Status of GWMP

Att3_LGA12_MCCSD_GWMP_1of3

GROUNDWATER MANAGEMENT PLAN DEVELOPMENT BACKGROUND

Groundwater is the primary water supply for the Town of Mendocino. Approximately 400 individual wells are used to supply both commercial and domestic water usage from an area of approximately one square mile (Figure 1). Well depths typically range between 40 to 200 feet, with most new wells in the range of 100 to 150 feet. A few older wells are as shallow as 20 to 25 feet. Mendocino wells are completed in the unconfined Mendocino Headlands Aquifer, and well yields range from less than 1 gpm to over 25 gpm. Because of these low yields, most properties employ storage tanks and the community, through the MCCSD, has implemented significant water conservation measures. Even so, some wells run dry in the late fall months, especially in drier than normal years; water is trucked in to replenish storage tanks at several properties on a regular basis in the fall, and the practice is more widespread during periods of drought.

Due to the annual shortage of groundwater in the Town of Mendocino, the Mendocino City Community Services District (MCCSD) unanimously approved a Groundwater Management Policy statement on December 22, 1987 (Appendix A, page 4) to take action to establish a Groundwater Management Plan (GWMP). Twenty-one months prior to this policy approval, on March 1, 1986, the MCCSD Board started a multiyear process to develop a GWMP. Community and stakeholder involvement played a significant role in the final development of the GWMP.

MCCSD conducted a "Water Survey" to assist the Board to develop a GWMP. That same month, the Mendocino Beacon published a series of articles regarding water resources issues in Mendocino. On October 31, 1986, twelve agencies that were similar in size to MCCSD were surveyed about their water systems, conservation measures, and any water use plan they had in effect. A Special Meeting was held on April 7, 1987 to initiate the formation of a Citizens Advisory Committee (CAC) to assist in the development of the GWMP. On December 8, 1987 a Public Hearing was held to discuss the Groundwater Management Program. GWMP information compiled by the CAC and the District's planning consultant were used in the September 1, 1988 "Town of Mendocino Groundwater Management Plan" report prepared by the planner. The report reviewed local groundwater conditions and made recommendations that were later included in the final GWMP.

Prior to the adoption of the GWMP, MCCSD received support from a number of agencies for the development of the Plan. From 1987 to 1990, letters of support were received by the District for development of the GWMP from the California Department of Health Services (Appendix A, page 2), the Mendocino County Flood Control and Water Conservation District, and the Mendocino County Water Agency. On January 2, 1990, the Mendocino County Board of Supervisors adopted a minute order authorizing MCCSD to develop a groundwater extraction ordinance (Appendix A, page 5). A Memorandum of Understanding (Appendix A, MOU 90-113, page 6) was approved between the Mendocino County Department of Public Health and the MCCSD authorizing the District to regulate groundwater extraction within its boundaries. The Mendocino County Water Agency acceded to MCCSD the authority to develop a GWMP and to regulate groundwater extraction in the District on January 4, 1990 (Appendix A, page 8).

