

From: Kenneth Seasholes <seashole@ag.arizona.edu>
To: ADWR.GWIA("vlittle@ag.arizona.edu")
Date: 10/4/99 11:22AM
Subject: Sub-area management 'analysis'

Safe Yield Task Force member;

In a previous meeting of the sub-area management subcommittee, I mentioned the desirability of an issue analysis. I have taken a modest stab at this and posted two documents at <http://Ag.Arizona.Edu/~seashole/TAMA/>

The first document is a discussion of some of the problems that could arise from sub-area management. There are a few recommendations, but it is mostly my own ruminations. Many of the concerns have already been discussed in the meetings (and even incorporated into the current draft proposal), but I have tried to organize my thoughts more systematically.

The second document is a brief examination of each of the seven sub-area 'candidates' that has been circulating. I have included draft maps with each of the issues. Again, the summaries and maps are designed to organize some of the information, and are in no way 'definitive.'

These documents are not very profound, but my hope is that they will stimulate further discussion. Comments, questions and harsh rebukes are always welcome.

Ken.

Kenneth Seasholes	Phone: 520-792-9591 ext. 24
Senior Research Specialist	FAX: 520-792-8518
Water Resources Research Center	<http://ag.arizona.edu/AZWATER/>
College of Agriculture	see also...
The University of Arizona	<http://ag.arizona.edu/~seashole/>

Seasholes, October 1, 1999

Sub-Area Management: Opportunities and Limitations

Sub-area management (SAM) could represent an important change in the way Tucson area water resources are managed. Indeed, SAM may well be the most significant and broadly supported recommendation that comes out of the Task Force. However, there are potential pitfalls.

The purpose of this discussion is to stimulate discussion, and to refine the recommendations that are sent to the Statewide Task Force. The views expressed here are my own, obviously.

Opportunities for mischief

The greatest risk of implementing sub-area management is that it could be used as a pretext to undermine basin-wide management. The line of reasoning used to establish sub-areas (some parts of the AMA are "more responsible" for achieving safe yield than others) could easily be flipped on its head. For instance, areas which are not experiencing declining groundwater levels could argue that they should not be "forced" to meet stringent conservation or replenishment obligations. And even if there were no backsliding, a whole new front would open up for local water conflict--how much of the pain is concentrated in the sub-areas versus the basin as a whole.

For all of its flaws, the 1980 GMA contained some remarkably enlightened provisions. The Act created large, hydrologically-defined management areas that were intended to address long-term, regional water issues. Aside from being "hydrologically rational" (almost) the AMAs have the advantage of encompassing the major water use sectors, and not dividing populations. This has undoubtedly reduced conflict, and reinforced the notion that everyone within the AMA shares a common resource base. In reality we do *not* all share the same resource base, and not all areas within the AMAs are experiencing groundwater declines. But this small fiction has served a useful purpose.

As the recommendation for sub-area management is refined, the Safe Yield Task Force should consider concurrent measures which would restrict the ability to use SAM as a means of weakening existing basin-wide management.

Warm & fuzzy vs. harsh & punitive

As the concept of SAM is refined, competing visions of implementation emerge. On the one hand is SAM can be viewed as a tool to empower local areas. Residents and other stakeholders would work with the Department to set distinctive management goals for their area. Community input would be of paramount importance. The latest draft of the SAM proposal

downplays this vision, but vestiges remain.

A competing vision sees SAM as a powerful regulatory tool that has become necessary because of larger policy failures. The Tucson AMA may not achieve safe yield in 2025, and significant problems like subsidence are not being adequately addressed. Rectifying these critical problems will require drastic action. In this view SAM represents a fundamental shift in strategy, and only the most serious issues warrant this approach.

In making its final recommendations, the subcommittee and Task Force should be clear about the tone of its recommendation. Is SAM a modest proposal for enhancing local solutions to water issues, or is it significant new management tool that should be used sparingly?

Top-down vs. bottom-up

In subcommittee discussion the question arose as to whether a subarea could be established based on voluntary designation by stakeholders. What if, for instance, a group of landowners near a riparian area requested sub-area status? This top-down/bottom-up question is part of a larger discussion of how "active" the AMA should be, and the degree to which policy should be influenced by stakeholders.

In its overall water management efforts, the Department has attempted to balance the interests of all water-use sectors, and to ensure adequate public input. While this deference to users is important for establishing and maintaining consensus, it is occasionally at odds with long-term management goals.

It was noted that a "voluntarily defined" subarea would presumably be easier to establish. "Flexibility" is also an attribute associated with bottom-up initiatives. These considerations are particularly important when it is necessary to seek cooperation from stakeholders.

Defending "top-down" policies is neither easy nor popular. However, ADWR has the legal (and, arguably, moral) responsibility to manage groundwater for the long-term interests of the people of the state of Arizona. That responsibility translates into an obligation to establish uniform, rational and effective policies. In this view SAM boundaries should be based on rigorous, objective, and hydrologically necessary criteria. Allowing those outside of ADWR to actively shape SAM boundaries would appear to violate the concepts of both uniformity and objectivity.

