

# RECOMMENDATIONS FOR METERING AGRICULTURAL WATER WITHDRAWALS IN GEORGIA

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*REFERENCE:* *Proceedings of the 2003 Georgia Water Resources Conference*, April 23-24, 2003, at the University of Georgia. Kathryn J. Hatcher, Editor, Institute of Ecology, University of Georgia, Athens, Georgia.

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**Abstract.** The purpose of this short document is to provide general recommendations for approaches to measuring agricultural irrigation withdrawals from surface and ground water resources for the state of Georgia. With over 20,000 permitted withdrawals already in place, this will not be a trivial task. Many of these recommendations have been incorporated into House Bill 237 which was introduced during the 2003 legislative session in Georgia.

## GENERAL RECOMMENDATIONS

The following recommendations are offered by a group of engineers and scientists who reside in the state of Georgia and have many years of experience with the measurement of agricultural water use. *These are consensus recommendations.* Although alternatives are suggested, they are not prioritized. The group did not necessarily agree when evaluating the “best” and “worst” alternatives for measuring agricultural withdrawals.

### Terminology

**Meter vs. Measuring Device.** Terminology used in language requiring measurement of agricultural withdrawals sometimes specifies “flow meters” (example: the authorizing legislation for Colorado specifies “flow meters”). We recommend that “measuring device” be used in Georgia’s enabling legislation, and in rules and regulations. This allows alternative devices to be considered when flow meters are excessively expensive, extremely difficult to install and maintain, and cannot be installed in an appropriate location to yield good quality data. Identifying “meters” as the only acceptable option

would greatly limit real and reasonable alternatives to achieving the same goal.

**Designated Agency.** We specify “designated agency” without recommendation as to which action agency or agencies should oversee agricultural water use measurement and collection of data from the measurement devices. We make no assumptions about the “designated agency” and realize that more than one agency may be considered due to the breadth of the specification, installation, monitoring, reporting, and data management activities. Any designated agency must have sufficient capable personnel to achieve the desired water measurement objectives.

### Enabling Legislation

Enabling legislation should be as flexible and simple as possible. For example, the current legislation authorizing water use measuring devices in Nebraska states: “It (the natural resources district) may require the installation of devices for measuring ground water withdrawals from water wells”.

### Rules and Regulations

The rules associated with implementing and enforcing measurement of agricultural water use should also be as simple and flexible as possible. The rules implementing water measurement, including cost-share directives, in Nebraska are minimal. Excessive details in the rules could limit flexibility for consideration of good measurement alternatives. It is our opinion that the designated agency should have flexibility to make changes and modifications to rules if operations do not work as originally intended, or if improved approaches are later identified.

## **Approaches to implementing a measurement program**

A staged approach could be used to implement a measurement program. Areas of the state that are deemed to have the most serious water issues should be measured first. One alternative is to implement the measurement program on a pilot scale (require a certain number of counties to have measuring devices installed within a specified period of time). Another alternative is to begin the installation of measurement devices in the saltwater intrusion impact area (first two tiers of counties along the coast). Since this area has a limited number of withdrawals, some of the challenges (that will almost certainly occur) in a new program could be worked out in a limited area, while obtaining beneficial information for a critical location. If additional sites are needed, several counties in southwest Georgia could be targeted for inclusion in the first installation phase.

A regionalized implementation process can allow the input and decision making to include local, concerned personnel. Regionalized approaches will likely have the best potential for success in the implementation process and data being collected. As problems are encountered in one area, modifications can be considered in other areas. If regions can use different criteria, more alternative measurement devices have the opportunity of being selected for use across the state.

Another alternative is to use a voluntary approach where a high level of cost share funds could be provided to those who volunteer in the first couple of years. The voluntary approach could help address problems with particular water measurement devices and installations. A voluntary approach should have a geographic and time limit to achieve water measurement goals in a particular location to eliminate scattering initial installations across the state (for logistical efficiency).

### **Measure all withdrawals or a percentage?**

It is the consensus opinion of the group that 100% of the agricultural withdrawals (current and future) should be measured. In some other states, the goal has been to achieve measurement of a percentage of the withdrawals (such as 90%). Ninety percent implementation is likely achievable, but the goal should be to measure 100% of the withdrawals. Without that goal, the current unknowns (how many withdrawals are there?) would continue to be a problem.

Given our recommendation that “all” withdrawals be measured, the next issue is “under what conditions can a

“major percentage” of the withdrawals be monitored”? An adjusted goal could be to measure all agricultural withdrawals as feasible by existing technology at some maximum cost (for example – \$2000 for purchase and installation). Then, plan to measure the remaining withdrawals as technology advances allow accurate, reliable, and cost-effective measurement.

### **What types of measuring devices should be required?**

Based on experiences of other states where measuring devices have been required and installed, propeller-type flow meters have a long history of operation and are sometimes designated as the only options to achieve the desired measurement criteria. Specific types and brands of propeller-type flow meters are required in some locations based on cost, reliability, operation, repair capability, etc. However, many other flow measurement approaches may meet the required reliability and quality constraints. Some alternatives may provide reliable results, be less expensive, have fewer moving parts, and require less maintenance when compared to propeller-type flow meters.