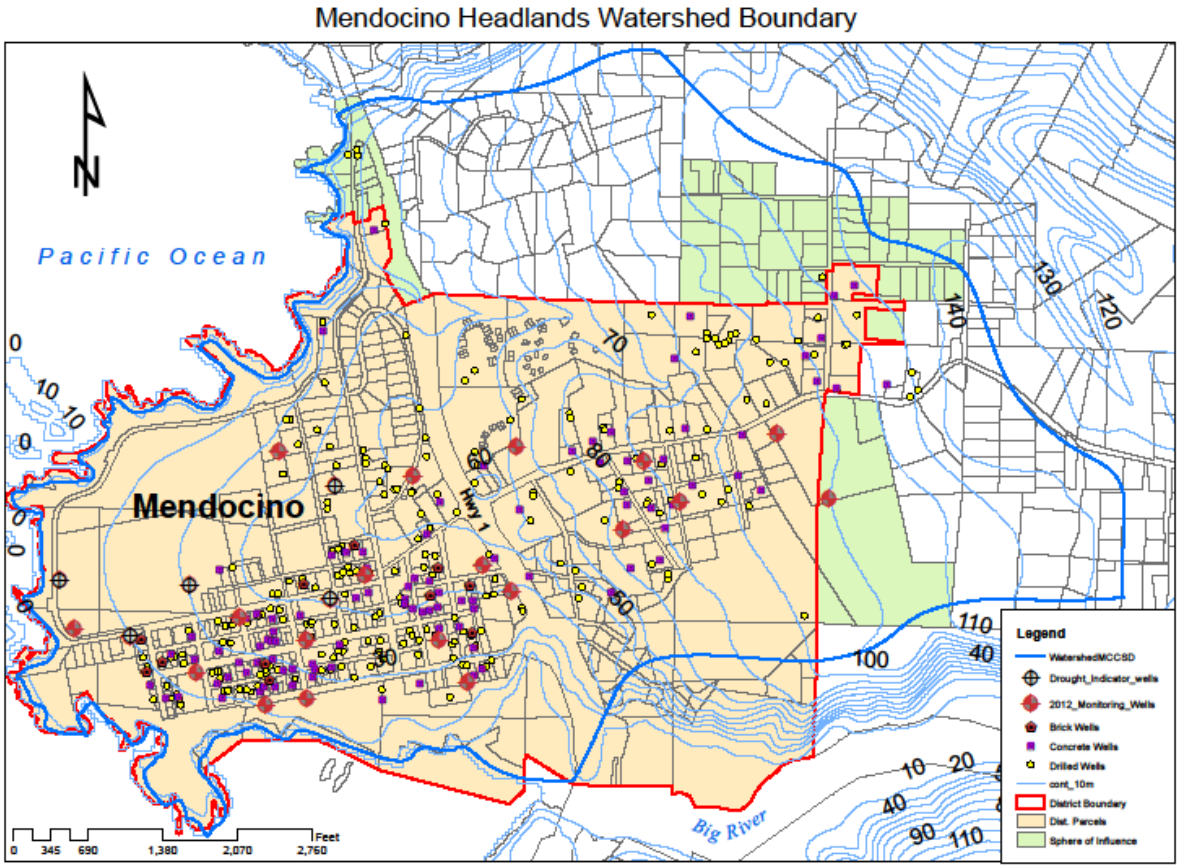

Figure 1 Mendocino Well Locations and Watershed Boundary

AUTHORITY TO ESTABLISH A GWMP

In 1987, the California Legislature enacted Water Code Section 10700–10717, as outlined in Assembly Bill No. 786, which provided the authority for MCCSD to establish programs for the management of groundwater resources within the District boundaries.

In 1990, the District assumed responsibility for groundwater management from Mendocino County, as authorized by AB 786. MCCSD entered into an agreement with the County of Mendocino Public Health Department to regulate groundwater extraction within the District's boundaries in accordance with Water Code Sections 10700–10717 and Mendocino County BOS Agreement No. 90-113 (Appendix A, page 6). The County Health Department had previously enforced the groundwater extraction provisions of Policy 4.13-16, in the Mendocino Town Plan.

ADOPTION OF THE GWMP

On January 9, 1990 MCCSD adopted a Resolution of Intention, Resolution No. 113 (Appendix A, page 10), to adopt the Groundwater Management Plan, which was Groundwater Extraction Permit Ordinance

90-1. On February 26, 1990 the District Board of Directors voted in favor of Groundwater Extraction Permit Ordinance 90-1.

The adoption of the Groundwater Management Plan by MCCSD followed the procedures outlined in AB786 (CWC Section 10700-10717):

1. **1/9/90** A Public Hearing was held to review the GWMP ordinance. A Resolution of Intent was adopted (Appendix A, Resolution 113, page 10) to adopt and implement a Groundwater Extraction Permit Ordinance.
2. **1/29/90** A second Public Hearing was held to introduce Ordinance 90-1, the Groundwater Extraction Permit Ordinance.
3. **2/26/90** Ordinance 90-1 was adopted (Ord. 90-1 cover and signature pages, Appendix A, page 11). The ordinance went into effect 35-days later.

