

THE SECOND MANAGEMENT PLAN:
A MANAGEMENT STRATEGY FOR THE 1990s

by

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The Arizona Department of Water Resources is now entering the second phase of a five-phase process which is intended to eliminate overdraft of the groundwater supplies by the year 2025 in selected parts of the state. The majority of Arizona's water users are within regions of the state called "active management areas" (AMAs). It is within these four geographic areas that the conservation and augmentation efforts required by the 1980 Groundwater Management Act are focused.

The goal of the management efforts in the Prescott, Phoenix and Tucson AMAs is to achieve safe-yield, resulting in a balance between demand for groundwater and the average rate of replenishment. The Pinal AMA's goal as stated in the Code is less defined; it requires extending the agricultural economy for as long as possible while preserving groundwater supplies for non-irrigation uses. Groundwater depletions in the four areas have been ongoing since the 1940s, when agricultural water use expanded rapidly in central and southern Arizona. More recently, rapid urbanization has placed increasing demands on the state's groundwater supplies.

The primary tools that are available to the Department to control demand for groundwater are the Management Plans, which contain mandatory conservation requirements for most municipal, industrial and agricultural water users within the AMAs. Other tools include limitations on drilling new large wells, a prohibition on bringing new irrigated land into production, and a provision which precludes subdividing land in the absence of a 100 year assured water supply for the proposed development.

The First Management Plan (FMP) for the period 1980-1990 was adopted in December of 1984; its requirements were not enforceable until calendar year 1987. The FMP was an important first step towards the goal of safe yield, but was viewed in part as a vehicle to establish the management structure for subsequent plans. The data base available when the first plan was written was somewhat limited, since mandatory metering requirements went into effect the same year it was drafted. Since then, DWR staff have had significantly more opportunity to assemble water use data and analyze alternative conservation approaches.

Maximum Reasonable Conservation

In contrast to the First Management Plan, the conservation goals in the Second Management Plan have been deliberately designed to achieve the maximum reasonable level of conservation in all sectors. The Groundwater Code actually requires that requirements for the agricultural sector "assume the maximum conservation consistent with prudent long-term farm management practices." Industrial users are required to use the "latest commercially available conservation technology consistent with reasonable economic return." The language in the Code is less specific for municipal users than that for other sectors, but the approach used in setting the municipal targets incorporated the "maximum reasonable" concept.

DWR's strong conservation approach in the SMP reflects the Department's philosophy that establishing high expectations for conservation in the early years will make the safe yield goal more achievable. The majority of the water users who will be served in 2025 have not yet moved to Arizona. With one of the fastest growth rates in the country, it is important that DWR require new users to start out with low water use landscaping, low flow plumbing devices, and an understanding of the water management strategies that are appropriate for this area. It is far easier for social and economic reasons to build-in water conservation "from the ground up" than to expect significant retrofitting at a later date. Also, reductions in water demand in the early years will result in higher groundwater levels when the safe-yield goal is reached, since less water will have been removed from the aquifer. Higher groundwater levels relate to reduced pumping costs, better water quality, and reduced risk of subsidence.

Greater Degree of Specificity

The Second Management Plan (SMP) is far more detailed than the FMP for reasons in addition to the availability of a better data base. In order to eliminate problems that have been identified in the First Plan, the SMP is far more individually tailored, especially in the municipal program. For example, the FMP used an across-the-board percent reduction for all municipal providers whose 1980 water use rate exceeded 140 gallons per capita per day. The SMP contains target rates that are based on an individual analysis of the conservation potential of the approximately 100 large providers in the four AMAs. The conservation potential analysis required the development of a detailed data base for each provider, enabling disaggregation of residential-vs-non-residential, single-vs-multifamily, and interior-vs-exterior water use patterns in each service area. Water use projections for each sector enabled identification of new-vs-existing users. In each service area, conservation measures were selected which would be appropriate for implementation in the water use categories which were determined to have conservation potential.

There are several other examples of areas in which the SMP requirements have greater specificity than the FMP version. The requirements for turf and "other industries" are more tailored to the water use patterns of the affected facilities. In the agricultural sector, the program is laid out in a manner quite similar to that in the FMP, but the water allocations are based on an analysis that is far more detailed than the original version.

Effluent Use Incentives/Requirements

The FMP baseline assumed 100% of the effluent generated within the AMA would be reused by 1990. This assumption proved to be overly optimistic. In the SMP, it is assumed that 60% of the total effluent generated in the AMA will be used by 2000 (50,000 acre feet). This number has also generated questions about how realistic the effluent use projections are. In 1985, 11% of the effluent generated was being used.

In light of these concerns, stronger effluent use incentives have been built into the SMP, and for the first time, there are also effluent use requirements included. The draft plan is expected to undergo further revisions to expand the incentives for effluent use, but at present they include the following:*

Municipal

- o Effluent does not count against a municipal provider's gallons per capita per day target. This target is calculated by taking the total water withdrawn, diverted or received except effluent, and dividing this number by the population served.

