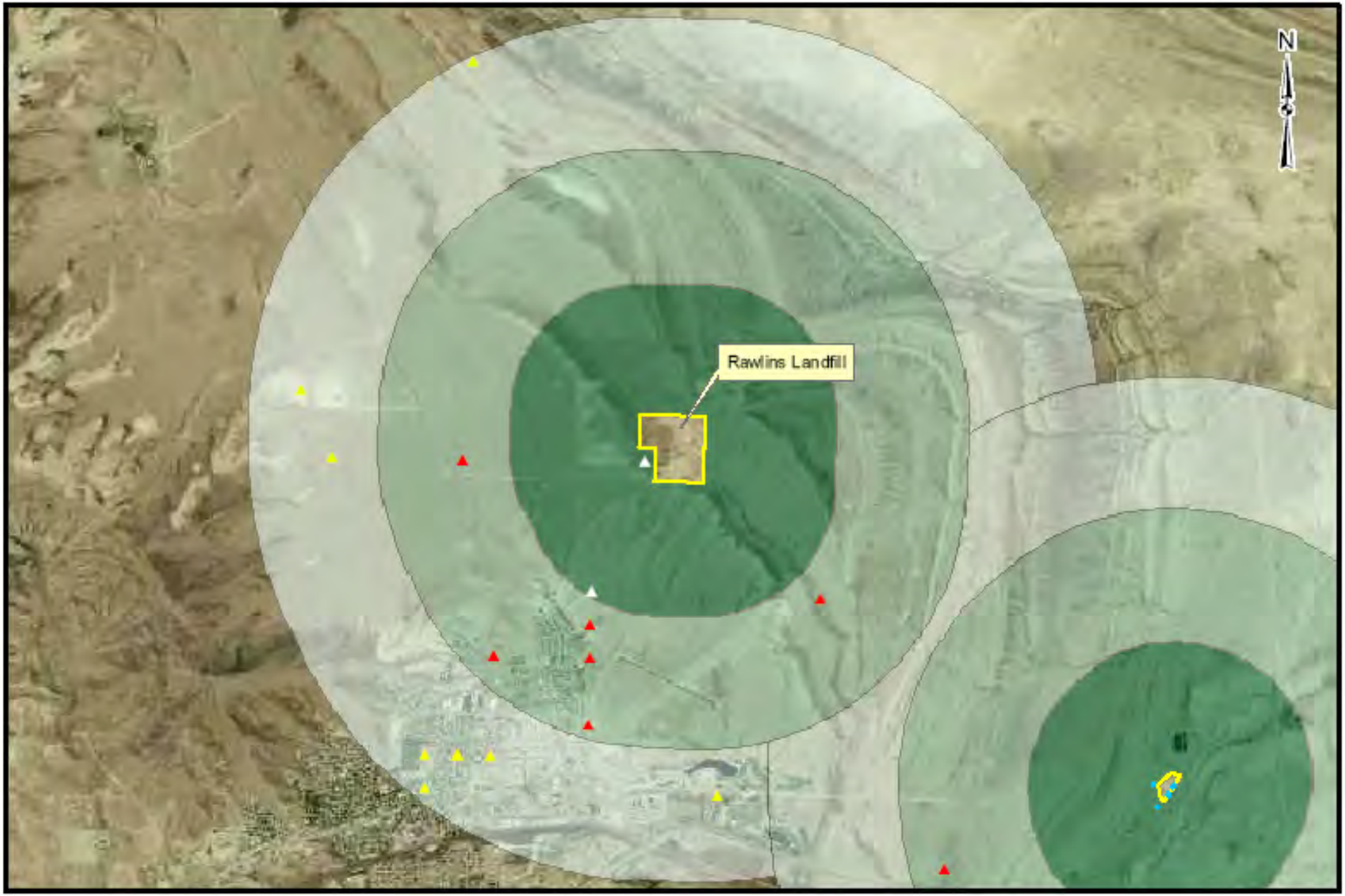
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through November 7, 2009**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Barium
Calcium
Chloride
Dichloroethane, 1,1-
Dichloroethene, cis-1,2-
Fluoride
Magnesium
Nitrogen, Nitrate+Nitrite as N
Sodium
Sulfate
Tetrachloroethene
Trichloroethene
Trichlorofluoromethane
Vanadium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Rawlins Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Rock River #1** **File Number:** **10.490**

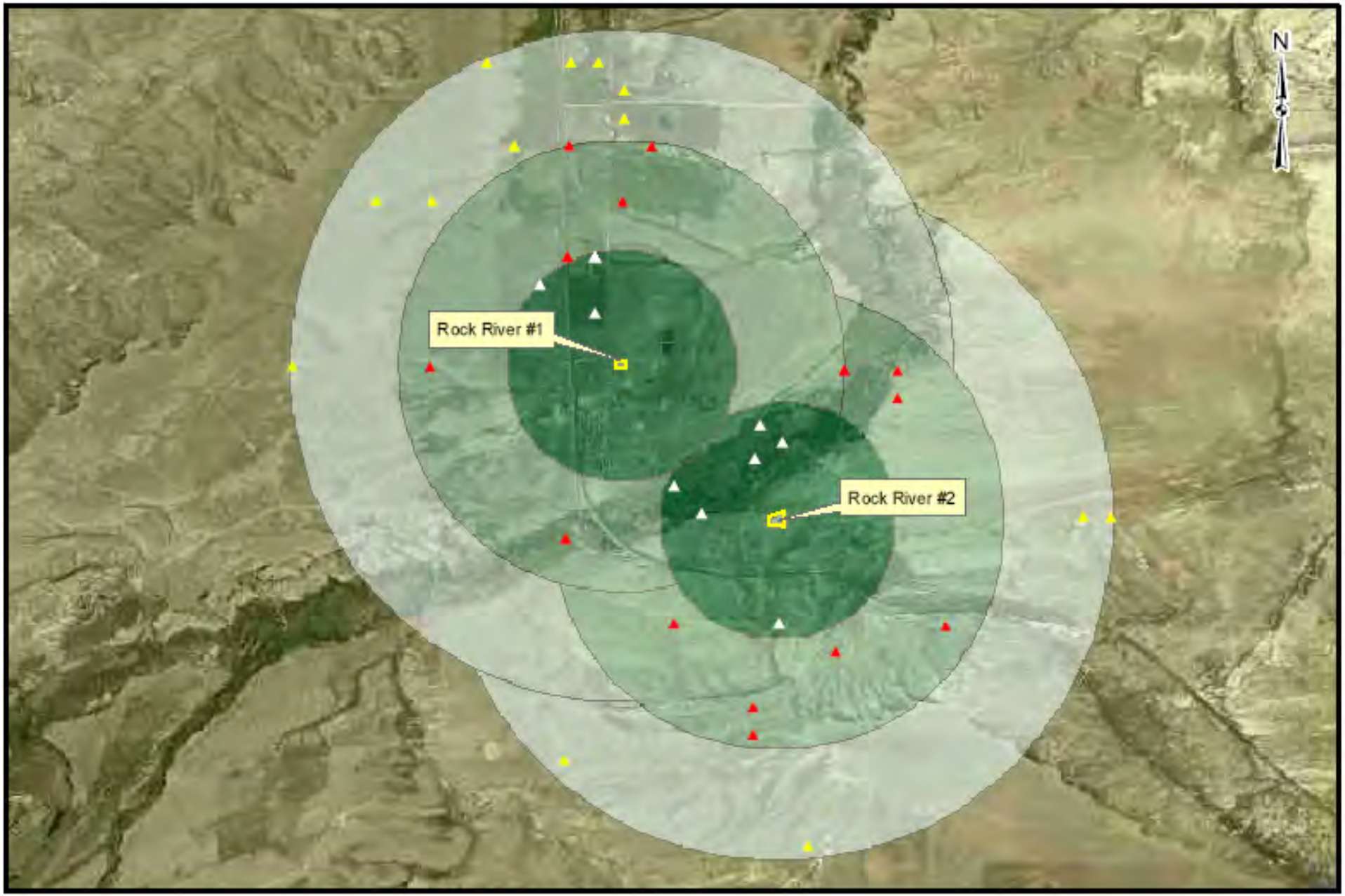
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through March 3, 2010**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Bicarbonate as HCO3
Chloride
Fluoride
Magnesium
Nitrogen, Nitrate+Nitrite as N
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Rock River #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 6,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Rock River #2** **File Number:** **10.491**

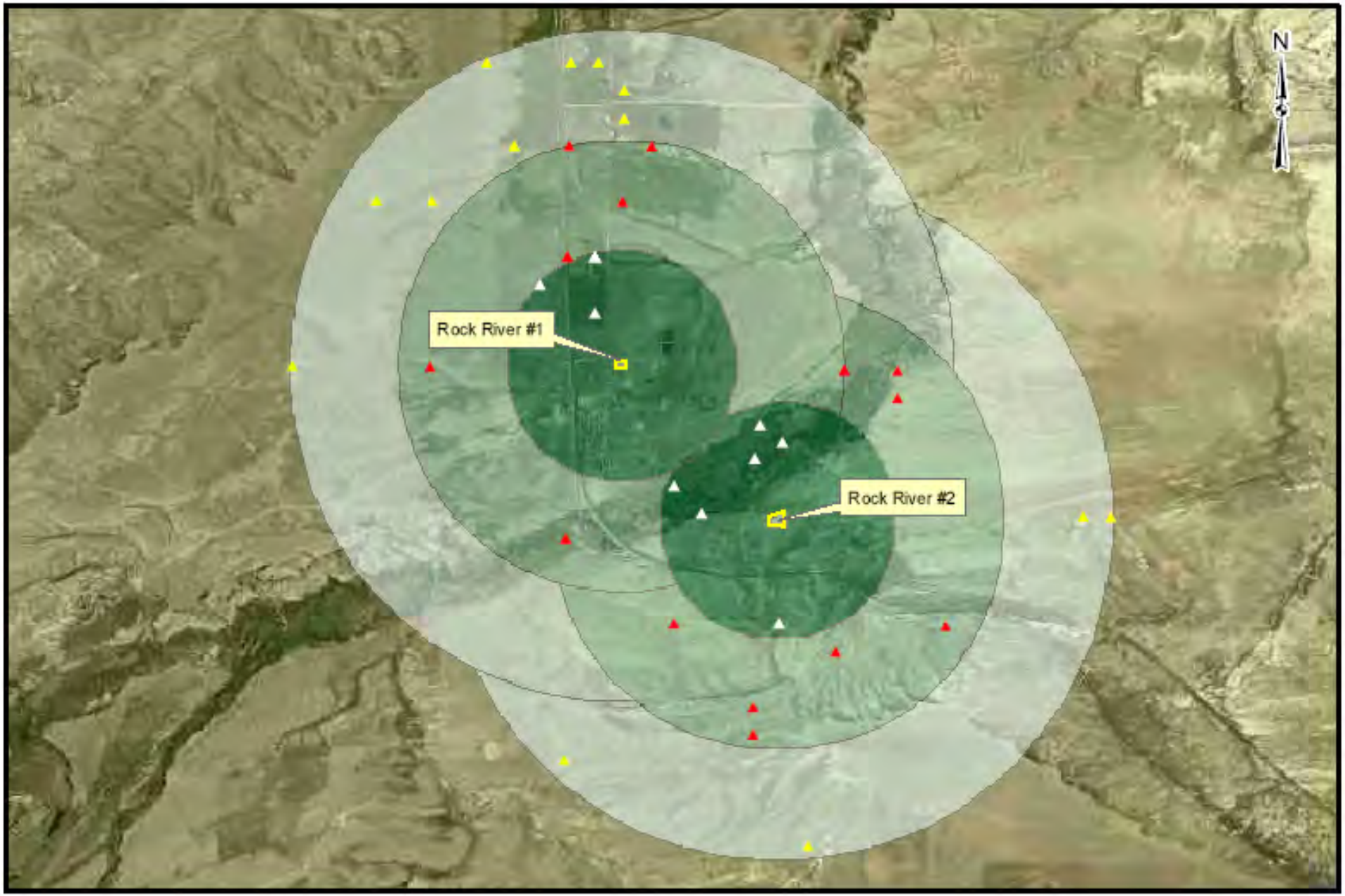
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through March 4, 2010**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Arsenic
Barium
Beryllium
Bicarbonate as HCO3
Cobalt
Copper
Iron
Lead
Manganese
Nickel
Nitrogen, Nitrate+Nitrite as N
Selenium
Sodium
Vanadium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Rock River #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 6,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Saratoga** **File Number:** **10.515**

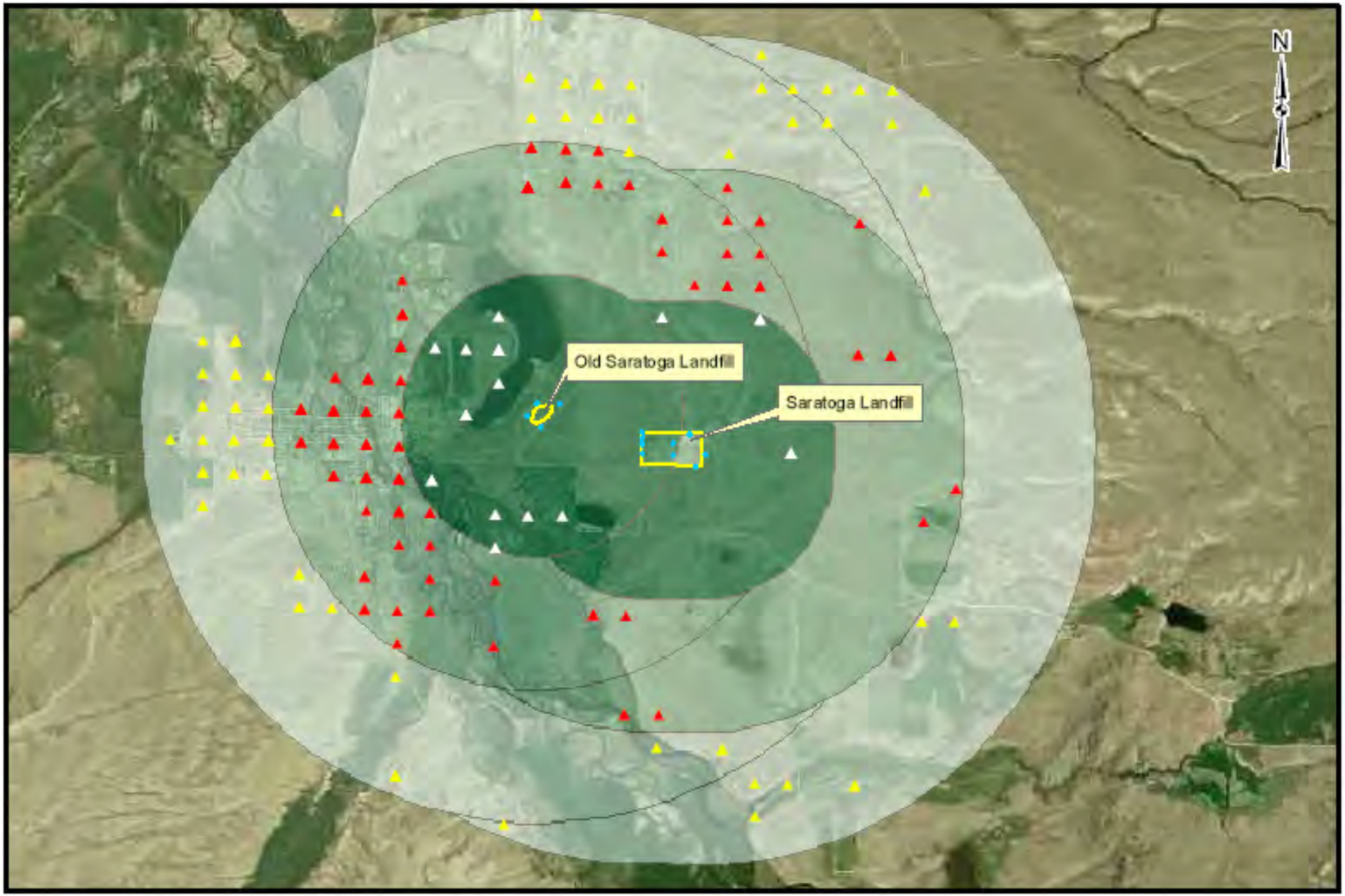
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 27, 2010**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Barium
Chloride
Chromium
Iron
Sodium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL exceeded for volatile organic contaminant.



Water Supply Wells within 3 Miles of the Saratoga & Old Saratoga Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

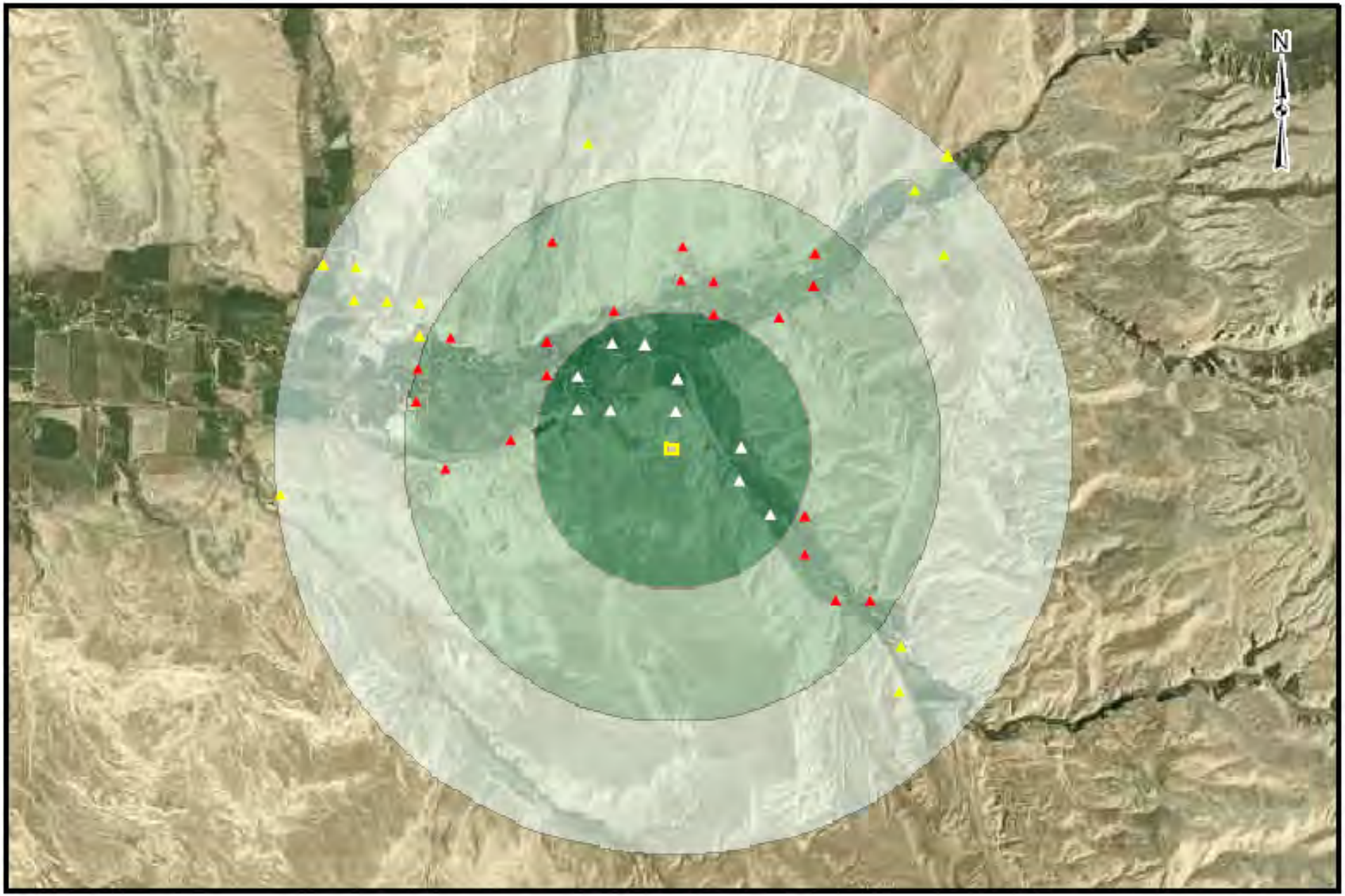
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Shell** **File Number:** **10.520**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Shell Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Sheridan** **File Number:** **10.525**

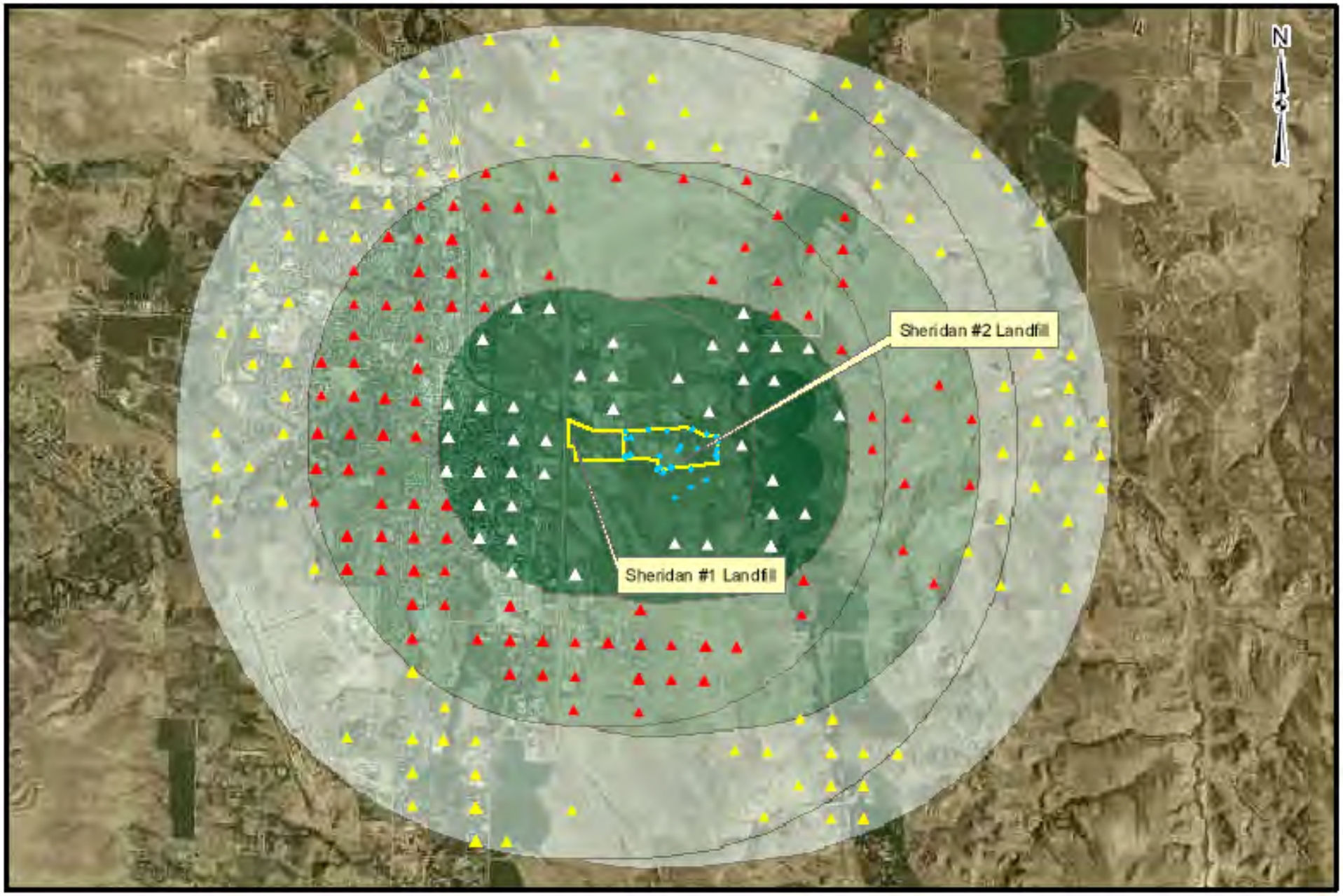
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through November 4, 2009**

Comments:

Contaminants higher in downgradient wells:

Barium
Bicarbonate as HCO3
Calcium
Chloride
Chlorobenzene
Dichlorobenzene, 1,2-
Dichlorodifluoromethane
Dichloroethane, 1,1-
Dichloroethene, cis-1,2-
Magnesium
Manganese
Methylene chloride
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Tetrachloroethene
Trichloroethane, 1,1,1-
Trichloroethene
Trichlorofluoromethane

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Sheridan #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Sheridan Expansion** **File Number:** **10.526**

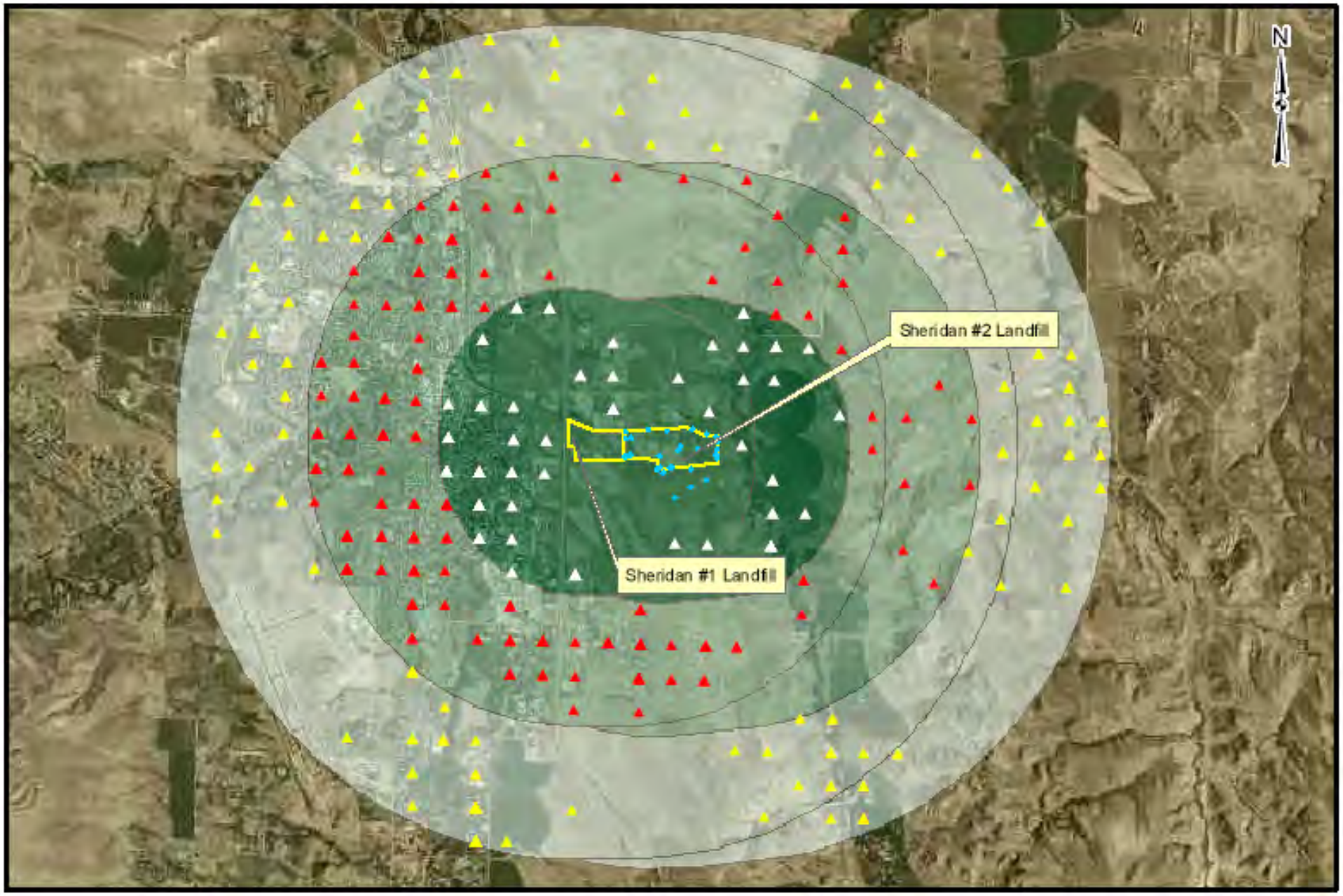
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 3, 2009**

