

## Water – The Wisconsin Water Utility Numbers

During the last year the Public Service Commission (PSC) has made significant changes to the annual report containing the financial and operational data that the PSC uses to set rates for the municipal and investor owned water system of the state. At this time there are 583 utilities; 511 are municipal, 66 are sanitary districts and six are privately owned. These utilities are classified, with exceptions, based on the number of customers, with 71 reporting as Class AB (4,000 or more customers), 158 utilities reporting as Class C (1,000 and 3,999 customers), and 353 utilities reporting as Class D (less than 1,000 customers).

The following tables of averages are developed from the pumping statistic page in the 2001 - 2007 annual reports of municipal and sanitary district utilities. Because of changes in the 2008 annual report, the data doesn't match the categories in the tables, found below. Unmetered Utility Use, Unmetered Utility Defects, and Unmetered Nonutility Use are categories that account for known uses of water. Many of these uses are estimated when actual consumption is not known. Typical activities found in each category include, but are not limited to:

**Unmetered Utility Use** –Hydrant valve exercising, frozen lateral prevention, water treatment backwashing, water tower cleaning, well maintenance, sedimentation basin cleaning, booster pump cooling, meter test bench, water used for lubrication, water main testing, water quality testing, and main flushing.

**Unmetered Utility Defects** – Water main breaks, defective tank valves, distribution system leaks, customer meter under-registration, design flaws such as recirculated water around meter, tower overflows, and telemetry failure.

**Unmetered Nonutility Use** – Fire department training and fires, private fire protection sprinkler tests, vandalism, and theft.

<b>Statistics for an Average Class AB Water Utility (1,000 gallons)</b>							
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Water Pumped</b>	2,414,981	2,406,733	2,343,051	2,292,530	2,354,974	2,251,959	2,271,818
<b>Water Sold</b>	2,114,233	2,097,855	2,011,107	1,946,864	2,021,729	1,938,826	1,941,546
<b>Unmetered Utility Use</b>	58,622	55,790	51,117	58,870	56,135	64,306	61,233
<b>Unmetered Utility Defects</b>	37,043	24,139	20,138	60,506	31,364	28,891	28,501
<b>Unmetered Nonutility Use</b>	3,036	12,017	10,461	2,800	3,822	4,014	6,775
<b>Total Non Metered Use</b>	78,135	74,456	69,103	105,215	81,118	90,375	89,805
<b>Not Metered % of Sold</b>	3.70%	3.55%	3.44%	5.40%	4.01%	4.70%	4.63%
<b>Water Loss</b>	222,613	234,422	262,842	240,451	247,490	222,757	240,467
<b>Water Loss % of Pumped</b>	9.22%	9.74%	11.22%	10.49%	10.51%	9.90%	10.58%

**Statistics for an Average Class C Water Utility (1,000 gallons)**

	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Water Pumped</b>	240,600	240,030	236,972	233,252	246,788	237,146	239,638
<b>Water Sold</b>	203,574	203,070	199,935	196,879	209,872	199,502	204,589
<b>Unmetered Utility Use</b>	7,423	7,844	7,733	7,744	6,583	6,485	7,824
<b>Unmetered Utility Defects</b>	6,249	4,417	5,570	4,947	4,999	5,726	4,846
<b>Unmetered Nonutility Use</b>	1,141	1,470	1,034	1,167	1,361	2,658	1,548
<b>Total Non Metered Use</b>	10,898	10,630	11,230	11,427	10,540	11,647	11,779
<b>Not Metered % of Sold</b>	5.35%	5.23%	5.62%	5.80%	5.02%	5.84%	5.76%
<b>Water Loss</b>	26,128	26,330	25,807	24,945	26,376	25,997	23,270
<b>Water Loss % of Pumped</b>	10.86%	10.97%	10.89%	10.69%	10.69%	10.96%	9.71%