Industrial

- o Turf facilities that use effluent are given an additional $\frac{1}{2}$ acre-foot per acre per year in their maximum annual water allotment
- o Effluent lakes on new golf courses are not limited in size, while potable water lakes are indirectly limited through the allotment
- o Turf facilities that experience technical difficulties associated with effluent use may apply for a modification of their allotment. In addition, a leaching allowance can be obtained as needed.

* Since this paper was presented, a 10% discount rate for effluent use has been added for agricultural users, and the turf application incentive in the Phoenix AMA has been increased to one acre-foot per acre per year.

- o Cooling towers (in excess of 250 tons of cooling capacity) are exempt from recycling requirements if they use effluent.
- o New large landscape users (in excess of 10,000 square feet of water-intensive vegetation) are exempt from acreage limitations if they use effluent.
- o Augmentation grant funds may be available to fund certain effluent-related projects.

In addition to the incentives listed above, new turf facilities built after 1990 must use effluent to serve at least 50% of their total annual water requirements after 1995. The incentive rate is set to encourage users to exceed the 50% requirement. Thus, those who exceed the 50% figure get 0.3 acre-feet per acre of effluent incentive, and those in excess of 90% effluent use get 0.5 acre-feet.

Sand and gravel and metal mining facilities are both required to evaluate the potential for effluent use.

Expanded Augmentation Program

The Augmentation Program that was contained in the FMP for Tucson related to a specific project, the Alamo Wash/Rillito Recharge Project. An amendment to the FMP document contained the rationale for development of this project, which is a multi-agency cooperative effort that is currently in the feasibility assessment phase. The Alamo/Rillito project was intended to demonstrate how urban floodflows could be safely charged into the aquifer. Effluent and CAP water may also be considered for recharge at that site.

The SMP Augmentation Program contains a complete assessment of five new sources of supply for the Tucson Basin, and evaluates the role of effluent use and artificial recharge as a storage mechanism. The evaluation is done on both a statewide and a local level for the following augmentation options:

- o Expanded utilization of CAP/Plan 6
- o Storm water runoff
- o Water transfers
- o Watershed management
- o Weather modification

In addition to this assessment of potential augmentation measures, the SMP develops goals and objectives for the TAMA, and defines the role the Department is likely to take in regional supply enhancement schemes. The chapter also establishes criteria for determining consistency with management plan goals to be used in evaluating underground storage and recovery projects. Finally, the SMP prescribes the development of an augmentation grants program to be allocated to entities that

intend to build augmentation projects and do planning and feasibility studies. The grants will be supported by the augmentation fees collected within TAMA.

Water Quality

The Code requires that DWR include, for the first time, a water quality assessment in the SMP. A program for water quality management is optional under the Code, but DWR is specifically directed to seek legislation that authorizes any new water quality management programs that are deemed to be necessary. The SMP water quality program includes an assessment of six major constituents found in groundwater. It was determined that the water quality management program could be achieved within existing authority given that primary responsibility for water quality protection rests with the Department of Environmental Quality.

The importance of water quality issues in the overall water management picture should not be underestimated. Use limitations associated with poor quality water may have a significant impact on the AMA's ability to achieve safe-yield and to demonstrate 100 year assured supplies.

The constituents that were evaluated as part of the assessment included the following:

- o Total dissolved solids
- o Sulfates
- o Nitrates
- o Metals
- o Pesticides
- o Volatile organic compounds

In general, it was found that groundwater quality in the Tucson AMA is excellent. Maps of the occurrence of these constituents have been included in the Plan. The groundwater management strategy proposed by the Department incorporates water quality considerations into rule packages that are presently being developed on the following subjects:

- o Assured water supply
- o Well construction and drillers licensing
- o Well spacing/impacts analysis
- o Groundwater withdrawal permits
- o Recharge and underground storage and recovery projects

In addition to this effort, the DWR has committed to an ongoing water quality assessment program and evaluation of incentives for the use of poor quality water.

Conservation Assistance

The Second Management Plan alludes to the Department's commitment to assist water users in meeting conservation requirements. It is anticipated that the Department will be very active in development of education materials and providing technical assistance to various water users. The program is presently being developed, but will definitely include several strategies. Sample conservation programs, demonstration projects and cooperative programs will be developed. Consultants may be engaged to provide detailed technical assistance to user groups. DWR staff will facilitate ongoing conservation activities through public presentations, interagency coordination, development of educational materials, and flexible compliance programs.

Conclusion

The Second Management Plan provides a comprehensive water management strategy for the 1990's. From the perspective of the Tucson AMA, a number of the limitations of the First Management Plan approach have been addressed through the use of a more comprehensive data base and a more tailored regulatory approach. Greater emphasis on "maximum reasonable" levels of conservation is complemented by a greatly expanded augmentation effort. The water quality considerations that are crucial to integrated, effective water policy have been identified. Finally, DWR has committed to an ongoing partnership with water users in achieving regional conservation goals.