Comments:

Contaminants higher in downgradient wells:

Barium
Cadmium
Calcium
Chloride
Chloroethane
Cobalt
Dichlorodifluoromethane
Dichloroethane, 1,1-
Fluoride
Methylene chloride
Nickel
Nitrogen, Ammonia as N
pH
Selenium
Sodium
Trichloroethane, 1,1,1-
Trichlorofluoromethane

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Sheridan #1 & #2 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Sinclair #2** **File Number:** **10.541**

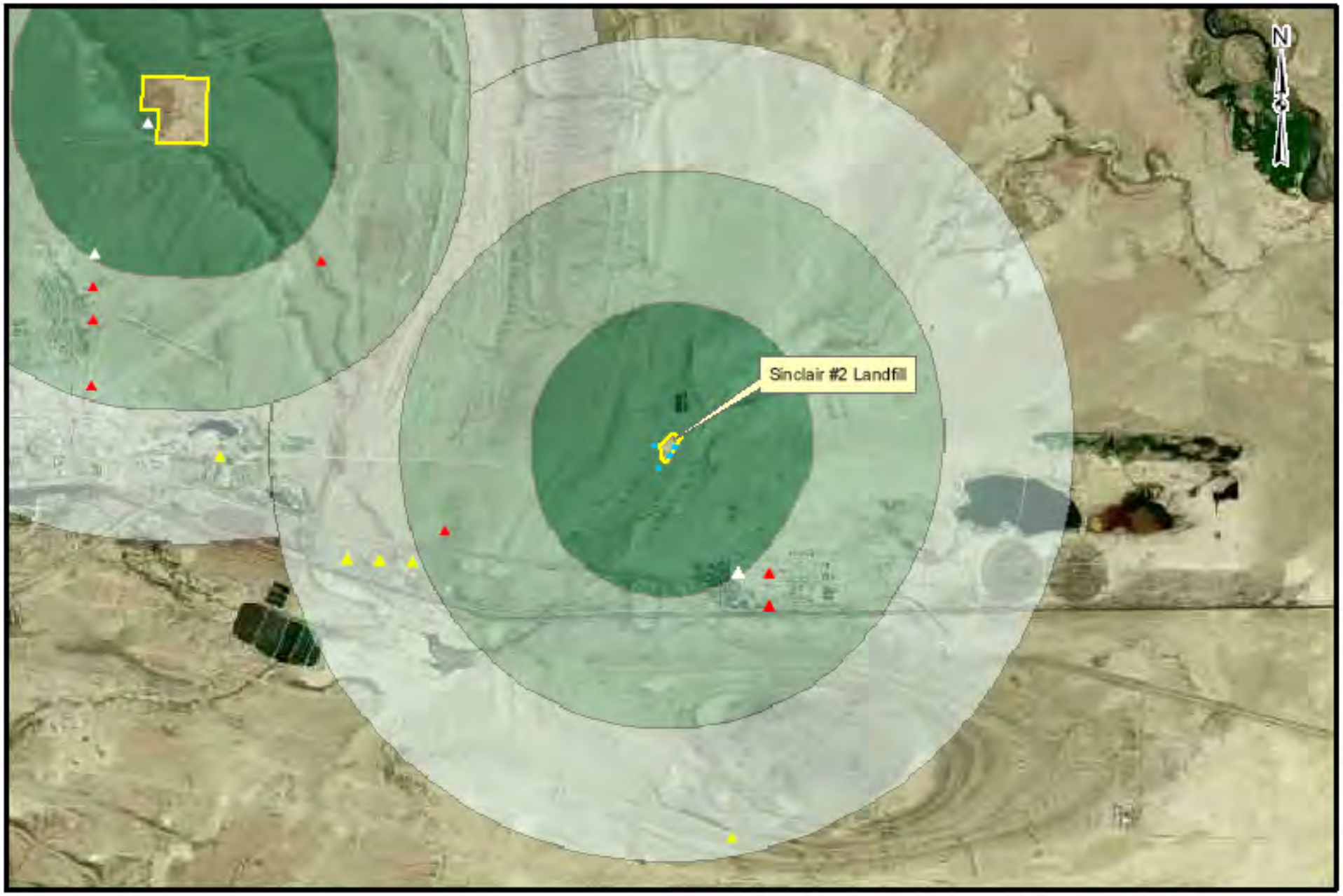
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 26, 2010**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Barium
Benzene
Bicarbonate as HCO3
Carbonate as CO3
Chloride
Fluoride
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
pH
Sodium
Toluene
Xylenes, Total

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Sinclair #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

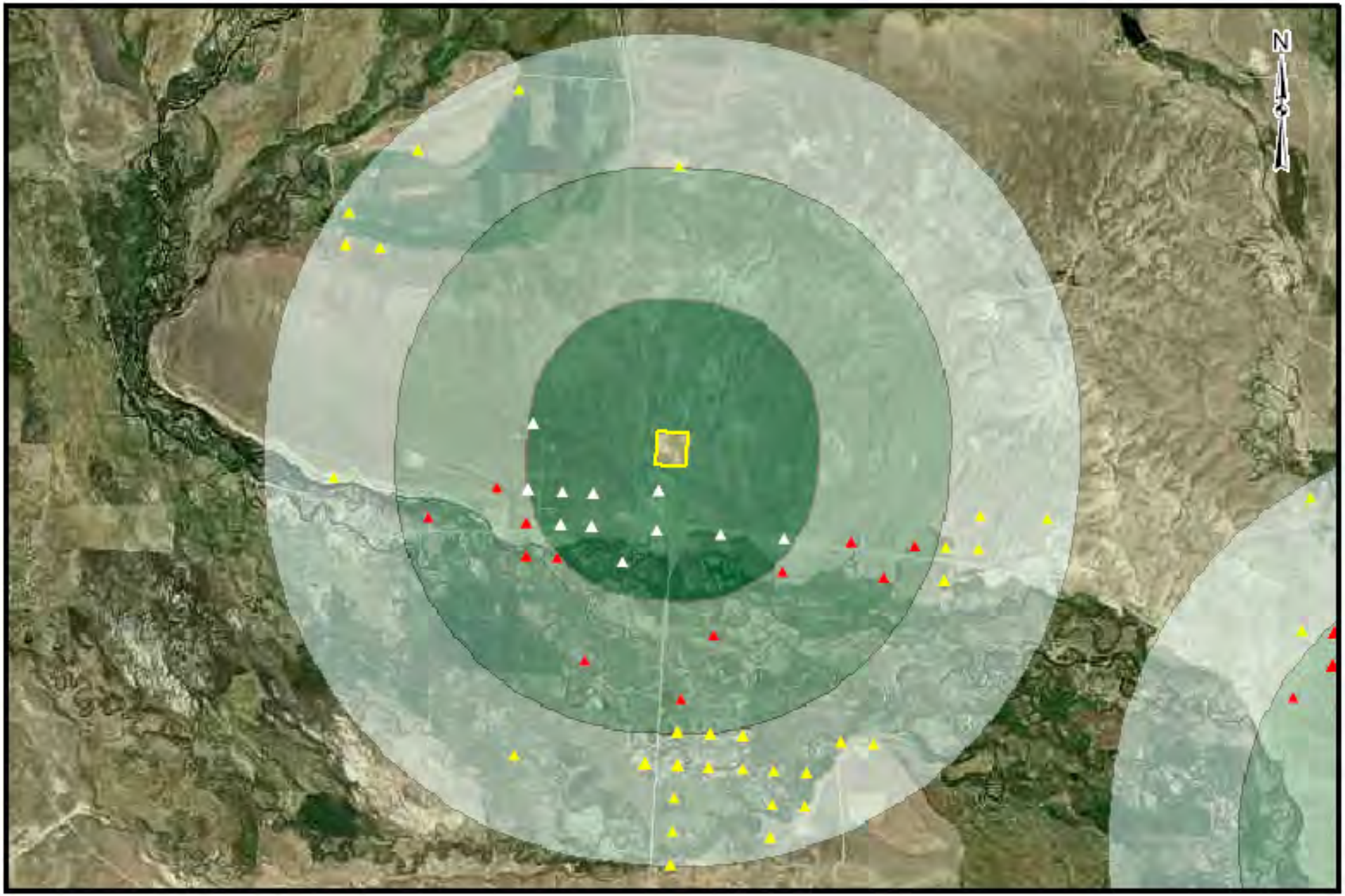
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Boulder** **File Number:** **10.550**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Boulder Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

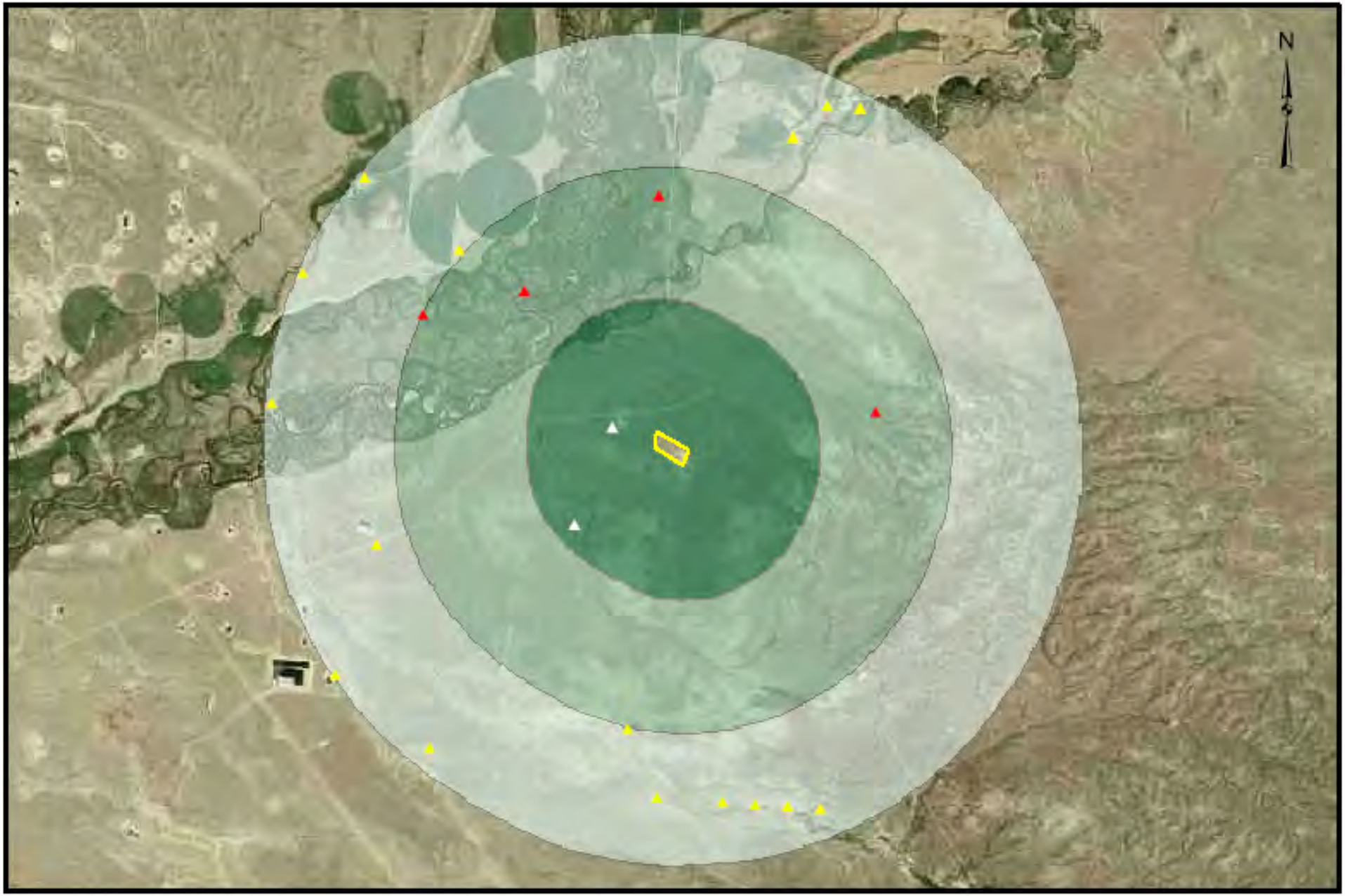
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Daniel Junction** **File Number:** **10.555**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Daniel Junction Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Marbleton #2** **File Number:** **10.561**

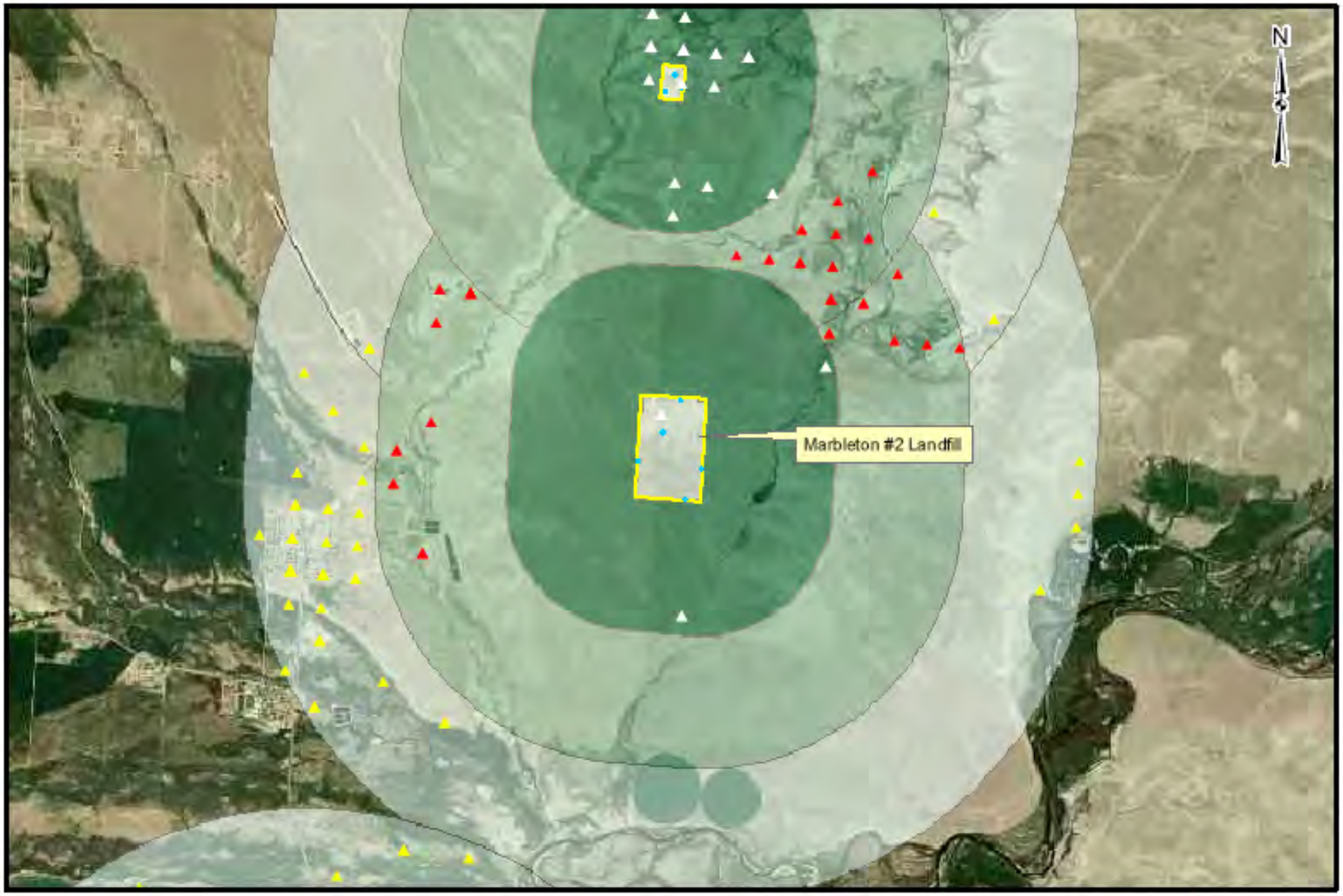
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through November 5, 2009**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Calcium
Chloride
Copper
Dichloroethene, 1,1-
Iron
Lead
Magnesium
Manganese
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Sulfate
Trichloroethane, 1,1,1-
Trichlorofluoromethane

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Marbleton #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

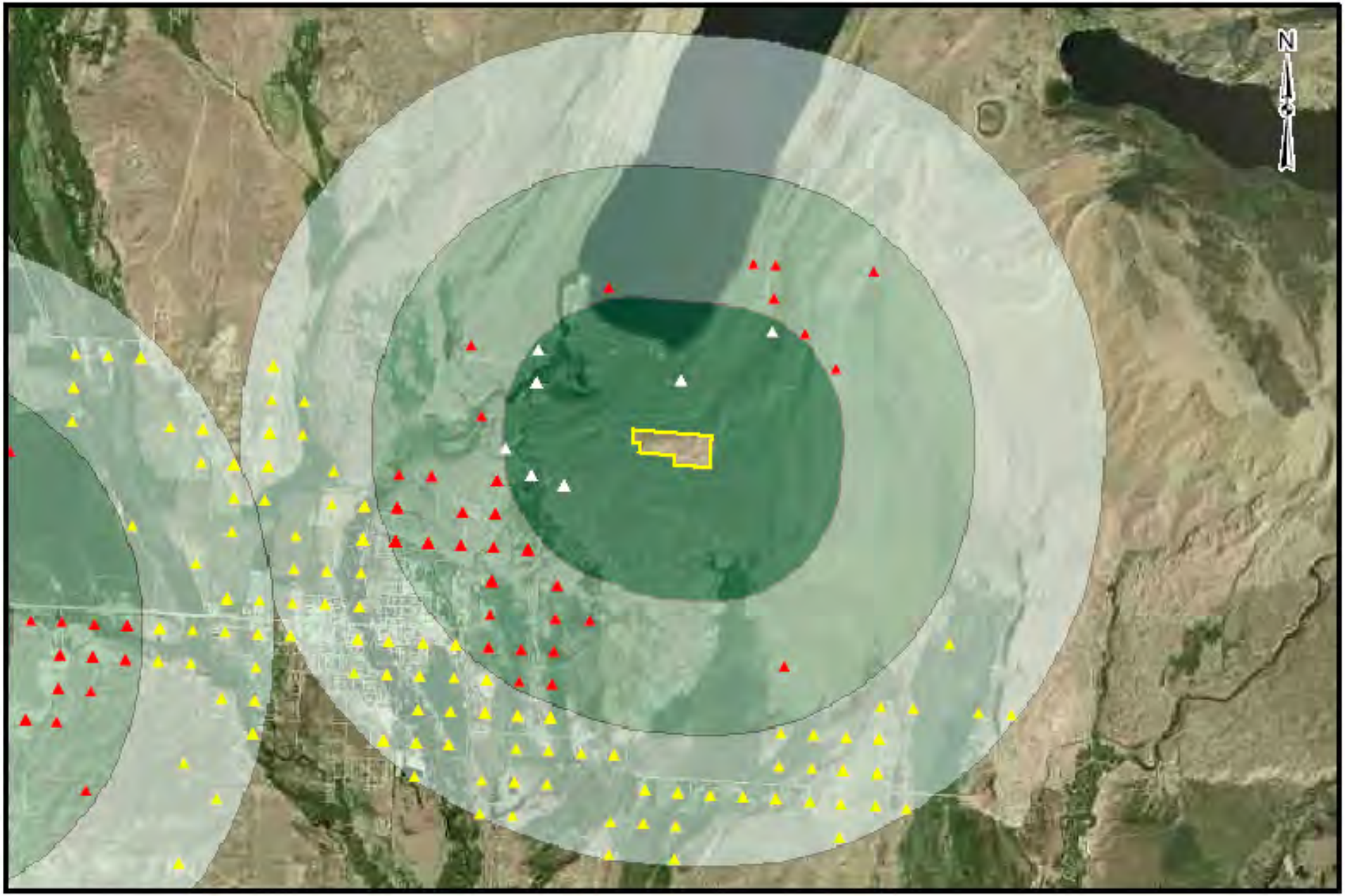
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Pinedale #1** **File Number:** **10.570**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Pinedale #1 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

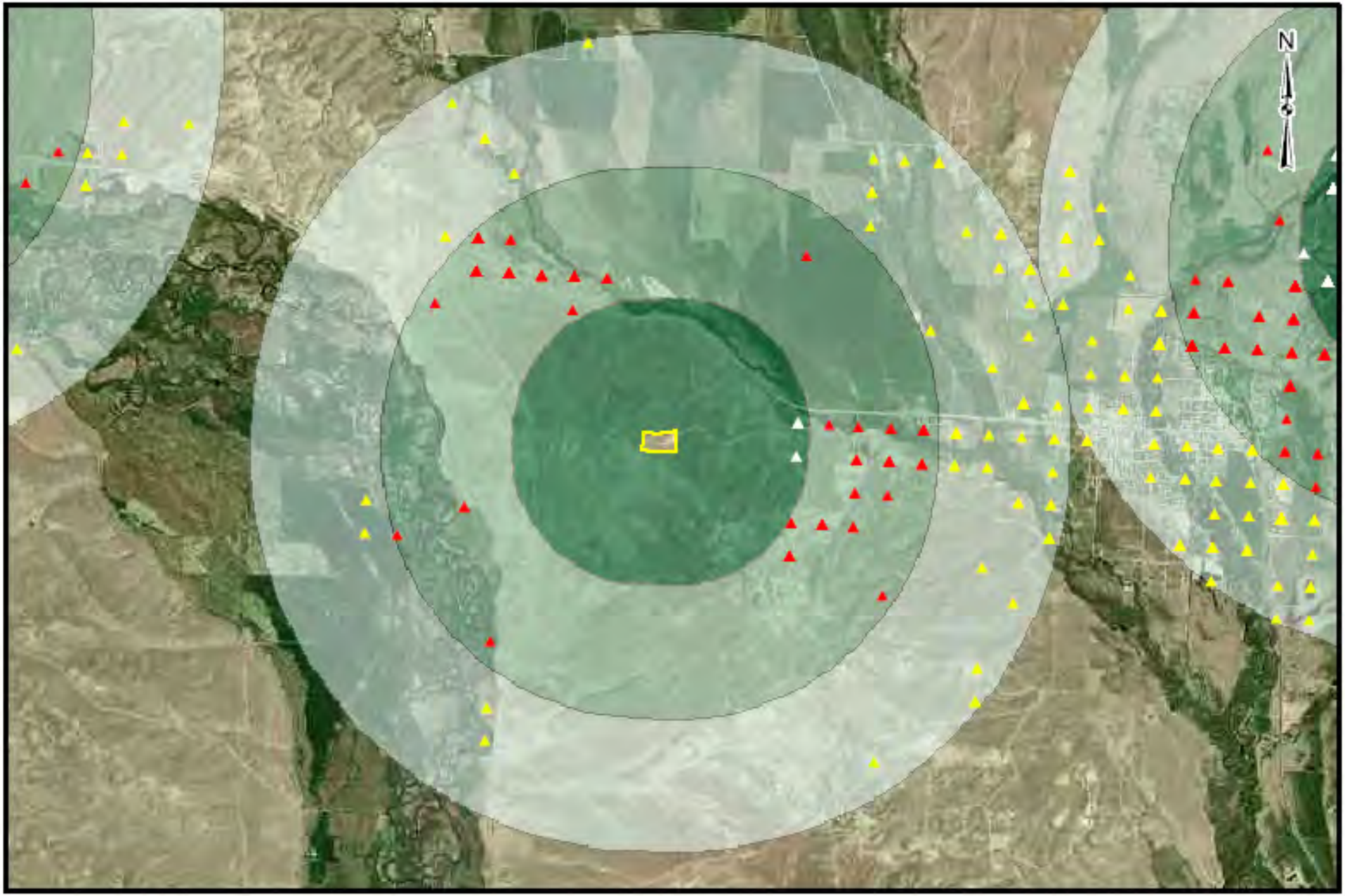
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Pinedale #2** **File Number:** **10.571**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Pinedale #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Sundance** **File Number:** **10.580**

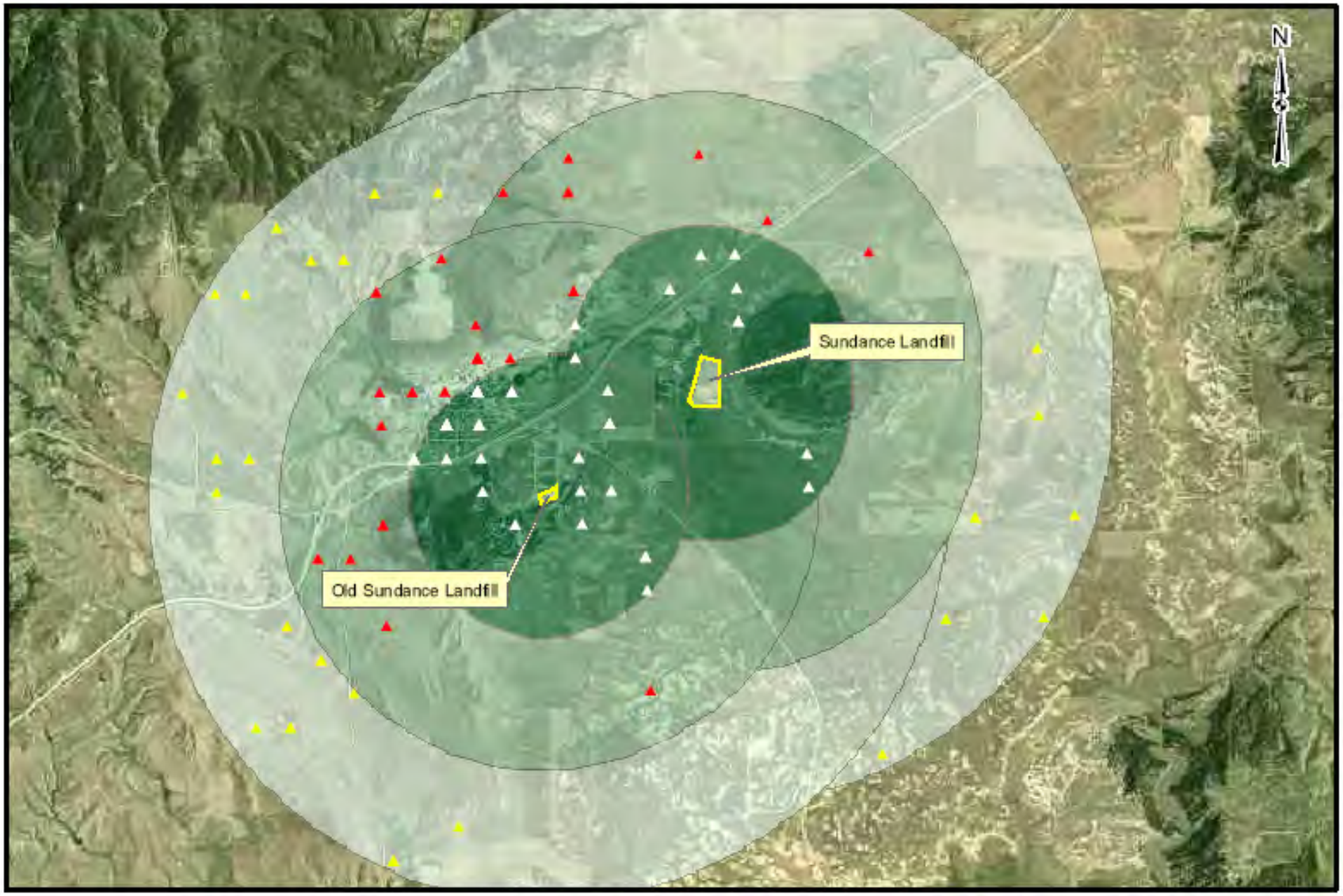
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through September 24, 2009**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Calcium
Chloride
Dichlorodifluoromethane
Dichloroethane, 1,1-
Fluoride
Magnesium
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Tetrachloroethene
Trichloroethene