The Task Force recommendations should be clear as to what the scope of sub-area management is. Is SAM strictly a TAMA/ADWR management tool? How are the criteria going to be selected? Is ADWR going to aggressively adopt SAM, or is it going to defer to others?

Equity

Equity is a contextual and highly subjective concept. Equity, or more precisely, perceived inequity, also happens to be at the core of many water-related conflicts. Compelling anecdotal evidence suggests that many of the current difficulties in the Tucson AMA have strong inter-sectoral and inter-generational equity components.

Some potential sub-area designations have the potential to exacerbate existing equity concerns. For instance, SAM based on declining groundwater levels would likely heavily affect both mining and municipal users, while several large irrigation districts would be exempt (based on incidental recharge from effluent discharge). It should be noted that these inequities could exist even though the sub-area designation itself was rational, rigorous, uniform, *et cetera*.

The subjective nature of equity substantially limits the ability to arrive at any "perfectly equitable" solution to a resource allocation problem. Indeed, the allocation of a scarce commodity is, by definition, a *political* act. The current allocation of costs and benefits is the result of both overt and subtle political accommodation. SAM can be used to nudge the momentum in one direction or another, but the current balance is quite fragile.

The recommendations regarding SAM need to be sensitive to any changes to the balance of burdens and benefits felt by water use sectors. To the degree that it is possible (and the requisite objective criteria are met) the designation of a sub-area should not result in substantial changes to the current allocation environment.

SAM, CAM, or PAM?

The issues and concerns discussed above argue for constrained implementation of sub-area management. While the term "critical area management" is problematic, it does convey the gravity of the underlying issues (perhaps "Problem Area Management," or...). Semantics aside, all parties advocating for sub-area management should acknowledge the serious potential negative consequences associated with SAM. That said, there are compelling arguments to be made on behalf of sub-area management.

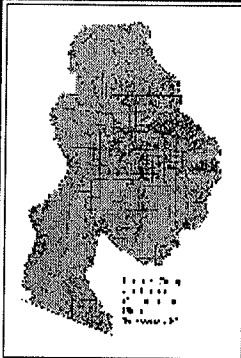
If ADWR is to make the case (to the legislature and others) for SAM, it must do so in a way that is airtight. "Trust us," "We will examine areas on a case-by-case basis," and "We will have a public review period" are statements which are unlikely to garner the support necessary to change the law. Instead, SAM must be presented as a critical tool that will be reserved for hydrologically defined problems where other options are clearly ineffective, inefficient or unavailable. In other words, sub-area management should stand or fall on its own merits,

rather than be tied to a sloppy and uncertain process.

From: Kenneth Seasholes; October 1, 1999

Proposed candidates for sub-area management

Note: the material here is intended for discussion purposes only. The order of issues is arbitrary. Click on images to enlarge. The usual disclaimers apply.



water quality

Goal: make better use of low quality water, and protect uncontaminated groundwater

Remedies:

- discourage adjacent pumping so contamination doesn't spread
- encourage use of poor quality water

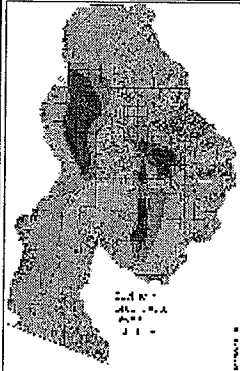
Data: moderate, many pollution sources are unknown.

Level of support/opposition: matching quality to usage is a nearly universally supported concept (e.g. reserving the highest quality water for domestic use, while using poor quality water for industrial uses). Improving low quality water and then using it for domestic purposes (à la TARP) is controversial, and currently prohibited for TW. Public health concerns, as well as potential fouling of high quality groundwater are concerns.

Discussion: encouraging the use of poor quality water could likely be achieved without a sub-area designation. ARS §45-515 describes conditions for issuance of a "poor quality groundwater withdrawal permit." Additional incentives and/or regulatory conditions could be applied to this type of well.

Discouraging adjacent pumping is a reasonable candidate for sub-area designation. However the number of potential candidate wells is probably small. Calculating the impact of pumping on the migration of pollution is difficult and subject to large errors.

Recommendation: consider alternatives to sub-area; refine notion of adjacent pumping



water levels/depth to water

Goal: keep levels from seriously declining to prevent higher costs, lower quality and subsidence

Remedies:

- discourage pumping in areas with declining gw levels
- encourage site-specific recharge

Data: Fair. Generalizations would have to be made based on spotty records.

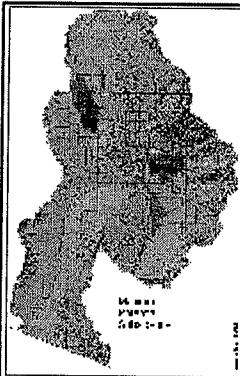
Level of support/opposition: There is broad concern over declining

groundwater levels. This is in keeping with the establishment of the AMA.

Discussion: A distinction would have to be made between declines in any particular well, and areas in which there are substantially declining groundwater levels. Rates of decline and time intervals would have to be specified.

