

ISSUE 16: SUB-AREA MANAGEMENT

In the Tucson AMA, several limitations have been identified with basin-wide implementation of safe-yield. In the context of safe-yield as currently defined, some portions of the basin may be experiencing ongoing declines while water levels are rising elsewhere. Physical problems that may continue to occur include the following: groundwater quality problems, loss of riparian habitat, subsidence, inadequate water supply, and dropping water levels. An overlay approach that provides for additional management tools in specific regions of an AMA is being explored.

BACKGROUND

The management goal of the Tucson AMA is “safe-yield,” defined in the Groundwater Code as a long-term balance between groundwater withdrawals and natural and artificial recharge in an AMA. A.R.S. § 45-561. Achieving a “paper balance” between withdrawals of groundwater and recharge does not ensure that other water management objectives are met. For example, in Tucson’s central wellfield, if groundwater level declines continue, subsidence will be exacerbated, Tucson’s ability to prove physical availability of water for AWS purposes will be reduced, pumping and distribution costs will increase, and the riparian habitat in the Tanque Verde area may be damaged. These ongoing declines are permissible so long as they are offset elsewhere in the AMA under the current definition of safe yield.

The concept of sub-area management, (previously referred to as “critical area management”) has received substantial attention during the past several years. Water supply and demand conditions vary widely across the AMA, and some portions of the AMA are particularly sensitive to damages associated with dewatering the aquifer. There are very few tools available in the Groundwater Code to address specific sub-areas. The criteria for recovery of stored water outside the area of hydrologic impact in the management plans are the only current regulations designed to address local impacts; it is possible that well-spacing rules (which have not yet been promulgated) could address portions of this problem using current authorities.

SOLUTIONS CONSIDERED

The following ideas have been considered. Additional ideas may be added to this list.

- Change the AMA-wide management goal of safe-yield to a more specific goal, e.g.: “to reduce declining groundwater levels, while achieving, and thereafter maintaining, a long-term balance between AMA-wide withdrawals and recharge” or “sustainable yield” to encourage a recharge surplus rather than a balance between withdrawals and recharge. Sustainable yield, in this

context, would include a component to protect surface water flows, not just a groundwater balance.

- Require that safe-yield be achieved on a sub-basin, or portion of AMA basis in discrete areas of the AMA.
- The “overlay approach”, which retains the statutory safe-yield definition for the entire AMA, but would set goals for certain areas, perhaps to maintain or restore water table elevations in riparian areas, prevent or mitigate subsidence in others, or to contain groundwater contamination.

PRELIMINARY RECOMMENDATIONS

- **The overlay concept should be further developed. It should provide the necessary tools to allow the establishment of sub-areas within AMAs that would have specific restrictions, incentives and management goals. The sub-areas would be established in areas of concern where existing authorities to respond to the problems are generally found to be inadequate. The boundaries or criteria for the sub-area should be established through a public process that results in an amendment of the management plan.**
- **Boundaries could be mapped based on criteria such as: 1)intensity of groundwater pumping; 2) rate of decline; 3) sensitivity to drought or floods; 4)subsidence threat; 5) water quality problems; 6) presence of riparian vegetation or high groundwater levels that could support riparian vegetation; or 7) Indian settlement provisions, etc. The criteria could change over time as the severity of the management problem increases or decreases.**
- **In some cases, the sub-areas may overlap to address multiple issues. The array of management tools that would be available within sub-areas would be specified in the Code, but none of them would be implemented until they were formally adopted in the management plan. Ideas for special tools include either incentives or new restrictions. Incentives could include conservation or augmentation grants or tax credits. New restrictions could include: 1) limitations on conversions of irrigation grandfathered rights; 2) limitations on new exempt wells; 3) higher pump taxes; 4) required replenishment within the sub-area; 5) more stringent conservation requirements; or 6) more stringent recovery well criteria, etc.**

OBSERVATIONS

If there is a change in the AMA-wide goal, additional management tools will be needed to manage water levels and/or protect surface flows. The Santa Cruz AMA already has a management goal that addresses water level management, but the adequacy of the management approach taken in the Santa Cruz AMA would have to be evaluated in the context of the Tucson AMA. Changes in land use and population growth could make this approach very difficult to implement.

The overlay concept has been broadly supported, in part because it can be implemented without major institutional changes. However, equity concerns will be a major impediment unless there is a consensus that the selected approach is fair and reasonable. In order to avoid potential objections, sub-areas should be identified based on sound hydrologic principles. The Department should work with affected jurisdictions to encourage them to participate in the process of designating the sub-area and defining the management options. An economic analysis of costs and benefits to affected parties should be required, and sub-areas should not be created for the sole purpose of regulating an individual user or sector without their consent. If increased pump taxes are involved, there could be a requirement that the taxes be spent within or for the benefit of the sub-area. Regular review of physical conditions and regulatory standards and the opportunity for an appeals process would also be necessary.

2009 COMMENTS

Using the updated ADWR groundwater model for the TAMA determine which areas of the AMA are currently showing groundwater declines of greater than four feet per year.

Identify in which of those areas the problem will continue, worsen or improve. For example:

- is the pumping occurring in the service area of an undesignated provider where replenishment is taking place in an area that is not hydrologic ally connected? Does the provider plan to continue pumping for the foreseeable future? Will the over pumping continue?**
 - is the pumping occurring in an area that is planning infrastructure improvements that will improve the situation? Such as in Oro Valley where a direct delivery CAP system is being planned that will eliminate groundwater pumping except to meet peak demands? Will the problem improve?**
 - Are the declining water levels in a service area that plans to develop more land and pump more water? Will the problem worsen?**
 - Is groundwater pumping market driven where it may fluctuate with the market? Agricultural and Industrial uses may not be consistent from year to year.**
- What are best guess projections?**

Using data gathered from the exercise above determine true areas of declining groundwater levels.

Determine solutions for those areas. Possible solutions include:
Additional infrastructure for effluent
Additional infrastructure for CAGR deliveries
Additional recharge sites
Greater efficiencies by existing users

Develop other sources (water harvesting, graywater, stormwater catchments etc...)

Additional infrastructure for CAP or other renewable supply

When reasonable alternatives have been identified a modeler can be tasked with testing recommended scenarios with model runs to help identify the best course(s) of action to take.