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Sundance & Old Sundance Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Point of Rocks** **File Number:** **10.585**

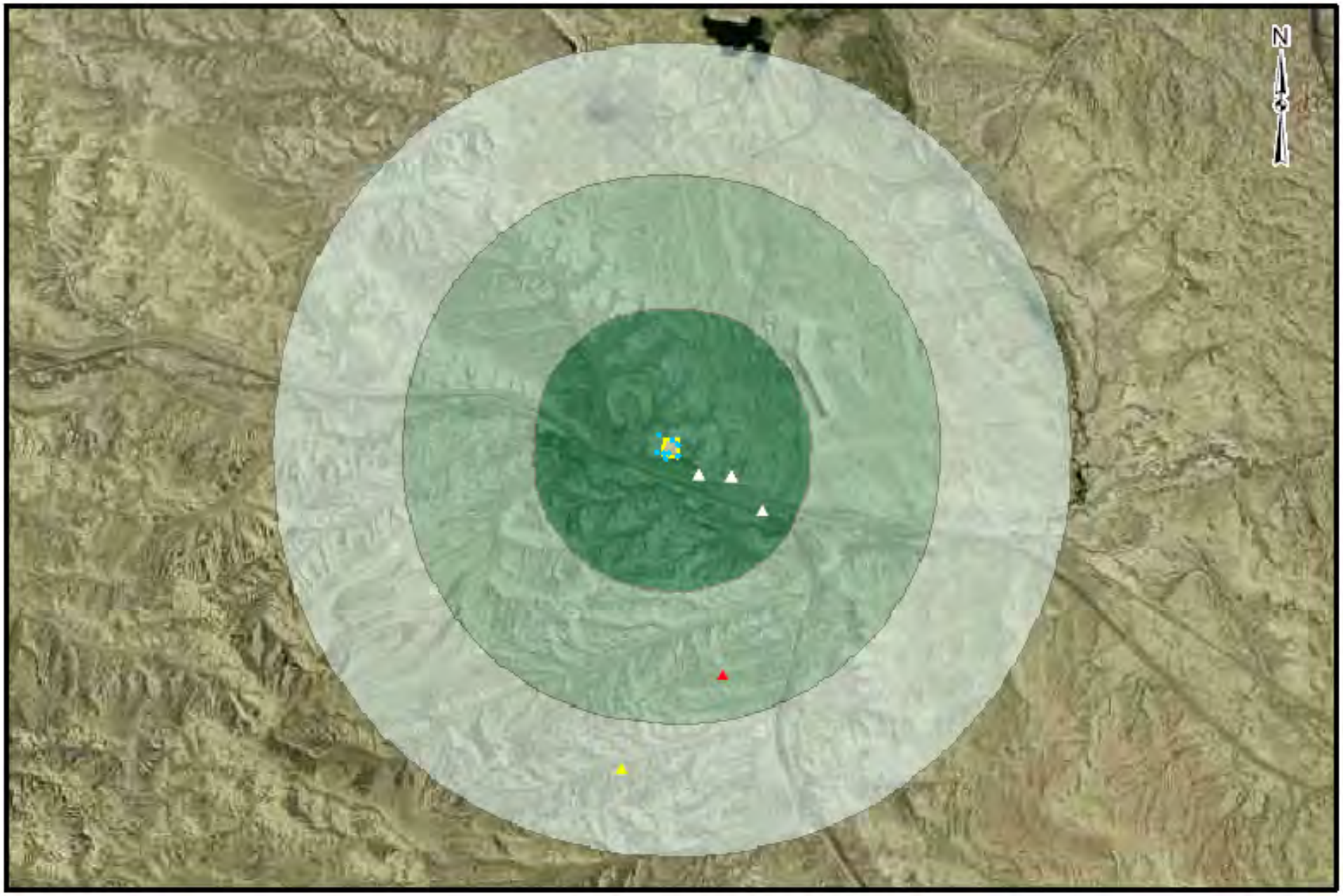
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 22, 2010**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Calcium
Chloride
Fluoride
Magnesium
Methylene chloride
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Point of Rocks Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Reliance** **File Number:** **10.590**

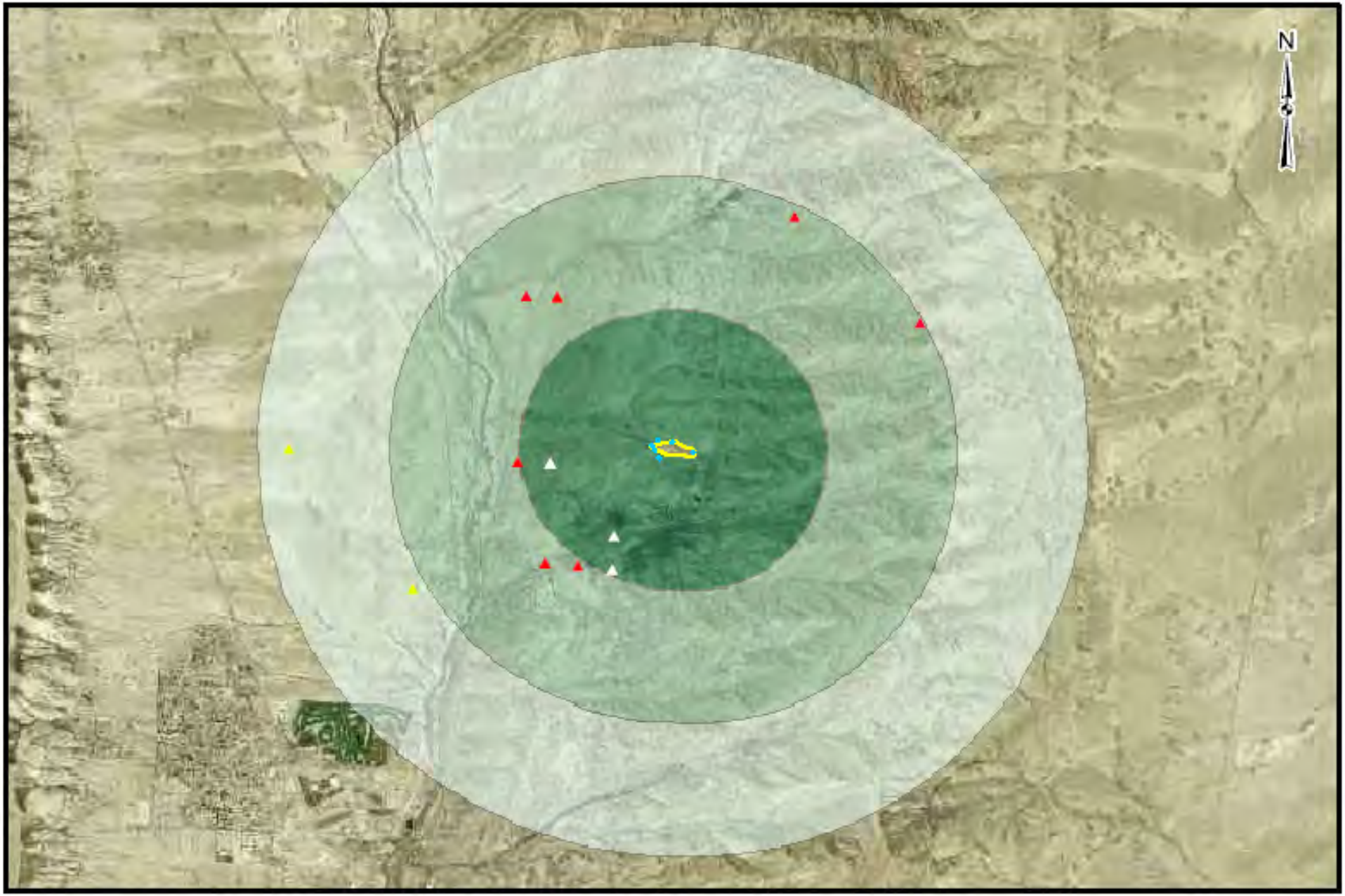
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 21, 2010**

Comments:

Contaminants higher in downgradient wells:

Arsenic
Barium
Beryllium
Cadmium
Calcium
Chloride
Cobalt
Copper
Fluoride
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
pH
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Thallium
Vanadium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Reliance Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

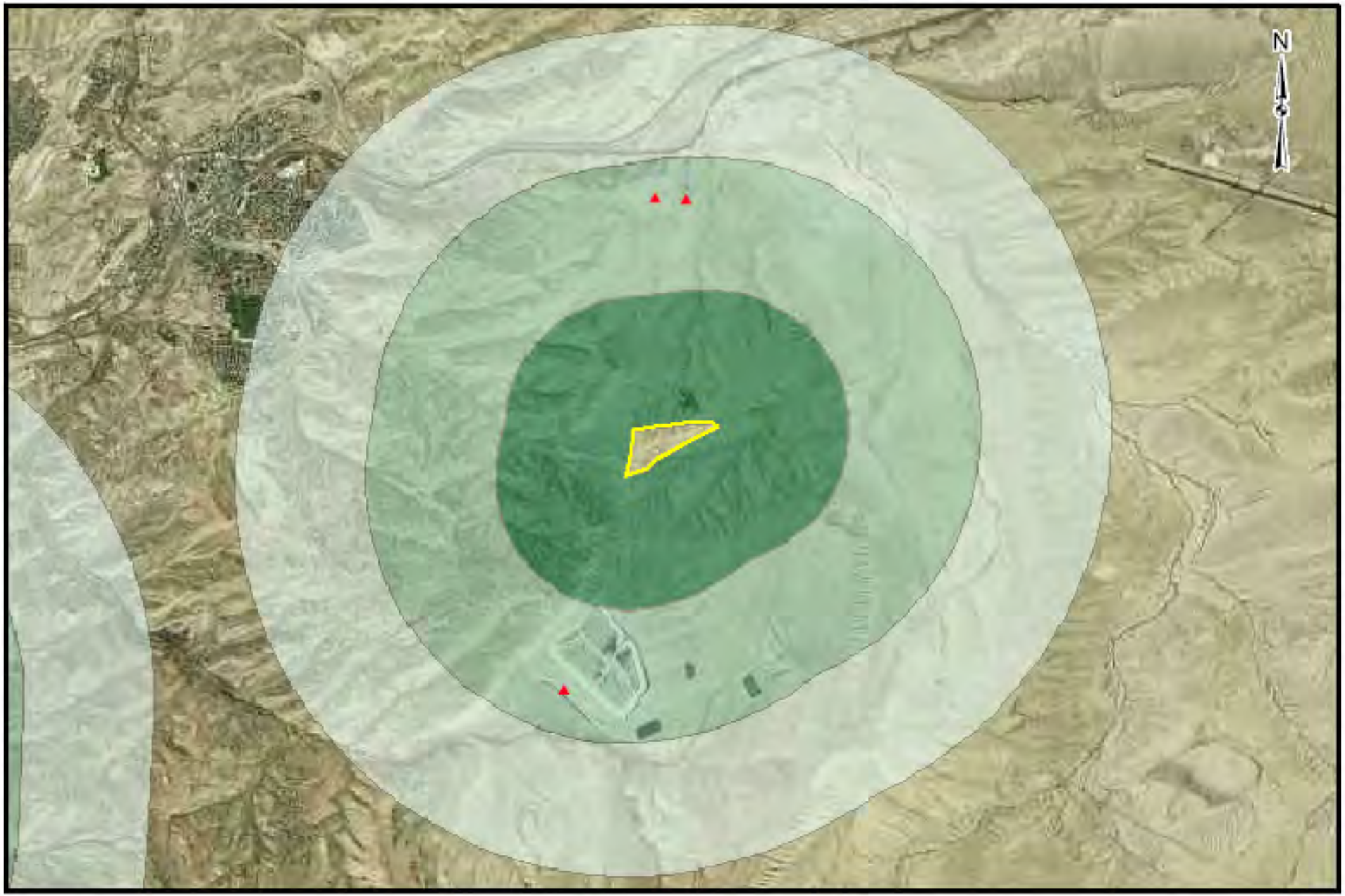
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Rock Springs (old site)** **File Number:** **10.594**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **No wells installed.**



Water Supply Wells within 3 Miles of the Old Rock Springs Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Rock Springs** **File Number:** **10.595**

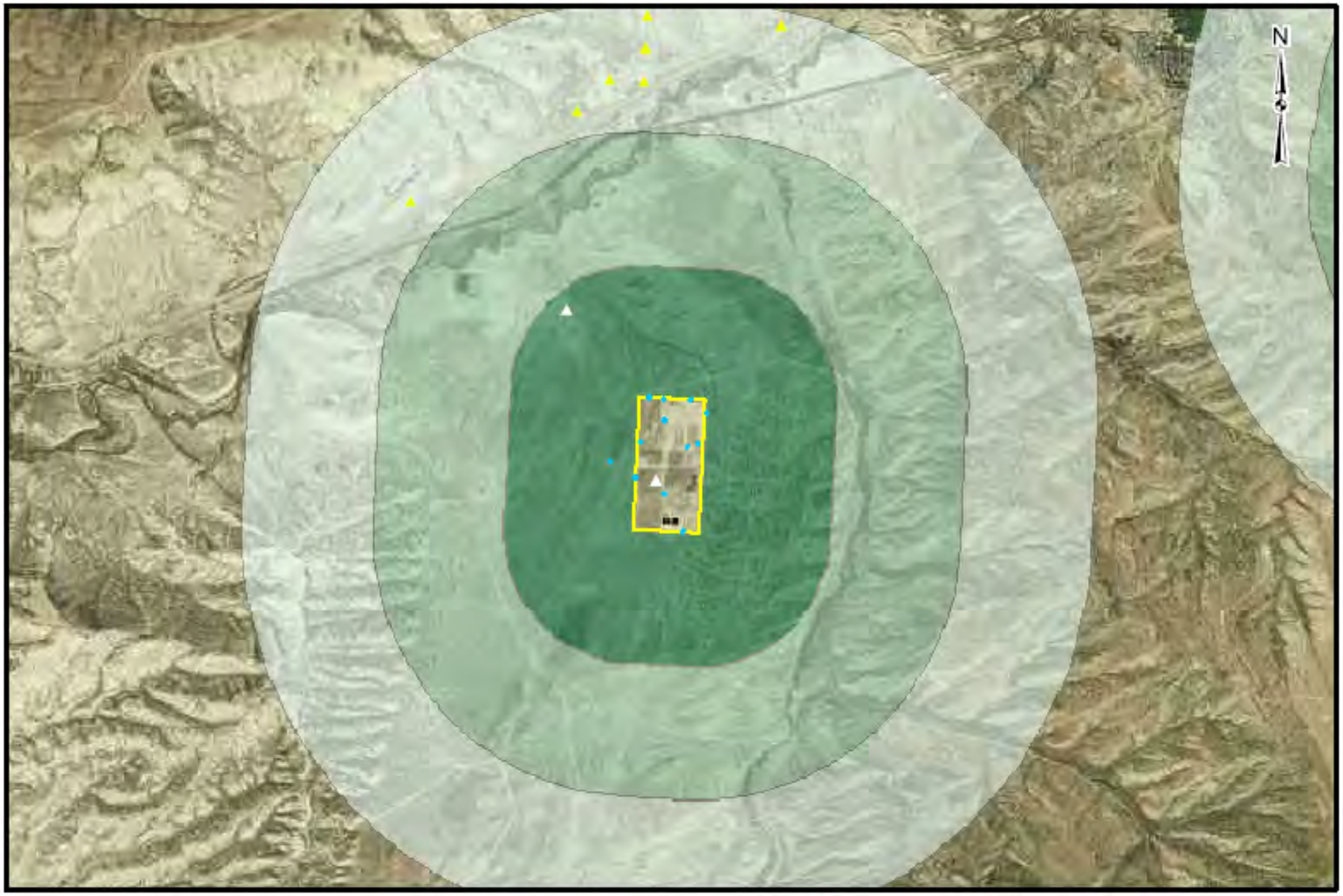
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 20, 2010**

Comments:

Contaminants higher in downgradient wells:

Antimony
Bicarbonate as HCO3
Carbon tetrachloride
Chloride
Chloroform
Cyanide, Total Automated
Dichloroethane, 1,1-
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Tetrachloroethene
Trichloroethane, 1,1,1-
Trichloroethene
Trichlorofluoromethane

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Rock Springs Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

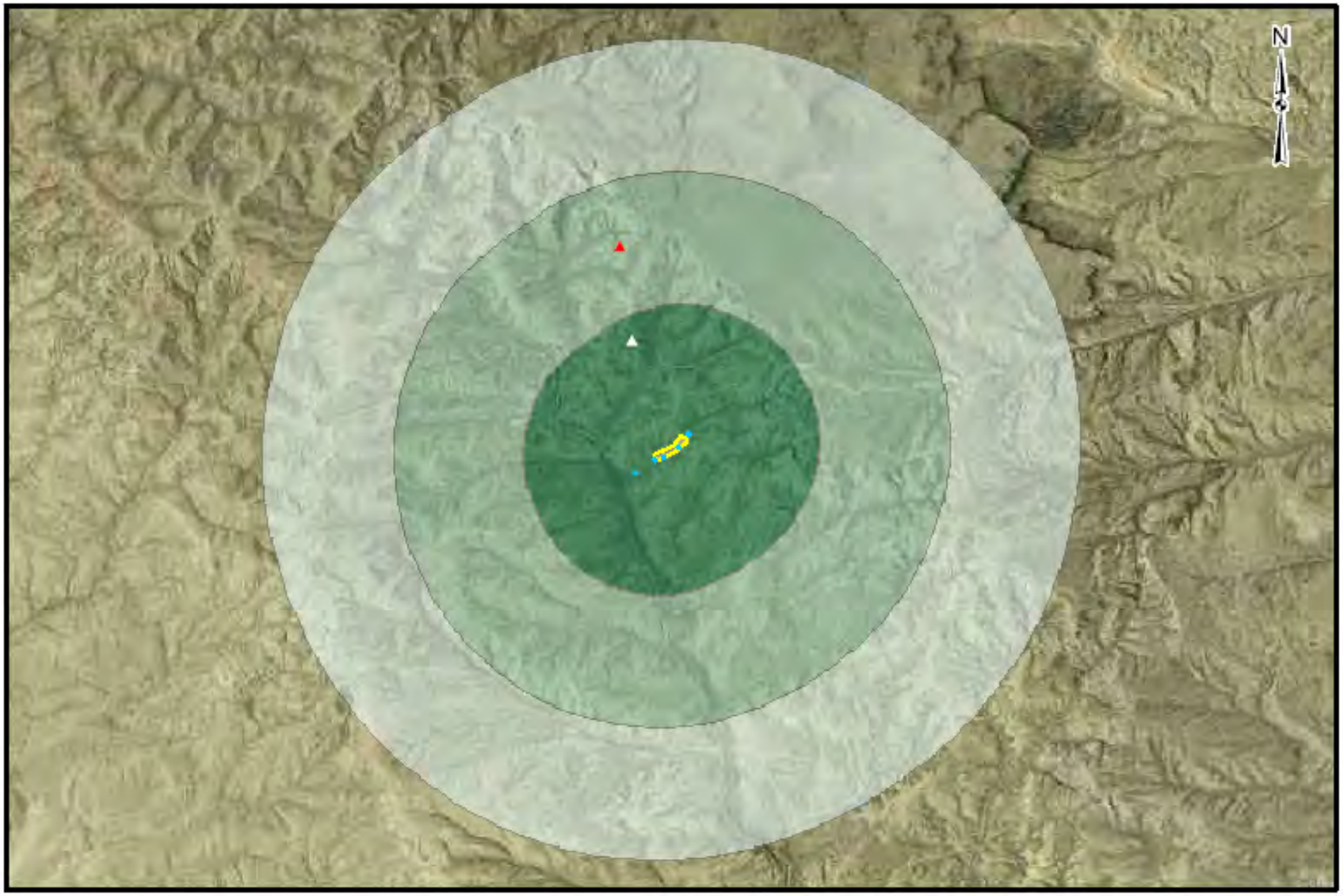
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Superior** **File Number:** **10.600**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **Analyses limited as a result of accumulation of silt in a number wells which prevented collection of samples from all wells.**



Water Supply Wells within 3 Miles of the Superior Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

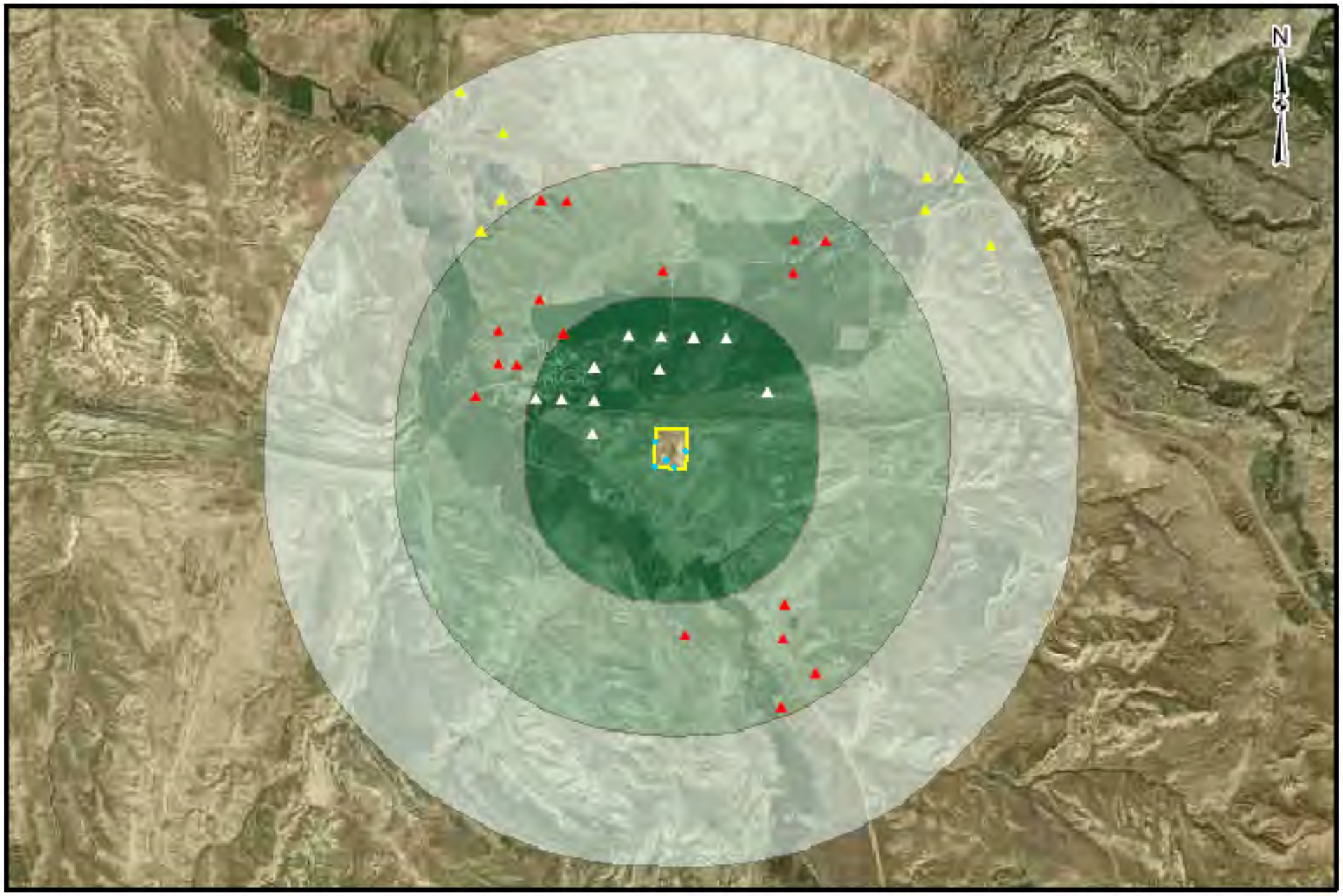
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Ten Sleep #1** **File Number:** **10.605**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Ten Sleep Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Horsethief Canyon #2** **File Number:** **10.616**

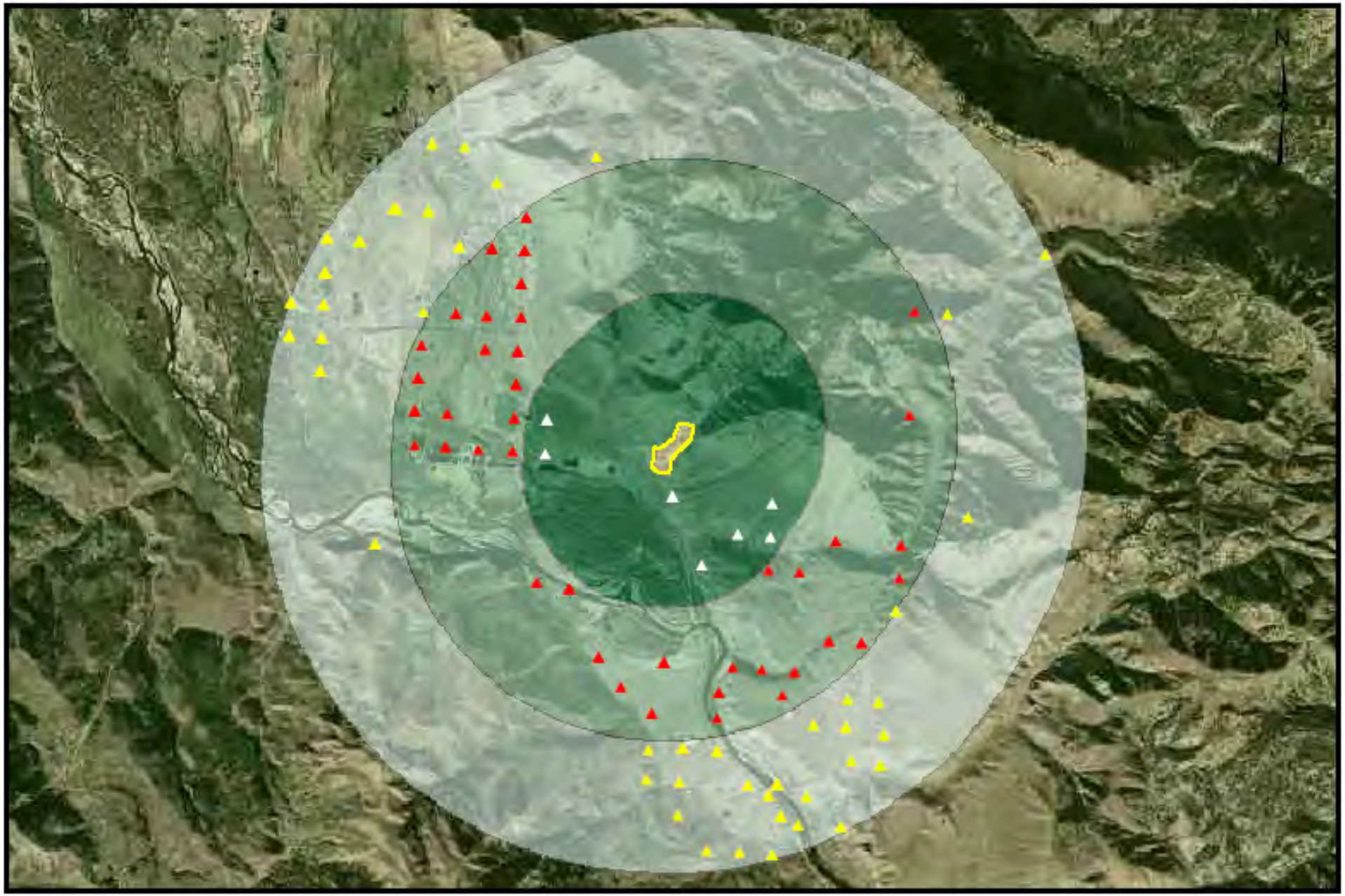
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 28, 2010**

