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An analysis of nitrate contaminated water in Cherry Valley

Adriana Hernandez-Romo

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AN ANALYSIS OF NITRATE-CONTAMINATED WATER IN
CHERRY VALLEY

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Public Administration

by
Adriana Hernandez-Romo
December 2005
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CHERRY VALLEY

A Thesis

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Adriana Hernandez-Romo

December 2005

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Date

12-1-05
ABSTRACT

Water resources are a critical component to the existence of Cherry Valley, located in the County of Riverside, east of the City of Calimesa, west of the City of Banning, north of the City of Beaumont, south of the county line. Recently, a higher concentration of nitrates was found in Cherry Valley’s local groundwater supplies. To address the nitrate problem, the Beaumont Cherry Valley Water District, San Timoteo Watershed Management Authority (STWMA) and the City of Beaumont formed a panel committee, the San Timoteo Watershed Management Project Committee One to investigate the origin of the nitrates (Brown & Caldwell. California Water News, Aug. 19, 2005).

This paper reviews the political environment in relation to nitrate level increases of local water supplies, and the probable cause of those increases based on previous studies conducted by the United States Geological Survey (USGS), the Chino Watermaster, and the Desert Water Agency (DWA). The influences in the political environment consist of competing interests of residents residing in Cherry Valley, Beaumont Cherry Valley Water District, the San Timoteo Watershed Management Authority (STWMA), San Gorgonio Pass Water Agency (SGPWA), the Santa
Ana Regional Water Quality Resources Control Board (WQRCB), the County of Riverside, and the City of Beaumont.

In the analysis of the research findings, misconceptions relevant to nitrate levels in groundwater supplies are clarified. Also, consistent with the findings of this research, solutions to resolve the nitrate dilemma are presented. In the recommended solutions, the winners and losers are identified.
ACKNOWLEDGMENTS

TO THE WORKING PROFESSIONALS

THAT MADE THEMSELVES AVAILABLE

FOR QUESTIONS

AND SPECIAL THANKS TO PROFESSORS

DR. MICHAEL CLARKE AND DR. KENT SCHOFIELD

FOR THEIR DEDICATION TO STUDENTS LIKE MYSELF.
DEDICATION

TO MY FAMILY FOR ACCOMPANYING ME ON THIS ENDEAVOR.
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CHAPTER ONE
INTRODUCTION TO THE STUDY

Background

The Beaumont Cherry Valley Water District (BCVWD) is the sole public water purveyor in the Cherry Valley area. Consistent with the Irrigation District Principal Act (Water Code 20500-29976) the District can: provide water supplies for beneficial uses, drainage, electric power, flood control, reclaim wastewater, sewage disposal, construct, maintain, and operate recreational facilities in connection with dams, reservoirs, or other work owned and constructed by the district, and own as well as maintain an airport within its service area. As authorized by the LAFCO Commission, BCVWD can provide retail water services. The population the district currently serves is estimated at 24,873 residents, 5,891 of which reside in Cherry Valley (CA Department of Finance. E-1 City / County Population Estimates, 2005: http://www.dof.ca.gov/HTML/DEMOGRAP/E-1text.htm & U.S. Census Bureau. American Fact Finder: http://factfinder.census.gov). Any other service the District would like to provide as authorized by the water
code must be approved by LAFCO. This process is called the activation of a latent power.

BCVWD’s groundwater supply is extracted from the Beaumont and Edgar Canyon basins. Cherry Valley overlies the Edgar Canyon Basin, which is its primary source of water. In 2003, the District provided 6,308 acre-feet of water to its customers. The projected 2005 water demand for BCVWD is estimated to be at 11,900 acre-feet (WEI Correspondence to STMWA. Jun. 21, 2004. Subject: Final Report—Update of Water Demands and Water Supply Plans). In 2003, Cherry Valley received an estimated 1,396 acre-feet of water from BCVWD or 22% of the District’s water demand (Calculation based on BCVWD 2000 UWMP).

To fulfill demand projections, BCVWD is seeking alternative water sources to its existing sole source—groundwater. It is anticipated that 5,470 acre-feet of reclaimed water will be purchased from the City of Beaumont as an additional water source to fulfill demand projections (Dudek & Assoc. 2005. Water & Wastewater Municipal Service Review Report: Pass/Mountain Area. Prepared for the Local Agency Formation Commission, pg. 2-77). The recycled water will be used solely for irrigation purposes, thereby leaving potable water available for domestic purposes.
Reclaimed water is not available for Cherry Valley since there is not a recycled water distribution system in the area. Being that there are not many alternative water sources to the community, the management of local water resources is vital to Cherry Valley's existence.

In the midst of all the efforts by BCVWD to maintain a reliable water supply, the nitrate issue has exasperated the community. Cherry Valley Pass Acres & Neighbors (CVAN) for instance, has developed legitimacy among local agencies and is actively contesting the strategy of STWMA to evaluate the nitrate problem. The group has a history of challenging the findings of local agencies and has fought to preserve their rural community. As neighboring communities like the City of Beaumont urbanize, the group continues to oppose any urban development encroaching upon their community. The political tensions between land use agencies, the local water purveyors, and the residents of Cherry Valley, do not facilitate the community's planning process nor do they resolve the nitrate problem.

Although the nitrate problem is a new issue being driven by STWMA, it has the potential of degrading the existing water supplies available to Cherry Valley. The consequences of finding excessive nitrates in groundwater
are contrary to those goals of the water purveyor and the community. BCVWD’s goal is to deliver reliable quality potable water, while the community’s goal is to maintain a rural environment. The County of Riverside land use policies have designated Cherry Valley as a low density area, which allows for the development of single family dwelling units on large parcels (1 ac. minimum), as well as equestrian and animal keeping land uses (County of Riverside General Plan: The Pass Area. Oct. 2003, pg. 17). Future development is allowed on a minimum lot size of one-acre, with the exception of the Cherry Valley Gateway Policy Area. These types of land uses allow the use OSWDS, which may be the cause of nitrate level increases. The competing interests of the District and Cherry Valley delay the decision-making process to resolve the nitrate problem.

Statement of the Problem

This study investigates the nitrate problem identified by STWMA and the repercussions of that finding to the political environment. Nitrate information is being transmitted to the press and residents are concerned with the fate of their community. In August of 2005, the San Bernardino Valley Sun Newspaper reported that the nitrate-
level of Beaumont Cherry Valley Water District’s Well No. 16 increased to a level higher than the standard allowed by the Federal Environmental Protection Agency (EPA) for potable water distribution (Cruz, Mike. Panel to investigate contaminated water. San Bernardino County Sun. Aug. 19, 2005. http://www.sbsun.com/cda/article).

In analyzing the problem, the hypotheses addressed in this paper are 1) nitrate levels are a significant problem in Cherry Valley, and 2) the problem is being manipulated by the political players.

Purpose of the Study

The San Timoteo Watershed Management Authority (STWMA), as a planning agency has hired Wildermuth Environmental Inc. (WEI) to investigate the source of nitrates in BCVWD’s water supply, under the direction of the STWMA Project Committee One. However, representatives of the Cherry Valley Unincorporated Community (UC) have refused to acknowledge the legitimacy of the study provided that the agencies involved have previously provided inconsistent data (Stanley W. Riddell. Letter to Gerard Thibeault, RWQCB, Santa Ana Region; Aug. 22, 2005. Subject:
Groundwater Contamination from on-site wastewater disposal system in the Cherry Valley Community of Interest).

The research analysis of this paper will assess the validity of the statement "nitrate-contaminated water in Cherry Valley", entertain the theory that human effluent is the source of the nitrates in Cherry Valley, and evaluate the role of politics steering the nitrate issue.

The purpose of the analysis is to verify the soundness of the argument that there is a nitrate-contaminant problem in Cherry Valley. The nitrate situation has been obscured by the media, STWMA, and the Cherry Valley UC. Each group has a different perception on the nitrate issue. This research is important because it depicts the reality of the situation. Arguments made by residents in Cherry Valley, STWMA, BCVWD, the RWQCB, and the DHS are compared to relevant nitrate-contamination studies.

Similar studies have been performed for the United States Geological Survey (USGS), the Chino Watermaster, and Cathedral City. These studies have identified the source of the nitrate problem in agricultural, rural, and urban settings. The circumstances in Cherry Valley are comparable to the nation's nitrate-contamination problem found in the USGS study, the Chino Basin nitrate-pollution
evaluated for the Chino Watermaster, and Cathedral City’s nitrate-contaminated groundwater.

The difference between the aforementioned nitrate studies and this study is that this investigation is based on the actions of local agencies prior to the completion of the scientific study. Unlike the former studies this study incorporates the role of the political environment in the assessment of the nitrate issue.

Theoretical Bases and Organization

The theoretical basis of this study lies on earlier investigations that have associated nitrate degradation of water quality to the continued use of on-site waste disposal systems. STWMA has made the same argument found in the studies of the USGS, the Chino Watermaster, and Cathedral City. The purpose of the studies was to find the source of nitrates in the study area. Likewise, STWMA has a theory that “the only significant sources of nitrate in... [the Cherry Valley] area are OSWDS” (Schlange, Andrew. Letter to Gerard Thibeault, RWQCB, Santa Ana Region. Aug. 10, 2005; Subject: Groundwater Contamination from On-Site Waste Disposal System in the Cherry Valley Community of Interest). The statement that human effluent
is the source of nitrates found in Cherry Valley's potable water is a common argument among STWMA and the residents of Cherry Valley.

