

MEMORANDUM

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TO: Mt. Nebo Water Agency (MNWA)

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SUBJECT: Groundwater Management Program

PROJECT NO.: 399.03.200



The purpose of this memorandum is to outline a groundwater management program for the Mt. Nebo Water Agency (MNWA). The program includes data collection, groundwater modeling, and development of management alternatives that are reviewed by the Technical Committee and approved by the Board each year. The program facilitates more adaptive management based on annual aquifer conditions. Each step of the framework is described below with respective implementation costs.

BACKGROUND

MNWA is a coalition formed of water users at the government and community level in Southern Utah County to better manage groundwater supplies. It is an interlocal agreement aimed at sustaining the groundwater supply that will be impacted by future growth and other variables.

Several planning studies have been completed to understand current and future conditions and have proposed recommendations:

1. *Regional Water Supply Study*, Mt. Nebo Water Agency (HAL, 2019)
2. *Remaining Safe Yield Report*, CUWCD (HAL, 2020)
3. *Juab County and South Utah County Water Supply & Infrastructure Plan Formulation Project, Tasks 5 & 6 Technical Report – South County*, CUWCD (HAL, 2020)
4. *Juab County and Southern Utah County Water Supply and Infrastructure Plan Formulation Project*, CUWCD (Jacobs, 2021)
5. *Groundwater Management Program*, Mt. Nebo Water Agency (HAL, 2022)

The reliability of the future water supply is uncertain, as are the forecasted conditions in the study area. To combat this issue, a groundwater management plan has been recommended. The first step has been achieved with the development of a groundwater monitoring program and database for member agencies. Going forward, a management program is required to act on the data that are submitted.

The goal of the groundwater management program is to understand the condition of the aquifer and make subsequent decisions for best management by MNWA. It would determine the best use of the supply that limits long-term impacts to each MNWA member. The likelihood of a successful plan is increased by the fact a coalition of willing members already exists. Furthermore, the members of MNWA are the largest users of groundwater in the area and hold the majority of groundwater rights. Their combined efforts could protect the longtime groundwater supply.

External Variables

Future water supply and demand can be estimated but in the end are unknown. Many external variables could alter those estimates from the conditions projected in previous reports. Potential differences are further compounded by the size of the study area and the number of utilities participating. For this reason, it is best to implement a policy that allows for flexible groundwater management that can sustain the reliable supply.

Climate Change

The global climate is changing, and Utah is not immune. Future conditions will likely be warmer and wetter, bringing important changes in patterns of snow and rain, supply and demand, and irrigation and evapotranspiration. Wise water suppliers will inform themselves of these changes and plan accordingly.

Future Policy

An unknown variable that may impact the available supply of groundwater is future regulation. Regulations are difficult to predict and could affect water governance. Examples include legislation focused on limiting withdrawals or a change in development patterns for regions. Variability associated with this issue is important to consider and necessitates an adaptable management program.

Agriculture

Currently, Southern Utah County has a high percentage of agricultural land use. Both surface water and groundwater are used to irrigate. The amount of land originally assumed to be converted to municipal use may change. As more information is collected on agricultural water demands, it can better inform plans for groundwater management.

Water Banking (WestWater)

In 2021 MNWA received grant funding from the U.S. Bureau of Reclamation WaterSMART Water Marketing Strategy grant program to evaluate the feasibility of a water bank. WestWater Research was tasked with the work. The analysis showed that a formal water bank was not necessary for MNWA and that other exchange programs would be more impactful. The study found that most agricultural groundwater rights are senior to municipalities' water rights and that agricultural water use could hinder the ability of municipal systems to use their more junior water rights. It was suggested that Strawberry Project water used by the municipal systems be exchanged with agricultural users for reduced groundwater withdrawals.

Utah Division of Water Rights

Section 73-5-15 of the Utah Code gives the Utah Division of Water Rights (DWRi) authority to implement groundwater management plans for regions withdrawing more water than the safe

yield. The Statute also allows for a voluntary program to be implemented, such as what MNWA is doing. Important to note in 73-5-15 (4)(c)(iii): “The adoption of a voluntary arrangement ... by less than all of the water users in a groundwater basin does not affect the rights of water users who do not agree to the voluntary arrangement.” MNWA members are voluntarily participating in a groundwater management program to minimize risk. Participation from all aquifer users is encouraged but not enforced, and MNWA’s actions do not affect the nonparticipants.