Non-trivial equity issues arise due to both natural and incidental recharge. In addition, those benefitting from pumping may be remote from where the pumping occurs.

Recommendation: a good candidate, though tricky to implement



subsidence

Goal: keep us from sinking, cracking and otherwise falling apart

Remedies:

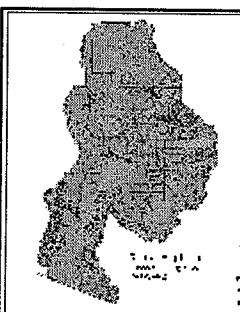
- discourage pumping in areas with declining gw levels
- encourage recharge

Data: Fair. Predictive models are of generally poor quality (both the rates of subsidence and the extent of impacts such as fissuring are subject to large estimation errors). Knowledge of subsurface geology is limited. Actual subsidence monitoring is greatly enhanced via differential GPS and remotely sense imagery.

Level of support/opposition: Subsidence is arguably the most serious negative consequence of groundwater overdraft, and as such there is broad support for mitigation efforts.

Discussion: Some equity issues are raised since those benefitting from pumping may be remote from where the pumping occurs. Boundaries are difficult to define and very slow to change.

Recommendation: a good candidate, though tricky to implement



riparian areas

Goal: keep what we have, and (perhaps) restore what we used to have

Remedies:

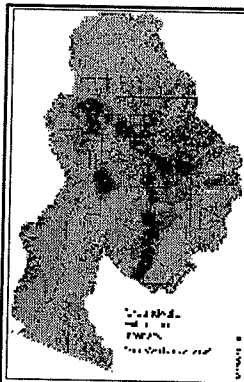
- discourage pumping near high quality riparian zones
- encourage restoration/renovation

Data: Good. May include some subjective criteria.

Level of support/opposition: Community support for riparian maintenance/restoration is broad, though only moderately deep (nearly everyone likes the idea, but are lukewarm on paying for it).

Discussion: A number of existing and planned projects are addressing aspects of this issue. This is a measure of the issue's relative importance, but it also begs whether sub-area designation is needed. Corrective measures may be burdensome (bringing in additional supplies and/or severely restricting pumping).

Recommendation: overall this good candidate for sub-area management



**pumping/withdrawals/
recharge/recovery/replenishment**

Goal: match up where extraction is occurring and where recharge should occur

Remedies:

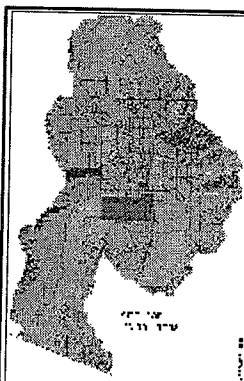
- discourage pumping in areas of high intensity pumping
- encourage recharge
- require replenishment in area of impact

Data: Fair to good.

Level of support/opposition: both moderate support and opposition. Issues tend to be obscure and technical, so interest group is relatively small.

Discussion: Several concepts are melded together here, but they share a "wet water" perspective. Other than lawyers, developers and a few ADWR staffers, "paper water" is widely disliked and poorly understood. Sub-areas based on groundwater extraction intensity (discussed *ad nauseam* previously) fall into this category.

Recommendation: promising candidate for sub-areas



Indian issues

Goal: recognize special circumstances regarding American Indian lands and water rights

Remedies:

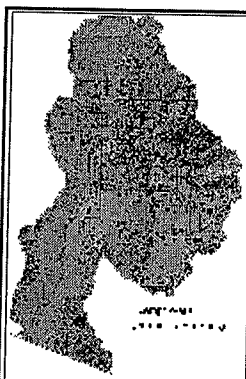
- create separate plans, *et cetera*

Data: Perfect.

Level of support/opposition: there is broad community support for dealing with Indian water issues in a way that acknowledges the (semi)sovereign status of tribal people. Opposition could arise if resources in question are viewed to be zero-summing.

Discussion: American Indian lands are already accounted for, and managed, somewhat differently by ADWR. Extending that distinction through sub-area designation could allow the Department to account for the uncertainty of Indian water use in a more systematic manner. However, the boundaries are not hydrologically defined, and the same effect could be achieved through categorical classification, rather than geographic classification.

Recommendation: consider categorical changes



lot splitting/exempt wells

Goal: increase equity between exempt pumpers and those with a replenishment obligation

Remedies:

- discourage new exempt wells
- regulate existing exempt wells

Data: None.

Level of support/opposition: Fierce opposition to any modification to exempt well regulations. The issue is "off the radar screen" for the public, though the underlying equity issues could resonate.

Discussion: There are substantial data limitations for all aspects of exempt wells. The Department does not know (and has made no reasonable effort to determine) such fundamental factors as the rate of abandonment, or average water use by exempt type. Nevertheless, the Department asserts that exempt wells account for "less than one percent" of TAMA pumping.

Exempt well issues can be dealt with categorically, rather than geographically.

Recommendation: fair to poor candidate for sub-area management. Data issues require attention.