Limitations of the Study

"Nitrate-contaminated water in Cherry Valley" is an inflammatory phrase utilized by the media to describe the issue (Cruz, Mike. Panel to investigate contaminated water. San Bernardino County Sun. Aug. 19, 2005. http://www.sbsun.com/cda/article). The media has been successful in capturing the public's interest in BCVWD's water quality as it has developed into a politically sensitive topic. However, the Santa Ana Regional Water Quality Control (RWQCB) and Drinking Water Program District Office of the State Department of Health Services (DHS) have not identified the nitrates in BCVWD's water supply as a problem. As a result, it has been difficult to obtain detailed data from the District and its consultant, Wildermuth Environmental Inc. (WEI). There are reports that reference the nitrate-levels of the wells in Cherry Valley, but the nitrate-level data referenced has been difficult to obtain.
The STWMA Final Phase I Report prepared by WEI discusses the basins in STWMA’s planning area, including the Edgar Canyon and Beaumont Basins. The report is a management tool that outlines a plan of action to maintain reliable and qualitative water resources. This report was reviewed because it references data, tables, and figures, which include the nitrate levels in wells. However, the tables and figures referenced in the report’s text were not provided in the report body or appendices. Also, the references listed in the report confirm that the groundwater quality data, including historic nitrate information was provided by WEI for the report. WEI was contacted, but was unable to provide the data. Similarly, the STWMA Monitoring Program Report also prepared by WEI references nitrate data in the body of the report, but the data is not attached. WEI is currently implementing the ten-year monitoring program as outlined in the STWMA Monitoring Program Report to monitor the water quality in the STWMA area and test the source of nitrate spikes in BCVWD’s service area. Since new data is being generated by WEI under the Monitoring Program and the STWMA Project Committee One, the nitrate data was not provided by WEI. Although, WEI has previous nitrate records of BCVWD’s water
supply, as outlined in former reports prepared in 2002 and 2004, WEI was not able to provide those resources for this study.

To obtain the necessary nitrate data for this research, the State DHS-Preventive Services, Drinking Water Quality Program was contacted. DHS provided the nitrate data of BCVWD’s wells from 1984 to the present. The data was reviewed to determine whether STWMA’s argument that there is a nitrate problem is consistent with Federal EPA standards.

The limitations of the study also reflect the limited resources available to a small public agency like BCVWD. BCVWD does not receive a portion of the one-percent property tax for the area it serves and in 2004 it operated at a deficit of $18,735 (http://www.bcvwd.org: BCVWD FY 2004-05 Budget). BCVWD only retains hard copies of water sampling data. Also, the District only employs 17 people and its current staff does not have the expertise or resources to perform a nitrate study. Instead, the District contracts for professional services as it did with WEI.

Since the District has contracted with WEI for professional services, the firm has input the District’s
water quality data into an electronic database. However, WEI is a private entity that does not have to comply with the Public Records Act and supply the general public with documentation upon request.

The difficulty in obtaining the nitrate data referenced in former studies conducted by WEI and the resources referenced by STWMA is evidently related to their lead in the political environment. There is no other political player that could perform the water sampling at this stage. Thus, the documents prepared by STWMA being used to support the theory that OSWDSSs are causing the nitrate level increases in Cherry Valley are compared to studies of USGS, the Chino Watermaster, and the Cathedral City Cove, and to the data provided by the DHS.

Nomenclature


- **Advantex Treatment System**: an innovative on-site disposal system that provides a second-level wastewater treatment
to residential effluent prior to being disposed into the environment.

- **Aquifer:** an underground layer of earth that holds water of one or more geologic formations containing enough saturated porous and permeable material to transmit water at a rate sufficient to feed a spring or for economic extraction by a well (http://ag.arizona.edu/AZWATER/publications/sustainability/report_html/appenda_01.html).

- **Annexation:** means the annexation, inclusion, attachment, or addition of territory to a city or district (Govt. Code Sec. 56017).

- **Basin:** An area enclosing a relatively distinct hydrologic body or related bodies of groundwater (http://ag.arizona.edu/AZWATER/publications/sustainability/report_html/appenda_01.html).

- **BCVWD:** Beaumont Cherry Valley Water District

- **Change of organization:** means any of the following; a city incorporation, a district formation, an annexation to, detachment from, a city or district, a disincorporation of a city, a district dissolution, a consolidation of cities or special districts, a merger or
establishment of a subsidiary district (Govt. Code Sec. 56021).

- CVAN: Cherry Valley Pass Acres and Neighbors
- CEQA: California Environmental Quality Act
- CHK: Cortese-Knox Hertzberg Reorganization Act of 2000
- DHS: Department of Health Services
- CDFA: California Department of Food and Agriculture
- Diuresis: excessive discharge of urine.
- Drinking Water Source Assessment and Protection (DWSAP) Program: established by the DHS' Division of Drinking Water and Environmental Management to provide information to communities that wish to develop local programs to protect their sources of drinking water
- EIR: Environmental Impact Report
- EPA: Environmental Protection Agency
- Groundwater: water beneath the earth's surface, often between saturated soil and rock that supplies wells and springs or as defined by the Water Code it means water beneath the surface of the ground, whether or not flowing through known and definite channels.
- Groundwater basin: An area enclosing a relatively distinct hydrologic body or related bodies of groundwater.

- LAFCO: Local Agency Formation Commission

- Maximum Contaminant Level (MCL): is an enforceable standard set by the U.S. Environmental Protection Agency based on the public water systems ability "to detect and remove contaminants using suitable treatment technologies." (http://www.epa.gov/safewater/contaminants/dw_contamfs/nitrates.html)

- MGD: Million gallons per day

- NWQAP: National Water-Quality Assessment Program

- OSWDS: On-site Waste Disposal System

- ppm: Parts per million

- Principal act: means, in the case of a district, the law under which the district was formed and, in the case of a city, the general laws or a charter, as the case may be (Govt. Code Sec. 56065).

- Safe yield: A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an
Active Management Area and the annual amount of natural and artificial recharge within a designated area.

- **WQRCB:** Water Quality Control Resources Board: Formed in 1967 to oversee both rights and water pollution planning and control duties for the State of California (Willis, Jill. Best, Best & Krieger. "Water Quality & California’s Bay-Delta", PA 620: Lecture 5/18/05).

- **Reorganization:** means two or more changes of organization initiated in a single proposal (Govt. Code Sec. 56073).

- **Reverse osmosis** - A process whereby water is forced through membranes that contain holes so small that even salts cannot pass through them. It removes microorganisms, organic chemicals and inorganic chemicals, producing very pure water (http://ag.arizona.edu/AZWATER/publications/sustainability/report_html/appenda_02.html).

- **SGFWA:** San Gorgonio Pass Water Agency

- **San Timoteo Watershed Management Authority (STWMA):** a Joint Powers Authority formed in 2001 "to manage the surface and groundwater and to develop a watershed management plan for an area over 120 square miles of the upper San Timoteo Creek drainage area" (BCVWD: Tract
31426, Pacific Scene Annexation Plan of Services; Mar. 22, 2005).

- **SP:** Specific Plan
- **Sphere of influence (SOI):** means a plan for the probable physical boundaries and service area of a local agency, as determined by the commission (Govt. Code Sec. 56076).
- **Spike:** A sharp rise followed by a sharp decline in a graph or in the tracing of a scientific instrument (The American Heritage College Dictionary (Third Ed.). Houghton Mifflin Co.: Boston, Massachusetts, pg. 1311).
- **Stakeholder:** One who has a share or an interest.
- **SWP:** State Water Project
- **TDS:** Total dissolved solids
- **UC:** Unincorporated Community
- **USGS:** United States Geological Survey
- **Urban Water Management Plan (UWMP):** required by SB610 (Costa) to verify sources of water supplies to meet current and future demands.
- **WWTP:** Wastewater treatment plant
- **Watershed:** It's the area of land that catches rain and snow and drains or seeps into a marsh, stream, river,
lake or groundwater

(http://www.ctic.purdue.edu/KYW/glossary/whatisaws.html).

- YVWD: Yucaipa Valley Water District
CHAPTER TWO

METHODOLOGY

Design of the Investigation

The design of this investigation is intended to provide the necessary research to analyze the nitrate problem in BCVWD’s water supply in a political context. The USGS, the Chino Basin Watermaster, and the City of Cathedral Cove studies are used in the analysis of Cherry Valley’s nitrate-level increases to support the theory that human waste is the primary cause of the nitrate elevations in BCVWD’s wells.

The resources used for this investigation identify the common source of nitrates and support the hypotheses that a) human waste is the primary source of nitrate contamination in BCVWD’s Well No. 16 and 21, located in Cherry Valley, and b) STWMA, BCVWD, and the City of Beaumont are the political forces driving the nitrate problem, not factual data.

The Chino Basin Watermaster is presented as a comparable source to the study of nitrates in Cherry Valley because of the agricultural land uses in the northern and southern areas served by the Chino Basin. The Chino
Watermaster found that nitrate contamination resulting from agricultural land uses were generally constant even after the transition of agricultural areas to urban uses. Cherry Valley transitioned from an agricultural to a rural community. However, the discovery of elevated nitrate levels in Cherry Valley’s groundwater supply is a new issue, not a constant issue. Therefore, that earlier agricultural land uses in Cherry Valley caused nitrate levels to increase is not a valid agreement. The Chino Basin study supports the theory that nitrate sources in Cherry Valley are not associated with former agricultural uses.

Secondly, the study conducted by the Desert Water Agency of the Cathedral City Cove proves that OSWDS can and do degrade the quality of groundwater. The area under investigation for the Cove study is also under the jurisdiction of the Santa RWQCB, which shows the relationship between the RWQCB and the study. Lastly, the USGS study supports the conclusion that shallower aquifers and areas with good soil are at a higher risk for nitrate contamination. Both conditions are found in Cherry Valley. Again, the studies provide evidence that supports the theory that the source of the nitrates is human waste, and
that the threat to the community can become critical over time as the area develops.

The resources available for the purposes of this paper also include correspondence generated by STWMA, WEI, and representatives of the Cherry Valley UC, sources obtained from agencies' websites, phone conversations, and interviews with the stakeholders. The correspondence is used to gain an understanding of the political context of the problem and support the theory that OSWDS are the source of the nitrate problem in Cherry. Also, in discussions with STWMA, BCVWD, SGPWA, WEI and the Santa Ana RWQCB Staff, it became evident they had been in contact with each other regarding the nitrate issue, following the chain of command.

The variables influencing the nitrate-contaminant study are the layers of government and the residents of Cherry Valley. Governing agencies are attempting to validate the problem, while Cherry Valley representatives are trying to invalidate the recognition of the problem. The interests of both groups will be identified to gain an understanding on how each is politically driven. The political issues are cumbersome as each group of stakeholders affected by the nitrate level increases has
competing beliefs and values. Thus, it is important to understand the role of each.

Population

The sample population, Cherry Valley, was chosen for this research project because residents in the community are organized, politically active, and reside where claims of nitrate contamination exist. When all these variables are present there is a potential for chaos that can delay remediation. Provided is brief description of the stakeholders, their competing interests/goals, their functions/authorities in the political environment, their assessment of the nitrate problems and the relevance to the methodology.

