

POSSIBLE APPROACHES TO GROUNDWATER MANAGEMENT IN THE NORTHERN SACRAMENTO VALLEY

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PERCEPTIONS ABOUT GROUNDWATER MANAGEMENT

For some in the Sacramento Valley, the thought of groundwater management conjures up visions of a large, costly government bureaucracy that tells private landowners what they can and cannot do with their groundwater. They have concerns that broad government policies fail to recognize local conditions and will fail to manage the resource effectively. Ultimately, they have little confidence that groundwater management can be achieved successfully.

In contrast, another sector of people have seriously considered groundwater management for a number of years. They recognize that long ago California Water Code (§102) established that all water, including groundwater, is the property of the people of the state and the right is not one of absolute ownership but merely the opportunity or right to use the water within certain limits. To them, implementing effective groundwater management is critical to sustain their right to use groundwater in perpetuity.

Still others do not have any concept of groundwater management at all. They simply trust that enough groundwater will be available for as long as needed and at an affordable cost.

These different perceptions illustrate that managing the groundwater resource is a complex matter of educational, political, legal, and technical issues. This article examines some basic concepts of groundwater management and explores different forms of management. One approach the “Basin Management Objectives (BMO) Method of Groundwater Management” is highlighted as one tangible means of implementing groundwater management.

THE BASICS OF GROUNDWATER MANAGEMENT

Groundwater management refers to protecting the groundwater resource in a defined groundwater basin or geographical area. Groundwater management works best on a local level because the hydrogeology is site specific (refer to newsletter articles #1 and #2 in this informational series). Figure 1 outlines four basic steps that are necessary to implement groundwater management. Groundwater management also involves long-term planning.

Four Basic Steps to Implement Groundwater Management:

- Monitoring
- Evaluation of Data
- Adaptive Management
- Enforcement

Figure 1. Four basic steps to groundwater management.

FORMS OF GROUNDWATER MANAGEMENT

Groundwater management can take various forms ranging from adjudication, special act districts or agencies, AB 3030 groundwater management plans, and local ordinances.

Legally adjudicated basins are court orders that specify how much groundwater each landowner is entitled to beneficially use. Special districts are established by state legislation enabling local authorities to govern the number of wells constructed and volume of groundwater extracted. Usually neither adjudication nor special act districts are preferred forms of groundwater management because they are relatively inflexible and are not necessarily founded upon principles of local management.

LOCAL GROUNDWATER ORDINANCES AND AB 3030 GROUNDWATER PLANS

As alternatives to adjudication and special districts, numerous water districts and agencies, and some counties have developed AB 3030 groundwater management plans in the northern Sacramento Valley and many counties have adopted Local Groundwater Ordinances.

The AB 3030 groundwater management planning process is the result of state legislation enacted in 1992 (Water Code §10750) and more recent legislation (SB 1938) that was enacted into law in 2002 to clarify the original law. The AB 3030 planning process encourages local groundwater management planning to assess the current status of the groundwater resource and to define long-term management goals and a strategy to achieve them. Plans are aimed at developing local oversight of the groundwater resource. Some key requirements of AB 3030 plans include defining Basin Management Objectives (BMO's); describing how all local entities will work cooperatively to share the same groundwater basin; and implementing monitoring protocols to detect changes in groundwater levels, groundwater quality, and land subsidence.

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Other forms of groundwater management with clear policing authority such as local groundwater ordinances, special districts, and even adjudication are better suited to manage crisis than AB 3030 planning.

A local ordinance utilizes the police power of the county to manage the extraction of groundwater. To date, most local ordinances regulate water transfers but do little to understand and manage the groundwater resource as a whole.

While local groundwater ordinances are used in the northern Sacramento Valley Counties, there are important differences among them. All of the ordinances share a concern in regulating water transfers. Many of them require a permit before groundwater can be transferred. In contrast, one local ordinance recognizes that water transfers are important but it also recognizes that growth, changing land and water uses, and surface water supply reliability influence the long-term sustainability of groundwater.