Comments:

Contaminants higher in downgradient wells:

Barium
Bicarbonate as HCO3
Chloroform
Dichloroethane, 1,1-
Methylene chloride
Nitrogen, Nitrate+Nitrite as N
Trichloroethane, 1,1,1-

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Horsethief Canyon Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Thermopolis** **File Number:** **10.625**

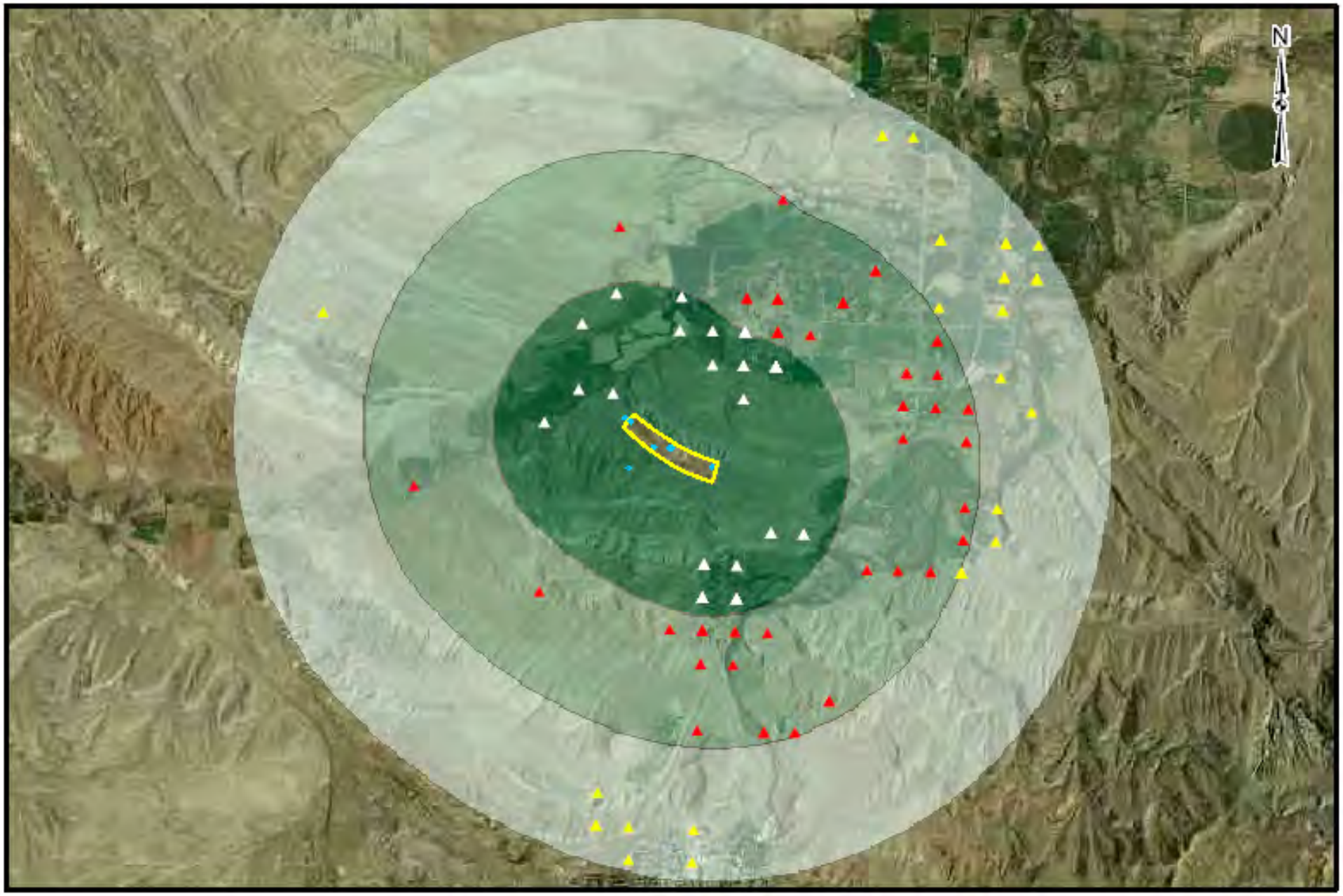
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through August 26, 2009**

Comments: **Background water quality may not be clearly or adequately identified, and additional wells are needed to constitute an adequate monitoring network.**

Contaminants higher in downgradient wells:

Arsenic
Benzene
Calcium
Chloride
Chromium
Copper
Fluoride
Iron
Lead
Magnesium
Manganese
Nickel
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Thermopolis Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

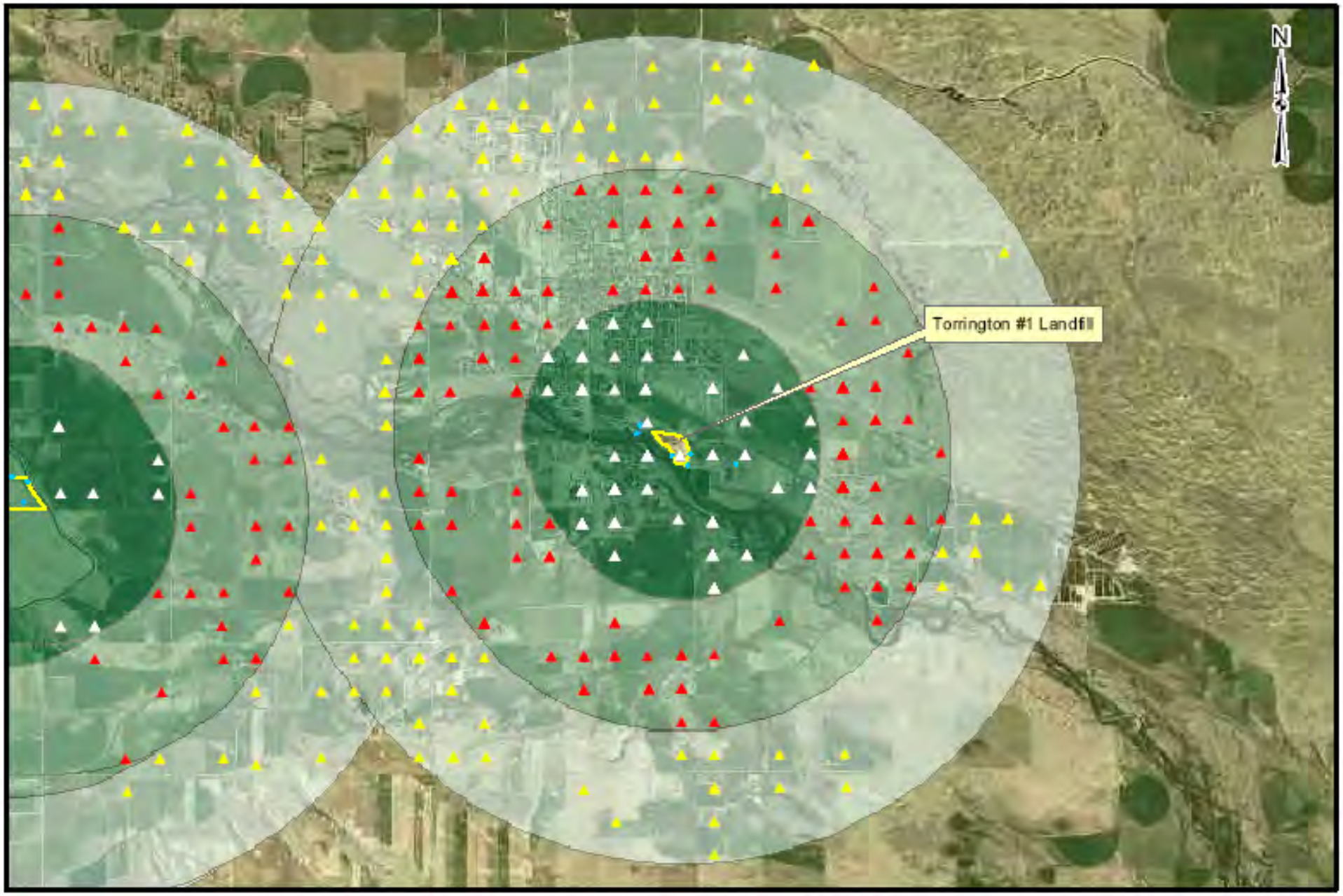
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Torrington #1** **File Number:** **10.630**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **Facility is located in the North Platte River floodplain. As of the date of this report, well coverage is inadequate to differentiate up-gradient and down-gradient groundwater.**



Water Supply Wells within 3 Miles of the Torrington #1 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Torrington #2** **File Number:** **10.631**

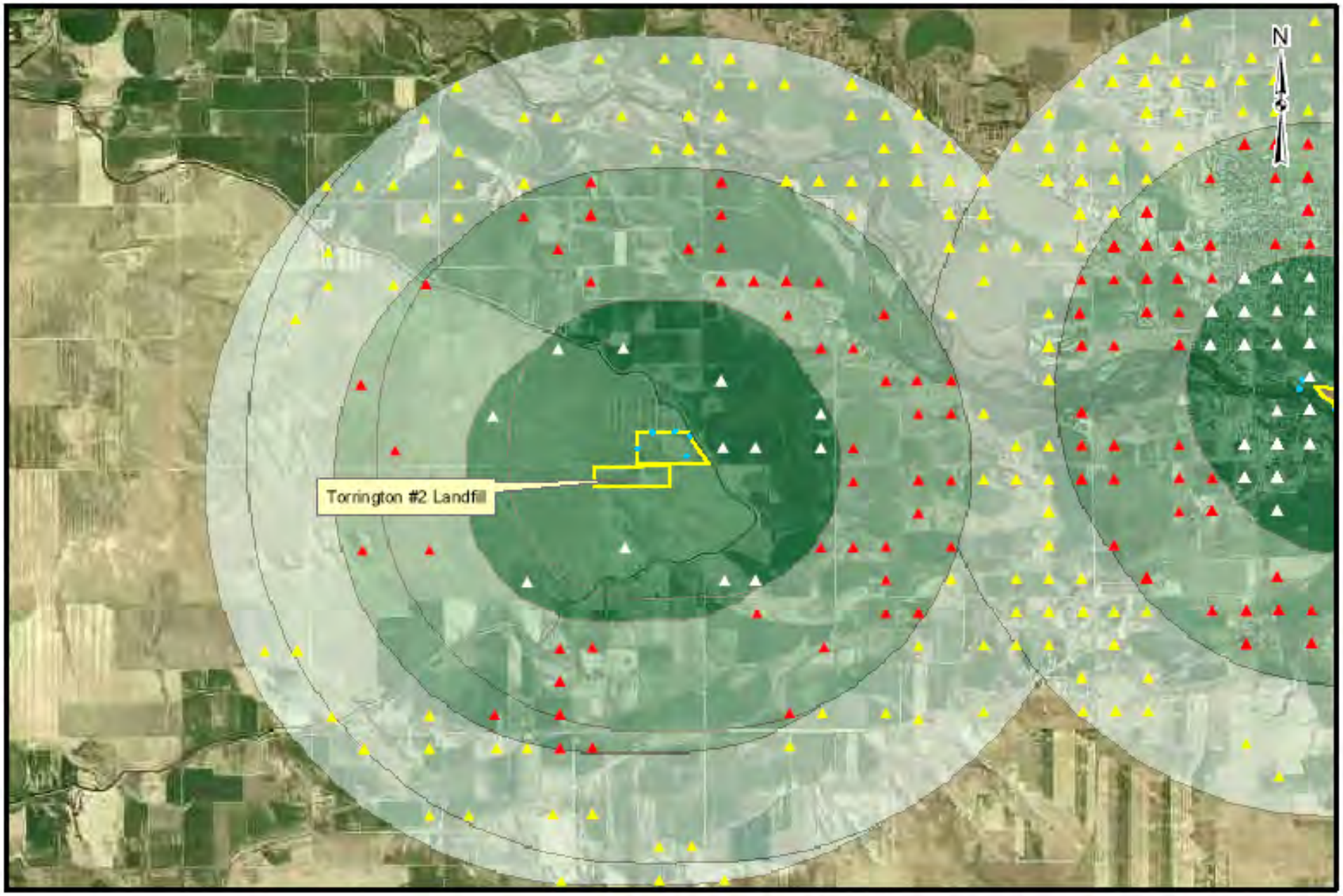
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through January 20, 2010**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Arsenic
Barium
Bicarbonate as HCO3
Calcium
Carbonate as CO3
Chloride
Chromium
Copper
Fluoride
Iron
Lead
Magnesium
Manganese
Nickel
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Vanadium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Torrington #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Torrington Disposal Service** **File Number:** **10.645**

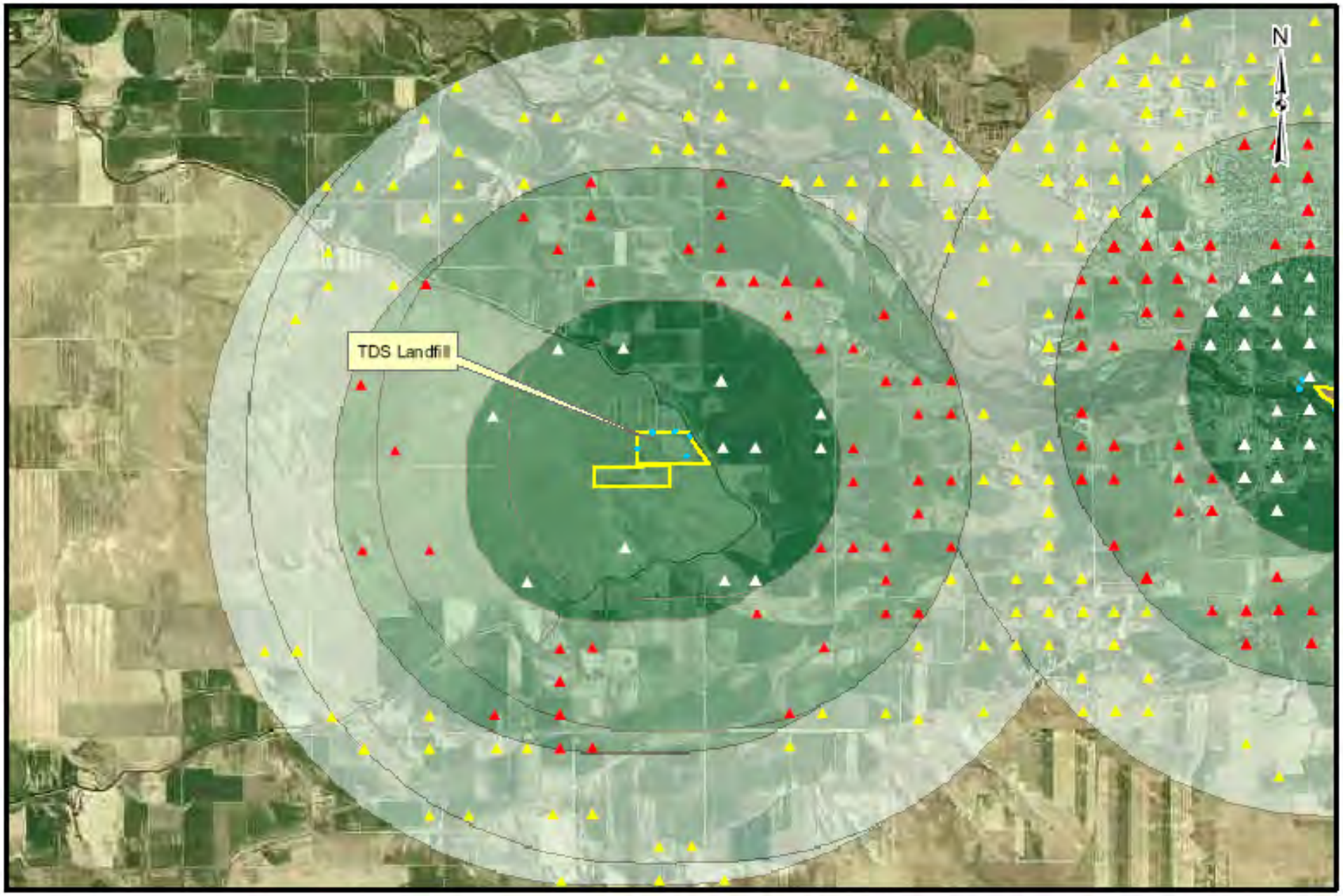
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 14, 2009**

Comments: **Private facility**

Contaminants higher in downgradient wells:

Arsenic
Barium
Calcium
Chloride
Chromium
Copper
Iron
Lead
Magnesium
Manganese
Nickel
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Vanadium
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the TDS Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Bridger Valley** **File Number:** **10.650**

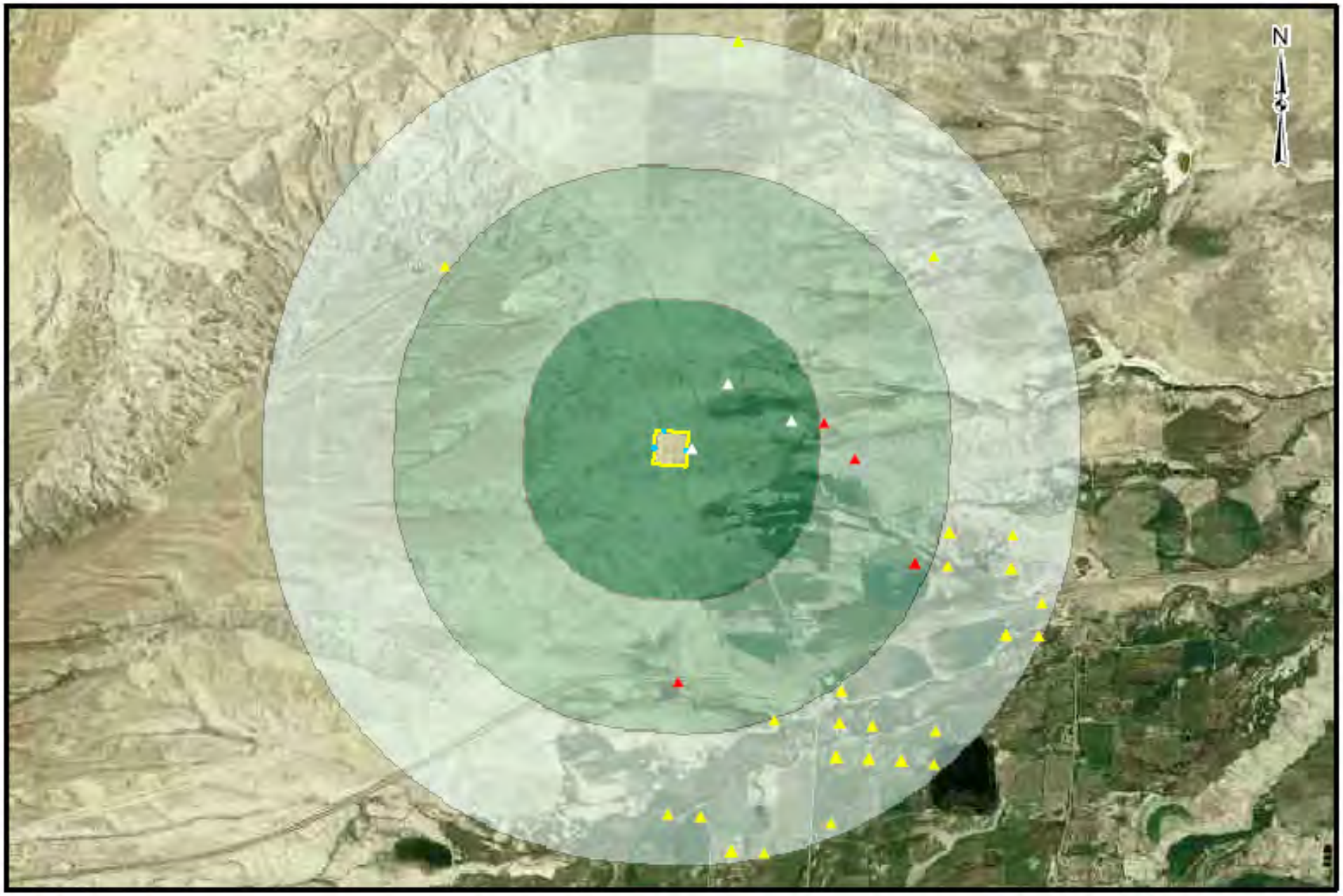
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through November 24, 2009**

Comments:

Contaminants higher in downgradient wells:

Chloroethane
Methylene chloride
Tetrachloroethene
Trichloroethane, 1,1,1-
Trichlorofluoromethane

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Bridger Valley Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Evanston #1** **File Number:** **10.655**

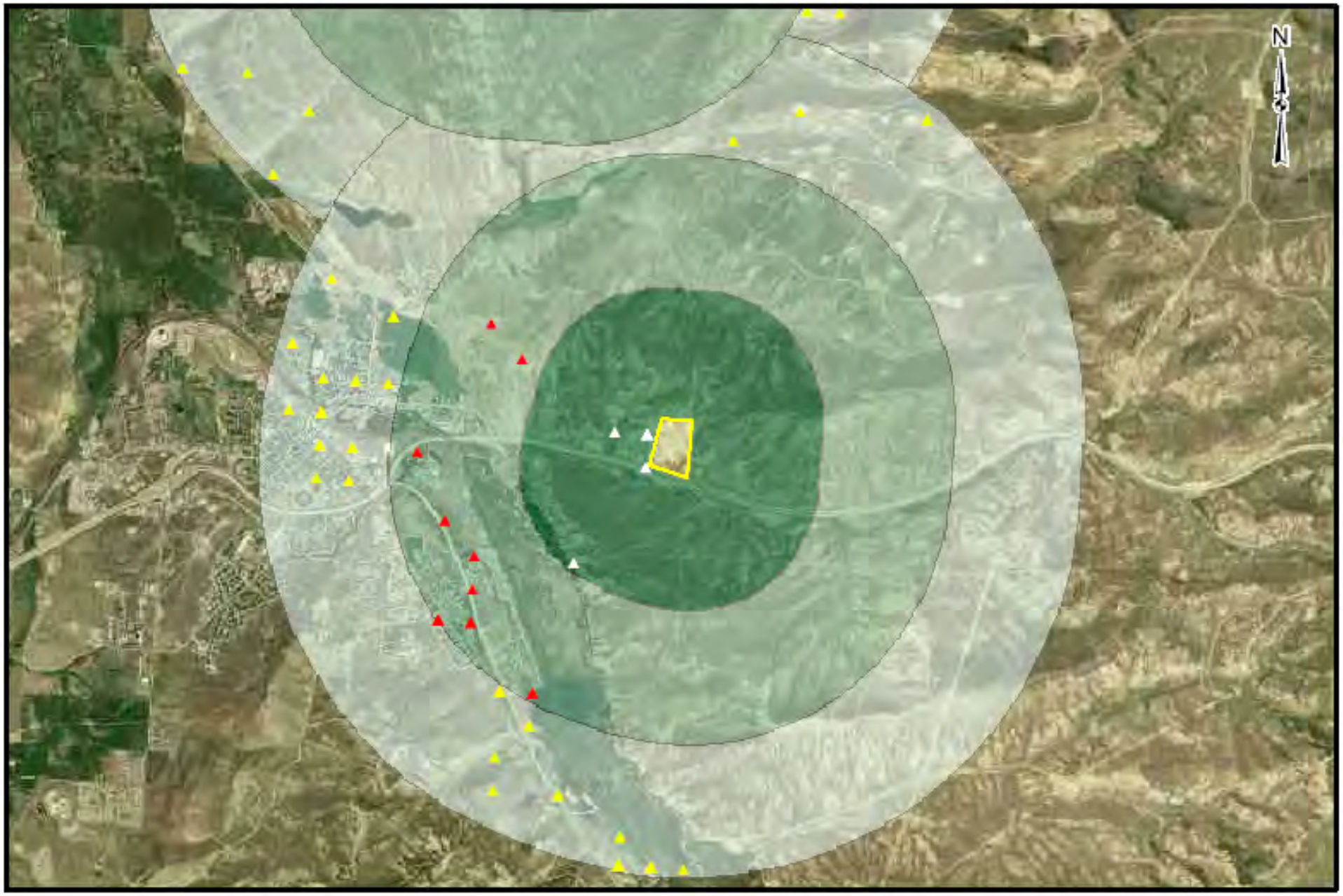
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 20, 2009**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Arsenic
Barium
Benzene
Bicarbonate as HCO3
Calcium
Chloride
Chloroethane
Chromium
Copper
Dichlorodifluoromethane
Dichloroethane, 1,1-
Dichloroethene, cis-1,2-
Iron
Magnesium
Manganese
Methylene chloride
Nitrogen, Ammonia as N
Nitrogen, Nitrate+Nitrite as N
Sodium
Solids, Total Dissolved TDS @ 180 C
Tetrachloroethene
Trichloroethane, 1,1,1-
Trichloroethene
Trichlorofluoromethane
Vinyl chloride
Zinc

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Evanston #1 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Evanston #2** **File Number:** **10.656**