City of Beaumont

The City of Beaumont is located north of Cherry Valley. The City hosts a rapidly growing population of approximately 18,900 residents, which receive all of its potable water from BCVWD’s water distribution system. The boundaries of the City of Beaumont and BCVWD overlap because the District provides water services and the City provides sewer services within the city limits. There are
currently existing sewer lines in Brookside Avenue, which divide the boundaries of the City and the Cherry Valley UC.

It is in the City’s best interest to facilitate the effort to manage water quality in BCVWD’s service area. To ensure the reliability of the water resources, representatives of the City including two council members and a staff employee have joined the STWMA Project Committee No. 1. As members of the Committee they are delegated to administer the functions of the five task groups.

Not only does the STWMA Project Committee One, work summary call for an investigation of nitrates’ impact on groundwater supplies, but it also provides support for BCVWD to obtain the necessary permits from the State DHS-Preventive Services-Drinking Water Program to provide wastewater in its service area. The City of Beaumont has the authority to sell recycled water to BCVWD for irrigation purposes, but BCVWD does not have the necessary permits to provide recycled water to its customers.

The City’s political role is illustrated in its ability to assist and partially fund the functions of the STWMA Project Committee One. The city council members approve the distribution of the city’s monetary funds, yet
two of the council members are also administering the use of those funds. While this does not necessarily taint the future conclusion of the study, the functions of the decision-makers are not separated from the operations of the Committee.

The results of the nitrate study could impact the City significantly. First, if OSWDS are proven to be the source of nitrate increases in the groundwater supply, the Santa Ana RWQCB will have to intervene. Once the Santa Ana RWQCB recognizes the validity of the nitrate study, it has the authority to mandate corrective actions be implemented by BCVWD, which will most likely be the installation of sewer lines. Again, the sewer lines adjacent to Cherry Valley are maintained by the City since the District does not provide sewer services.

**Cherry Valley Residents**

Cherry Valley is a unique community that is mainly represented by the Cherry Valley Pass Acres and Neighbors (CVAN) and the Unincorporated Community (UC) of Cherry Valley. These interest groups share the same members and philosophy—to preserve the rural environment of Cherry Valley. The groups are active participants in the planning process of their community as well as in areas surrounding
Cherry Valley. Although the community does not have land use authority it has gained recognition by other agencies for its recent litigation triumphs against the City of Beaumont and SGPWA.

Recently, the chairman of the Cherry Valley UC, Stan Riddell, has openly opposed the firm selected to conduct the nitrate study under the direction of the STWMA Project Committee One in Cherry Valley. The findings of the study could jeopardize the one-acre minimum land use designation in Cherry Valley if the investigation proves OSWDS are the source of the nitrate problem. The installation of sewer lines in Cherry Valley would allow for higher housing densities; therefore, allowing development to exist on less than half acre lots.

Also, it is important to note that there are several private wells within the boundaries of Cherry Valley, which are shallower than district wells. Subsequently, these wells most likely not treated and are at higher risk for nitrate contamination.

County of Riverside, Supervisor District 5

Supervisor Marion Ashley’s office is a stakeholder in Cherry Valley and has previously recommended alternatives to the continued use of on-site septic systems in Cherry Valley.
Valley. On April 21, 2005, Supervisor Ashley’s office recommended the formation of a County Service Area, to provide sewer services from a local municipality, or approve an assessment to fund the installation of sewer lines without annexation to a neighboring city.

The Board of Supervisors has land use authority, can initiate the adoption of a registered voter assessment, and adopt the formation of a County Service Area. Since Supervisor Ashley is an elected official it is his responsibility to address the concerns of the residents of Cherry Valley, which are within the boundaries of district five. Given that Cherry Valley is recognized as a voting block, it is critical for Supervisor Ashley to maintain the community’s support for upcoming elections.

**San Gorgonio Pass Water Agency**

The San Gorgonio Pass Water Agency is a state water contractor. SGPWA simply contracts for State Water Project (SWP) water to recharge the Calimesa and Beaumont Basins.
The water agency's authority does not extend to intervene in local water disputes. Still, it would be illogical for SGPWA to recharge a nitrate-contaminated basin. Thus, it would be wasteful to transfer SWP water into the basin, to later treat for nitrate-contaminants, to eventually distribute to retail customers.
Beaumont Cherry Valley Water District

Beaumont Cherry Valley Water District is the public water purveyor serving the City of Beaumont and Cherry Valley. By investigating the nitrate problem BCVWD can evaluate the threat of nitrates to its water supply. Although the district has not confirmed that septic seepage is the cause of the nitrate level increases, BCVWD is attempting to evaluate the impact of septic systems upon build-out of Cherry Valley. Once WEI's research is completed, the source of the nitrates will be known. If on-site septic systems are the source of the nitrate level increases, BCVWD can pursue activating its latent powers to provide collection, treatment, and disposal of wastewater in Cherry Valley. The District would have the responsibility to extend existing sewer lines in Brookside Avenue, north to Cherry Valley and seek funding sources for such a project. State funds and possibly the adoption of voter approved assessments could provide funding for the installation of sewer lines.

The general manager of BCVWD, Chuck Butcher, understands the political sensitivity of the nitrate issue and is seeking to adopt a salt mitigation fee on new development to remedy future water quality degradation
problems as a result of new developments. Mr. Butcher mentioned it would be inappropriate to charge the existing community for impact of future development (Butcher, Chuck, BCVWD General Manager. Sept. 23, 2005: Face-to-face Interview).

Regional Water Quality Control Board

The Santa Ana Regional Water Quality Control Board (RWQCB) is a division of the California Regional Water Quality Board, which is a department under the California Department of Water Resources (DWR). It is the DWR’s responsibility to deliver water resources throughout the state, and it is the RWQCB to ensure the quality of the water supplied. (Santa Ana RWQCB Staff. Oct. 27, 2005: phone interview).

Locally, the Santa Ana RWQCB is authorized to resolve water contamination problems and remedy any improper discharge of wastewater. Within its jurisdictional area, it is in the board’s interest to “preserve, enhance, and restore” the water quality of the basins and the Santa Ana River (www.waterboards.ca.gov/santaana/html/region_overview.html). The board does not have the authority to intervene in the Cherry Valley nitrate problem as identified by STWMA.
until a risk assessment study is completed and an evaluation of assessment is performed.

**Department of Health Services**

Under the jurisdiction of the State Department of Health Services-Preventive Services, the Drinking Water Program (DWP) district offices require public water agencies with water connections of 200 or greater to provide water quality data to the DHS for review (San Diego District Office Staff. Oct. 27, 2005: phone interview). The DHS requires water sampling of public water purveyors' sources of groundwater and surface water prior to delivering to customers. The requirements for water sampling vary among the different water agencies. BCVWD has provided data from 1984-present.

The DWP has the authority to issue permits for the collection and treatment of wastewater as well as the delivery of reclaimed water. Currently, BCVWD is seeking to obtain permits to provide wastewater services. Also, the agency has the authority to enforce treatments and shut down public water purveyors providing water services below the standard level mandated by the State.
San Timoteo Watershed Management Authority

STMWA is a new agency formed in 2001 by the BCVWD, YVWD, and the City of Beaumont to "develop a water resources management program that would provide a safe and reliable water supply for all water users in the watershed" (www.stwma.org/about.html). The member agencies of STWMA/STWMA Watershed are the City of Beaumont, Yucaipa Valley Water District, Beaumont Cherry Valley Water District, and the South Mesa Water Company. The agency is a management agency and does not have the authority to provide water services. STWMA is politically active and represents BCVWD and the City of Beaumont in the nitrate study. The agency is interested in proving its theory that septic systems are the source of the nitrate problem (Schlange, Andrew. Letter to Gerard Thibeault, RWQCB, Santa Ana Region. Aug. 10, 2005; Subject: Groundwater Contamination from On-Site Waste Disposal System in the Cherry Valley Community of Interest). Again, proving the theory would give STWMA, BCVWD and the City of Beaumont discretion over the use of OSWDS in Cherry Valley.
Treatment

The initial study of Cherry Valley water sources began in spring of 2005 by assessing the water policy in the area. It became evident that BCVWD has plenty of leverage being the only public water purveyor in the area, south of the Riverside/San Bernardino county line. It was presumed as a public agency BCVWD, would have all the nitrate data available to evaluate for research purposes of this paper. However, BCVWD under the STWMA Project Committee One, hired WEI to conduct a study of nitrates in the District's wells, who has past and current nitrate data, and is not a public agency. Neither the district nor the consultant were able to provide any sources besides their verbal confirmations and of the nitrate levels.

Since the Santa Ana RWQCB oversees the District's service area, discussions were initiated with the executive director and staff of the board. The board was not involved in the investigation being performed by the STWMA Project Committee One and, therefore, had no information available. Next, SGPWA and WEI were contacted. Being that SGPWA recharges the basin, an interview of the general manager, Jeff Davis was conducted. SGPWA was able to provide EPA mandates on maximum contaminant levels for
nitrates (MCL). Still, there was no data to compare to the MCL mandated by the federal government.

A request for the nitrate data was made also made to WEI, but the data was never provided. As a result, the DHS was contacted. The Drinking Water Program (DWP) was able to provide the nitrate data submitted by BCVWD, which contradicts STWMA's argument, that nitrates in Well No. 16 exceeded the MCL (Schlange, Andrew. Letter to Gerard Thibeault, RWQCB, Santa Ana Region. Aug. 10, 2005; Subject: Groundwater Contamination from On-Site Waste Disposal System in the Cherry Valley Community of Interest and See Appendix A). The political sensitivity of the issue became apparent. The agencies contacted previously were not able to produce the nitrate data because it would contradict statements made by STWMA.

Consequently, the validity of the nitrate problem was compared to the actual nitrate data reported to the DHS, and the source of nitrates in the water supply were analyzed based on previous research findings of the USGS, the Chino Watermaster, and Desert Water Agency for the Cathedral City Cove. The competing interests of the agencies and the community of Cherry Valley were presented in the data gathering process of this research as each
group discredited the others' actions. This paper evaluates the actions taken by the agencies to address the nitrate problem, identified by STWMA.

Data Analysis Procedures

To analyze the data obtained for this paper, the studies were used to address the political issues presented by each stakeholder. Misstatements were transmitted and misunderstandings were developed due to the lack of congruence between the residents of Cherry Valley and the governing agencies. Also, the role and authority of each group was identified to understand the nature of each groups' goals.