Glenn County Groundwater Ordinance No. 1115 adopted in August of 2000 engages the broader concept of groundwater management rather than just regulating water transfers. The Tehama County Coordinated Groundwater Management Plan exemplifies an AB 3030 groundwater plan that also engages the broader concept of groundwater management. These are two examples that recognize that groundwater management applied in its full context will effectively regulate water transfers and other factors affecting the groundwater resource. Whereas, groundwater regulation specifically focused on water transfers may not necessarily protect the long-term sustainability of the groundwater resource. Embedded in the Glenn County Ordinance and the Tehama County AB 3030 plan is a concept sometimes referred to as the "Basin Management Objectives (BMO) Method of Groundwater Management".

WHAT ARE BASIN MANAGEMENT OBJECTIVES (BMO'S) AND HOW DO THEY WORK?

To begin with, the basin management objectives method (BMO) for groundwater management identifies what needs to be protected. When it comes to groundwater extraction, there are three primary elements to protect: 1) unacceptable depletion of the groundwater stored below the ground surface; 2) degradation of the groundwater quality; and 3) unacceptable levels of land subsidence. Land subsidence is the lowering of the ground surface when too much groundwater extraction occurs. Land subsidence can damage infrastructures such as canals, wells, and levees.

Other important features of the BMO method is that it is flexible to change as knowledge is gained and it is purposely designed to enable local management. The larger groundwater basin is sub-divided according to local communities (or into sub-areas). Figure 1 illustrates how the groundwater basin underlying the valley floor in the eastern half of Glenn County has been divided into 17 sub-areas representing various local communities. The number of sub-areas is flexible and based upon local considerations. Some factors that have influenced the establishment of these sub-area boundaries include: surface water district boundaries; contiguous areas of land where groundwater is the sole source for irrigation; political boundaries such as supervisor districts; areas of similar cropping patterns and patterns of water use; and concentrated areas of domestic water use. Formation of sub-areas is limited to the valley floor because groundwater contained in fractured hardrock aquifer systems, typical of foothill and mountain regions, does not lend itself to this management approach.

Another key benefit of this approach is it allows for continuous public input by creating a Water Advisory Committee (WAC). This committee (WAC) advises the Board of Supervisors on groundwater management. The committee consists of citizens from each of these local communities or sub-areas. Citizens within each sub-area nominate a knowledgeable and willing representative. This person is appointed by the County Board of Supervisors to serve the committee. This person serves as liaison between their community and the WAC. Two important tasks that each WAC member fulfills is developing Basin Management Objectives (BMO's) for their respective community or sub-area and understanding the BMO's set for neighboring sub-areas. The premise for establishing a BMO is simple, each sub-area can set its own BMO's for one or more wells within the sub-area and

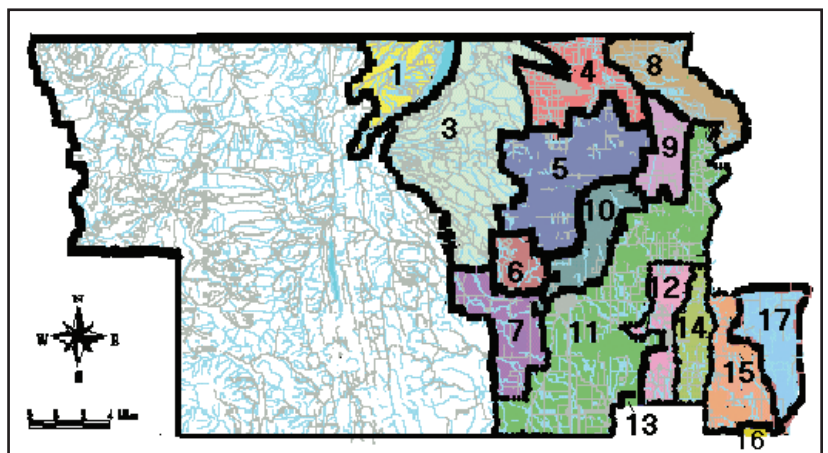


Figure 1. Illustration of local communities or subareas in Glenn County with specific Basin Management Objectives (BMO's).

pursue their specific groundwater management goals as long as it does not negatively impact neighboring sub-areas. Groundwater monitoring data will be the basis for setting the BMO and checking for compliance.

Figure 2 provides an example Basin Management Objective (BMO) for groundwater levels in one sub-area in Glenn County. This is just one of several wells in the sub-area where a BMO has been defined for groundwater levels. A BMO simply defines a threshold value for a specific well to determine whether water levels are within acceptable ranges.