There have been six amendments to the original ordinance: 91-3, 92-2, 00-1, 01-1, 04-1, and 07-1. The Board of Directors amended the current Groundwater Extraction Permit Ordinance, 07-1, on January 29, 2007 (Ord. 07-1 cover and signature pages, Appendix A, page 13).

ADDITIONAL GROUNDWATER MANAGEMENT PLAN PROGRAMS

The initial Groundwater Management Plan Ordinance 90-1 focused on regulating groundwater extraction to prevent aquifer overdraft. Since the 1990 GWMP ordinance adoption, new components and additional groundwater management programs have been added to the GWMP: 1) the Water Recycling Program, 2) the Water Conservation Program, 3) Groundwater Monitoring Program, 4) the Data Management Program, and 5) Water Shortage Contingency Plan.

1. Water Recycling Programs

MCCSD and Mendocino Unified School District approved a Memorandum of Understanding and Joint Resolution 97-1 (Appendix A, pages 15-17) at the regular Board of Directors meeting on February 24, 1997 to commit the necessary capital for the water recycling project. The regulatory requirements for the new water reclamation system were approved on August 27, 1997 when the California Regional Water Quality Control Board North Coast Region, after consulting with and receiving the recommendations of the State Department of Health Services, signed Order No. 97-66. Water Reclamation Requirements Order No. 97-66 outlined the provisions and limitations of the MCCSD and MUSD joint water reclamation system. Following adoption of Order 97-66, the original 1977 water reclamation order, that was approved by the Regional Water Board on June 23, 1977, was rescinded.

The intent of the Water Recycling Program is to irrigate the high school's athletic fields. The District's future plans are to expand the system to include: 1) a recycled water fire hydrant system (there is currently no fire protection system for the Town), 2) irrigation systems for the grammar and middle schools and Friendship Park. The residents and businesses are very supportive of this program, and the obvious benefit of the program is the improved field conditions. The unobserved benefit from the recycled system is reduced groundwater extraction from the local aquifer.

Approximately two million gallons per year of reused water has been used on the MHS athletic fields for irrigation since the new system was installed. Due to many field improvements and reclaimed water, the MHS soccer field is now considered one of the best in the conference. The new water recycling system now provides adequate irrigation to the High School athletic field for the first time in over 100

years. The Water Recycling System has been a very successful program. The fields are in excellent condition. Injuries caused by students playing on a hard dry field have been lowered, but most importantly, the use of recycled water has reduced groundwater extraction from the local aquifer.

2. Water Conservation Program:

This program stresses the need for voluntary water conservation. MCCSD has an ongoing policy to promote public awareness about the need for water conservation. Citizens Advisory Committees, press releases, surveys, informational letters to District residents and businesses, and a placard campaign have been used to promote water conservation. The Groundwater Extraction Permit section of the Groundwater Management Plan lists mandatory water conservation measures that are required for permit approvals.

The 1985 DWR Groundwater Study, which was published five years prior to MCCSD obtaining groundwater management authority, noted that Mendocino was already extremely conservative in its water use as compared with other north coast towns (an estimated 70 gpd per capita on average, as low as 45% to 76% of the water use in towns similarly situated). Conservative water use in Mendocino has helped extend Mendocino's groundwater supply.

The following recommendations (updated in part) were made by DWR-82 and hold continued relevance to any discussion of water conservation. DWR made recommendations in the study on how to reduce water consumption by 50%. Based on these recommendations, the District adopted its Water Conservation Program on February 25, 1991 (Appendix A, page 19). The District promotes water conservation by both voluntary water conservation education program and a mandatory water conservation requirement in the Groundwater Extraction Permit ordinance.

The water conservation recommendations and requirements that were outlined were intended to encourage habits of appropriate water use by residents and visitors. Water conservation was intended to forestall the drying of wells located in the District, and to help prevent depletion of the local aquifer.

Voluntary and mandatory water conservation efforts have been successful in Mendocino. Based on a 2011 Water Use Demand Review (Appendix A, page 20), water use in Mendocino was 42% of the expected water demand for the existing development in the community. The Water Conservation Program has helped reduce groundwater extraction and conserved the groundwater resource.