In addition, to attain a query to validate or discredit statements made by STWMA and BCVWD, the County of Riverside GIS Department was consulted. This data consisted of a list of assessor parcel numbers, acreage, and assessed structure and land values within the boundaries of the Cherry Valley Unincorporated Community (UC). To differentiate between the developed and undeveloped parcels, those that were listed to have an assessed structure value greater than $10,000 were considered developed for the research purposes of this
thesis. Based on this information the estimated amount of developable parcels would result in a certain amount of OSWDS in Cherry Valley. This will be discussed further in the body of the paper.
CHAPTER THREE

REVIEW OF THE LITERATURE

Introduction

Nitrates are chemicals that can be found in public and private drinking water supplies. The Federal Environmental Protection Agency regulates the maximum amount of nitrates allowed in potable water supplies. There are procedures for the water purveyors to follow to resolve any identified nitrate problem in their water supplies.

Nitrates in the Water Supply

The primary sources of organic nitrate in the water supply identified by the federal EPA are human sewage and livestock manure. Inorganic nitrates in the water supplies are primarily potassium nitrate and ammonium nitrate commonly used as fertilizers (http://dhs.ca.gov/ps/ddwem/chemicals/nitrate/index.htm: Nitrates and Nitrites in Drinking Water, Jul. 26, 2005). The Department of Health Services has associated the presence of nitrates in groundwater "with septic systems, confined animal feeding operations, or fertilizer use" (http://dhs.ca.gov/ps/ddwem/chemicals/nitrate/index.htm:...
Nitrates and Nitrites in Drinking Water, Jul. 26, 2005).

Consequently, nitrates are commonly found in rural areas.

Since nitrates are soluble, do not bind with other soils, and do not evaporate, the probability of percolating into groundwater supplies is high. However, nitrates combine with water. Consequently, nitrates released from effluent (NO₃⁻) remain in the soil and pollute underlying aquifers when blended with surface water, rain water, run off, etc. Provided is an illustration of the nitrogen cycle when dispersed from a on-site wastewater disposal system from "A Review of Nitrate Problems in Ground Waters of the Santa Ana Region and their Relationship to High Density Developments on Septic Tank Subsurface Disposal Systems":

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Figure 2. Fate of Nitrogen with Subsurface Disposal System.


Drinking Water Quality Legislation

In 1974, Congress adopted the Safe Drinking Water Act, which requires “EPA to determine the safe levels of chemicals in drinking water... [that] do or may cause health problems”, these are known as Maximum Contaminant Levels (MCL) (http://www.epa.gov/safewater/contaminants/dw_contamfs

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The MCL for nitrates has been set at 10 parts per million (ppm) or 45 mg/L.

When nitrates reach the 45 maximum contaminant level (MCL) public health is at risk—threatened. Drinking water with high levels of nitrates can lead to serious illness and sometimes to death. In infants under six months of age, nitrates consumed are converted to nitrites, which affect the child’s ability to carry oxygen in the child’s blood. This condition is known as methemoglobinemia or “blue baby syndrome”. An infant is unable to assimilate and transport oxygen through the circulatory system when nitrates in excess are consumed (http://www.epa.gov/safewater/contaminants/dw_contamfs/nitrates.html). “Symptoms include shortness in breath and blueness in skin” (http://www.epa.gov/safewater/contaminants/dw_contamfs/nitrates.html). The lack of oxygen in an infant’s system may result in respiratory failure and death (http://www.epa.gov/safewater/contaminants/dw_contamfs/nitrates.html).

For adults, the long-term effects of a life-time exposure to nitrates include diuresis (excessive discharge of urine), increased starchy deposits, and hemorrhaging of
the spleen (http://www.epa.gov/safewater/contaminants/dw_contamfs/nitrates.html). Since nitrate levels greater than 45mg/L are lethal to one segment of the population, infants, it is mandated as the maximum contaminant level.

In 1993, after the adoption of the Drinking Water Quality Act, EPA requires all water suppliers to collect water samples at least one a year to measure the level of nitrates if any in the water supply. If the nitrates are greater than 50% of the MCLs, the system must be monitored at least once every three months. If the contaminants are consistently above the MCLs, the supplier must intervene to decrease the MCLs. The nitrate removal treatments approved by EPA are Ion Exchange, Reverse Osmosis, and Electrodialysis.

**Impact of On-Site Wastewater Disposal Systems on Groundwater**

In the process of determining the maximum contaminant levels of nitrates in drinking water systems, the U.S. EPA has identified the primary sources of nitrates in groundwater to be animal manure and the continued use of on-site septic systems in rural areas. The impact septic systems have on the degradation of groundwater quality is
associated with the depth of the groundwater, the maintenance of the septic systems, and the number of septic systems in a given area. Provided are three studies that identify the various sources of nitrates found in groundwater, including human effluent released from on-site disposal systems.

United States Geological Survey Circular 1136: National Water-Quality Assessment Program

In the early nineties the United States Geological Survey (USGS) evaluated the potential threat of nitrates to the nation’s groundwater supplies. Compared to the nation, California wells were found to have a higher concentration of nitrates. Within California, the Central Valley and the Pass Area (Beaumont Cherry Valley Water District’s and Yucaipa Valley Water District’s service areas) were found to have higher concentrations of nitrates in their wells (See figure below).
In the study performed by USGS, USGS revealed that areas at greater risk for groundwater contamination are those with good soil quality and shallow aquifers. The source of the nitrates in agricultural areas is typically found in ammonia which "is one of the primary forms of..."
dissolved nitrogen in natural water” (http://water.usgs.gov/nawqa/circ-1136/circ-1136main.html).

Fertilizers used in agricultural, rural, and urban areas are applied as a nitrate or ammonia. In the soil, the ammonia is converted to nitrate. Since nitrates are highly soluble and do not bind with soil, well drained soils allow nitrates to percolate into the aquifers. The shallower the depth to groundwater, the greater the probability for nitrate-contamination of aquifers. (http://water.usgs.gov/nawqa/circ-1136/circ-1136main.html).

Of the data collected from 12,000 wells, 12% of the private wells contained nitrate contaminants versus 1% of publicly owned wells. The research found that private wells are typically at greater risk for nitrate-contamination when on-site septic systems were being used and the property was being used for agricultural purposes because the wells were 1) shallower and 2) were “often located near septic systems, agricultural fields, or animal feeding areas” (http://water.usgs.gov/nawqa/circ-1136/circ-1136main.html).

There is also a tendency for nitrate contamination of groundwater and surface water sources after the application of fertilizers and/or after a rainstorm. Spring runoff as
a result of rain easily percolates into well-drained soil and further percolates into groundwater basins. The findings of USGS have associated nitrate-contamination of groundwater supplies with the use of septic systems and the use of fertilizers, yet communities like Cherry Valley continue to operate in a similar manner.

Chino Basin Watermaster.

The Chino Watermaster agency was formed as required by a court order in 1998 under the adjudication of the Chino Basin to ensure adequate water supplies for all of its beneficiaries (http://www.cbwm.org). In 1999 under the Optimum Basin Management Program Phase I Report, nitrates were found to exceed the MCL in 606 of the basin’s wells. Approximately “eighty-three percent of the private wells had nitrate concentrations greater than the MCL” (Chino Basin Optimum Basin Management Program State of the Basin Report-2004, Pg. 4-9). For the purposes of the report the nitrate value used is nitrate-nitrogen (NO$_3$-N) and are compared to the MCL of 10mg/L.

Both the northern and southern areas served by the basin had higher concentrations of nitrates in their water systems. The southern parts of the Chino Basin consisted
mostly of areas that were formerly irrigated or non-irrigated, which were being occupied by dairies. These areas generally exceeded the 10 mg/L MCL and frequently exceeded 20 mg/L. The northern parts served by the Chino Basin that were formerly occupied by citrus groves and vineyards rarely exceeded 20 mg/L, but could not be used for potable water services (Wildermuth Environmental Inc. 2002. Chino Basin Optimum Basin Management Program State of the Basin Report. Prepared for the Chino Basin Watermaster, pg. 4-4).

Again fertilizers were found to be a contributor to the exceeded nitrate MCL in the southern portions served by the Chino Basin. Between 1939 and 1940 a quarter of a million tons of Chilean fertilizer were imported to California citrus growers. Although the Chilean fertilizer yielded economic returns for the citrus growers, the fertilizer degraded underlying groundwater supplies.

Wildermuth Environmental Inc. (WEI) was the consultant that conducted nitrate tests on water samples taken from the wells in the Chino Basin. The samples were used to differentiate the sources of the nitrate, and later determined whether the nitrate was from ammonia a common chemical found in fertilizers, animal manure, natural
degradation in the environment, or seepage from septic systems. All of the chemicals were evaluated and Wildermuth concluded the source that increased nitrate levels was primarily associated with the dairies or animal manure (Wildermuth, Mark. Phone Interview: 10/12/2005).

To resolve the nitrate problem, the Chino Watermaster has constructed the Chino Desalter I and is proposing to construct the Chino Desalter II. The desalter treats contaminated well water, lowers the Chino basin water table, increases the amount of imported State Project water used to recharge the basin, and eliminates the overflow of the basin to the Santa Ana River.

Desert Water Agency Analysis of Cathedral City Cove

The area located north of the Whitewater Basin, south of the Cathedral City limits, east of Date Palm Dr., and west of the Santa Rosa Mountains is 90% developed, utilizing at least 2.7 septic systems per acre. The Cathedral City Cove is approximately 1,030 acres in size, serves a population of 8,300, and supports 2,500 septic systems. In 1993, the University of California, Riverside and the Desert Water Agency "assessed the effects of
subsurface disposal systems on groundwater quality in Cathedral City Cove and discovered the septic systems were causing nitrate contamination in the groundwater supply (Staff Report in Support of a Basin Plan Amendment to Prohibit the Discharge of Wastewater into the Groundwater from Individual Subsurface Disposal Systems in the Cathedral City Cove, prepared by Colorado River RWQCB Staff: Sept. 2002).

The evidence they found to support their claim included the high concentration of nitrate in the water table, the high density of on-site septic systems, the absence of other nitrate sources, the location of wells sampled, and the tendency of contamination to be found in shallow aquifers. Groundwater sources at Cathedral City Cove are located approximately 200 feet below the surface, which increases the risk of contamination.