### **Quality Data and Maintenance Requirements**

The value of reported water use can be no better than the efforts made to assure quality of measurements. Under- or over-reporting caused by faulty devices or improper reading would fail to protect the permit holder’s usage rights. Inaccurate readings could mislead planning and action agencies, affecting their decisions or recommendations. A good “quality assurance” program is necessary.

Specifications should be provided for maintaining the quality of measuring devices. For most devices, recommended service intervals are known. Re-calibration would include physically removing the measuring device and testing as per manufacturers recommendations. For other devices, periodic checks of flow can be made with portable calibrated meters to determine if the measuring device is still operating within specifications. Regardless of the re-calibration schedule, a regular inspection/maintenance program is needed to spot failures or tampering. A well-designed maintenance program can reduce problems with inaccuracies in the measurement devices, and should be required by the designated agency.

### **Who should own the measuring devices?**

Two options are suggested. Landowners/tenants of the

permitted pumps and wells that will be measured can be required to purchase and own the devices. They and their suppliers would then be responsible for proper operation and replacement of failing devices. The state could provide cost-share for installation as well as for the measuring device to offset initial installation costs. We expect this approach would result in a variety of measuring devices, placing a burden on the responsible agency to become familiar with many brands and types of measuring devices.

Alternatively, a designated agency could purchase and own measurement devices, specify equipment criteria, as well as bid and determine quality needs for different devices. Using an agency that could select specific devices and purchase in volume would likely reduce the initial purchase price. This approach might also allow regional water management entities to use different criteria and measuring devices, thus allowing various manufacturers and/or vendors to participate in the statewide program. The agency could maintain their irrigation measuring devices and replace those that fail with their own recalibrated units. If accuracy is questioned, the designated agency would be required to check and replace faulty devices.

### **Measuring device placement**

It is our assumption that agricultural irrigation withdrawals from both ground and surface water resources will be measured at the point of withdrawal. In some cases, however, the amount withdrawn may be difficult to measure based on the condition of the site, the portability of a pumping system, or the existing plumbing. If a withdrawal location cannot be instrumented to the manufacturers specifications, we suggest that a water user be granted the option of obtaining measurements at other appropriate locations (such as on the irrigation system itself). If the rules are flexible, reasonable cost share amounts can be provided to meet those unusual conditions. The designated agency should be allowed the flexibility to make such decisions without having restrictive authorizing legislation.

### **Who will do the reading and reporting?**

Agricultural permit holders should be required to report based on similar reporting requirements associated with municipal and industrial permit holders. The question is whether the typical reporting frequency (yearly or semi-annually) would be acceptable for either private irrigation management or public policy use (consensus opinion). In

our opinion, individual reporting will not achieve the desired water management needs. To assure that accurate data are gathered and are widely accepted with confidence, we recommend that personnel associated with the designated agency be responsible for reading the measuring devices, and recording and reporting data.

### **How often should data be collected ?**

For most cases, annual water use data should be adequate for management of permits and potential water transfers. Operating and personnel costs would be minimized under an annual reporting system. There are risks involved. If a visit to a withdrawal site occurs only one time per year, there would be no reasonable approach to analyze and/or recover any water use data for that entire year, if the device failed.

An annual measurement program, however, would not address the question of “when” water is withdrawn. In areas where annual recharge of ground water occurs, timing of withdrawal could be as important as total amounts withdrawn. For example withdrawals made during drought or normal low flow periods may be the most critical need. In addition, water management, improved efficiency, and assessment of the impacts of improved management programs require water use data on a more frequent basis. Therefore, it is our recommendation that a random sample of installed measuring devices be monitored more often than once a year, but no more often than monthly. The size and distribution of a statistically valid sample should be specified by the designated agency in conjunction with the Environmental Protection Division of the Georgia Department of Natural Resources. Using a sample can help address the questions of when water is being used. This method could minimize personnel required to maintain and manage such a program.

### **Estimated Installation Costs**

Based on other states where measuring devices (in this case propeller-type flow meters) have been installed, the anticipated overall average cost of a meter and installation would be about \$1,000 per location. An average cost for a typical propeller-type flow meter will be about \$700 with installations costing about \$300. It is clear that some installations will be easy and low-cost, while others will cost more, depending on the particular site configuration.

**Personnel needs for the designated agency (or agencies)**

Sufficient personnel need to be funded and available to meet the needs of this program *prior to the initiation of data collection and reporting*. There must be sufficient numbers of trained and qualified personnel within the designated agency to: inspect installations, collect and maintain records, and conduct needed checks and calibrations. Otherwise, the potential to achieve reliable water measurements will be impaired. The planned timetable for installing the measuring devices should be consistent with realistic estimates of personnel availability within the designated agency. Required personnel should include those necessary for overseeing the purchase, installation, enforcement, maintenance, data collection, and data processing.