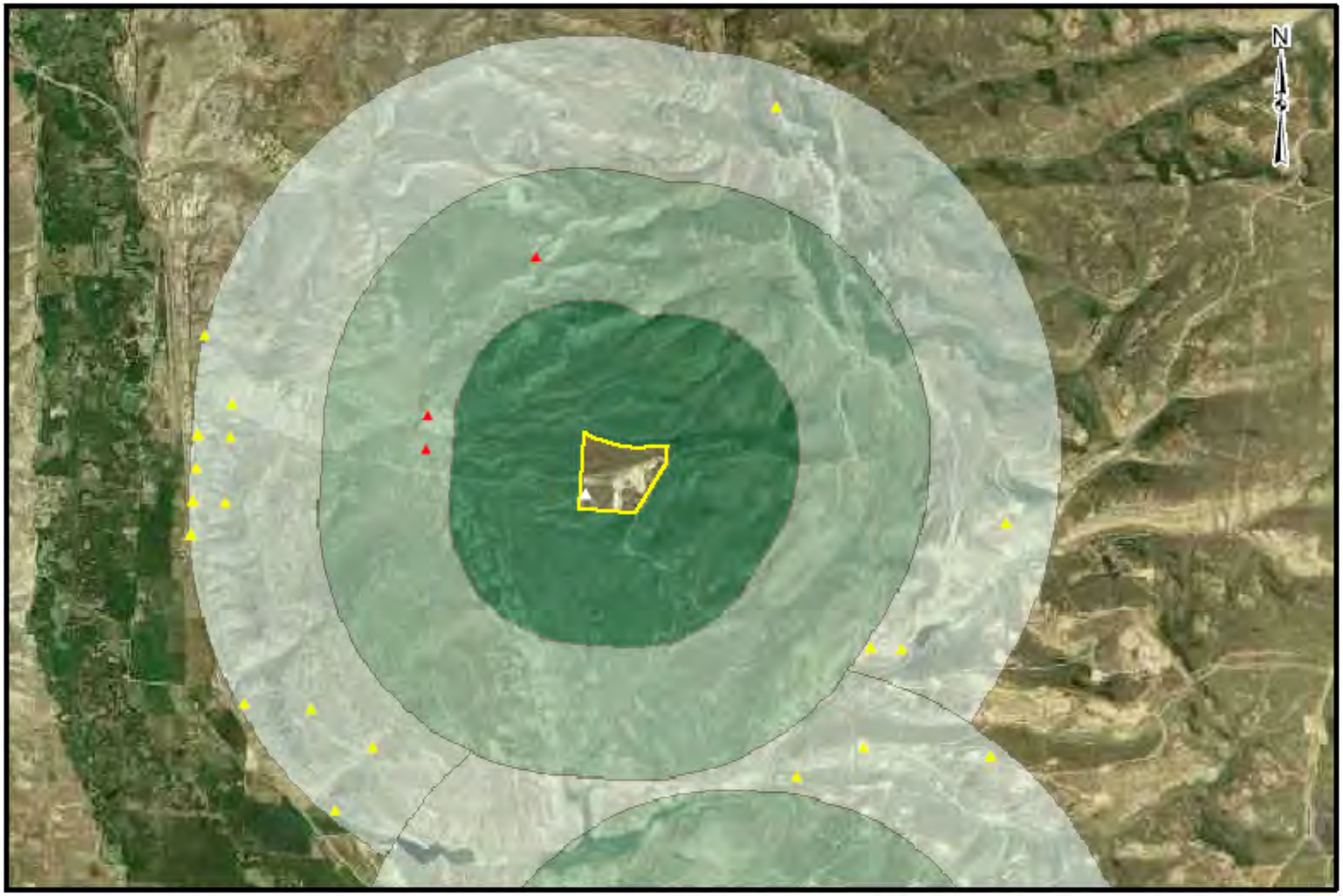
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 29, 2009**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Fluoride
Methylene chloride
Selenium
Sodium
Tetrachloroethene
Trichlorofluoromethane

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Evanston #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

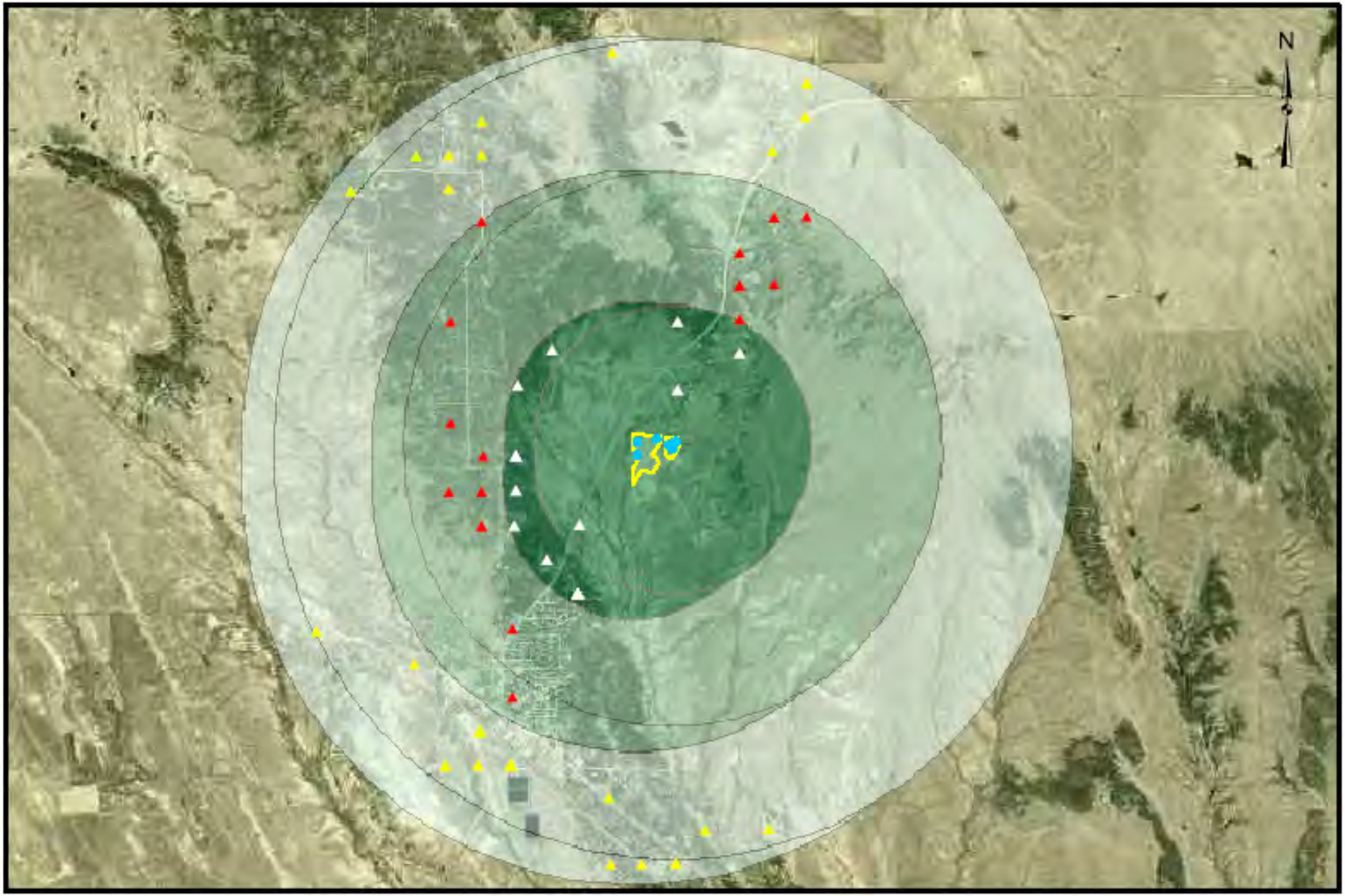
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Upton #1** **File Number:** **10.660**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Upton #1 & #4 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

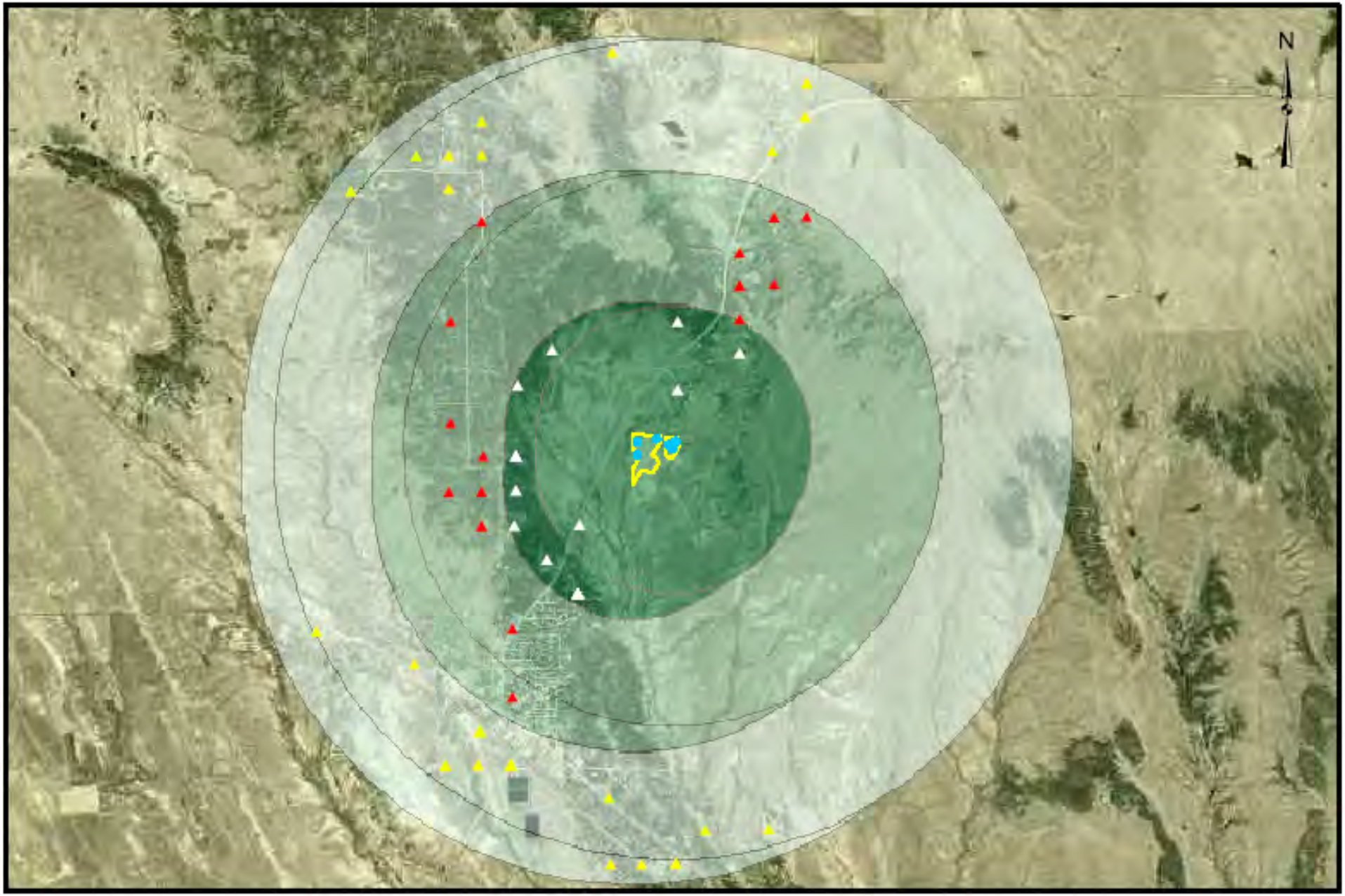
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Upton #4** **File Number:** **10.663**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **Data evaluated include samples collected through July 20, 2009.**



Water Supply Wells within 3 Miles of the Upton #1 & #4 Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Wamsutter #2** **File Number:** **10.681**

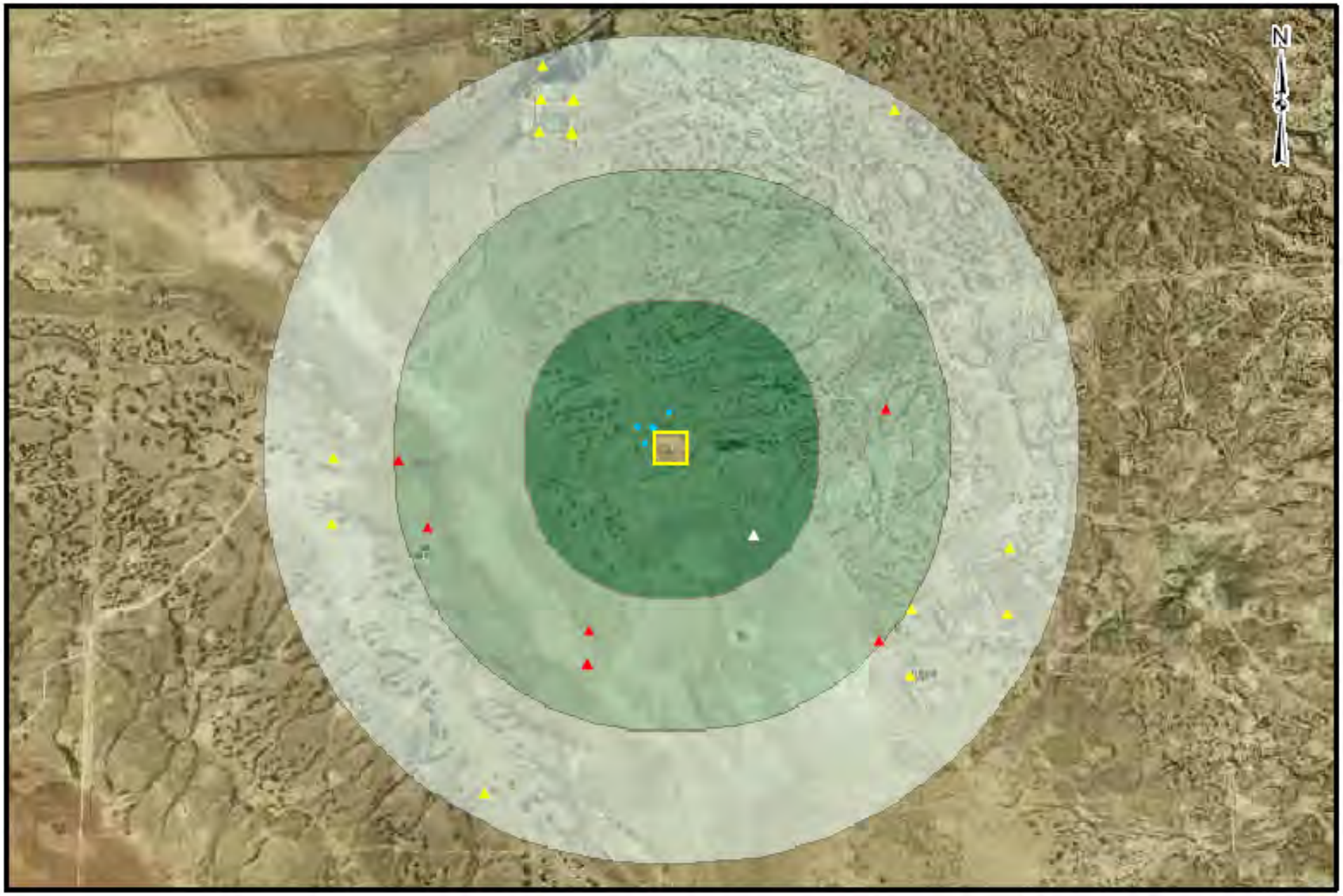
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 31, 2009**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Barium
Bicarbonate as HCO3
Chloride
Copper
Iron
Lead
Nitrogen, Ammonia as N
pH
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Wamsutter #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Washakie County SWDD # 1 - Worland #2** **File Number:** **10.692**

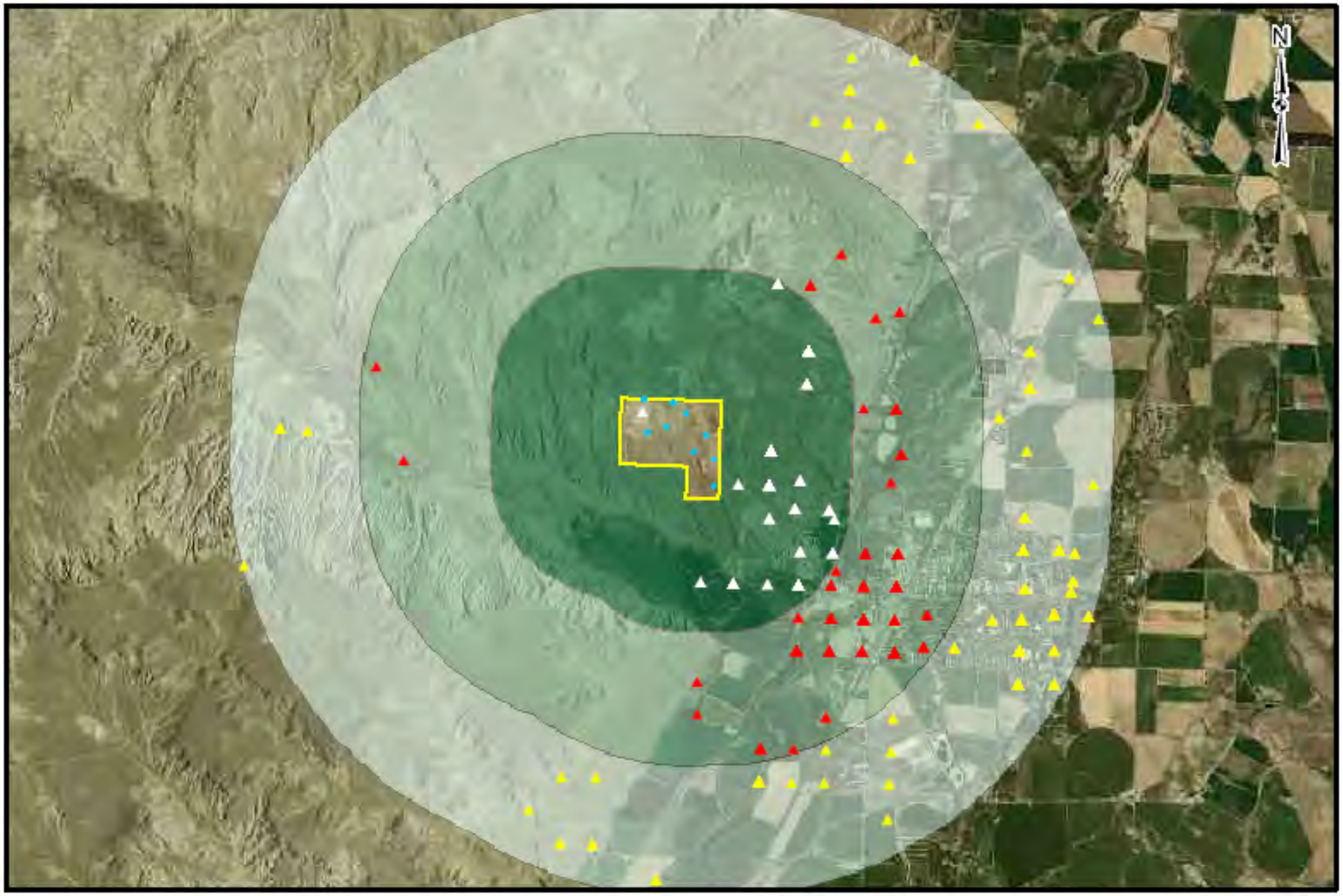
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 14, 2009**

Comments:

Contaminants higher in downgradient wells:

Acetone
Chloride
Fluoride
Magnesium
Nitrogen, Nitrate+Nitrite as N

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Washakie County Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Central Weston County SWDD** **File Number:** **10.700**

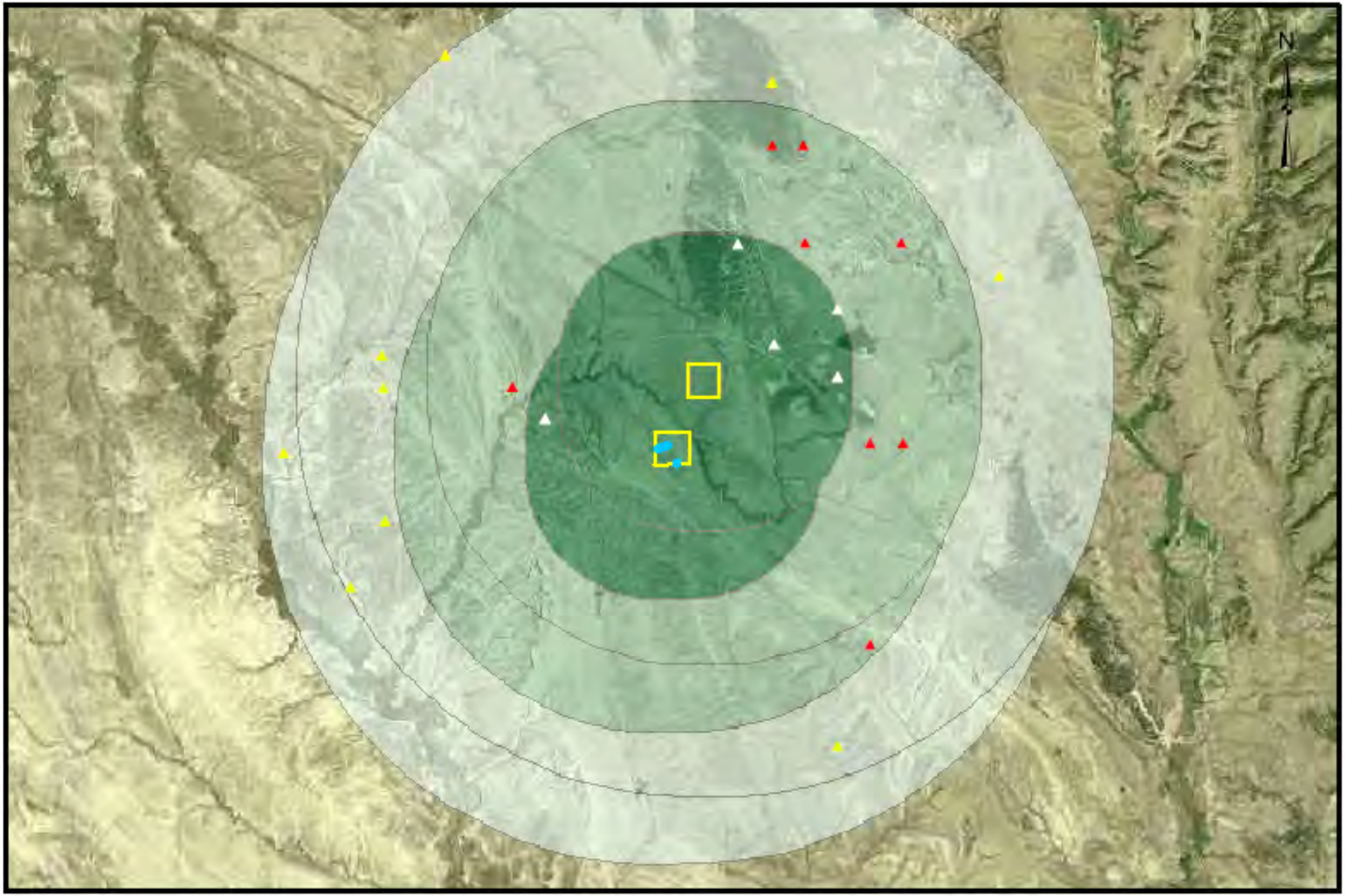
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through December 22, 2009**

Comments:

Contaminants higher in downgradient wells:

Nitrogen, Nitrate+Nitrite as N

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Central Weston County and Osage Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Wheatland** **File Number:** **10.706**

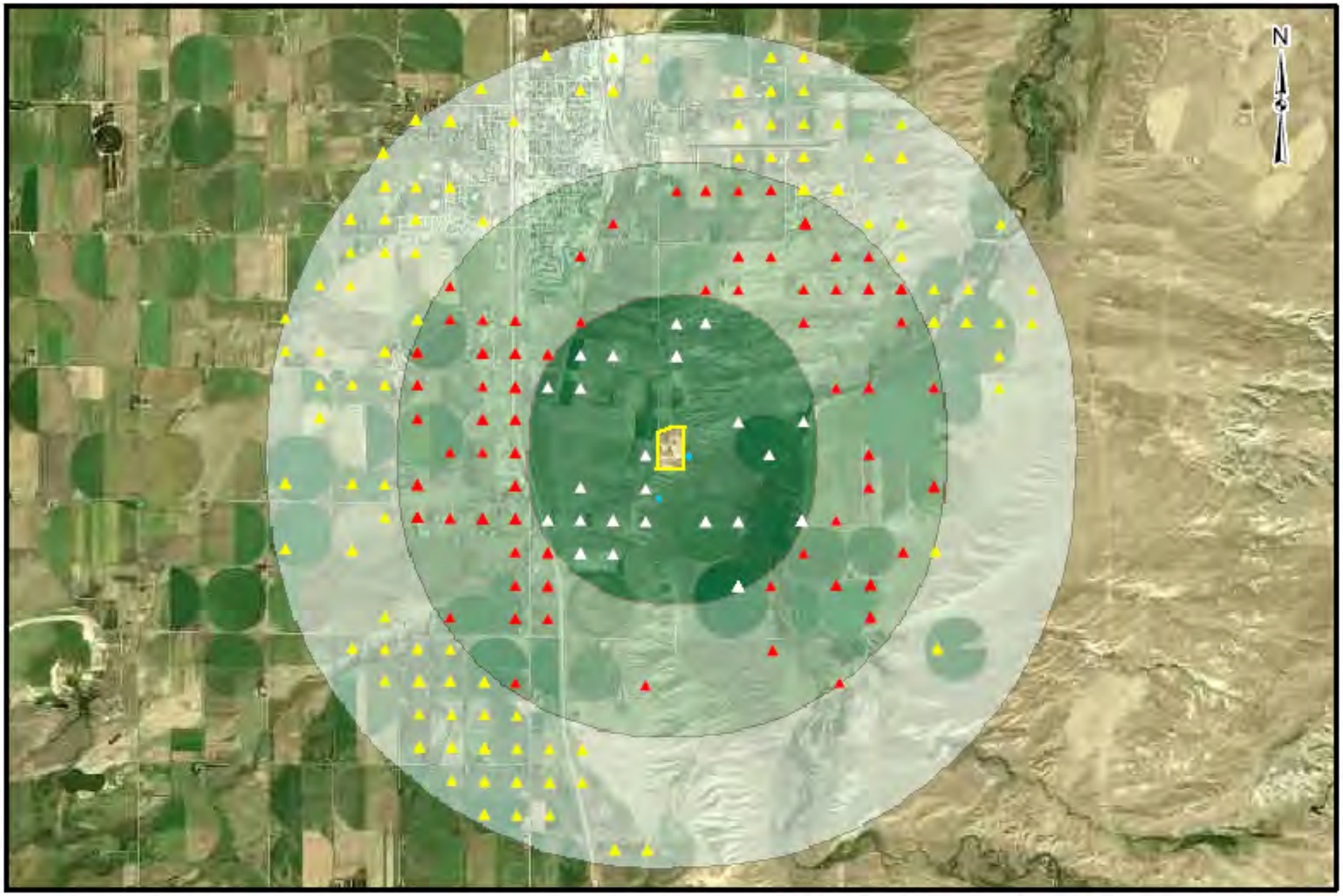
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through October 12, 2009**

Comments:

Contaminants higher in downgradient wells:

Bicarbonate as HCO3
Chloride
Nitrogen, Nitrate+Nitrite as N

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Wheatland Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