Residents residing in the Cathedral City Cove did not maintain their septic systems, which resulted in "soil clogging reduced porosity, permeability, and the infiltration rate of the effluent" (Staff Report in Support of a Basin Plan Amendment to Prohibit the Discharge of Wastewater into the Groundwater from Individual Subsurface Disposal Systems in the Cathedral City Cove, prepared by

Septic systems treat wastewater by removing solid materials and maintaining microorganisms that breakdown solids as well as harmful contaminants. During the clarification process solids, greases, and oils are removed. Treated effluent filters into the absorption field where it either evaporates or percolates into the groundwater. When systems are not maintained they fail causing nitrate levels to rise from human waste. In Cathedral City Cove area nitrate concentrations were an average of 200 mg NO₃⁻/l (Staff Report in Support of a Basin Plan Amendment to Prohibit the Discharge of Wastewater into the Groundwater from Individual Subsurface Disposal Systems in the Cathedral City Cove, prepared by Colorado River RWQCB Staff: Sept. 2002).

To remedy the nitrate contamination of the Desert Water Agency’s water table, Cathedral City had to transport the wastewater to a sewage treatment facility for treatment.
or extend sewer lines into the area. The constraint to the preferred alternative—the installation of sewer lines is the lack of the monetary resources to develop the infrastructure and remove or fill the existing septic systems with sand. The statutory deadline for compliance is January 1, 2012.

Similarities to Cherry Valley

The conditions in the USGS data, the Chino Watermaster, and the Cathedral City Cove exist in Cherry Valley. Like the areas studied, Cherry Valley’s subsistence is dependent on groundwater from local basins. The community is rural and lacks a public sanitary wastewater disposal system. Of the 2,970 parcels in Cherry Valley, 2,300 or so are developed and are on septic disposal systems on 4,245 acres (County of Riverside, GIS Department. Oct. 14, 2005. Cherry Valley Query). The disposal systems are in close proximity to private and public wells. The Regional Water Quality Control Board (RWQCB) allows one on-site disposal system per half acre lot, but several of the developed parcels are on less than half acre lots as is the case with Cherry Valley and Cathedral City.
BCVWD, the public water purveyor in the area has indicated that wells drilled at least 1,000 feet below the surface could be used as potable water sources, reiterating prior findings that shallower aquifers are at greater risk for nitrate contamination. Wells No. 16 and 21 located in Cherry Valley for instance, are shallower than Well No. 23 and have showed increased levels of nitrate. Further supporting the USGS research, after the winter rainstorms in Southern California, Wells No. 16 and 21 were found to have nitrate levels exceeding 50% of the MCL.

Although septic systems are the only mechanism used to treat human waste in Cherry Valley, the source of the nitrate-contamination in Well Nos. 16 and 21 has not been exclusively associated with sewer seepage. However, based on previous studies, it can be assumed that seepage is the primary source of the increased nitrate levels in Cherry Valley’s wells. As additional evidence, the area is predominantly rural and has limited agricultural uses, unlike the Chino Basin area. Therefore, fertilizers are not presumed to be a major nitrate contributor for purposes of this study. The southern portions of the Chino Basin were previously used to grow citrus and the source of nitrates in that area is associated to the fertilizers
previously used. In 1912, when the City of Beaumont incorporated, cherry orchards existed north of Oak Valley Parkway, formerly Fourteenth Street (Butcher, Chuck, BCVWD General Manager. Sept. 23, 2005: Face-to-face Interview). Well No. 22 located at Oak Valley Parkway does not demonstrate an increase in nitrates.

The majority of septic systems in Cherry Valley were installed in the 1950s and 1960s—over 40 years ago. If maintained properly these systems have an unlimited life expectancy. The Colorado River RWQCB in assessing the situation in the Cathedral City Cove area stated that if maintained appropriately the septic systems could be used with no failures or problems for the first twenty years. The disposal systems in Cherry Valley are past the twenty-year mark and could be causing the nitrate levels to increase in Wells No. 16 & 21. If that is the case, the winter rainfall may have facilitated the percolation of nitrates into the groundwater supplies. In March of 2005. Well No. 16 showed an increase of nitrate (NO₃) from 12 mg/L to 40 mg/L and Well No. 21 rose from 12 mg/L to 27 mg/L. As noted earlier the MCL is 45 mg/L. Consistent with state policy, the well water was blended with other well water prior to its delivery to retail customers. Wells were
tested again in July pursuant to EPA standards to verify the consistency, to find that nitrate levels had decreased to 14 mg/L and 15 mg/L, respectively.

**Differences to Cherry Valley**

The studies presented are different in scope to Cherry Valley. Beaumont Cherry Valley Water District, the City of Beaumont, and the San Timoteo Watershed Management Authority (STWMA) are being proactive in their approach to prevent future nitrate increases in BCVWD's wells. These agencies are attempting to measure the threat of nitrate contaminants to its primary water source—groundwater. Although conclusionary statements of exceeded nitrate standards have not been publicly supported by data, they are being used to gain support in the community for a public sewer system.

Due to the projected development in Cherry Valley, the general managers to STWMA and BCVWD have mentioned that the increase in nitrate levels in the Cherry Valley area is a major concern. Based on the amount of undeveloped lots in Cherry Valley and the half-acre minimum lot size requirement for the installation of on-site disposal systems, Mr. Schlange and Mr. Butcher were concerned that
6,000 to 8,000 new septic systems could be installed as the undeveloped parcels were developed (Butcher, Chuck, BCVWD General Manager. Sept. 23, 2005: Face-to-face Interview & Schlange, Andrew, STWMA General Manager. Oct. 7, 2005: Phone Interview). Consequently, the affected agencies are implementing a monitoring program to keep the nitrate level in the wells from reaching the MCL of 45 mg/L and investigating the source of the nitrates. The approach taken by BCVWD, the City of Beaumont, and STWMA is proactive, unlike the USGS, the Chino Watermaster, and the City of Cathedral City that have reacted to resolve the nitrate contamination problem long after MCLs were exceeded.

In actuality, the County of Riverside General Plan Zoning Law allows for one-acre minimum lot sizes, not half-acre lot developments in Cherry Valley, which would allow the installation of approximately 3,400 on-site disposal systems. There are an estimated 734 undeveloped parcels in Cherry Valley consisting of 4,245 acres (County of Riverside, GIS Department. Oct. 14, 2005. Cherry Valley Query). It is estimated that approximately twenty percent of the parcels are located in mountainous areas and
therefore are undevelopable, leaving approximately 3,400 acres for development.

Whether 8,000 or 4,000 septic systems are installed in Cherry Valley, the density of the septic systems and the proximity of the aquifers to the septic systems can jeopardize the district's water quality. Thus, the District, STWMA, and the City efforts are to prevent a future nitrate problem. Dealing with the aftermath of nitrate contamination tends to be more costly Schlange, Andrew (Letter to Gerard Thibeault, RWQCB, Santa Ana Region. Aug. 10, 2005; Subject: Groundwater Contamination from On-Site Waste Disposal System in the Cherry Valley Community of Interest).

San Timoteo Watershed Management Authority
Project Committee One

The San Timoteo Project Committee One was established in August of 2005 to investigate the nitrate-contamination problem in Cherry Valley (Brown & Caldwell, California Water News, Aug. 19, 2005). Its members consist of two City of Beaumont council members, one staff person, two BCVWD board members, and BCVWD general manager. The legal counsel for the committee is Mr. Joseph Aklufi. The two
consultants include Andrew Schlange and Wildermuth Environmental Inc. (WEI).

According to Mr. Schlange of STWMA, the basis of the Committee is to confirm the nitrate-contamination of Cherry Valley water (Schlange, Andrew. Letter to Gerard Thibeault, RWQCB, Santa Ana Region. Aug. 10, 2005; Subject: Groundwater Contamination from On-Site Waste Disposal System in the Cherry Valley Community of Interest). The nitrate issue stems from well nos. 16 & 21 that were found with more than 50% of the MCL. Both of the wells are located in Cherry Valley.

Purpose of the San Timoteo Watershed Management Authority Study

September 13th of 2005, the STWMA Project Committee One, met and established five task groups to evaluate the groundwater quality in Edgar Canyon area, the Beaumont Basin, and Singleton Basin. Wildermuth Environmental Inc. (WEI) was awarded the projects, one of which would measure the water quality impacts from the current and future use of on-site wastewater disposal systems in the unincorporated county area of Cherry Valley. The Committee in its establishment of Task Group B—Water Quality Impacts
from On-Site Waste Disposal Systems (OSWDS) in the Cherry Valley Community of Interest, is attempting to manage the increase in nitrates before nitrates exceed the MCL.

The study is also intended to assess the source of nitrates in well water, whether from natural animal and plant decomposition, vegetation, animal manure, or human waste. To supplement the information provided, the summary description of the STWMA Project Committee was included in this research analysis (See Appendix C). According to the summary, STWMA will assess the current and future threat of on-site septic systems to groundwater quality to BCVWD’s service area. The summary specifies the steps taken to develop an estimate of the per parcel effluent discharge and the potential impact of nitrates to the basins.

Long-term Water Quality Goals

Through the implementation of the STWMA Project Committee One Water Quality Management Program, the water quality goal for the Beaumont Basin nitrate level is 6 mg/L of EPA 10 mg/L MCL (Wildermuth Environmental, Inc. 2002. San Timoteo Watershed Management Program Final Phase 1 Report. Prepared for San Timoteo Watershed Management Authority).
Figure 4. San Timoteo Watershed Management Authority Groundwater Basin Nitrate Level Goals.


