



## Agricultural Water Use Reporting

Two recent water use laws were passed in Michigan (PA 177 & PA 148). State water use reporting (PA 148) will be required by many farm operations. Complaints from small well owners against large well owners will be investigated by the state (PA 177). These public acts reflect change to the Natural Resources and Environmental Protection Act (NREPA) and fall under the enforcement provisions contained therein. A copy of the complete acts may be found at <http://www.michiganlegislature.org>.

Both acts use the like definitions for a “large capacity well.” Large capacity wells are those with the capacity to withdraw 100,000 gallons per day (70 gallons per minute) average in any consecutive 30-day period. The combined capacity of more than one well at a site which is 100,000 gallons or greater capacity per day (70 gallons per minute), also meets the large capacity well definition. Water use reporting will also include surface water withdraws with single or combined capacity of 100,000 gallons per day (70 gallons per minute) average in any consecutive 30-day period. All agricultural water uses (irrigation, cooling, animal, watering, etc.) will apply to these laws. Well pumping capacity is included in the well log available the local health department, well driller or at: <http://www.deq.state.mi.us/well-logs>

Act PA 148 will establish state-wide groundwater mapping and water use reporting. This law will create a groundwater resource map of the state and establish a groundwater advisory committee to direct groundwater protection efforts in the future. The MDA will assemble township-based reports annually and forward to the MDEQ. If a producer has a site that exceeds the 70 gallon/minute threshold capacity, then he must start collecting monthly water use data to file the annual water use reporting forms in January 2005. Many producers will receive a mailing asking them to declare whether they will file with MDA at no cost or pay the \$100 fee to file with MDEQ. Sample water use reporting forms along with information on method of estimating water use are available at: <http://www.msue.msu.edu/aoe/wtrqlty.html>

### **Large capacity water users will be required to report the following:**

- (a) amount and rate of water withdrawn on an annual/monthly basis in either gallons or acre inches,
- (b) type of crop irrigated, if applicable,
- (c) acreage of each irrigated crop, if applicable,
- (d) source or sources of the water supply,
- (e) if the water withdrawn is not used entirely for irrigation, the use or uses of the water being withdrawn.
- (f) if the source of water withdrawn is groundwater, the static water level of the aquifer or aquifers needs to be identified,
- (g) applicable water conservation practices and an implementation plan for those practices.

### **Estimating the producers' water use could be accomplished by several methods:**

pump capacity multiplied by run time: or fuel/power use per hour,  
flow meter: meters actual flow, note maintenance and calibration concerns,  
water application multiplied by # of applications, plus estimate of additional water use,  
Industry average numbers (Mid West Plan Service or ASAE) with appropriate adjustments (not appropriate for high variable water uses such as irrigation).

Conducted correctly any combination of these systems could produce estimates that meet the needs of the law. Producers need to evaluate their water use and devise a simple, low-cost, low-time input method, to accomplish the goal of the legislation that may improve the management of the operation. Most farm supply houses, greenhouse supply houses and irrigation supply houses carry flow meters and run time timers.

SEE ATTACHED WORKSHEETS

## Water application multiplied by # of applications,

This system require no additional equipment irrigators and maximize the use of irrigation record most irrigator already keep. Calendar records of applications to field are kept along with rate of application. The number of actual irrigated acre in the field are multiplied by the number of applications and rate.

Example- Joe farmer has a 160 acre field with 142 actual irrigated acres. He applied .75 inches of water at each application. One application was made in June and 3 during July and 3 in August.

Month	Number of Apps.	Rate in Inches	Irrigated acres	Water Use
June	1	.75	142	106.5 Acre inches.
July	3	.75	142	319.5 Acre inches.
August	3	.75	142	319.5 Acre inches.
Total				745.5 Acre inches.

1 acre inch = 27,154 gallons      (745.5 Acre inches ) 27,154 gallons = 20,243,307 gallons

Pump capacity multiplied by run time: or fuel/power use per hour

Many pumping systems are equipped with hour meters or run time timers. With an accurate estimate of pumping a producer can calculated water use.

Example- Larry has a pumping plant on the river. He monitors the hour meter to track maintenance needs and now water use. In Larry's pump owners manual he found that the pump should produce 550 gal/min. ( 33,000 gal/hr.) at 80 psi (his standard operating pressure). Larry checked this pumping capacity multiplied by his average run time to irrigate one inch water on a field (1" on 72 acre in 60hrs ) against the total irrigated gallon needed to apply an inch of water to that field and found the to be very close at (543 gal/min.).

1 acre inch (27,154 gallons) ( 72 acres.) = 1,955,088 gallons = (60 hrs.) (60min.) (543 gal/min)

During June Larry recorded 70 hours of run time in July 210 hour and in August 200 hours.

Month	Hours of run time.	Pumping Rate	Water Use
June	70	33,000 gal /hour	2,310,000 gallons
July	210	33,000 gal /hour	6,930,000 gallons
August	200	33,000 gal /hour	6,600,000 gallons
Total			15,840,000 gallons

**Flow meter:** Flow meters are mechanisms installed in or on the main distribution pipe of the water supply. The actual flow is measured by impeller or sonar. Flow meters have the advantage of simplicity meters and can be read monthly and recorded. The disadvantage to flow meters is cost and maintenance. To maintain accuracy meters need to be calibrated annually. Meters need to be installed in a straight section of pipe at a point in transport pipe that all water used must pass.

**Industry average numbers:** Industry average numbers are not appropriate for high variable water uses such as irrigation. Although it is very common to here people say corn needs about 6 inches of irrigation water per year actual usage varies greatly depending on the weather, (heat units and rain fall), soil water holding capacity and management.

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