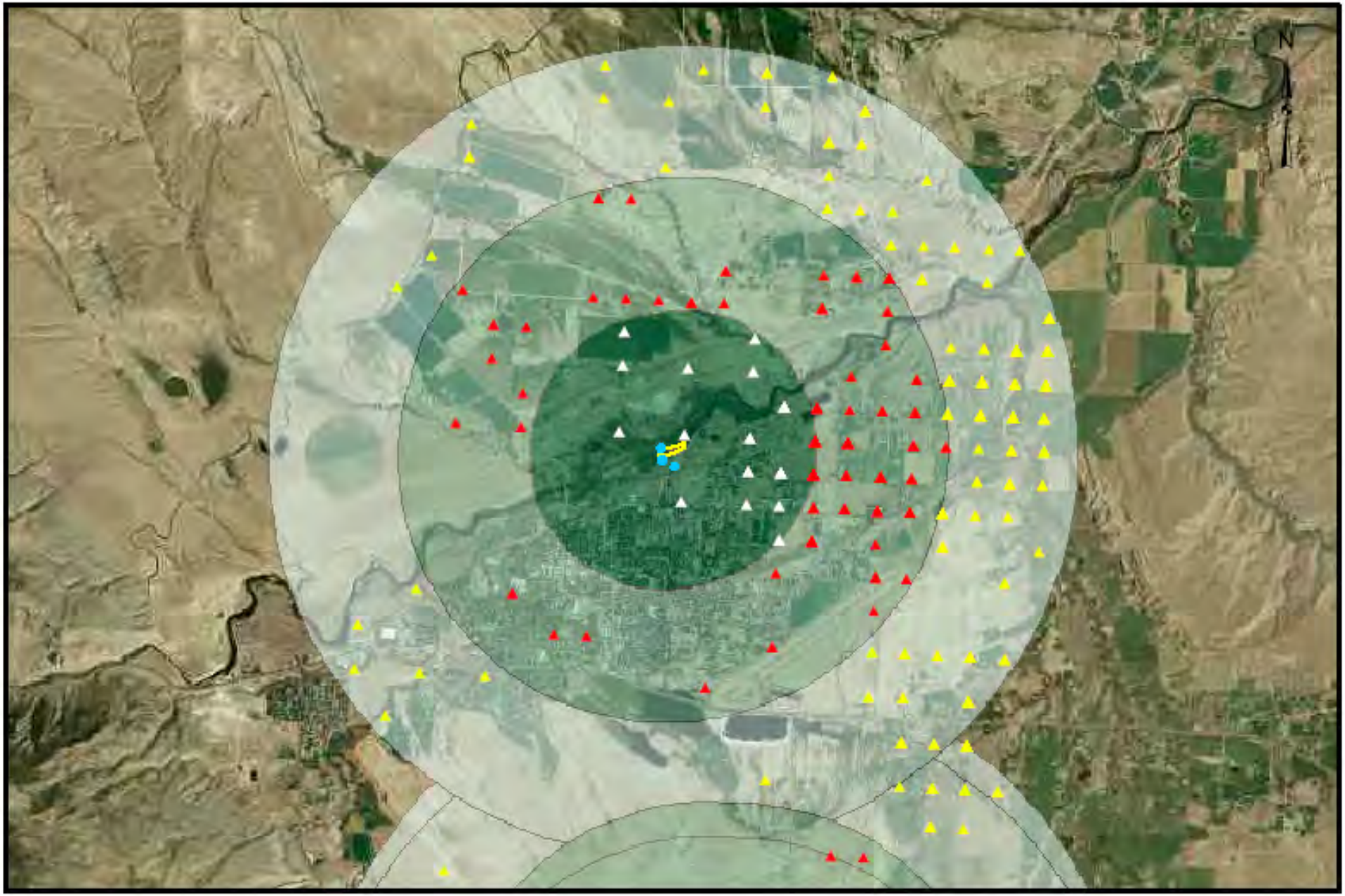
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Cody Dump** **File Number:** **10.751**

Groundwater Status: **No difference in constituent concentrations in wells upgradient and downgradient of landfill.**

Comments: **Data evaluated include samples collected through February 17, 2009.**



Water Supply Wells within 3 Miles of the Old Cody Town Dump

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Buffalo Dump** **File Number:** **10.759**

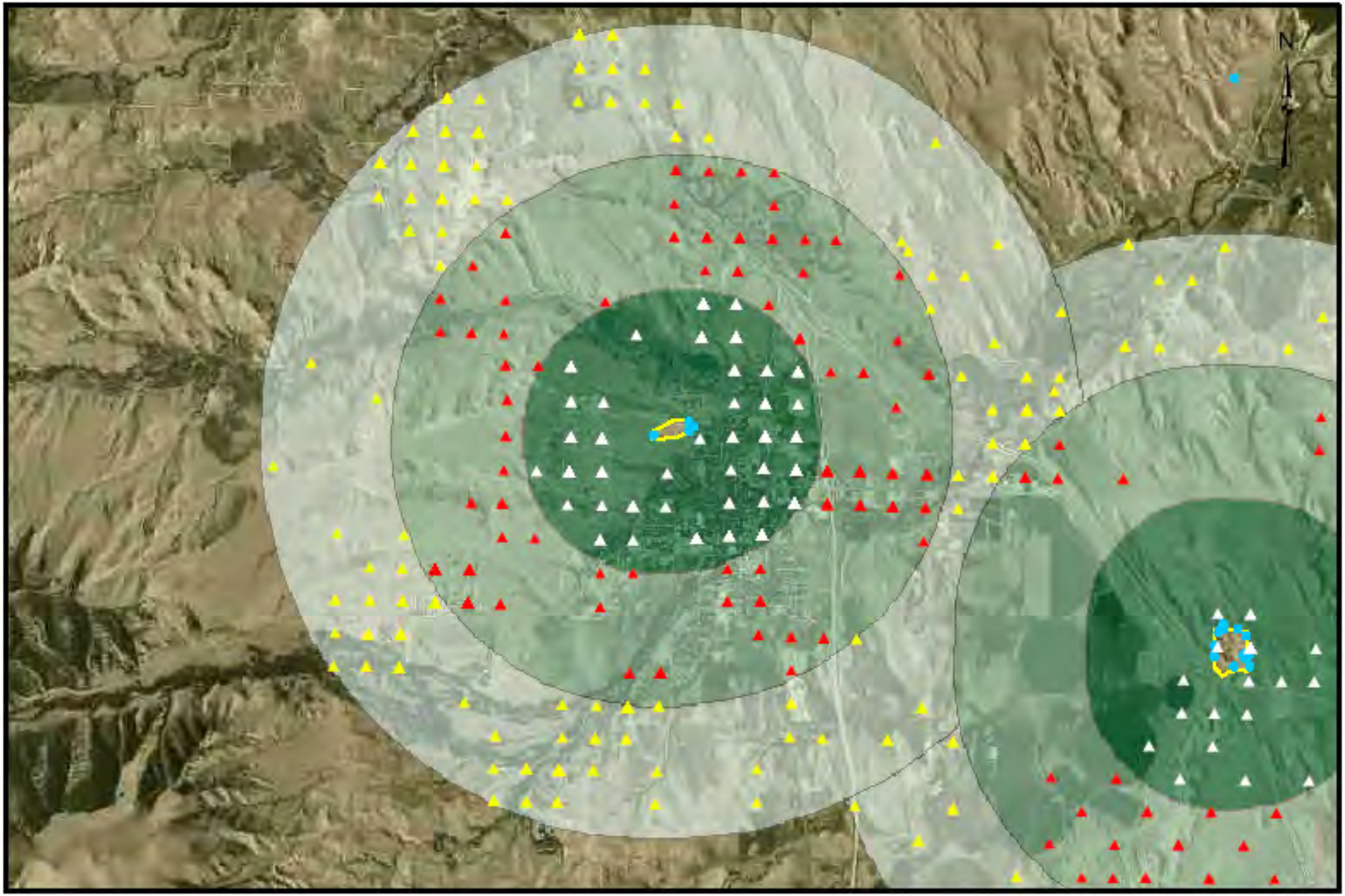
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through July 30, 2008**

Comments:

Contaminants higher in downgradient wells:

Chloride
Fluoride
Magnesium
Manganese
Nitrogen, Nitrate+Nitrite as N
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Old Buffalo Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Saratoga Dump** **File Number:** **10.760**

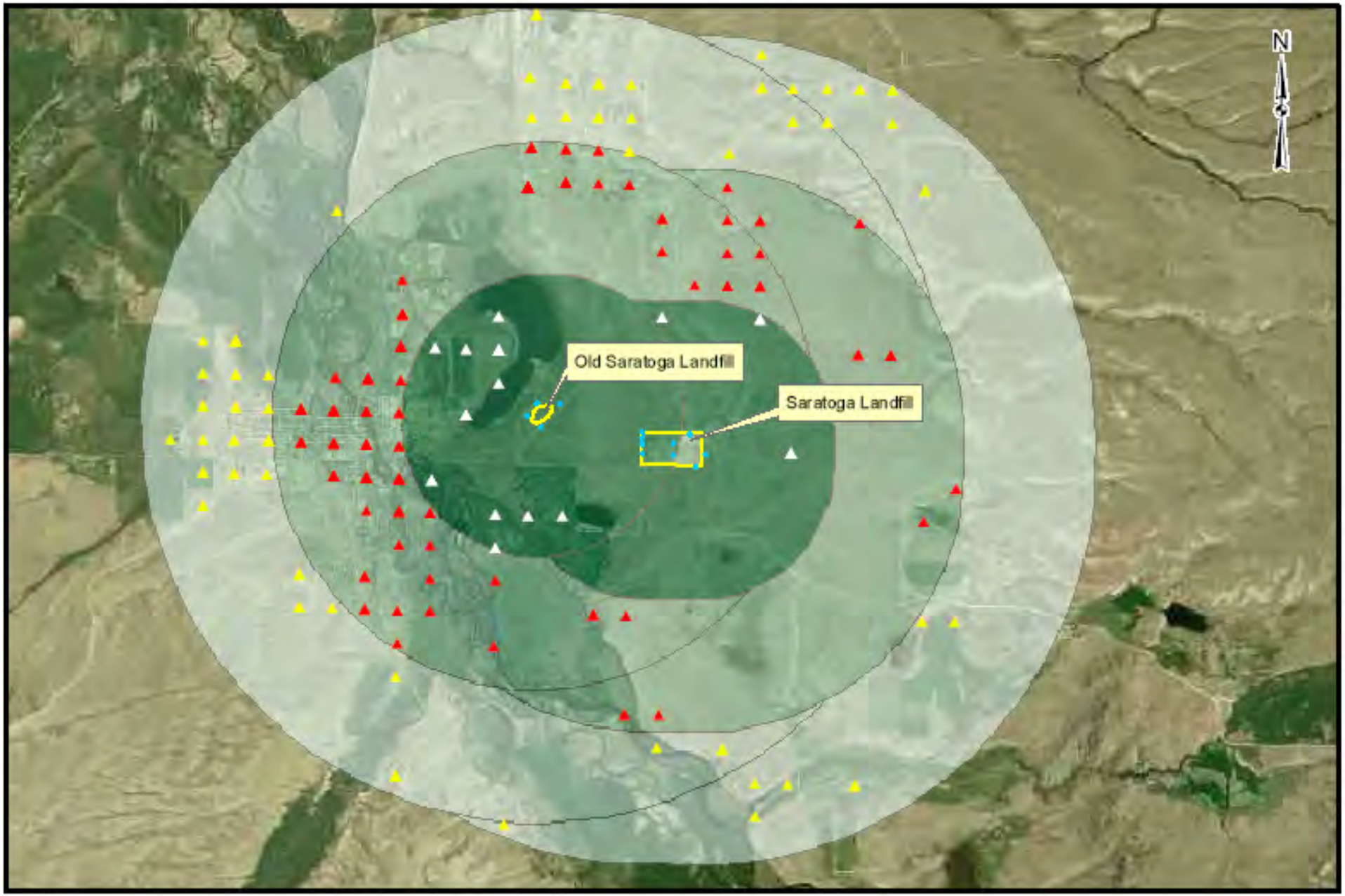
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through March 2, 2010**

Comments:

Contaminants higher in downgradient wells:

Antimony
Beryllium
Cadmium
Calcium
Fluoride
Nitrogen, Ammonia as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate
Thallium

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Saratoga & Old Saratoga Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

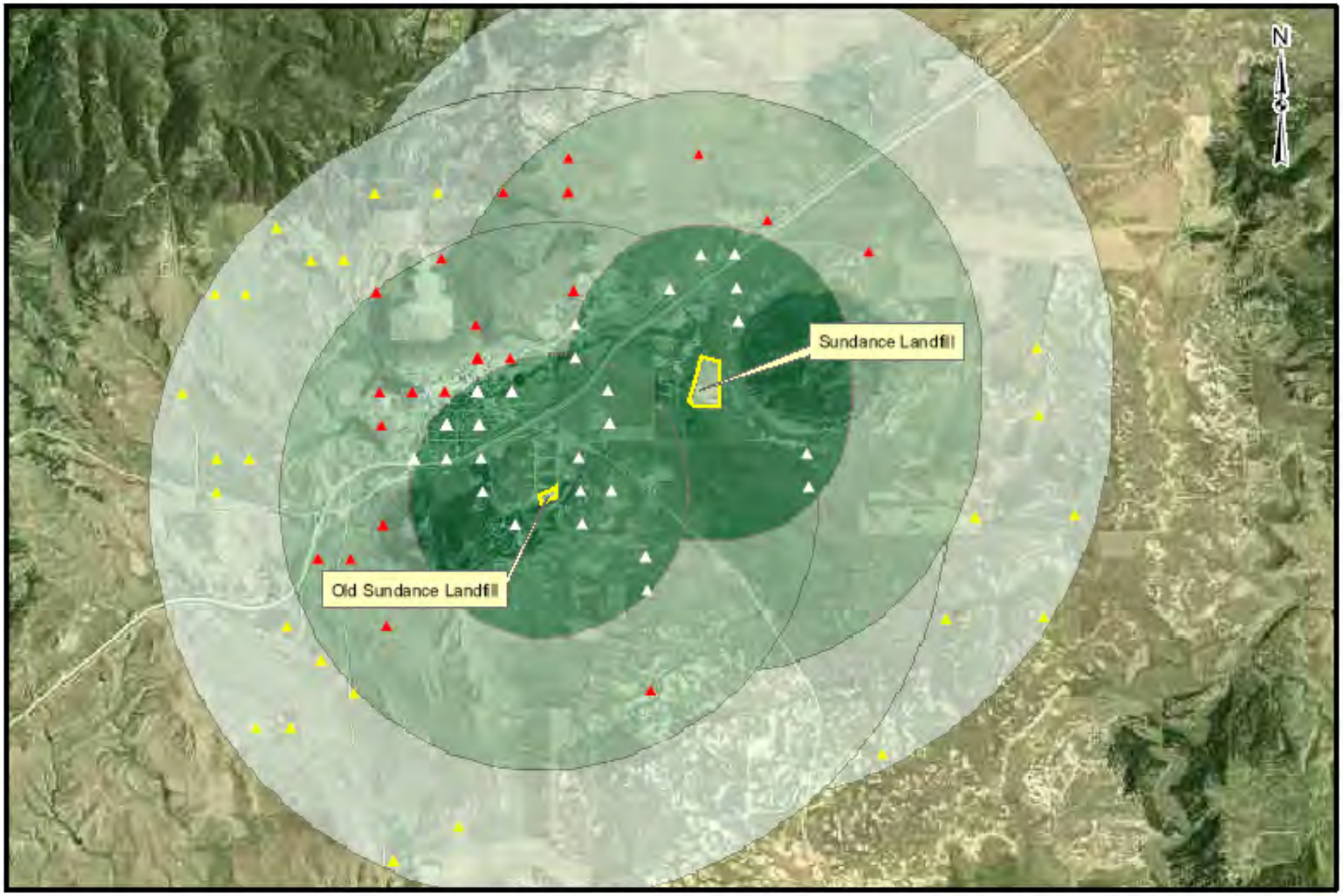
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Sundance Dump** **File Number:** **10.761**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments:



Water Supply Wells within 3 Miles of the Sundance & Old Sundance Landfills

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

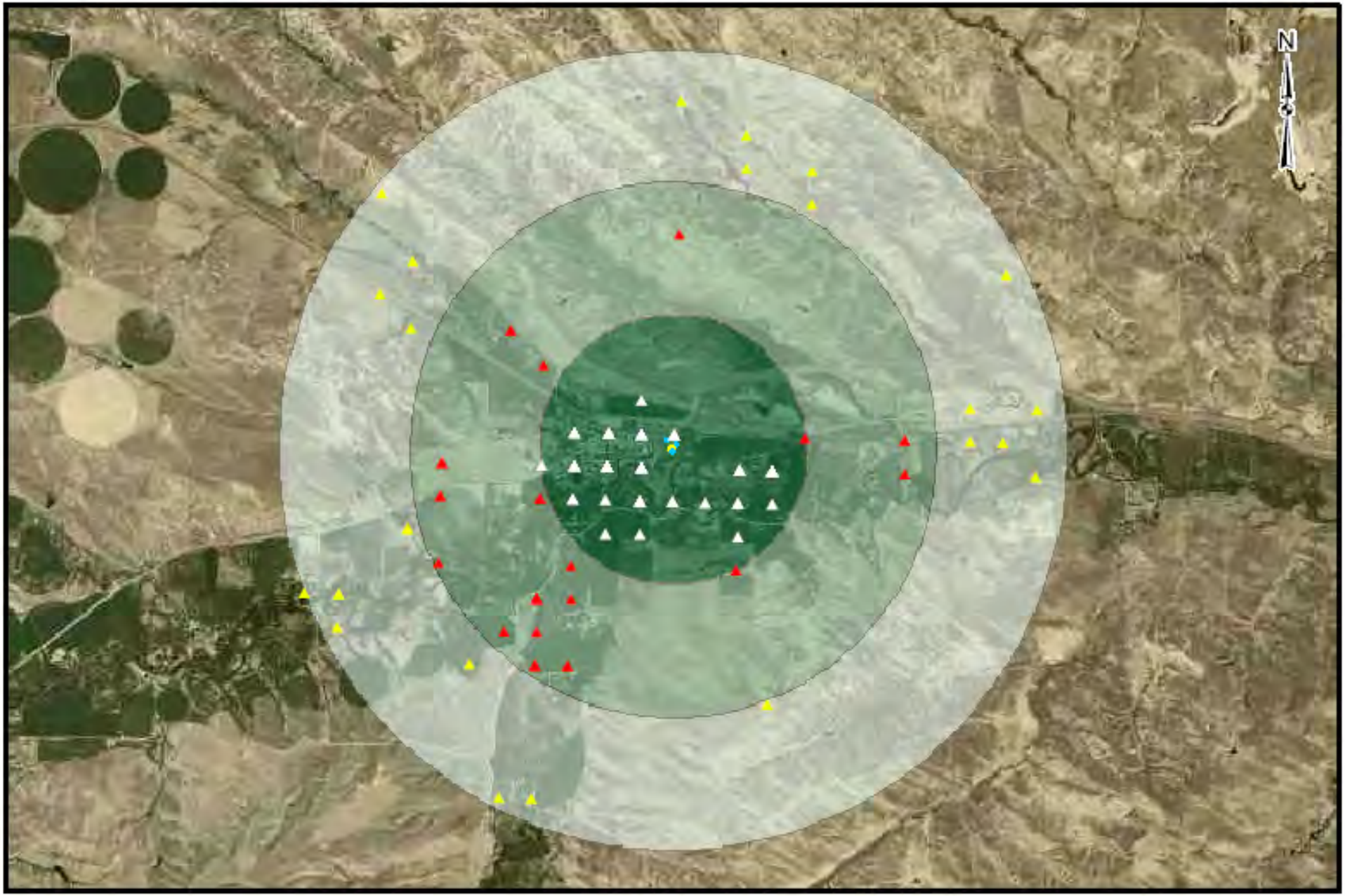
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Ranchester Dump** **File Number:** **10.763**

Groundwater Status: **No difference in constituent concentrations in wells upgradient and downgradient of landfill.**

Comments: **Data evaluated include samples collected through November 19, 2009.**



Water Supply Wells within 3 Miles of the Ranchester Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Big Piney #1** **File Number:** **10.768**

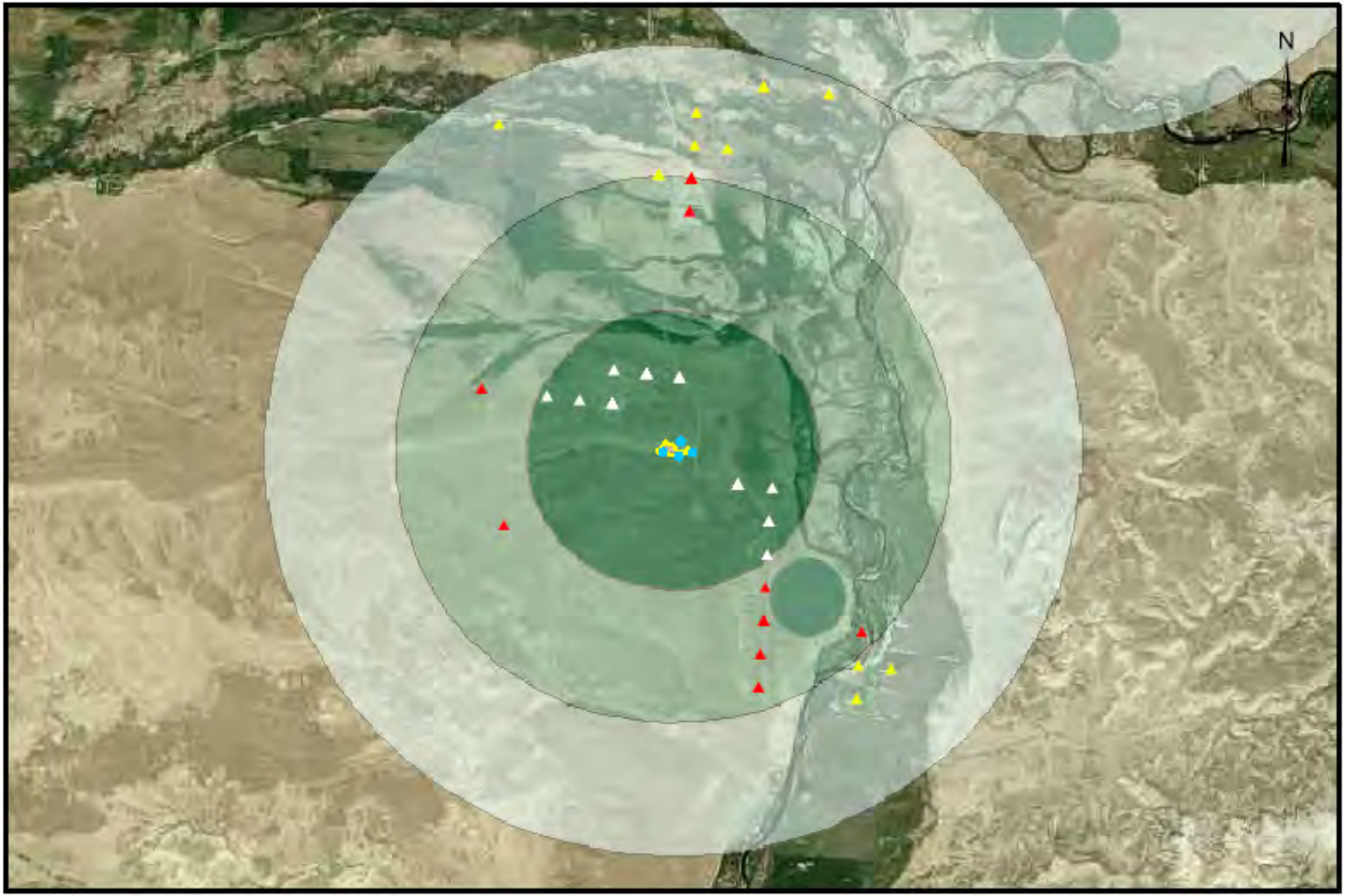
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through September 20, 2009**

Comments:

Contaminants higher in downgradient wells:

Antimony
Calcium
Chloride
Magnesium
Manganese
Nitrogen, Nitrate+Nitrite as N
Potassium
Selenium
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Big Piney #1 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Big Piney #2** **File Number:** **10.769**

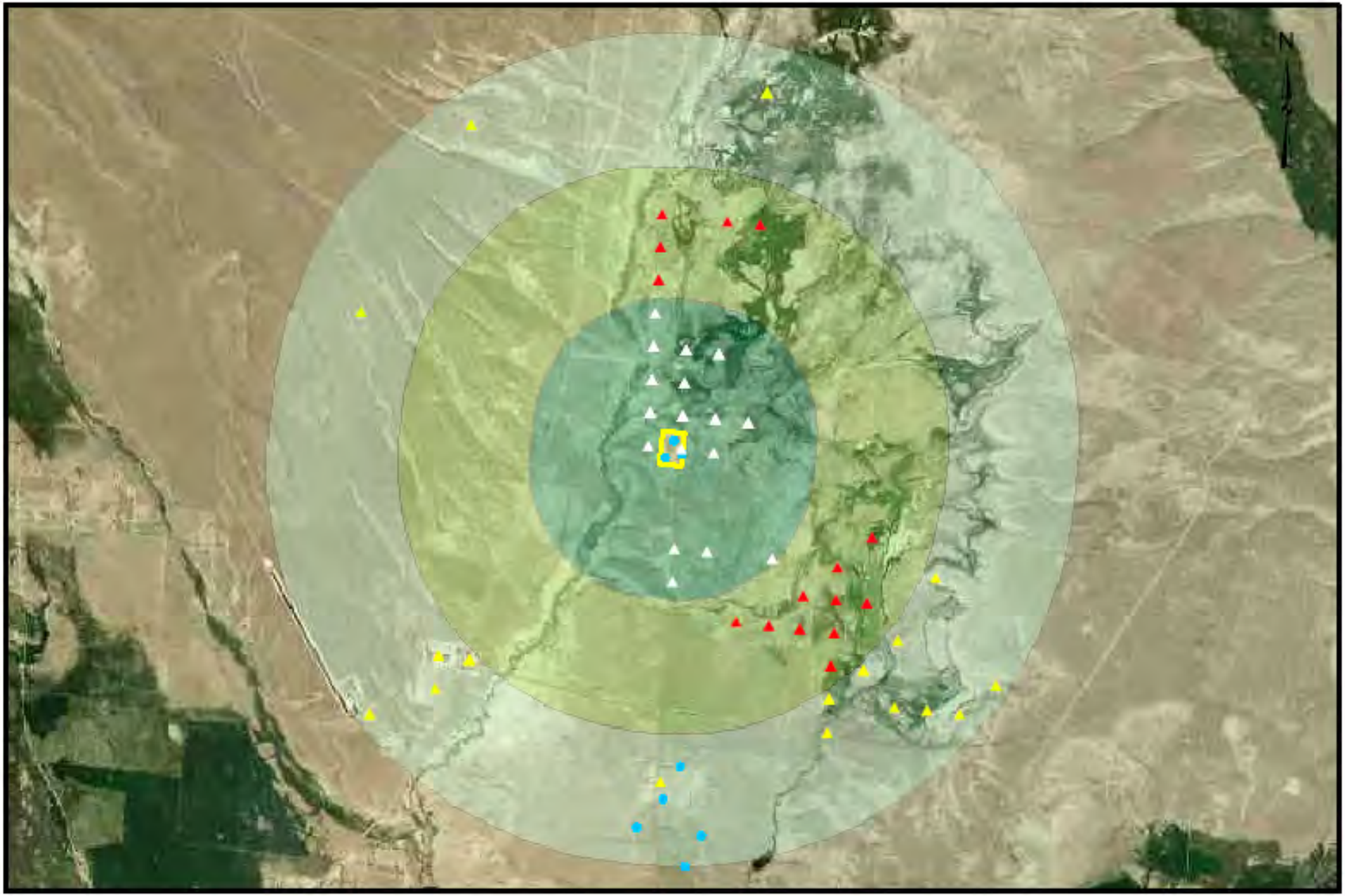
Groundwater Status: **Contaminant concentrations downgradient of landfill exceed those in upgradient well based on statistical analysis of data collected through September 20, 2009**

Comments:

Contaminants higher in downgradient wells:

Alkalinity, Total as CaCO3
Bicarbonate as HCO3
Chloride
Dichloroethane, 1,1-
Fluoride
Magnesium
Methylene chloride
Sodium
Solids, Total Dissolved TDS @ 180 C
Sulfate

NOTE: Blue (bold) text indicates groundwater protection standard is exceeded for this constituent. Red (bold italic) text indicates MCL is exceeded for a volatile organic contaminant.