The purpose of the Committee is also to seek alternative water sources while preserving the current resources. The Committee is also taking the necessary steps for BCVWD to obtain permits from the State DHS to provide secondary treatment—tertiary reclaimed water for irrigation purposes and eventually recharge the Beaumont Basin with recycled water.
Monitoring Program

The San Timoteo Watershed Management Program, Final Phase I Report composed in 2002 by WEI recommended the implementation of a monitoring program to efficiently manage the water resources in the area. The Monitoring Program began in 2003 and is scheduled for implementation to 2013. The goals of the program include:

1) Enhance Basin Water Supplies
2) Protect and Enhance Water Quality
3) Optimize Management of STWMA-Area Groundwater Basins
4) Protect Riparian Habitat in San Timoteo Creek and Protect/Enhance Habitat in the STWMA Area

The steps to implement these goals are in alignment with the practices of Beaumont Cherry Valley District. The District is currently monitoring its wells and reporting water quality data to the State DHS. The duties of the agencies complement each other and will facilitate the monitoring program process. The monitoring program is set-up to verify and update existing data, and compile it into one comprehensive program. WEI will collect the data from the State DHS and the Department of Water Resources into one database. The program will sample and analyze water
quality at least once every two years at private and publicly owned wells that are not a part of a mandated or existing water quality program. Currently, STWMA contains approximately 500 wells in its area (Wildermuth Environmental, Inc. 2004. San Timoteo Watershed Management Program Monitoring Program. Prepared for San Timoteo Watershed Management Authority).

Presently, San Gorgonio Pass Water Agency imports State Water Project water to recharge the Beaumont Basin and Cherry Valley is within the Beaumont Management Zone. It is in SGPWA’s interest to find the source of nitrate-contaminants to prevent future nitrate degradation of the local water supplies. To assure the reliability of the water supplies, STWMA continues to implement its ten year groundwater monitoring program. The monitoring program will allow STWMA to manage its water resources and recognize any increase in contaminants such as nitrates.
CHAPTER FOUR
RESULTS AND DISCUSSION

Presentation and Findings

The correspondence between STWMA, the Santa Ana RWQCB and the Cherry Valley UC present different perspectives on the nitrate issue. Provided are the letters and clarification to incorrect statements made in the letters based on the research findings of this paper.
August 10, 2005

Regional Water Quality Control Board, Santa Ana Region
Attention: Gerard Thibeault, Executive Officer
3737 Main Street, Suite 500
Riverside California 92501-3339

Subject: Groundwater Contamination from On-Site Waste Disposal System in the Cherry Valley Community of Interest

Dr. Mr. Thibeault:

We are writing to inform you of our concerns regarding nitrate degradation in the Beaumont Management Zone and of new information that we've developed regarding a potential source of this degradation: on-site waste disposal systems (OSWDS) in the Cherry Valley Community of Interest (CVCOI). The CVCOI is located north of the City of Beaumont and is served water by the Beaumont Cherry Valley Water District (BCVWD). The CVCOI overlies the Edgar Canyon area and the northern part of the Beaumont Management Zone. The CVCOI is not seweried.

The Edgar Canyon area is the northern part of the Beaumont Management Zone—separated from the main part of the Beaumont Management Zone by the Banning fault. The Bonita Vista Water Company and BCVWD produce groundwater from the Edgar Canyon area. Presently, nitrate concentrations in Bonita Vista's wells have reached 35 mg/L. Nitrate concentrations in the BCVWD wells in the Edgar Canyon area have increased over the years, but are currently below the nitrate drinking water standard. The only significant sources of nitrate in the Edgar Canyon area are OSWDS.

The BCVWD is the only major producer with wells located in the Beaumont Management Zone and in the CVCOI. Nitrate concentrations in BCVWD Well No. 16 are usually low, but have gradually increased over time. Recently, this well exhibited a sudden increase in nitrate concentration that exceeded the nitrate drinking water standard. Again, the only significant sources of nitrate in this area are OSWDS.

The mobile home park Plantation on the Lake located just west of the CVCOI recently requested water service from the BCVWD because the nitrate concentration in their well exceeded the drinking water standard. This mobile home park uses a community OSWDS, which appears to have contaminated their own well.

Currently, there are about 2,500 developed parcels in the CVCOI. At build out, there will be about 8,500 developed parcels. We are concerned that we are just beginning to realize

Figure 5. San Timoteo Watershed Management Authority Letter to Santa Ana Regional Water Quality Control Board.
the water quality impacts from OSWDS and that this problem will only get worse as more parcels are developed with OSWDS. We are also concerned that OSWDS are being permitted for parcels that are less than half an acre or effectively less than half an acre when more than one dwelling is constructed on a parcel (e.g., two or more houses on a lot, mobile home parks, etc).

The recently amended Basin Plan includes maximum benefit-based objectives for TDS and nitrate-N. There are “trip hammers” for ambient groundwater and Beaumont recycled water TDS. We are concerned that the uncontrolled discharge of OSWDS in the forebay of the Beaumont Basin will cause the TDS in groundwater to increase at a greater rate than would occur if the CVCOI was sewered and that the TDS loads from the OSWDS will trigger the need for desalting earlier than would otherwise occur. Currently, there is no way for the CVCOI to be assessed for the TDS added to groundwater by the CVCOI; consequently, the obligation may have be borne by the City of Beaumont and BCVWD.

For our part, we are participating in two investigations to develop additional information that can be used to determine the potential magnitude of the groundwater impacts from OSWDS in the CVCOI. Our first investigation (Geoscience, Parsons, and Wildermuth) will determine if the existing nitrate degradation was caused by OSWDS. The second investigation (Wildermuth) will estimate the local and basin-wide magnitude of nitrate degradation from OSWDS in the CVCOI. We would like to meet with you later this month to discuss our existing information, ongoing investigations, and what options are available for managing groundwater degradation from OSWDS. I or Mark Wildermuth will contact you in the near future to set up a meeting.

Very truly yours,

San Timoteo Watershed Management Authority

J. Andrew Schlange
General Manager

Figure 5. San Timoteo Watershed Management Authority Letter to Santa Ana Regional Water Quality Control Board (Continued).

In paragraph three of Mr. Schlange’s letter he states that Well No. 16, “exhibited a sudden increase in nitrate concentration that exceeded the nitrate drinking water standard” (Schlange, Andrew. Letter to Gerard Thibeault,
RWQCB, Santa Ana Region. Aug. 10, 2005; Subject:
Groundwater Contamination from On-Site Waste Disposal
System in the Cherry Valley Community of Interest). To the
contrary, the nitrate data provided by the State Department
of Health Services-Prevention Services-Drinking Water
Program indicates that the nitrate level of Well No. 16 was
at 40 mg/L (See Appendix A). The nitrate level did increase
from 12 mg/L in 2003 to 40 mg/L in March of 2005 and
decreased to 14 mg/L in July of 2005, but it did not exceed
the drinking water standard of the 45 mg/L MCL. There was
no data provided by BCVWD to the State DHS from October of
2003 to March of 2005 to indicate that this was a
consistent occurrence. The San Bernardino Valley Sun,
quoted Mr. Schlange’s letter transmitting information that
is contrary to data provided by the DHS. It would be
appropriate to add that STWMA may want to create a sense of
urgency among the community:

Mr. Schlange proceeds in paragraph four to state that
the Plantation on the Lake mobile home park “recently
requested water service from the BCVWD because the nitrate
concentration in their well exceeded the drinking water
standard.” The San Bernardino Valley Sun newspaper also
conveyed this information. This statement is not supported
by DHS, based on conversations with DHS staff. DHS advised management at the Plantation on the Lake mobile home park to seek an alternative water source to increase the reliability of their water supply. At the time the park depended on one well, which was not contaminated. It should be noted however, that the mobile home park is a high density community relying on an OSWDS, which is in close proximity to its well.

Lastly, Mr. Schlange in paragraph five states that "there will be about 8,500 developed parcels" in Cherry Valley at build-out. There are an estimated 3,400 acres of developable area in Cherry Valley, which would allow for the subdivision of 3,400 parcels into one acre minimums and the installation of approximately 3,400 septic systems on 4,245 acres. For purposes of this study, it is estimated that 20% of the undeveloped lots in Cherry are in mountainous areas, and therefore undevelopable (County of Riverside, GIS Countywide City/SOI Topography Map. 2004).

Mr. Riddell responded to Mr. Schlange's letter with a rebuttal letter (See Appendix D). To address Mr. Riddell's concerns, provided are a few responses. In response to Mr. Riddell's statement in paragraph three regarding Well No. 16, there is no data supporting the well exceeded the
nitrate drinking water standard. Since the well did not exceed the drinking water standard, BCVWD was able to blend water from Well No. 16 with water from other wells found to have lower concentrations of nitrates, prior to delivering the potable water. This is the type of remediation permitted by the Federal EPA.

In paragraph four, Mr. Riddell discredits that the OSWDS are the source of the nitrate level increases and in paragraph five he proceeds to state how difficult it is to understand that household disposal systems could percolate into an aquifer that is at least 500 feet below the surface. As mentioned in the USGS study, nitrate levels may temporarily rise after a heavy storm and this winter there was heavy rainfall throughout the state, supporting the notion that the rainfall could have contributed to nitrate level increases. Since nitrates remain as separate chemicals in the soil and Cherry Valley has good quality, porous soil the percolation of nitrates into the aquifers is facilitated (Thibeault, Gerard J., Santa Ana RWCB Executive Director. Oct. 7, 2005: Face to face Interview). Also, in the case of Cathedral City aging on-site wastewater disposal systems were the cause of nitrate-water contamination. The first leach systems of the Cove were
installed in the 1930s and were causing problems in the early nineties. The first OSWDS installed in Cherry Valley are between fifty to sixty years old. Also, the aquifers underlying Well No. 16 and 21 are less than 1000 feet deep, increasing the possibility for nitrate contamination.

Paragraph seven mentions that the zoning law in Cherry Valley would protect the groundwater. In actuality, zoning law would allow for the installation of approximately 3,400 new on-site wastewater disposal systems based on current county zoning. Although Cherry Valley is zoned low density residential, the combination of development and the use of OSWDS in rural areas have proven to degrade water quality, as illustrated in the USGS, Chino Basin, and the Cove studies. Furthermore, in paragraph eight, Mr. Riddell makes two statements; first, regarding consultant selection, the Cherry Valley UC would approve of a “firm with no ties, past, or current, with BCVWD, the STWMA, nor the City of Beaumont” and secondly asks the Santa RWQCB to "take the lead" on the study if they are authorized to do so. Mr. Riddell's request is contrary to the current business practices for selecting a consulting firm. In analyzing the Chino Basin, WEI has gained an expertise in testing sources of nitrates and evaluating groundwater
quality. WEI’s experience will greatly benefit the study being performed for STWMA to assess the impact of nitrates on water quality in Cherry Valley. Also, WEI has built a relationship with the local agencies. These agencies would tend to have a greater level of trust with a firm they have used. Nevertheless, the Santa RWQCB cannot take the lead on the nitrate study because it is not authorized to investigate every suspected contamination within its jurisdictional area.