3. Groundwater Monitoring Program:

MCCSD initiated a Groundwater Monitoring Program in 1996. The original monitoring wells were selected for access and geographical distribution. A letter was sent to District property owners requesting authorization to monitor their wells to help determine aquifer conditions within the MCCSD boundaries. From the 35 property owners that responded, 16 wells were selected for monitoring. Over ½ of the wells were regularly pumped and were not static, so the groundwater level data from these wells was of little value.

In 2000, the District started monitoring the well field on a semi-monthly basis. Five of the 16 wells were static, 3 had occasional water use, and eight were regularly pumped. The pumped wells skewed the data by increasing the average depth to water, so these water level measurements were unusable for monitoring average changes in groundwater elevations. Dropping the regularly pumped wells reduced the well field to 7 wells, which left gaps in the aquifer monitoring data. The original monitoring well field was concentrated in the southwest section of the District where the major development in

Mendocino was located. Additional monitoring wells were needed to replace the pumped wells, and to improve the geographical distribution of the well field.

In order to augment knowledge of the existing groundwater regime, as well as to provide additional data for a numerical Mendocino Groundwater Model, ten new monitoring wells were drilled between September of 2002 and May of 2003. Installation of the monitoring wells was funded by a 2002 LGA Grant. The well field was extended to the eastern and western boundaries of the District. The placement of these wells expanded the areal distribution of the revised monitoring well field into all areas where MCCSD has groundwater management authority. Since 2002, groundwater elevation data that is representative of the Mendocino Headlands Aquifer has been monitored on a monthly basis (Figure 2).

Groundwater Monitoring Program data was used to establish the perennial yield of the aquifer and to develop the numeric groundwater model developed with funding from a DWR Local Groundwater Assistance Grant in 2002.