Water Supply Wells within 3 Miles of the Big Piney #2 Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

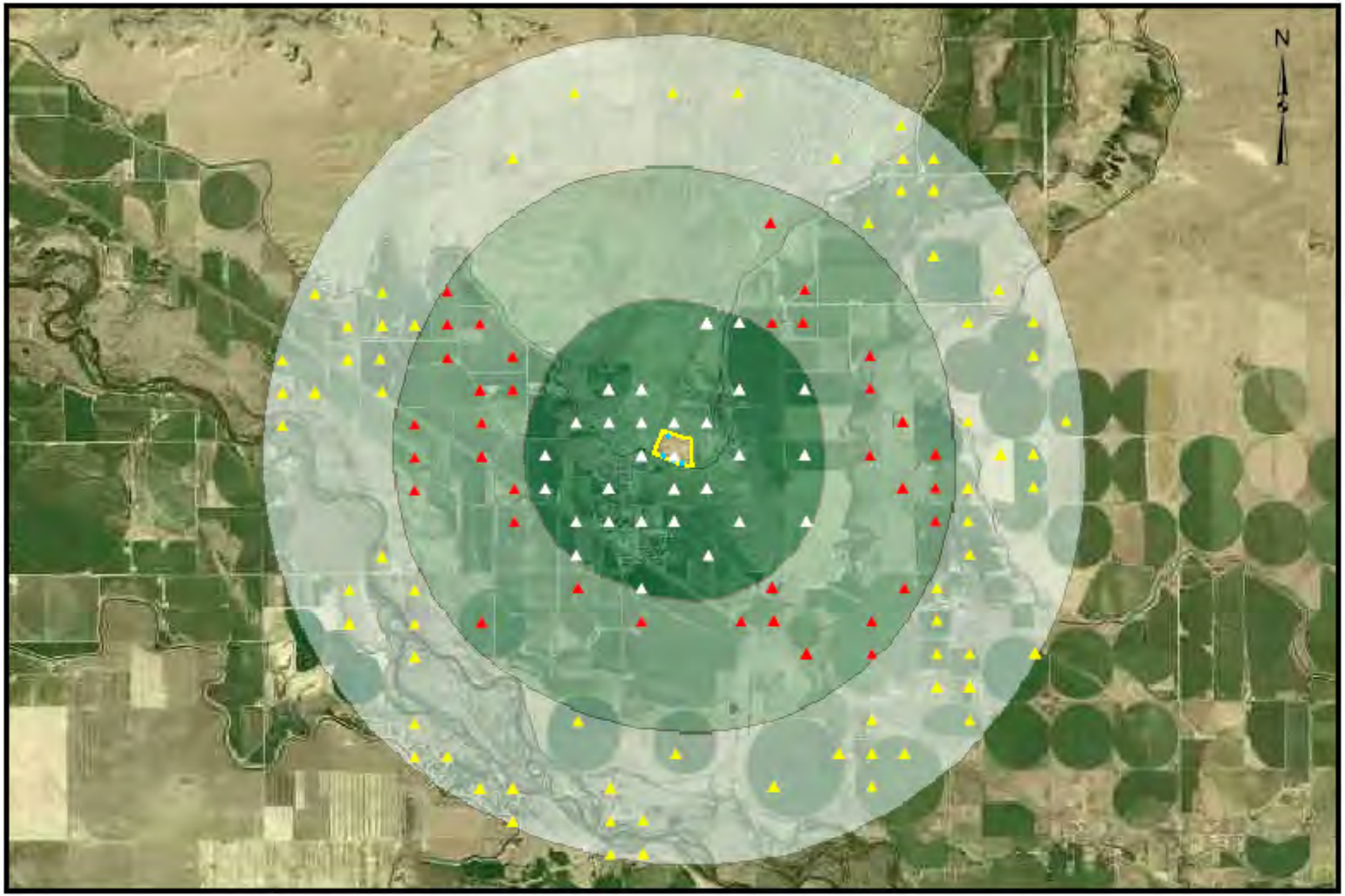
Report Date: May 10, 2010

Landfill Groundwater Detail Report

Landfill Name: **Lingle** **File Number:** **30.052**

Groundwater Status: **Groundwater status unknown because data are either inadequate as of the generation of this report or no data were collected.**

Comments: **Insufficient number of samples collected to evaluate, as of the date of this report.**



Water Supply Wells within 3 Miles of the Lingle Landfill

- Water Supply Wells between 2 & 3 Miles of Landfill
- Water Supply Wells between 1 & 2 Miles of Landfill
- Water Supply Wells within 1 Mile of Landfill
- Monitor Wells
- Landfill Boundary
- 1 Mile
- 1-2 Miles
- 2-3 Miles

1 0.5 0 1 Miles

1 inch = 5,000 feet

Note that water supply well locations shown on map may represent more than one well. Well locations are derived from section, township, and range information and are plotted on the map to the nearest 1/4 1/4 section. The accuracy of the location of indicated water wells is to the nearest 0.125 mile.

Appendix E
December 14, 2004, Memorandum
Landfill Remediation Cost Estimate

Memorandum

Date: December 14, 2004

To: Dave Finley, Administrator Solid and Hazardous Waste Division

From: Jan Lydigsen, Solid and Hazardous Waste Division

Subject: Landfill Remediation Cost Estimate

DEQ estimates the following number of landfills is likely to require groundwater remediation:

Size category	Number of Wyoming landfills in each size category	Number of Wyoming landfills predicted to require groundwater remediation, based on DEQ projections	Percentage of Wyoming landfills predicted to require groundwater remediation
Large (>15 acres)	23	19	~90%
Medium (5-15 acres)	20	15	~80%
Small (1-5 acres)	37	18	~50%
Very small (<1 acre)	50	6	~12%
Total	130	58	~45%

What will it cost to address a problem of this magnitude?

DEQ's original projection was that the total remediation cost at 65 of Wyoming's 130 landfills would equal $184 million. That cost projection has been revised to incorporate new cost data and to reduce the overall number of landfills projected to be affected to 58. DEQ's projections and the basis for these projections, are as follows:

Cost category: Screening investigations $1,980,000

A screening investigation is needed to determine if any of the 109 landfills without documented groundwater impacts are currently impacting groundwater. A screening investigation includes installation of an average of three to four wells, and a single round of groundwater sampling. The average cost of this screening investigation is estimated to be $30,000. Performance of the screening investigations would be prioritized based on size of landfills, aquifer sensitivity areas, and number of wells within one mile of the landfill. Since there is a universe of 109 landfills without documented groundwater contamination, and 43 of those landfills have monitor well systems in place, there is a need to conduct a screening investigation at 66 landfills.

DEQ's original cost projection assumed a need for 109 screening investigations, at a cost of $3.27 million. The original cost projection did not account for the existence of groundwater monitor systems at 43 landfills. The revised cost projection, 66 landfills at $30,000 each, or $1.98 million, is lower than the former projection by $1.29 million.

Cost category: Supplemental groundwater investigations: $7,800,000

Supplemental groundwater investigations are needed at those landfills with indications of groundwater impacts, to serve two purposes: first, wells are needed to determine the nature (how bad) and extent (how far) of any groundwater contamination; and second, wells are needed to assess the type of corrective action systems that would be effective at the site.

Costs were developed for the four size-based categories of landfills that exist in Wyoming: very small, small, medium and large. DEQ chose to assess costs for supplemental groundwater investigations based on landfill size, since it costs more to investigate larger areas than smaller ones. In DEQ's original estimate, only costs for small, medium and large landfills were developed. Each supplemental investigation project is anticipated to take one year. Project management costs were estimated at two hours of project manager time per week at $100/hour.

Development of an investigation work plan was estimated to be more complex at larger sites than smaller ones. Junior ($50/hour) and senior ($100/hr) personnel are expected to develop the work plan. The hours required for work plan development are estimated at:

Large	100 hours
Medium	60 hours
Small	40hours
Very small	30hours

The number of wells is estimated to vary by size of landfill, and a well drilling and completion cost of $3500/well was used. Depending on the geologic conditions, some well installation costs will be more and some less. The following number of wells was projected to be necessary:

Large	16 wells
Medium	12 wells
Small	8 wells
Very small	4 wells

The number of hours required for the original field work and quarterly monitoring was estimated to vary by the size of the landfill:

Size	Hours initial event	Quarterly sampling
Large	200 hours	2 people 4 days
Medium	180 hours	2 people 3 days
Small	140 hours	2 people 2 days
Very small	120 hours	2 people 1.5 days

Laboratory analysis is estimated at $1500 per sample, and four quarters of samples are required from each well. Some geotechnical work is included in each investigation. Reporting costs vary by size of landfill. Other direct costs are estimated, and vary by size of landfill:

	Lab analyses	Geotech	Reporting	ODC's
Large	$96,000	$10,000	100 hours	$10,000
Medium	$72,000	$ 7500	60 hours	$ 7,500
Small	$48,000	$ 5000	40 hours	$ 5,000
Very small	$24,000	$ 2500	30 hours	$ 2,500

To calculate overall investigation costs, DEQ assumed that the investigation phase will be needed at the numbers of landfills projected to require groundwater corrective action, as described above (i.e., at 19 large, 15 medium, 18 small, and 6 very small landfills). Since 21 landfills are already known to be leaking, the cost analysis assumed that approximately 50 percent of the cost of an investigation had already been completed at these 21 facilities.

The total investigation cost is projected to be $7,800,000. This is lower than the original estimate of $10.9 million due to reevaluation of the landfill sizes and accounting for work already performed.

Cost category: Capping and gas mitigation $49,000,000

Installation of a supplemental landfill cap is anticipated to be required as a part of many of the remedial projects undertaken at leaking landfills. A supplemental cap may also be called for at some landfills that have not yet exhibited leakage, as a measure to prevent future groundwater contamination from occurring. Installation of a cap is considered to be a standard remedy employed by EPA at municipal solid waste landfills that are in the federal Superfund program. Additionally, installation of a landfill cap can sometimes cause methane gas to migrate laterally away from the landfill, increasing the risk of fire or explosion to nearby offsite buildings. Methane gas is a decomposition byproduct from municipal solid waste.

DEQ's original estimate assumed that 80% of all 130 landfills would require a supplemental cap, or a total of 104 landfills The estimate considered that all the leaking landfills (originally projected at 65), and two thirds of the nonleaking landfills (43) would need to be capped. DEQ used data from a similar state landfill remediation program that

has operated in Minnesota for more than a decade. In that program, the average cost for a cap and gas mitigation at landfills in communities with populations of about 24,000 is $550,000. This cost was used as an average cost for capping a typical landfill in Wyoming, since an average community population of 24,000 was believed to be reasonable for Wyoming.

DEQ has now revised its estimate for the cost of capping and gas mitigation. The cost to cap a landfill is not only dependent on the size of a landfill but also on whether suitable capping materials are available nearby. Mobilization/demobilization costs will be higher per acre for smaller landfills than larger landfills. Cap design can affect costs as well. Two basic capping options exist: a cap based on use of clay or other impermeable material to limit the infiltration of precipitation, and a cap based on use of natural soils with sufficient water-holding ability to store precipitation and allow plants to use the water. Clay caps are referred to as 'prescriptive' caps, and natural soil caps are referred to as 'evapotranspiration', or 'ET' caps.

To prepare this estimate of the costs of capping affected landfills, DEQ reviewed the data available in its files on currently operating landfills from worksheets prepared by operators to calculate the amount of financial assurance required for closure. These worksheets estimate the total acreage at each landfill that has been affected by landfilling operations. It is this total acreage that would need to be capped, if a cap were installed. For closed landfills, the landfill size was estimated by DEQ based upon a file review, and individual staff knowledge about these sites. The costs for capping landfills were refined based this information.

Costs for installing a 'prescriptive' cap and costs for an 'ET' cap have been developed by the City of Casper for closure of its existing landfill, which will reach capacity in several years. The cost estimate for the construction phase of the 'prescriptive' cap was $42,000/acre and for the 'ET' cap $95,000/acre. These do not include engineering and design costs so it is reasonable to assume that actual costs would be higher. However it is also reasonable to assume that the State will focus on ways to minimize costs. An average capping cost of $95,000 per acre is reasonable.

Capping costs are estimated to be required for 55.5 acres of closed, leaking landfills. There are also 248 acres of closed landfills which are not known to be leaking at this time. It is likely that during the screening and or investigation phase, the State will decide that some landfills should be capped as a preventive measure. Also, during the screening and investigation phase, it may be discovered that some of these landfills are leaking. To cap the 303.5 acres of closed leaking and closed, potentially leaking landfills would cost approximately $28.9 million, assuming a capping cost of $95,000/acre.

For landfills which are already capped, and which are either leaking or have the potential to leak, supplemental capping may be recommended. It is estimated that supplemental capping will cost less than $20,000/acre. To provide supplemental capping/gas

mitigation at all 1057 acres of currently active landfills would cost approximately $20 million..

Capping and gas mitigation costs are estimated at $49 million. This is lower than the original estimate because acres of closed landfills were estimated from file information rather than estimating a general cost for all landfills. This estimate also assumes that capping costs for currently active landfills would be limited to supplemental capping costs.

Cost Category: Remediation $103,000,000

The original estimate assumed that half the landfills would require groundwater remediation. Costs for groundwater remediation projects were estimated for large, medium and small landfills. I also assumed that some projects would last 10 years, some 20 years and some 30 years. From these estimates, I generated an average cost and assumed this average cost for 65 landfills.

In the current estimate, I modified this based on the revised classification of landfills into very small, small, medium and large. The project size varied from monitoring only to pump and treat. The time to completion also varied from 10 years to 30 years.

Based on the new assumption that ~90% of large landfills will leak and ~80% of medium landfills will leak the cost estimate for remediation was also revised for the number of landfills in each size category that are anticipated to leak.

Of the known 21 leaking landfills and the assumed additional 37 that are anticipated to leak, an estimated 14 are known or expected to be in a high aquifer sensitivity area, eight in medium to high aquifer sensitivity areas, and sixteen in medium aquifer sensitivity areas. The remainder are estimated to be in medium/low to low aquifer sensitivity areas.

For cost estimation purposes, I assumed that all leaking landfills in the medium/low to low aquifer sensitivity areas will require monitoring only. I also assumed that one half the leaking landfills in medium aquifer sensitivity would require monitoring only. These landfills will be equally divided between 10, 20 and 30 year monitoring programs. The average cost of 10/20/30 year monitoring-only programs for landfills based on size is:

Large	$1,606,000
Medium	$1,123,000
Small	$ 804,000
Very Small	$ 503,400

Therefore the cost for monitoring only is estimated at:

	Number of landfills	Cost
Large	10	$16.0 Million

Medium	8	$ 9.0 Million
Small	11	$ 8.8 Million
Very Small	3	$ 1.5 Million
		$35.3 Million

I assumed landfills in areas of high aquifer sensitivity would require an active, 30-yearsystem:.

	Number of landfills	Cost
Large	3.5	$16.6 Million
Medium	3.5	$12.8 Million
Small	4	$10.5 Million
Very Small	1	$ 1.9 Million
		$41.8 Million

The remaining sixteen landfills in medium/high to medium aquifer sensitivity, I assumed would require an average in-situ, remediation program, with an equal distribution of 10, 20 and 30 year projects:

	Number of landfills	Cost
Large	5.5	$ 13.7 Million
Medium	3.5	$ 6.7 Million
Small	3	$ 4.0 Million
Very Small	2	$ 1.9 Million
		$ 26.3 Million

Under this scenario, the estimated groundwater remediation cost for 58leaking landfills is $103 million. A spreadsheet showing the assumptions used for remediation costs is attached.

This is approximately $2 million less than the original estimate.

DEQ Administration costs over 30 years are estimated at $10.5 million.

The overall, revised cost estimate is $172 million. This is somewhat less than the original estimate of $184 million.

Screening Investigations	$ 1.98 million
Full Groundwater Investigation	$ 7.80 million
Capping and Gas Mitigation	$ 49.00 million
Remediation	$103.00 million
DEQ Administration	$ 10.50 million
	$172.3 million

Cost Estimate
Landfill Investigation, Capping and Remediation

		Costs per year	Costs for first 25 years
Program Administration - WDEQ			
1. a. Program development (estimate one year to set up program) Develop technical program (guidance/rules)		$75,000	NA
Total Cost - one time		$75,000	$75,000
b. Manage Fee Collection (estimate $10,000 to develop database to track fees)	First year $20,000	$10,000	$250,000
Total Costs - Annual and after 25 years		$10,000	$260,000
2. Manage technical program			
Manage contractors		$331,618	$8,290,443
Total cost - annually and after 25 years		$331,618	$8,290,443
3. Administer Contracts and Program Management			
		$75,000	$1,875,006
Total cost - annually and after 25 years		$75,000	$1,875,006
		$406,618	$10,500,450

Screening, Investigation, Capping, and Remediation	$/landfill	No. of landfills	total cost	$ for first 25years
4 Screening Site Investigation landfill (66 landfills with no information as to whether or not they are leaking)	$30,000	66	$1,980,000	$1,980,000
5. Site Investigation for the 58 landfills which are leaking or are anticpated to leak, Assumes LFs now leaking have begun the investigation		58	$7,800,000	$7,800,000
6. Capping and Gas Mitigation Assume currently closed landfills will require a cap Assume landfills which are leaking may require supplemental capping			$49,000,000	$49,000,000
7. Remediate Groundwater (assume 58 of landfills will require groundwater remediation)		58	$103,000,000	$103,000,000
8. Annual O&M required beyond 25 years at 10% of landfills requiring groundwater cleanup	per landfill $100,000	6	one year $580,000	10 more years $5,800,000

Total costs for first 25 years	$172,280,450
Average Annual Cost	$6,891,218
Annual cost for years 25 through 35	$580,000

Groundwater Remediation

Very Small		No. of years	30 yrs O&M	totals for 10 years	totals for 20 years	totals for 30 years
4. Site Remediation						
project Management	$10,400					
Project Implementation						
qtrly monitoring	$3,200					
reporting	$4,000					
				$50,400	$106,400	$162,400
ODCs	$800					
work plan	$9,000					
first year analysis	$20,000					
Monitoring Only	$0			$263,400	$503,400	$743,400
In-situ / Simple (ie SVE)						
Capital Cost	50,000					
Annual O&M	$11,300	30	$339,000	$426,400	$779,400	$1,132,400
In-situ / medium (SVE/sparge)						
Capital Cost	75,000					
Annual O&M	$19,000	30	$570,000	$528,400	$958,400	$1,388,400
In-situ / complex (PRB)						
Capital Cost	100,000					
Annual O&M	$26,700	30	$801,000	$630,400	$1,137,400	$1,644,400
ex-situ(ie p&T)						
Capital Cost	125,000					
Annual O&M	$37,000	30	$1,110,000	$758,400	$1,368,400	$1,978,400

Quarterly Monitoring assume 2 people1 day to sample wells
In-situ/simple - O&M assume 3 hours per week, $20 wk misc, and $2500/year other expense
In-situ/medium - O&M assume 5 hours per week, $20 wk misc, and $5000/year other expense
In-situ/complex - O&M assume 7 hours per week, $20 wk misc, and $7500/year other expense
Ex-situ/ - O&M assume 10 hours per week, $20 wk misc, and $10,000/year other expense
4 wells
First time analysis cost is $1250 per sample
Quarterly Monitoring costs are assumed to be $350/sample

Monitor only average	$503,400
High aq sens cleanups	$1,978,400
Monitor only LFs	$1,510,200
Average insitu cost	$958,400
Rem med AQ sens LFs	$1,916,800.0

$103,587,067

Small		No. of years	30 yrs O&M	totals for 10 years	totals for 20 years	totals for 30 years
4. Site Remediation						
project Management	$15,600					
Project Implementation						
initial field work						
qtrly monitoring	$3,200					
reporting	$4,000					
				$126,000	$266,000	$406,000
ODCs	$1,000					
work plan	$12,000					
first year analysis	$50,000					
Monitoring Only	$0			$426,000	$804,000	$1,182,000
In-situ / Simple (ie SVE)						
Capital Cost	50,000					
Annual O&M	$14,900	30	$447,000	$625,000	$1,152,000	$1,679,000
In-situ / medium (SVE/sparge)						
Capital Cost	75,000					
Annual O&M	$23,100	30	$693,000	$732,000	$1,341,000	$1,950,000
In-situ / complex (PRB)						
Capital Cost	100,000					
Annual O&M	$30,800	30	$924,000	$834,000	$1,520,000	$2,206,000
ex-situ(ie p&T)						
Capital Cost	125,000					
Annual O&M	$44,700	30	$1,341,000	$998,000	$1,019,000	$2,648,000

Quarterly Monitoring assume 2 people1 day to sample wells
In-situ/simple - O&M assume 4 hours per week, $20 wk misc, and $3500/year other expense
In-situ/medium - O&M assume 6 hours per week, $20 wk misc, and $6500/year other expense
In-situ/complex - O&M assume8 hours per week, $20 wk misc, and $9,000/year other expense
Ex-situ/ - O&M assume 12 hours per week, $20 wk misc, and $12,500/year other expense
10 wells
First time analysis cost is $1250 per sample
Quarterly Monitoring costs are assumed to be $350/sample

Monitor only average	$804,000
High aq sens cleanups	$10,592,000
Monitor only LFs	$8,844,000.0
Average insitu cost	$1,337,667
Rem med AQ sens LFs	$4,013,000.0

Groundwater Remediation

Medium		No. of years	30 yrs O&M	totals for 10 years	totals for 20 years	totals for 30 years
4. Site Remediation						
project Management	$20,800					
Project Implementation						
qtrly monitoring	$6,400					
reporting	$3,000					
analysis				$189,000	$399,000	$609,000
ODCs	$1,500					
first year analysis	$75,000					
work plan	$15,000					
Capping &Monitoring Only	$0			$596,000	$1,123,000	$1,650,000
In-situ / Simple (ie SVE)						
Capital Cost	75,000					
Annual O&M	$22,900	30	$687,000	$900,000	$1,656,000	$2,412,000
In-situ / medium (SVE/sparge)						
Capital Cost	100,000					
Annual O&M	$31,900	30	$957,000	$1,015,000	$1,861,000	$2,707,000
In-situ / complex (PRB)						
Capital Cost	125,000					
Annual O&M	$47,400	30	$1,422,000	$1,195,000	$2,196,000	$3,197,000
ex-situ(ie p&T)						
Capital Cost	150,000					
Annual O&M	$61,500	30	$1,845,000	$1,361,000	$2,503,000	$3,645,000

Quarterly Monitoring assume 2 people 2 days to sample wells
In-situ/simple - O&M assume 6.5 hours per week, $20 wk misc, and $5000/year other expense
In-situ/medium - O&M assume9 hours per week, $20 wk misc, and $7500/year other expense
In-situ/complex - O&M assume 14 hours per week, $20 wk misc, and $10,000/year other expense
Ex-situ/ - O&M assume 17.5 hours per week, $25 wk misc, and $15,000/year other expense
15 wells
First time analysis cost is $1250 per sample
Quarterly Monitoring costs are assumed to be $350/sample

Monitor only average	$1,123,000
Monitor only LFs	$8,984,000.0
High aq sens cleanups	$12,757,500
Average insitu cost	$1,904,333
Rem med AQ sens LFs	$6,665,166.7

Large		No. of years	30 yrs O&M	totals for 10 years	totals for 20 years	totals for 30 years
4. Site Remediation						
project Management	$31,200					
Project Implementation						
qtrly monitoring	$9,600					
reporting	$5,000					
analysis				$252,000	$532,000	$812,000
ODCs	$2,000					
work plan	$18,000					
first year analysis	$100,000					
Monitoring Only	$0			$848,000	$1,606,000	$2,364,000
In-situ / Simple (ie SVE)						
Capital Cost	100,000					
Annual O&M	$26,950	30	$808,500	$1,217,500	$2,245,000	$3,272,500
In-situ / medium (SVE/sparge)						
Capital Cost	125,000					
Annual O&M	$37,250	30	$1,117,500	$1,345,500	$2,476,000	$3,606,500
In-situ / complex (PRB)						
Capital Cost	150,000					
Annual O&M	$48,750	30	$1,462,500	$1,485,500	$2,731,000	$3,976,500
ex-situ(ie p&T)						
Capital Cost	175,000					
Annual O&M	$73,500	30	$2,205,000	$1,758,000	$3,251,000	$4,744,000

Quarterly Monitoring assume 2 people 3 days to sample wells
In-situ/simple - O&M assume 7 hours per week, $25 wk misc, and $7500/year other expense
In-situ/medium - O&M assume 10 hours per week, $25 wk misc, and $10000/year other expense
In-situ/complex - O&M assume12.5 hours per week, $25 wk misc, and $15,000/year other expense
Ex-situ/ - O&M assume 20 hours per week, $30 wk misc, and $20,000/year other expense
20 wells
First time analysis cost is $1250 per sample
Quarterly Monitoring costs are assumed to be $350/sample

Monitor only average	$1,606,000		
Monitor only LFs	$16,060,000.0	mon	$35,398,200
High aq sens cleanups	$16,604,000	hig	$41,931,900
Average insitu cost	$2,484,000		
Rem med AQ sens LFs	$13,662,000.0	avg	$26,256,966.7
		total	$103,587,067

Appendix F
Remediation Cost Calculations

Remediation Cost Calculations

Very Small Landfills (< 1 acre)

Facility	Facility #	Operating Status	Facility Acres	Cap Acres	Groundwater Status	Additional Capping Costs	Pre 1989 Landfill Additional Wells	Post 1989 Landfill Additional Wells	Pre 1989 Landfill Semiannual Sampling	Post 1989 Landfill Semi Annual Sampling	Cap and Monitor Total	Active Remediation	Facility Total
Albin	10.005	H	0.50	0.50	U						$0		$0
Hartville	10.275	H	0.65	0.65	U						$0		$0
Very Small Facility Totals:			1.15	1.15		$0	$0	$0	$0	$0	$0	$0	$0

Notes:

Groundwater Status
U = Unknown
N = Contamination Not Detected
S = Contamination Suspected
I = Impacted
C = Cap Improvements Needed
R = Active Remediation Needed

Operating Status
H = Historic (Pre 1989)
C = Closed (Post 1989)
O = Operating (Post 1989)

Total Historic Landfills	28
Total Closed Landfills	36
Total Operating Local Government Landfills	50
Total Landfills Studied	114

For pre 1989 landfills, cost estimates include 1 new well, 4 quarterly samples for 4 wells, and 20 years of semiannual sampling for 4 new wells.
For post 1989 landfills, cost estimates include 1 new well, 4 quarterly samples for 1 well, and 20 years of semiannual sampling for 1 new well.