Discussion of Findings

In the correspondence circulated by STWMA and the Cherry Valley UC, the political implications of the groups’ competing interests are evident. STWMA is not concerned with what the consequences of prohibiting the use of septic systems would be to the community. Similarly, representatives of the Cherry Valley UC are not willing to accept that on-site disposal systems could be the cause of the degradation of water quality. If nitrates are indeed a problem, the widespread installation of sewer lines would not be feasible in Cherry Valley if it continues to develop on one acre minimums. With one acre minimum subdivisions
there is not sufficient development to spread of the costs of sewer infrastructure.

Identification of Alternatives

The solutions implemented to decrease the nitrate-levels in the wells are dependent upon the source of the nitrate. For purposes of this paper it is theorized that septic systems and the cause of the nitrate spikes. The solution would be to replace the on-site wastewater disposal systems are this would require the installation of sewer lines or the installation of an on-site secondary treatment disposal system. These new septic tanks have two chambers that allow for the treatment of wastewater prior to its release into the drain field or dispersal field.

The most viable alternative to decreasing the nitrate levels and maintaining a reliable water supply would be the installation of a public sewer system. This would require the extension of the City of Beaumont’s sewer lines located on Brookside Ave., north into Cherry Valley, amending the City of Beaumont’s sphere of influence to include Cherry Valley, and annexation to City. The compromise to be discussed among the two groups, STWMA and Cherry Valley UC/CVAN, would be which agency authorized to provide water
service would provide sewer most efficiently. In evaluating which agency, the City of Beaumont or Beaumont Cherry Valley Water District, could provide sewer services, costs and benefits must be taken into account.

Group Theory

In this situation the most viable alternative can be evaluated through Group Theory or equilibrium (Dye, Thomas R. Understanding Public Policy, 8th Ed. Prentice Hall: Englewood Cliffs, NJ: 1995, pg. 24). To develop a policy or decision the affects a portion of any population would require managing conflict among groups by compromising, and balancing interests (Dye, Thomas R. Understanding Public Policy, 8th Ed. Prentice Hall: Englewood Cliffs, NJ: 1995, pg. 24).

The equilibrium is the "balance which...groups constantly strive to tip in their favor" and will be reached based on the group that has the greater political influence, Cherry Valley residents or STWMA? (Dye, Thomas R. Understanding Public Policy, 8th Ed. Prentice Hall: Englewood Cliffs, NJ: 1995, pg. 24). Currently, STWMA is driving the nitrate problem and has tipped the scales in their favor by using the media to develop an urgency for a
public sewer system. The nitrate study under investigation will potentially yield satisfactory findings to support the theory that human effluent is the source of nitrate contamination in BCVWD's wells. To remedy the problem, would be to discontinue the use of OSWDS.

The influence of the groups is determined by their numbers, wealth, organizational strength, leadership, access to decision makers, and internal cohesion (Dye, Thomas R. Understanding Public Policy, 8th Ed. Prentice Hall: Englewood Cliffs, NJ: 1995, pg. 24).

STWMA members consist of BCVWD, the City of Beaumont, YVWD, and the South Mesa Water Co. whose interests are aligned with those of STWMA, cover a larger area than Cherry Valley. Moreover, STWMA has the resources to conduct the nitrate study, unlike the residents of Cherry Valley. STWMA has established working relationships with local agencies by participating on the execution of a memorandum of understanding (MOU), which includes member agencies as well as the City of Banning, and SGPWA.

CVAN and the Cherry Valley UC are representative of a large portion of Cherry Valley, which has the strength to organize and communicate with the overall community. In the past, CVAN has been represented by Robert E. Goodwin from Goodwin & Associates, located in San Francisco, in suits filed against the City of Beaumont and SGPWA.
Recognition is also given to Cherry Valley because it is considered a significant voting block. Presently, Cherry Valley's authority is limited, while STWMA steers the study. Once the study is completed, CVAN can apply its leverage and challenge future actions based on study findings pursuant to CEQA.

To facilitate equilibrium it should be noted that "overlapping group membership helps to maintain equilibrium" (Dye, Thomas R. Understanding Public Policy, 8th Ed. Prentice Hall: Englewood Cliffs, NJ: 1995, pg. 25). Cherry Valley residents for instance, are within STWMA's jurisdiction and STWMA's goal is to continue with the nitrate study for the sake of the community, to preserve the water quality in the area. STWMA's functions to manage water resources overlap as the agency is representative of its member agencies and residents within its jurisdictional area.

According to group theory, competing groups such as Cherry Valley and STWMA, allow equilibrium to be maintained by preventing one group from becoming the majority. Whether, a majority or not, reaching equilibrium in the community is difficult for there are the competing interests of Cherry Valley and STWMA.
Equilibrium for these groups would be achieved by allowing Cherry Valley to maintain its rural environment and installing sewer lines. This could require Cherry Valley residents to accept density transfers. This would allow areas in Cherry Valley to be developed at higher densities or clustered, yet maintain the one unit per acre overall density. Sewer lines could not be extended throughout Cherry Valley, especially in the community's most northern area where nitrate levels are low and the valleys do not allow for the installation of a public sewer system.

Costs/Benefits

There are also tangible and intangible benefits that Cherry Valley and STWMA would benefit from in the installation of a public sewer system. The intangible benefits to installing a public sewer system would be to maintain public health and safety. On the other hand, tangible costs are commonly an issue among public agencies because public funds are not easily available and when they are, there are limits to their use. There is state and local funding for capital improvement projects such as the construction of a WWTP, the problem arises when the project
is built and there are no funds available to maintain and operate the project. The intangible costs of not addressing the nitrate issue appropriately or in a timely manner, would be the continued degradation of the District’s groundwater sources.

The tangible benefit from installing sewer infrastructure would be an improvement in water quality. Supportive of infrastructure development is staff at the Santa Ana RWQCB. Accordingly, the use of on-site secondary treatment systems is not supported by the Santa Ana RWQCB because as a fairly new system, there is not a lot of data available to determine the future consequences of its use. The use of secondary treatment systems is therefore, not highly supported as a long-term solution to the nitrate level increases caused by human effluent. The RWQCB staff would rather see sewer lines installed in areas where sewer systems are failing than risk the failure of another system fifty years later (Thibeault, Gerard, RWQCB, Santa Ana Region, Executive Officer. Oct. 7, 2005: Face-to-face Interview).

The extension of sewer lines to Cherry Valley if public awards are granted to the District or the City to maintain public health and safety, landowners will only be
Cherry Valley, the city would not extend its service area into the Cherry Valley UC.

The most efficient and effective choice would be to extend the City's sewer lines from Brookside Avenue and activate BCVWD's latent power of wastewater collection. This would allow the community to remain unincorporated and subject to low density county area. Although Cherry Valley would remain outside of the city limits a public sewer system could sustain higher densities, which would result in increased pressure from developers for the County to allow higher densities.

In the long run, the Cherry Valley UC would lose portions of its community to development and would be encroached further by new development. However, Cherry Valley would continue to receive reliable quality water services. Generally STWMA and BCVWD would be the winners in this type of situation by continuing to provide reliable water resources. Even though STWMA does not provide water services, it is ensuring that the member agencies are by managing the water resources of its watershed. BCVWD would continue to operate as the public water purveyor and provide sewer services to the area.
CHAPTER FIVE
SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

The purpose of this research was to evaluate the validity of the rising nitrate-levels in the unincorporated county area of Cherry Valley. The common sources of nitrates in the water supply are fertilizers, animal manure, and effluent from on-site disposal systems. Prior studies by the USGS, Chino Watermaster, and the Desert Water Agency for the Cove were used as milestones for sources of nitrate-contamination in groundwater supplies. The USGS study proved that privately owned wells were at greater risk for nitrate-contamination versus publicly owned wells because they have the tendency to be shallower and near septic systems.

In addition, the Chino Basin Watermaster proved that fertilizers and dairies cause heavy nitrate contamination of groundwater supplies. There are no dairies in Cherry Valley, there are limited agricultural uses, and the community is rural. Moreover, nitrates have been a constant problem at the Chino Basin in contrast to the recent nitrate spikes in BCVWD's wells. Thus, the
elevation of nitrate levels in BCVWD’s wells could be a result of septic seepage as was the case in the Cathedral City Cove. The USGS nitrate study further supports the notion that sources of nitrates are associated with rural environments’ continued use of septic systems.

The potential threat of nitrate-contamination is being evaluated by WEI under the STWMA Project Committee One. Based on research gathered for this thesis, the threat of nitrate-contamination is a foreseeable problem for the future. DHS has expressed that the increase in nitrate levels is not classified as a problem until the water samples consistently exceed over 50% of the MCL.

Regardless of the amount of discharge each residence in Cherry Valley releases a day, the installation of 3,400 septic systems would degrade the District’s water supply. The natural environment could potentially be incapable of naturally processing the partially treated effluent released from the leach systems.

The limitation of the study was being able to obtain the nitrate data from the affected agencies. Additionally, the impact of septic systems to the water table in the BCVWD’s service area is currently being assessed and limits the amount of data available for this study.
The most important resource in understanding the competing interests of STWMA and Cherry Valley is the correspondence to Santa RWQCB. The correspondence revealed that Cherry Valley's interests are to remain a rural community, while STWMA wants the public to acknowledge the nitrate problem. Consistent with the conditions in Cherry Valley and the findings of previous nitrate studies, STWMA is correct in associating the nitrate source to human effluent.

Conclusion

The results in the research confirm that the water in Cherry Valley has not been contaminated by nitrates, but that there could be a problem with water quality as Cherry Valley develops on one-acre minimums. The media classified the elevation of nitrate levels in the water supply as "nitrate-contaminated water" in Cherry Valley. The research data shows that Well Nos. 16 & 21 in Cherry Valley did not exceed the nitrate MCL. In March of 2005 the nitrate level exceeded 50% of the MCL and in July of 2005 the nitrate levels dropped back to normal (DHS. "Nitrates and Nitrites in Drinking Water" 2005). All the other wells
in BCVWD’s service area do not show a significant increase in nitrates (See Appendix A).