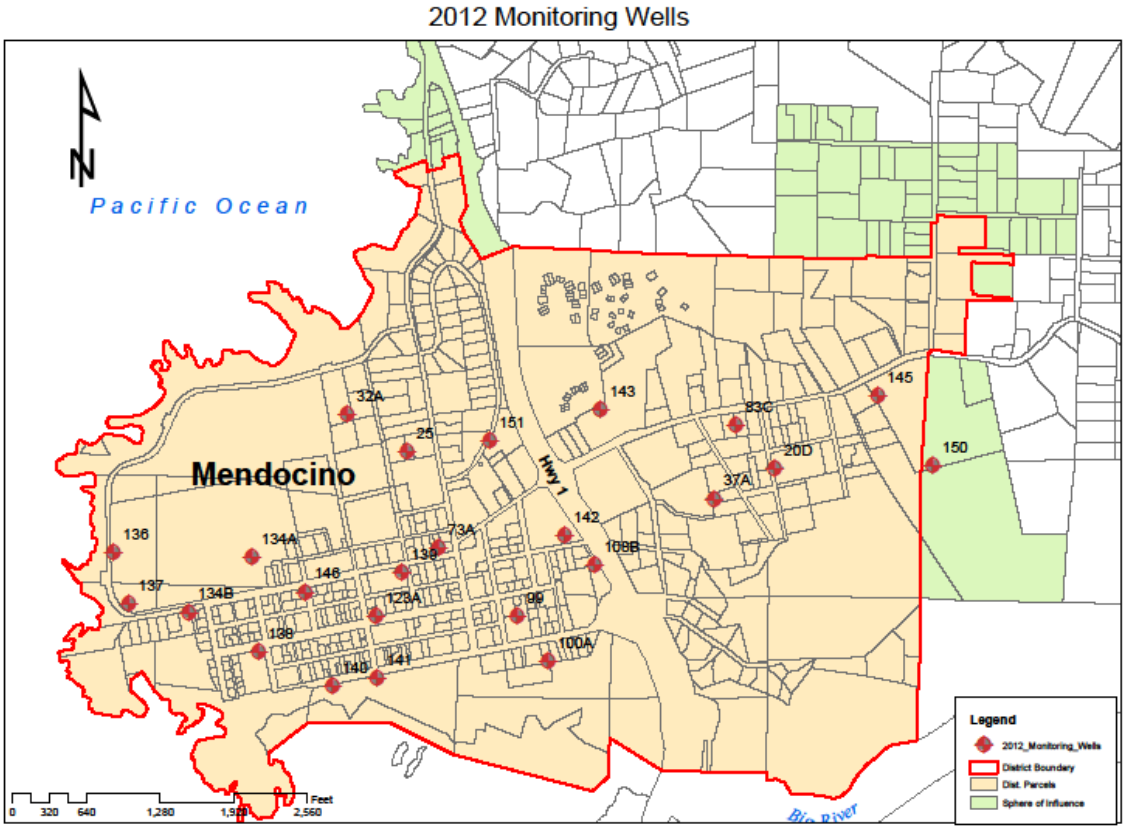

Figure 2 MCCSD Monitoring Well Field

4. Data Management Program:

MCCSD has been responsible for groundwater management within its boundaries since 1990. During that period of time, the District has collected a great deal of groundwater data from groundwater monitoring and aquifer testing. The District has also spent twenty-two years developing site specific administrative procedures for groundwater management (Ordinance 07-1, Appendix B, page 43).

The GWMP and Programs rely on groundwater data collection and data analysis to assist the Board of Directors in the groundwater management decision-making process. The 1988 draft of the "Town of Mendocino Groundwater Management Plan" recommended developing a Town-map with all available groundwater information. This map would serve as a foundation for groundwater management decision-making; administrative procedures would be supported by groundwater data. A mapping project with associated data analysis was envisioned as a method to generate a sophisticated model of the Mendocino's hydrogeology. The value of the mapping project was discussed on page 46 of the 1988 report:

> "Mapping Project—a map of the Town should be developed describing experience with water availability within the District. Sources include government studies and the personal reminiscences of townspeople. All available information should be compiled and plotted on the map. This map may serve as the basis for describing sub-districts within the District with differing historic and contemporary experiences with water availability. This conceptualization may give rise to a rational basis for distinctive policies within wet and dry districts and a basis for informing persons contemplating development within these districts. The more information that can be compiled and modeled the greater the foundation for later informed actions. Eventually, data collected through this map can be combined with meter collection data to generate sophisticated models of the Town's hydrogeology."

Since the adoption of the GWMP, the Geographic Information System (GIS) and numeric groundwater modeling has been developed as practical data-viewing and analysis tools. The MCCSD Board of Directors approved development of the District's GIS on September 24, 2001. Data sets were purchased from Mendocino County for a basic GIS. These layers consisted of road, watershed, aerial photos, parcel maps, and associated feature tables. The GIS was very limited, since the staff did not have the computer power or software to fully use this technology. In 2002, MCCSD was awarded a DWR Local Groundwater Assistance Grant to develop a usable Geographic Information System and a numeric model of the District's hydrogeology.

The new GIS contained the original county layers, local well data, and well locations. Part of the grant was used to develop a groundwater model using the U.S. Geological Survey developed model code MODFLOW to assist MCCSD in managing the groundwater resources for the Town of Mendocino. The "Groundwater Modeling Study of the Mendocino Headlands" final report was completed in May 2004. Other portions of the LGA Grant funded the development of the updated Groundwater Monitoring Program previously discussed, including the drilling and completion of ten new monitoring wells to supplement the existing monitoring well network.

The objective of the Mendocino Groundwater Model was to create a numerical model that MCCSD can use to help implement its groundwater management program. Model development combined the existing understanding of the Mendocino Headland hydrogeology from the DWR (1985) Study with recently collected data from the MCCSD. This existing data includes historic pump test results, new pump tests completed on the monitoring wells, a well water level canvass, and topographic survey information. The model development includes locating the saturated zones of the marine terrace deposits. Model calibration was based on groundwater elevation data collected by MCCSD from wells in the area. From the model results, an estimate of the perennial yield of the Mendocino Headlands Aquifer was developed.