In this example, the ground surface elevation is 164 feet above sea level. Over 25 years, the average fall surface water elevation is 128.7 feet above sea level or 35.3 feet below ground surface. A management action level has been established for this well to be 113.2 feet above sea level or 50.8 feet below ground surface. When groundwater levels exceed this BMO threshold, it signifies that fall groundwater levels have declined to levels that rank among the bottom one-third of the 25-year history. It increases the interest in future groundwater monitoring data to see whether groundwater levels continue to decline to levels never seen before or whether levels recover back to average or above average levels. If abnormally low groundwater levels continue, investigations will be undertaken to understand why the groundwater levels are in decline and how to correct it.

In this example, static groundwater levels in the fall were selected to establish a BMO for this well. In other circumstances, static spring groundwater levels, static summer groundwater levels, or summer pumping levels may be used. The choice of conditions when groundwater levels are measured and used to define a BMO is entirely dependent upon specific management goals within a sub-area. Readily available static, spring or fall groundwater levels have often been used to establish BMO's until a history of other types of data such as summer pumping levels has been developed. BMO thresholds can be established for water quality based upon measurement of electrical conductivity (ECw), pH, and temperature, and for land subsidence by using devices called extensometers or a grid of precisely surveyed land monuments.

Financing a groundwater management program is often a concern. In the Glenn County example, the Agricultural Commissioners office is the lead entity facilitating implementation of the ordinance. They provide part-time staff at little additional cost to the county. Personnel from other public entities such as Water Districts, Public Works, Environmental Health, Department of Water Resources, and UC Cooperative Extension, in addition to private entities and individuals support the process with voluntary and in-kind services. Obtaining competitive grant monies is another important aspect of financing the groundwater management program.

NEXT ISSUE

Because groundwater monitoring is critical to implementing the "BMO Method of Groundwater Management", the next issue of this informational series will discuss scientifically sound methods currently in use to monitor groundwater levels, groundwater quality, and land subsidence.

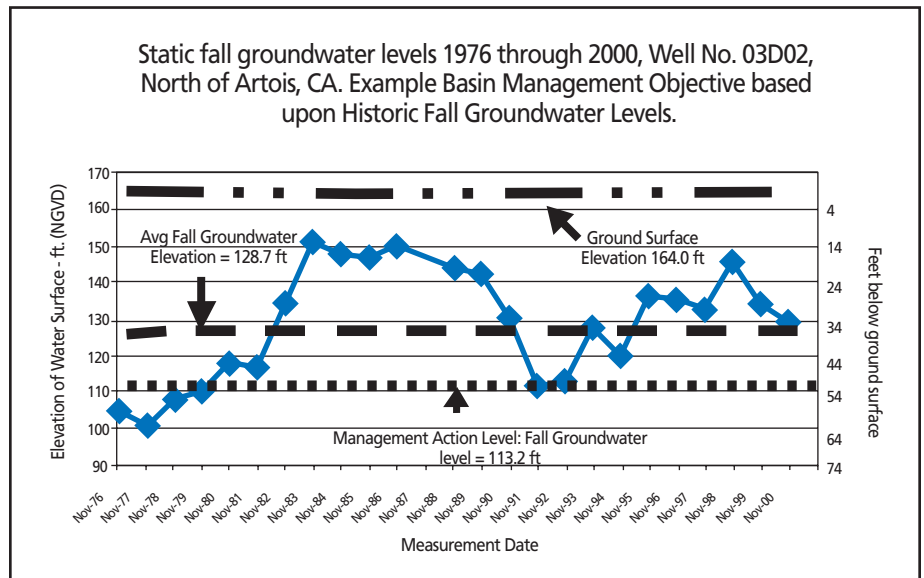
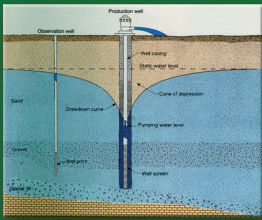


Figure 2. Example Basin Management Objective (BMO) for a specific well within a sub-area of Glenn County.



This newsletter is the third in a series of six discussing topics related to groundwater, water wells and pumping plants.



Possible Approaches to Groundwater Management in the Northern Sacramento Valley

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