Remediation Cost Calculations

Small Landfills (1 - 4.99 acres)

Facility	Facility #	Operating Status	Facility Acres	Cap Acres	Groundwater Status	Additional Capping Costs	Pre 1989 Landfill Additional Wells	Post 1989 Landfill Additional Wells	Pre 1989 Landfill Semiannual Sampling	Post 1989 Landfill Semi Annual Sampling	Cap and Monitor Total	Active Remediation	Facility Total
Alcova #1	10.400	C	2.00	2.00	I, C	$40,000		$101,000		$300,000	$441,000		$441,000
Alcova #2	10.401	C	3.00	3.00	I, C	$60,000		$101,000		$300,000	$461,000		$461,000
Bosler	10.045	H	2.00	2.00	I, C	$100,000	$119,000		$480,000		$699,000		$699,000
Burns	10.060	H	1.30	1.30	U						$0		$0
Chugwater	10.088	H	3.00	3.00	I, C	$150,000	$119,000		$480,000		$749,000		$749,000
City of Cody (dump in twn)	10.751	H	3.00	3.00	N						$0		$0
Clark #1	10.430	C	3.00	3.00	I, C	$60,000		$101,000		$300,000	$461,000		$461,000
Clearmont #2	10.091	C	4.60	3.00	I, C	$60,000		$101,000		$300,000	$461,000		$461,000
Daniel Junction	10.555	H	1.00	1.00	U						$0		$0
Elk Mountain	10.120	H	2.00	2.00	I, C	$100,000	$119,000		$480,000		$699,000		$699,000
Emblem Burlington	10.130	C	4.50	4.50	U						$0		$0
Fort Laramie #2	10.146	C	1.50	1.50	U						$0		$0
Ft. Laramie #1	10.145	H	3.20	3.20	U						$0		$0
Glendo #1	10.225	H	1.20	1.20	I, C	$60,000	$119,000		$480,000		$659,000		$659,000
Granger	10.245	H	3.00	3.00	U						$0		$0
Hanna (old site)	10.270	H	4.00	4.00	U						$0		$0
Hyattville	10.300	C	3.20	3.20	I, C	$64,000		$101,000		$300,000	$465,000		$465,000
LaGrange	10.315	O	3.82	2.00	I, C	$40,000		$101,000		$300,000	$441,000		$441,000
Manderson #1	10.365	C	1.00	1.00	U						$0		$0
Manville #1	10.375	H	1.30	1.30	U						$0		$0
Manville #2	10.376	O	5.00	2.00	U						$0		$0
Medicine Bow	10.385	H	3.00	3.00	I, C	$150,000	$119,000		$480,000		$749,000		$749,000
Pine Bluffs	10.480	H	2.30	2.30	S						$0		$0
Ranchester	10.763	H	1.00	1.00	N						$0		$0
Rock River #1	10.490	H	3.00	3.00	I, C	$150,000	$119,000		$480,000		$749,000		$749,000
Shell	10.520	C	4.50	4.50	U						$0		$0
Upton #1	10.660	H	2.80	2.80	U						$0		$0
Small Facility Totals:			73.22	66.80		$1,034,000	$714,000	$606,000	$2,880,000	$1,800,000	**$7,034,000**	$0	**$7,034,000**

Historic Landfills	16	Pre-1989 total	$4,304,000	$0	
Closed Landfills	9	Post 1989 Total	$2,730,000	$0	
Operating Landfills	2	Total	$7,034,000	$0	$7,034,000

Notes:

Groundwater Status
U = Unknown
N = Contamination Not Detected
S = Contamination Suspected
I = Impacted
C = Cap Improvements Needed
R = Active Remediation Needed

Operating Status
H = Historic (Pre 1989)
C = Closed (Post 1989)
O = Operating (Post 1989)

For pre 1989 landfills, cost estimates include 5 new wells, 4 quarterly samples for 8 wells, and 20 years of semiannual sampling for 8 new wells.
For post 1989 landfills, cost estimates include 5 new wells, 4 quarterly samples for 5 wells, and 20 years of semiannual sampling for 5 new wells.

Remediation Cost Calculations

Medium Landfills (5 - 15 acres)

Facility	Facility #	Operating Status	Facility Acres	Cap Acres	Groundwater Status	Additional Capping Costs	Pre 1989 Landfill Additional Wells	Post 1989 Landfill Additional Wells	Pre 1989 Landfill Semiannual Sampling	Post 1989 Landfill Semi Annual Sampling	Cap and Monitor Total	Active Remediation	Facility Total
Bairoil #1	10.014	H	2.50	2.50	I, C	$125,000	$196,200		$720,000		$1,041,200		$1,041,200
Bairoil #2	10.015	C	2.50	2.50	I, C	$50,000		$89,100		$270,000	$409,100		$409,100
Big Piney #1	10.768	H	7.00	7.00	I, C	$350,000	$196,200		$720,000		$1,266,200		$1,266,200
Boulder	10.550	H	5.00	5.00	U						$0		$0
Buffalo (old dump)	10.759	H	8.00	8.00	I, C	$400,000	$196,200		$720,000		$1,316,200		$1,316,200
Central Weston Co.	10.700	O	5.00	5.00	I, C	$100,000		$178,200		$540,000	$818,200		$818,200
Clark #2	10.431	O	9.80	9.80	I, C	$196,000		$178,200		$540,000	$914,200		$914,200
Evansville	10.137	H	12.09	12.09	N						$0		$0
Glendo #2	10.226	C	8.80	8.80	I, C	$176,000		$178,200		$540,000	$894,200		$894,200
Guernsey	10.260	C	8.00	8.00	I, C, R	$160,000		$178,200		$540,000	$878,200	$2,853,420	$3,731,620
Hanna (HCJPB)	10.280	O	4.00	4.00	I, C	$80,000		$178,200		$540,000	$798,200		$798,200
Hulett #1	10.285	O	7.50	7.50	I, C	$150,000		$178,200		$540,000	$868,200		$868,200
Kaycee	10.305	O	6.50	6.50	I, C	$130,000		$178,200		$540,000	$848,200		$848,200
Kysar	10.445	C	14.00	14.00	I, C	$280,000		$178,200		$540,000	$998,200		$998,200
Meeteetse	10.450	O	6.80	6.80	U						$0		$0
Midwest-Edgerton #2	10.391	O	9.50	9.50	U						$0		$0
Moorcroft #1	10.394	C	5.00	5.00	I, C	$100,000		$178,200		$540,000	$818,200		$818,200
Moorcroft #2	10.395	C	8.80	8.80	I, C	$176,000		$178,200		$540,000	$894,200		$894,200
Moorcroft #3	10.396	O	9.70	9.70	U						$0		$0
Point of Rocks	10.585	C	6.40	6.40	I, C	$128,000		$178,200		$540,000	$846,200		$846,200
Reliance	10.590	C	14.50	14.50	I, C	$290,000		$178,200		$540,000	$1,008,200		$1,008,200
Rock River #2	10.491	C	7.00	7.00	I, C	$140,000		$178,200		$540,000	$858,200		$858,200
Saratoga (old cmty. dmp)	10.760	H	8.00	8.00	I, C	$400,000	$196,200		$720,000		$1,316,200		$1,316,200
Sinclair #2	10.541	C	9.00	9.00	I, C, R	$180,000		$178,200		$540,000	$898,200	$2,853,420	$3,751,620
Sundance (old dump)	10.761	H	5.20	5.20	U						$0		$0
Superior	10.600	C	9.00	9.00	U						$0		$0
Ten Sleep	10.605	O	8.00	8.00	U						$0		$0
Medium Facility Totals:			207.59	207.59		$3,611,000	$784,800	$2,583,900	$2,880,000	$7,830,000	**$17,689,700**	$5,706,840	**$23,396,540**

Historic landfills	7
Closed Landfills	11
Operating Landfills	9

Pre-1989 total	$4,939,800	$0	
Post 1989 Total	$12,749,900	$5,706,840	
Total	$17,689,700	$5,706,840	$23,396,540

Notes:

Groundwater Status
U = Unknown
N = Contamination Not Detected
S = Contamination Suspected
I = Impacted
C = Cap Improvements Needed
R = Active Remediation Needed

Operating Status
H = Historic (Pre 1989)
C = Closed (Post 1989)
O = Operating (Post 1989)

For pre 1989 landfills, cost estimates include 9 new wells, 4 quarterly samples for 12 wells, and 20 years of semiannual sampling for 12 new wells.
For post 1989 landfills, cost estimates include 9 new wells, 4 quarterly samples for 9 wells, and 20 years of semiannual sampling for 9 new wells.

Remediation Cost Calculations

Large Landfills (> 15 acres)

Facility	Facility #	Operating Staus	Facility Acres	Cap Acres	Groundwater Status	Additional Capping Costs	Pre 1989 Landfill Additional Wells	Post 1989 Landfill Additional Wells	Pre 1989 Landfill Semiannual Sampling	Post 1989 Landfill Semi Annual Sampling	Cap and Monitor Total	Active Remediation	Facility Total
Baggs	10.010	O	160.00	25.00	I, C	$500,000		$255,400		$780,000	$1,535,400		$1,535,400
Big Horn Co. S	10.025	O	158.66	24.00	I, C	$480,000		$255,400		$780,000	$1,515,400		$1,515,400
Big Horn N #1	10.035	C	50.00	28.50	I, C	$570,000		$255,400		$780,000	$1,605,400		$1,605,400
Big Horn N #2	10.036	O	79.00	16.25	I, C	$325,000		$255,400		$780,000	$1,360,400		$1,360,400
Big Piney #2	10.769	H	25.00	25.00	I, C	$1,250,000	$273,400		$960,000		$2,483,400		$2,483,400
Buffalo #1	10.050	O	49.00	22.00	I, C, R	$440,000		$255,400		$780,000	$1,475,400	$3,706,140	$5,181,540
Campbell Co. #1	10.065	C	100.32	18.00	I, C, R	$360,000		$255,400		$780,000	$1,395,400	$3,706,140	$5,101,540
Campbell Co. #2	10.066	O	138.86	15.00	I, C, R	$300,000		$255,400		$780,000	$1,335,400	$3,706,140	$5,041,540
Casper Balefill	10.070	O	95.34	5.00	I, C, R	$100,000		$255,400		$780,000	$1,135,400	$3,706,140	$4,841,540
Cheyenne	10.080	O	201.64	101.00	I, C, R	$2,020,000		$255,400		$780,000	$3,055,400	$3,706,140	$6,761,540
Cody	10.441	O	41.00	41.00	I, C, R	$820,000		$255,400		$780,000	$1,855,400	$3,706,140	$5,561,540
Cody (old site)	10.440	C	50.00	30.00	U						$0		$0
Cokeville #1	10.335	C	16.00	16.00	U						$0		$0
Cokeville #2	10.336	O	40.00	25.00	U						$0		$0
Douglas	10.110	O	120.00	45.00	I, C	$900,000		$255,400		$780,000	$1,935,400		$1,935,400
Dubois	10.165	O	40.40	30.00	U						$0		$0
Eastern Laramie Co.	10.330	O	48.50	35.00	I, C	$700,000		$255,400		$780,000	$1,735,400		$1,735,400
Eden Valley	10.115	O	25.71	20.00	I, C	$400,000		$255,400		$780,000	$1,435,400		$1,435,400
Encampment	10.135	C	30.27	23.00	U						$0		$0
Glenrock #1	10.235	O	41.60	16.00	I, C	$320,000		$255,400		$780,000	$1,355,400		$1,355,400
Green River #1	10.255	O	40.00	35.00	I						$0		$0
Green River (old)	10.256	C	73.64	45.00	I						$0		$0
Horsethief Canyon #2	10.616	O	70.00	33.46	I, C, R	$669,200		$255,400		$780,000	$1,704,600	$3,706,140	$5,410,740
Kemmerer #1	10.345	C	74.00	50.00	I,C	$1,000,000		$255,400		$780,000	$2,035,400		$2,035,400
Kemmerer #2	10.346	O	63.00	51.00	I, C	$1,020,000		$255,400		$780,000	$2,055,400		$2,055,400
LaBarge	10.310	C	17.01	17.00	U						$0		$0
Lander	10.190	O	175.00	72.40	I, C, R	$1,448,000		$255,400		$780,000	$2,483,400	$3,706,140	$6,189,540
Laramie	10.320	O	250.00	130.00	I, C	$2,600,000		$255,400		$780,000	$3,635,400		$3,635,400
Lingle	10.350	C	33.05	20.00	U						$0		$0
Lusk	10.360	O	37.00	17.00	I, C, R	$340,000		$255,400		$780,000	$1,375,400	$3,706,140	$5,081,540
Marbleton #2	10.561	O	249.25	80.00	I, C, R	$1,600,000		$255,400		$780,000	$2,635,400	$3,706,140	$6,341,540
Midwest-Edgerton #1	10.390	C	22.00	22.00	U						$0		$0
Newcastle #1	10.415	C	22.00	22.00	S						$0		$0
Newcastle #2	10.416	O	39.00	36.80	U						$0		$0
Pinedale #1	10.570	C	74.00	74.00	U						$0		$0
Pinedale #2	10.571	C	20.00	20.00	U						$0		$0
Powell	10.455	O	106.50	48.00	I, C	$960,000		$255,400		$780,000	$1,995,400		$1,995,400
Rawlins	10.485	O	140.00	92.00	I, C, R	$1,840,000		$255,400		$780,000	$2,875,400	$3,706,140	$6,581,540
Riverton #1	10.215	C	60.00	60.00	I, C, R	$1,200,000		$255,400		$780,000	$2,235,400	$3,706,140	$5,941,540
Rock Springs	10.595	O	323.09	208.00	I, C	$4,160,000		$255,400		$780,000	$5,195,400		$5,195,400
Rock Springs (old site)	10.594	H	90.00	40.00	U						$0		$0
Sand Draw	10.195	O	217.00	80.00	U						$0		$0
Saratoga	10.515	O	70.82	23.00	I, C	$460,000		$255,400		$780,000	$1,495,400		$1,495,400
Sheridan #1	10.525	C	58.20	43.00	I, C, R	$860,000		$255,400		$780,000	$1,895,400	$3,706,140	$5,601,540
Sheridan #2	10.526	O	120.00	85.00	I, C, R	$1,700,000		$255,400		$780,000	$2,735,400	$3,706,140	$6,441,540
Shoshoni	10.220	O	32.10	40.00	I, C	$800,000		$255,400		$780,000	$1,835,400		$1,835,400
Sundance	10.580	O	62.90	17.00	I, C	$340,000		$255,400		$780,000	$1,375,400		$1,375,400
Thayne	10.340	O	33.00	26.00	I, C	$520,000		$255,400		$780,000	$1,555,400		$1,555,400
Thermopolis	10.625	O	200.00	23.50	I, C	$470,000		$255,400		$780,000	$1,505,400		$1,505,400
Torrington #1	10.630	H	30.00	30.00	U						$0		$0
Torrington #2	10.631	O	46.24	30.00	I, C	$600,000		$255,400		$780,000	$1,635,400		$1,635,400
Uinta Co - Bridger Valley	10.650	O	40.00	40.00	I						$0		$0
Uinta Co - Evanston #1	10.655	C	67.00	67.00	I, C, R	$1,340,000		$255,400		$780,000	$2,375,400	$3,706,140	$6,081,540
Uinta Co - Evanston #2	10.655	O	185.10	30.00	I, C, R	$600,000		$255,400		$780,000	$1,635,400	$3,706,140	$5,341,540
Upton #4	10.663	O	28.00	19.60	U						$0		$0
Wamsutter #2	10.681	O	37.23	20.00	I, C	$400,000		$255,400		$780,000	$1,435,400		$1,435,400
Wheatland #2	10.706	O	37.00	36.00	I, C	$720,000		$255,400		$780,000	$1,755,400		$1,755,400
Worland #1, #2	10.691 10.692	O	280.00	45.00	I						$0		$0
Large Facility Totals:			5,034.43	2,389.51		$35,132,200	$273,400	$9,449,800	$960,000	$28,860,000	**$74,675,400**	$59,298,240	**$133,973,640**

Historic landfills	3
Closed Landfills	16
Operating Landfills	39

Pre-1989 total	$2,483,400	$0	
Post 1989 Total	$72,192,000	$59,298,240	
Total	$74,675,400	$59,298,240	$133,973,640

Notes:

Groundwater Status
U = Unknown
N = Contamination Not Detected
S = Contamination Suspected
I = Impacted
C = Cap Improvements Needed
R = Active Remediation Needed

Operating Status
H = Historic (Pre 1989)
C = Closed (Post 1989)
O = Operating (Post 1989)

For pre 1989 landfills, cost estimates include 13 new wells, 4 quarterly samples for 16 wells, and 20 years of semiannual sampling for 16 new wells.

For post 1989 landfills, cost estimates include 13 new wells, 4 quarterly samples for 13 wells, and 20 years of semiannual sampling for 13 new wells.

Cost Summary	
Capping Cost = $39,777,200	Total Cap and Monitor Cost = $99,399,100
Additional Well and Investigation Cost = $14,411,900	Total Active Remediation Cost = $65,005,080
20 Year Sampling & Analysis Cost = $45,210,000	Potential State Wide Remediation Cost Obligation = $164,404,180
Active Remediation Cost = $65,005,080	

Facilities that chose to cease receipt of waste after September 13, 1989, did so under the assumption that they would not be obligated for further landfill expenses. Landfills that chose to receive waste after 1989, did so knowing many of these expenses would be necessary, although corrective action probably wasn't expected. Therefore these costs were isolated so that alternate funding methods could be considered.

Potential Pre-1989 Facility Capping and Monitoring Cost	**$11,727,200**
Potential Pre-1989 Facility Active Remediation Cost Cost	**$0**
Potential Pre-1989 Facility Total Cost	**$11,727,200**
Potential Post-1989 Facility Capping and Monitoring Cost	**$87,671,900**
Potential Post-1989 Facility Active Remediation Cost Cost	**$65,005,080**
Potential Post-1989 Facility Total Cost	**$152,676,980**
Potential Total State Wide Remediation Cost Obligation	**$164,404,180**

Appendix G
Remediation Cost Calculations
Landfills Without Adequate Data

Cost Estimates for Facilities Without Adequate Data – 5-7-10

Facility Status - Impacts								
Very Small (1)		**Small (2)**		**Medium (3)**		**Large (4)**		**Total**
H: U	2	H: U	6	H: U	2	H: U	1	11
H: I,C	0	H: I,C	5	H: I,C	4	H: I,C	1	10
H: I,C,R	0	H: I,C,R	0	H: I,C,R	0	H: I,C,R	0	0
H: N	0	H: N	2	H: N	1	H: N	0	3
H: S	0	H: S	1	H: S	0	H: S	0	1
C/O: U	0	C/O: U	6	C/O: U	5	C/O: U	14	25
C/O: S	0	C/O: S	0	C/O: S	0	C/O: S	1	1
C/O: I	0	C/O: I	0	C/O: I	0	C/O: I	4	4
C/O: I,C	0	C/O: I,C	7	C/O: I,C	13	C/O: I,C	21	41
C/O: I,C,R	0	C/O: I,C,R	0	C/O: I,C,R	2	C/O: I,C,R	16	18
Total:	2		27		27		58	114

Historical Facilities w/ Data = 13 > Historical Facilities w/Data w/ Remediable Impacts = 10 (10/13 = 77%) > Impacted Historical Facilities Requiring Cap = 10 (10/10 = 100%) > Impacted Historical Facilities Requiring Active Remediation = 0 (0 / 10 = 0%)

So,

Historical Facilities w/o Data (U = Unknown) = 11 > Historical Facilities (U) w/ Remediable Impacts ~ **8** (77% x 11) > Impacted Historical Facilities (U) Requiring Cap ~ **8** (8 x 100%) > Impacted Historical Facilities (U) Requiring Active Remediation = **0** (0 x 0%) (VS – 1; S – 5; M – 1; L – 1)

Closed/Open Facilities w/Data = 63 > Closed/Open Facilities w/Data w/ Remediable Impacts = 59 (59/63 = 94%) > Closed/Open Facilities Requiring Cap Only = 41 (41/59 = 70%) > Impacted Closed/Open Facilities Requiring Active Remediation = 18 (18/59 = 30%)

So,

Closed/Open Facilities w/o Data (U = Unknown) = 25 > Closed/Open Facilities (U) w/ Remediable Impacts = **24** (94% x 25) > Closed/Open Facilities (U) Requiring Cap Only ~**17** (70% x 24) > Impacted Closed/Open Facilities (U) Requiring Active Remediation = **7** (24 x 30%) (VS – 0; S – 6; M – 5 w/ 1AR; L – 13 w/6AR)

Note: For C/O facilities as a group and for H facilities as a group, acreages were averaged within each size class prior to removing the requisite %/# of facilities from the final calculation. This was done to "smooth out" the effects of facilities requiring very large or very small caps within a class size category.

Potential statewide remediation cost obligation estimate for "Unknowns" = $62,285,060. See spreadsheet *"Unknown Status Remediation Cost Estimates 100514"*

Remediation Cost Calculations - Landfills Without Adequate Data

Very Small Landfills (< 1 acre)

Facility	Facility #	Operating Status	Facility Acres	Cap Acres	Groundwater Status	Additional Capping Costs	Pre 1989 Landfill Additional Wells	Post 1989 Landfill Additional Wells	Pre 1989 Landfill Semiannual Sampling	Post 1989 Landfill Semi Annual Sampling	Cap and Monitor Total	Active Remediation	Facility Total
Albin	10.005	H	0.50	0.57	U	$28,500	$41,800		$240,000		$310,300		$310,300
Hartville	10.275	H	0.65	0.65	U						$0		$0
Very Small Facility Totals:			1.15	1.22		$28,500	$41,800	$0	$240,000	$0	$310,300	$0	$310,300

Notes:

Operating Status

H = Historic (Pre 1989)
C = Closed (Post 1989)
O = Operating (Post 1989)

Remediation Cost Calculations - Landfills Without Adequate Data

Small Landfills (1 - 4.99 acres)

Facility	Facility #	Operating Status	Facility Acres	Cap Acres	Groundwater Status	Additional Capping Costs	Pre 1989 Landfill Additional Wells	Post 1989 Landfill Additional Wells	Pre 1989 Landfill Semiannual Sampling	Post 1989 Landfill Semi Annual Sampling	Cap and Monitor Total	Active Remediation	Facility Total
Burns	10.060	H	1.30	2.55	U	$127,500	$119,000		$480,000		$726,500		$726,500
Daniel Junction	10.555	H	1.00	2.55	U	$127,500	$119,000		$480,000		$726,500		$726,500
Emblem Burlington	10.130	C	4.50	4.50	U	$90,000		$101,000		$300,000	$491,000		$491,000
Fort Laramie #2	10.146	C	1.50	1.50	U	$30,000		$101,000		$300,000	$431,000		$431,000
Ft. Laramie #1	10.145	H	3.20	2.55	U	$127,500	$119,000		$480,000		$726,500		$726,500
Granger	10.245	H	3.00	2.55	U	$127,500	$119,000		$480,000		$726,500		$726,500
Hanna (old site)	10.270	H	4.00	2.55	U	$127,500	$119,000		$480,000		$726,500		$726,500
Manderson #1	10.365	C	1.00	1.00	U	$20,000		$101,000		$300,000	$421,000		$421,000
Manville #1	10.375	C	1.30	1.30	U	$26,000		$101,000		$300,000	$427,000		$427,000
Manville #2	10.376	O	5.00	2.00	U	$40,000		$101,000		$300,000	$441,000		$441,000
Shell	10.520	C	4.50	4.50	U	$90,000		$101,000		$300,000	$491,000		$491,000
Upton #1	10.660	H	2.80	2.55	U						$0		$0
Small Facility Totals:			33.10	30.10		$933,500	$595,000	$606,000	$2,400,000	$1,800,000	**$6,334,500**	$0	**$6,334,500**

Notes:

Operating Status

H = Historic (Pre 1989)

C = Closed (Post 1989)

O = Operating (Post 1989)

Remediation Cost Calculations - Landfills Without Adequate Data

Medium Landfills (5 - 15 acres)

Facility	Facility #	Operating Status	Facility Acres	Cap Acres	Groundwater Status	Additional Capping Costs	Pre 1989 Landfill Additional Wells	Post 1989 Landfill Additional Wells	Pre 1989 Landfill Semiannual Sampling	Post 1989 Landfill Semi Annual Sampling	Cap and Monitor Total	Active Remediation	Facility Total
Boulder	10.550	H	5.00	5.10	U	$255,000	$196,200		$720,000		$1,171,200		$1,171,200
Meeteetse	10.450	O	6.80	6.80	U	$136,000		$178,200		$540,000	$854,200	$2,853,420	$3,707,620
Midwest-Edgerton #2	10.391	O	9.50	9.50	U	$190,000		$178,200		$540,000	$908,200		$908,200
Moorcroft #3	10.396	O	9.70	9.70	U	$194,000		$178,200		$540,000	$912,200		$912,200
Sundance (old dump)	10.761	H	5.20	5.10	U						$0		$0
Superior	10.600	C	9.00	9.00	U	$180,000		$178,200		$540,000	$898,200		$898,200
Ten Sleep	10.605	O	8.00	8.00	U	$160,000		$178,200		$540,000	$878,200		$878,200
Medium Facility Totals:			53.20	53.20		$1,115,000	$196,200	$891,000	$720,000	$2,700,000	**$5,622,200**	$2,853,420	**$8,475,620**

Notes:

Operating Status

H = Historic (Pre 1989)

C = Closed (Post 1989)

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Remediation Cost Calculations - Landfills Without Adequate Data

Large Landfills (> 15 acres)

Facility	Facility #	Operating Staus	Facility Acres	Cap Acres	Groundwater Status	Additional Capping Costs	Pre 1989 Landfill Additional Wells	Post 1989 Landfill Additional Wells	Pre 1989 Landfill Semiannual Sampling	Post 1989 Landfill Semi Annual Sampling	Cap and Monitor Total	Active Remediation	Facility Total
Cody (old site)	10.440	C	50.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800	$3,706,140	$5,374,940
Cokeville #1	10.335	C	16.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800	$3,706,140	$5,374,940
Cokeville #2	10.336	O	40.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800	$3,706,140	$5,374,940
Dubois	10.165	O	40.40	31.67	U	$633,400		$255,400		$780,000	$1,668,800	$3,706,140	$5,374,940
Encampment	10.135	C	30.27	31.67	U	$633,400		$255,400		$780,000	$1,668,800	$3,706,140	$5,374,940
LaBarge	10.310	C	17.01	31.67	U	$633,400		$255,400		$780,000	$1,668,800	$3,706,140	$5,374,940
Lingle	10.350	C	33.05	31.67	U	$633,400		$255,400		$780,000	$1,668,800		$1,668,800
Midwest-Edgerton #1	10.390	C	22.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800		$1,668,800
Newcastle #2	10.416	O	39.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800		$1,668,800
Pinedale #1	10.570	C	74.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800		$1,668,800
Pinedale #2	10.571	C	20.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800		$1,668,800
Rock Springs (old site)	10.594	H	90.00	40.00	U	$2,000,000	$273,400		$960,000		$3,233,400		$3,233,400
Sand Draw	10.195	O	217.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800		$1,668,800
Torrington #1	10.630	C	30.00	31.67	U	$633,400		$255,400		$780,000	$1,668,800		$1,668,800
Upton #4	10.663	O	28.00	31.67	U						$0		$0
Large Facility Totals:			746.73	483.38		$10,234,200	$273,400	$3,320,200	$960,000	$10,140,000	**$24,927,800**	$22,236,840	**$47,164,640**

Notes:

Operating Status

H = Historic (Pre 1989)

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Cost Summary- Landfills Without Adequate Data	
Capping Cost = $12,311,200	Total Cap and Monitor Cost = $37,194,800
Additional Well and Investigation Cost = $5,923,600	Total Active Remediation Cost = $25,090,260
20 Year Sampling & Analysis Cost = $18,960,000	Potential State Wide Remediation Cost Obligation = $62,285,060
Active Remediation Cost = $25,090,260	