Discussions with DWRi have indicated that DWRi does not need to be heavily involved with MNWA. There is no official endorsement or written approval from DWRi. MNWA will be able to facilitate the program but is still subject to a state-mandated groundwater management plan if withdrawals are deemed to exceed safe yield. The goal of the program is to mitigate this risk and avoid any potential limitations to existing water rights.

ANNUAL GROUNDWATER REVIEW FRAMEWORK

The proposed framework for the groundwater program is an adaptable approach informed by a yearly review of aquifer conditions. It will leverage the annual collection of data, modeling results, and collaboration with members. Efforts from the members and consultants ensure that the technical foundation is rigorous and properly informs future decisions. Furthermore, the framework allows for additional steps and analysis to be implemented over time, not restricting any opportunities for change. As new problems arise, they can be considered in planning attempts. The proposed framework is illustrated in Figure 1, and each step is described below.

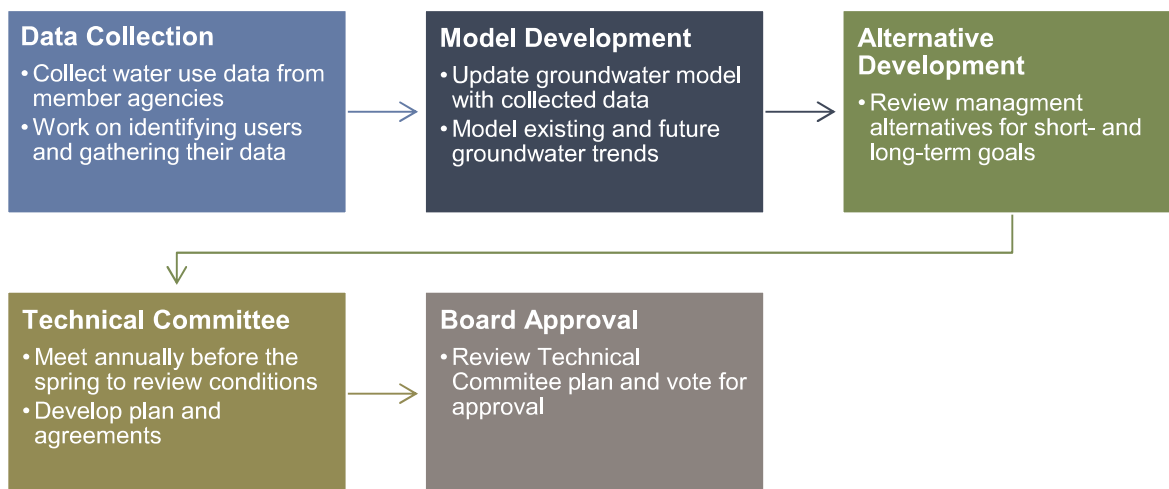


Figure 1: Annual Groundwater Review Framework

Data Collection

A groundwater database currently exists for MNWA. Members agreed to submit information monthly about their groundwater sources. The submitted data includes pumping rates, water production, and recorded groundwater levels. A database is essential for tracking trends in the aquifer and informing management decisions.

Previously, information was submitted manually by each member to a shared Google Sheet. The

database is now being modified to be part of Microsoft Suite. Monthly forms will be sent to each member. Responses will automatically populate the database and provide inputs for the groundwater model.

Throughout the year, additional groundwater users can be identified and invited to share information to the database. This effort can be an ongoing process that helps calibrate the model to best represent the aquifer.

Model Development

A groundwater model for Southern Utah County was developed in previous efforts. It was derived from a 3-dimensional MODFLOW simulation of South Utah and Goshen Valleys obtained from the U.S. Geological Survey. The model was modified with a variety of sources to represent current conditions (HAL, 2022). The latest instance used input from the MNWA groundwater database to model the groundwater levels. It was informative at showing areas of concern and current trends.

The model can predict groundwater levels throughout the region based on pumping trends. Regularly updated information from the database will help calibrate the model. Information from the database can show the long-term impacts of current pumping rates. Furthermore, different pumping scenarios can be simulated to identify the ability to meet future demands.

Model outputs on groundwater levels can guide annual management decisions. This approach is more proactive and offers confidence in the reliability of the groundwater supply. Additionally, it can track the safe yield of the aquifer and indicate if more stringent practices need to be implemented.

Alternative Development

Outputs from the model can be used to inform an annual groundwater management plan. The plan must be a collaborative effort that provides equitable solutions to each member.