STWMA has generated public awareness in Cherry Valley of the nitrate level increases in BCVWD’s wells. In order to create a sense of urgency for a public sewer system, STWMA has allowed the public to believe that Well No. 16 exceeded the nitrate drinking water standard. In addition, STWMA has maintained control by administering the nitrate study and implementing the Monitoring Program that includes monitoring of private wells to allow for better management of the Banning, Beaumont, and Edgar Canyon Basins.

Recommendations

The recommendation to resolve future increases in nitrate levels is to discontinue the use of on-site disposal systems as development occurs. BCVWD could activate its sewer disposal latent power, to collect wastewater to transport to Beaumont’s WWTP for treatment. Meanwhile, Cherry Valley residents could continue in their efforts to maintain a rural lifestyle as long as it does not impose a threat on the natural environment, which it currently does not. The affected agencies need to come together and compromise.
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APPENDIX B

MAP OF CHERRY VALLEY
APPENDIX C

SAN TIMOTEO WATERSHED MANAGEMENT AUTHORITY
PROJECT COMMITTEE ONE WATER QUALITY MANAGEMENT
SUMMARY DESCRIPTION OF WORK
San Timoteo Watershed Management Authority
Project Committee One
Water Quality Management

Summary Description of Work and Anticipated Work Products
Fiscal Year July 1, 2005 through June 30, 2006

The following summary task descriptions are based on discussions with the City of Beaumont (Beaumont), the Beaumont Cherry Valley Water District (BCVWD), and the San Timoteo Watershed Management Authority (STWMA) and their consultants. Detailed work breakdown structures and budgets were developed for give task groups (A through E). Of these, only the first four will be done this fiscal year (A through D) with the fifth task group (E) scheduled for next year.

Task Group A – Groundwater Development in the Beaumont South Basin

The objective of this task group is to determine the feasibility of pumping groundwater from the Beaumont South Basin in the vicinity of Coopers Creek and downstream from the Beaumont recycled water plant. Basic research will be done on existing wells in the Beaumont South Basin and the upper San Timoteo Basin. Thereafter, a drilling program will be developed and two boreholes will be drilled. One of these boreholes will be drilled deep into the San Timoteo formation to obtain lithology and to assess the water supply characteristics of the shallow and deep systems. Both boreholes will be completed as test wells and aquifer stress tests will be run to characterize aquifer properties and water quality. If productive wells can be developed, these test wells may be converted to production wells and new production wells will be pumped into the BCVWD non-potable water system and used for irrigation. The deliverables for this task group will include plans and specifications for drilling and testing two wells, and draft and final reports. The cost of this task group will be about $146,000, which does not include CEQA processing, drilling, and well construction costs. The duration of this task group will be six to nine months.

Task Group B – Water Quality Impacts from On-Site Waste Disposal Systems (OSWDS) in the Cherry Valley Community of Interest

The objective of this task group is to develop a rigorous assessment of the current and future threat to groundwater quality in the Edgar Canyon area, Beaumont Basin, and Singleton Basin. This will be done by assessing the current and future locations and numbers of OSWDS and estimating the current and future discharges to groundwater from the OSWDS. For current conditions, indoor water use (equivalent to discharge from OSWDS) will be estimated from total water sales (BCVWD meter reads) and estimated outside use. This will be extrapolated to future conditions based on planned
development in the currently undeveloped parts of the CVCOI. Geographical information system tools will be used to analyze parcel data and develop discharge estimates. The basin-wide TDS impact in the Edgar Canyon area, Beaumont Basin, and Singleton Basin will be estimated with the Constantly—Stirred Reactor model that was used to develop the Maximum Benefit TDS objective for the Beaumont Management Zone. The deliverables for this task group will include draft and final reports and meetings with regulators. The cost of this task group will be about $88,000. The duration of this task group will be four to six months.

Task Group C – Develop Salt Mitigation Fee

The objective of this task group is to develop a salt mitigation fee that can be assessed on new construction. This salt mitigation fee will provide funding for the construction of salt mitigation projects that will be required in future years to offset the use of imported State Project water and recycled water associated with new development. This will be done by revising the work completed last year by Back and Veatch and developing equitable formulas for allocating the salt mitigation costs of new development. The deliverables for this task group will include draft and final reports and meetings with Beaumont and BCVWD staff. The cost of this task group will be about $37,000. The duration of this task group will be two months.

Task Group D - Preparation of Title 22 Compliance Documents to Acquire Permits for Recycling

The objectives of this task group are to prepare two documents that are required to obtain permits for the use of recycled water for irrigation and eventually for groundwater recharge. Two reports will be produced: one that demonstrates the Beaumont recycling plant’s ability to meet Title 22 recycling requirements for irrigation uses; and a second report that can be used to obtain a master recycling permit for irrigation uses throughout the BCVWD service area. A consultation will be held with the Department of Health Services to determine if these reports can be combined and, thereby, reducing cost. Existing documentation will be used to synthesize these reports and new analyses will be done where information is missing. The deliverables for this task group will include draft reports (2), draft final reports, (2) and final reports (2), and meetings with DHS, Beaumont, and BCVWD staff. The cost of this task group will be about $115,000. Subsequent work, including a DHS-required public hearing and permit negotiations (DHS and RWQCB), is not included herein. The duration of this task group will be six to eight months.
Task Group E – Preparation of Title 22 Engineering Report for Recharge of Recycled Water

The objective of this task group is to prepare a Title 22 Engineering Report for planned groundwater recharge projects that will use recycled water. This task has been deferred until next fiscal year. The deliverables for this task group will include draft, draft final, and final reports, and meetings with DHS, Beaumont, and BCVWD staff. The cost to complete this task group is about $130,000. Subsequent work, including DHS-required public hearing and permit negotiations (DHS and RWQCB), is not included herein. The duration of this task group will be eight to ten months.
APPENDIX D

CHERRY VALLEY UNINCORPORATED COMMUNITY
LETTER TO SANTA ANA REGIONAL WATER
QUALITY CONTROL BOARD
Regional Water Quality Control Board, Santa Ana region
Attention: Mr. Gerard Thibeault, Executive Officer
3737 Main Street, Suite 500
Riverside, California 92501-3339
22 August 2005

Subject: Groundwater Contamination from on-site waste disposal system in the CHERRY VALLEY COMMUNITY OF INTEREST.


Dear Mr. Thibeault

I am the chairman of the Cherry Valley Unincorporated Community Committee (CVUC), The Cherry Valley Unincorporated Community is a community designated by the Local Agency Formation Commission (LAFCO) as a special community with a population of approximately 5500 and specified borders. Prior to being designated as a UC, the CVUC was designated as a Community of Interest (COI), which is how the area is erroneously referred to in subject letter.

As you are aware and as outlined in referenced letter, the residents of Cherry Valley are primarily served by the Beaumont/Cherry Valley Water District. My family and I have lived in Cherry Valley for over 28 years and have received water service from the B/CV Water District during the entire period. During this period we have received mandatory periodic reports from the District attesting to the quality of the water provided by the District. I am providing several recent copies of these reports. As you will note, the reports do not indicate any progressive deterioration in the quality of the water, which one would expect if on-site septic systems were the source of the cited degradation in the quality of the water. A survey of other resident of Cherry Valley reveals the exact experience.

Referenced letter states that B/CVWD well No. 16 recently exhibited “a sudden increase in nitrate concentration that exceeded the nitrate
drinking water standard”. However, we are not aware that this well was pulled from service or what other remedial actions might have been taken to resolve a serious health problem nor were any water users advised of the problem.

Obviously, the myriad septic systems employed throughout Cherry Valley for many years could not cause a “sudden increase” in the nitrate level in a single well. If, in fact, there was a problem, it was caused by an isolated factor that should have been identified and corrected.

We have been advised that the water level of the Beaumont Aquifer lies approximately 500 feet below the surface of the ground. Of course, it is understood that the water level below the ground surface varies with the elevation of the ground and with other factors. However, it is difficult to understand how water from household septic systems could permeate through 500 feet of soil and still contain dangerous levels of nitrates.

We should advise that we have been aware of concerns by certain individuals in recent years that septic systems potentially could degrade water quality. We are not aware of any “new information” that has suddenly arisen that would lend added credence to these concerns. In consideration of the career positions of the individuals that have expressed these concerns, we are convinced that these “concerns” are based on political motives.

Cherry Valley is the oldest inhabited community in the Pass Area. Some of its homes are over 100 years old. Septic systems have been in use throughout the community throughout its history. The population has not exploded as it has in Beaumont but has grown at a moderate rate. Existing County zoning provides for one home per acre, except in isolated situations. We believe that adherence to the zoning law will serve to protect our ground water.

We believe that the residents of Cherry Valley would agree to “sewering” the community and would be willing to pay for their share of the cost, if they could be assured that the basis for such action were valid. In that regard we would insist that a study be conducted by an firm with no ties, past or current, with the BCVWD, the STWMA nor the City of Beaumont. The firms listed in referenced letter are unacceptable to us. Perhaps your office has the designated authority for such a study and could take the lead? We further would demand that the entire City of Beaumont, without exception, be placed on sewers and that the old sewer systems, which has been in the ground with clay pipes for many years, be replaced.
However, be advised that the CVUC has no taxing authority or income from the sale of water or income from any source and is in no position or is willing to pay for any studies or contractual actions of any kind.

Sincerely
Stanley W. Riddell, Chairman

encl: water reports

cc: Mr. Schlange
Supv. Ashley

REFERENCES


10. Cherry Valley Acres and Neighbors et al., Plaintiffs and Respondents, v. City of Beaumont, Defendant and Respondent; Nobel Creek Meadows, LLC et al., Real Parties in Interest and Appellants. E034392. Court of Appeal of California, Fourth Appellate District,


16. Davis, Jeff, SGPWA General Manager. October 7, 2005: Face to face interview.


18. DHS. “Nitrates and Nitrites in Drinking Water” 2005.


24. http://www.physicalgeography.net/fundamentals/9s.html
32. Riddell, Stanley W. Letter to Gerard Thibeault, RWQCB, Santa Ana Region; Aug. 22, 2005. Subject: Groundwater Contamination from on-site wastewater disposal system in the Cherry Valley Community of Interest.
35. The American Heritage College Dictionary (Third Ed.). Houghton Mifflin Co.: Boston, Massachusetts, pg. 1311


44. Willis, Jill. Best, Best & Krieger. "Water Quality & California's Bay-Delta", PA 620: Lecture 5/18/05