The GIS and the groundwater model have assisted the District in developing a comprehensive view of Mendocino's groundwater conditions and availability, which were used to support subsequent groundwater management decisions. Through the improved groundwater Data Management Program, MCCSD now has the capability to calculate the perennial or safe yield of the Mendocino Headlands Aquifer to prevent depletion of the Town's groundwater resource. The MCCSD staff has compiled a sewer collection system GIS layer. This layer was used to develop no-drill buffer zone for new wells constructed in the District. The sewer collection system overlies the Town's aquifer, so setbacks from the sewer system are important for protection of groundwater quality.

5. Water Shortage Contingency Plan:

The Mendocino Groundwater Model was developed in 2002 with a LGA Grant. Based on below normal rainfall scenarios input into the 2002 Mendocino Groundwater Model, a new Water Shortage Contingency Plan was developed in 2006 for the Groundwater Management Plan again with a DWR LGA Grant. The various rainfall/recharge and water conservation scenarios for the Water Shortage Contingency Plan were based on typical drought year rainfall. The Model was modified to reflect current information on a parcel basis on land use and water demand. The Water Shortage Contingency Plan draft was completed in late August 2006 (Appendix B, page 78).

The District's hydrologists from Questa Engineering and ETIC Engineering produced the Mendocino Groundwater Model in 2002, and Questa Engineering and Kennedy/Jenks Consultants updated the Groundwater Model to develop the 2006 Water Shortage Contingency Plan. Groundwater level and rainfall data were added to the Mendocino Groundwater Model. Five numeric groundwater model scenarios were run: baseline average rainfall, 25% below normal rainfall, 40% below normal rainfall, historic drought (64% below normal rainfall), and a no rainfall year scenarios.

The Water Shortage Contingency Plan was based on the response of the Model to the 25%, 40%, and historic drought rainfall year runs. The Water Shortage Contingency Plan was prepared with a plan for serious and critical water shortages. The Plan included how to determine a groundwater shortfall, possible responses to a water supply shortage, a water shortage contingency plan with drought stage conditions and requirements, and an emergency water rationing plan.

Background research to develop the Plan involved reading through similar plans created for other small communities and water districts in Coastal California. The Department of Water Resources website was also consulted with requirements adopted from their own outline. The plan is useful for the following reasons: (1) It provides a strategy and specific response measures for different stages of drought; (2) As much as possible, it is scientifically based on the groundwater model runs; (3) It forecasts drought impacts, so that appropriate measures can be taken to curtail water use for overall protection of the groundwater supply for the community; (4) It estimates the financial impacts of drought to understand the consequences of wasteful practices, and establishes a program of voluntary and mandatory water conservation measures that were implemented after the Water Shortage Contingency Plan was reviewed and adopted by the District. Since the Town of Mendocino was entirely dependent on groundwater resources, this plan was essential.

More specifically, the Water Shortage Contingency Plan documents the drought history of the District, existing MCCSD groundwater management planning, and the water budget. An analysis of the water budget includes correlation of pumping demand and rainfall correlated from the groundwater model. This information and model data was used to determine the criteria for declaring four different drought stages with corresponding conservation efforts.

Critical to the plan was determination of drought stage based on both rainfall records and actual measurement of the water table in indicator wells. Five indicator wells were selected since pumping least influences them and they therefore best reflect hydrostatic water levels in the aquifer. An estimate of the minimum sustainable supply and procedures in the event of a catastrophic interruption are also documented. Finally, an economic impact analysis of drought was completed and was summarized in the plan.

The Water Shortage Contingency Plan was intended to promote water conservation and to monitor changes in groundwater storage. The first goal of the GWMP was to promote water conservation, and the Water Shortage Contingency Plan advances the District's efforts to conserve groundwater to protect the aquifer from overdraft. This Water Shortage Contingency Plan was a strategic way to manage future groundwater extraction and to plan for the next drought.

In addition to the Water Shortage Contingency Plan, a Water Shortage Emergency Ordinance draft was adopted. The new ordinance was developed to address both the need for the Board of the Mendocino City Community Services District to declare a water shortage emergency, and also to implement non-emergency water conservation measures. The Ordinance was based on a review of a number of Water Conservation Ordinances and Water Shortage Emergency Ordinances throughout California, but was specifically tailored to Mendocino's unique conditions. The District adopted both the Water Shortage Contingency Plan and the Water Shortage Emergency Ordinance in 2007.