Alternatives may differ each year and must be fluid for adaptive management. As more information is gathered, it can better inform alternative decisions. The following are examples of alternatives that can be explored to sustain groundwater supply:

1. Identifying large agricultural groundwater users and exchanging Strawberry Project water to reduce their groundwater withdrawal.
2. Prioritizing surface water use and development.
3. Adopting a supply-first (rather than demand-first) planning approach using water conservation programs that limit per capita water use to meet long-term safe yield.
4. Investigating the benefits of managed aquifer recharge.
5. Restricting groundwater withdrawals, on a rotation, for each member.

Exact solutions to such a difficult problem are hard to determine in the preliminary stages. The establishment of the program is the foundation to a solution and better long-term groundwater management. Alternatives can become more concrete in their application as conditions are better established.

Technical Committee

A key component of the program has been the formation of MNWA itself. There are increased

benefits to having both an existing Technical Committee and a Board that represents members in the region. The Technical Committee can review the information yearly and make informed recommendations for groundwater management.

It is proposed that the Technical Committee meet once a year in the spring, before irrigation season, to review the database and model results. That information can then inform possible alternatives that they wish to recommend for the year. The plan will be voted on by members of the Technical Committee and passed on to the Board for approval.

Board Approval

The final portion of the framework is obtaining approval from the Board. The Technical Committee will present the annual plan to be voted on by the Board. This provides a system of checks and balances to ensure decisions are made in the best interests of each MNWA member.

BUDGET NEEDS

A consultant's role is important to facilitate the program. They can act as a third party that provides data to aid in decision-making for the members. Their efforts can supplement the efforts of MNWA.

It is assumed that the consultant will participate in each portion of the groundwater management program. A summary of their roles is summarized below in Table 1.

Table 1: Consultant Roles

Program Component	Summary of Consultants' Role
Database Maintenance	Work with members to collect data monthly and manage the database. Help identify other large groundwater users in the area and work to gather information.
Model Development	Use groundwater database information to update and manage the groundwater model. Work to ensure that the most up-to-date information is included for other parameters (recharge, bedrock conditions, boundary conditions).
Alternative Development	Research groundwater management alternatives and present information to MNWA. Facilitate efforts and develop fair solutions to conserve water supply.
Technical Committee Assistance	Present information to the Technical Committee and work in the meetings to review data and develop annual plan.
Board Meeting Assistance	Aid in presenting information to the Board and addressing any comments or concerns.

Each component has an associated consultant cost. It is assumed that there will be some efforts from Technical Committee and Board members to participate in each portion of the program. Costs for the first year will be more to implement the program. After the program has been established, costs are anticipated to be less for subsequent years. A summary of the assumed costs is shown in Table 2. These values are subject to change based on future rates and assumed efforts as the plan is implemented.

Table 2: Estimated Annual Costs

Program Component	Estimated 1st Year Costs	Estimated 2nd Year and Beyond Costs
Database Maintenance	\$6,000	\$4,000
Model Development	\$18,000	\$14,000
Alternative Development	\$8,000	\$6,000
Total	\$32,000	\$24,000

The success of the program depends greatly on the continued involvement of MNWA members. It is assumed that member efforts currently spent on participating with MNWA will continue at a similar level and cost. Table 3 summarizes member roles in the proposed groundwater management program.

Table 3: Member Roles

Program Component	Summary of Members' Role
Database Maintenance	Submit monthly data for all water sources in a timely manner.
Model Development	Review model results and help provide input when necessary.
Alternative Development	Continually work to develop alternatives to best manage groundwater supplies.
Technical Committee Assistance	Be active participants in annual plan development and work towards long-term solutions.
Board Meeting Assistance	Participate and provide input and feedback as necessary.

PROPOSED ANNUAL SCHEDULE

The following schedule is recommended for the annual groundwater management program:

- **Monthly Throughout the Year:** Members submit groundwater data.
- **First Week of December:** Consultant checks the groundwater data for accuracy and completeness and begins to update the model with data from the year.
- **First Tuesday of March:** The Technical Committee meets with the consultant to review model results and assess the water supply forecast to begin developing alternatives.
- **First Tuesday of April:** Finalize groundwater management plan for the year and prepare for Board approval.
- **Second Week of May:** Technical committee presents annual groundwater management plan to the Board for final approval.

REFERENCES

Hansen, Allen & Luce (HAL). 2019. "Mt. Nebo Water Agency Regional Water Supply Study."

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