2012 GWMP MISSION, GOALS AND OBJECTIVES

The 2012 GWMP Mission Statement encapsulates MCCSD's focus for implementation of its groundwater management activities.

GWMP MISSION

"To manage and protect the groundwater resources within the boundaries of the Mendocino City Community Services District for the common good of all present and potential users."

The 2012 GWMP and groundwater management programs (Appendix B) are designed and implemented to meet the Goals and Objectives of the GWMP. These goals and objectives are essential to manage Mendocino groundwater in a way that assures its long-term sustainability, reliability, and good quality.

2012 GWMP GOALS

- Promote water conservation
- Limit groundwater withdrawals to prevent aquifer overdraft
- Manage Mendocino's groundwater supply during drought
- Ensure groundwater quality is protected
- Develop groundwater management programs that serve as a foundation for groundwater management decision-making

2012 GWMP OBJECTIVES

1. Implement effective administrative procedures for groundwater extraction permitting
2. Develop a representative updatable numerical groundwater model to provide a comprehensive overview of Mendocino's hydrogeology

3. Regularly monitor groundwater elevations and quality in the Mendocino Headlands Aquifer
4. Conserve groundwater through Recycled Water and Water Conservation Programs
5. Utilize the Water Shortage Contingency Plan to help prevent aquifer depletion during drought conditions

The Groundwater Extraction Permit ordinance has helped prevent aquifer depletion and mandates water conservation. The Water Shortage Contingency Plan has been successfully used to limit groundwater withdrawals, and prevented serious declines in groundwater levels during two recent drought periods. Groundwater quality has been protected by identifying no-drill zones with the District's GIS. Current groundwater conditions are monitored on a regular basis to track changes in groundwater storage in the local aquifer.

2012 GWMP

The MCCSD GWMP (Appendix B) has evolved over a 26 year period. The District did not have a GWMP template for its development. Its initial development was made possible through the work of past MCCSD Directors, Citizens Advisory Committees, knowledgeable consultants, and dedicated volunteers. The adoption of AB 786 and the addition of CWC Section 10700-10717 in 1987 provided the statutory authority for MCCSD to manage Mendocino's groundwater resources. Groundwater Programs have been added over the last 22 years as new technology became available to improve the effectiveness of the GWMP. Much of what MCCSD has learned about the local groundwater environment was made possible through 2 DWR Local Groundwater Assistance Grants.

Since the 1990 GWMP ordinance adoption, new components and additional groundwater management programs have been added to the plan. Each of these programs was designed to meet the goals and objectives of the GWMP.

Groundwater extraction permitting limits groundwater pumping to sustainable levels. Through the permitting process, property owners are required to prove that they have adequate groundwater for new development, changes in use, and expansions of existing use, and that any increased extraction will not adversely affect nearby wells or the aquifer. Both mandatory and voluntary water conservation promotes water resource protection, and contributes to the prevention of aquifer depletion. MCCSD has a monitoring program that provides data that is representative of current aquifer conditions. The Water Shortage Contingency Plan provides a tool to plan for and manage future droughts.

Groundwater management decisions are now supported by a sophisticated groundwater model of the Mendocino Headlands Aquifer. The Mendocino Groundwater Model serves as a useful tool to evaluate potential future changes in groundwater quality. The Model allows the District to calculate and track the perennial yield of the aquifer, and to evaluate long-term trends in groundwater availability. The Model has given the District Board of Directors a comprehensive overview of Mendocino's hydrogeology, and has assisted them in their groundwater management decision making process.

The MCCSD 2012 GWMP, which relies on both effective administrative procedures for limiting groundwater withdrawals and sophisticated groundwater modeling to track groundwater availability and quality, will help protect the aquifer from overdraft, depletion, or water quality degradation in the future. It is a comprehensive plan that the District will continue to use to manage the groundwater resources in Mendocino "for the common good of all present and potential users".