**Statistics for an Average Class D Water Utility (1,000 gallons)**

	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Water Pumped</b>	44,004	44,054	41,780	40,321	41,555	40,389	42,223
<b>Water Sold</b>	35,268	35,154	33,923	32,657	33,874	33,101	35,276
<b>Unmetered Utility Use</b>	1,536	1,801	1,499	1,538	1,252	1,244	1,208
<b>Unmetered Utility Defects</b>	1,609	1,333	1,479	1,415	1,730	1,363	1,353
<b>Unmetered Nonutility Use</b>	1,834	1,619	1,315	1,071	838	396	201
<b>Total Non Metered Use</b>	2,675	2,930	2,672	2,684	2,594	2,218	2,028
<b>Not Metered % of Sold</b>	7.58%	8.33%	7.88%	8.22%	7.66%	6.70%	5.75%
<b>Water Loss</b>	6,061	6,002	5,186	4,980	5,087	5,069	4,919
<b>Water Loss % of Pumped</b>	13.77%	13.62%	12.41%	12.35%	12.24%	12.55%	11.65%

The above tables show Class AB utility water loss has varied somewhat, going from 9.22% to 11.22% to 9.90% to 10.58%, Class C utility water loss was fairly steady until it dropped over 1 percentage point in 2007, and Class D water loss is trending downward, going from 13.77% to 11.65%. These three tables will no longer be displayed because of the annual report changes in 2008.

The following graphic provides some average data statistics based on those 2008 annual reports submitted at the time this article was written. These averages do not include the two Class A investor owned utilities, Superior Water, Light, and Power Company and Wisconsin Gas LLC.

**Average Statistics Annual Report for 2008**

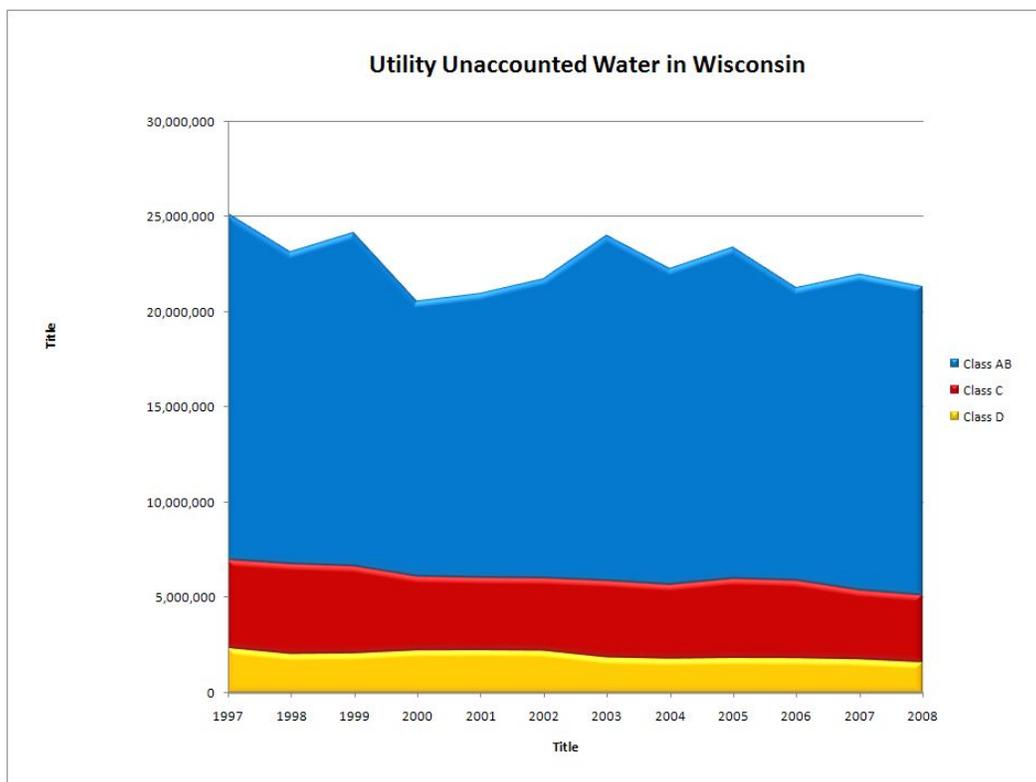
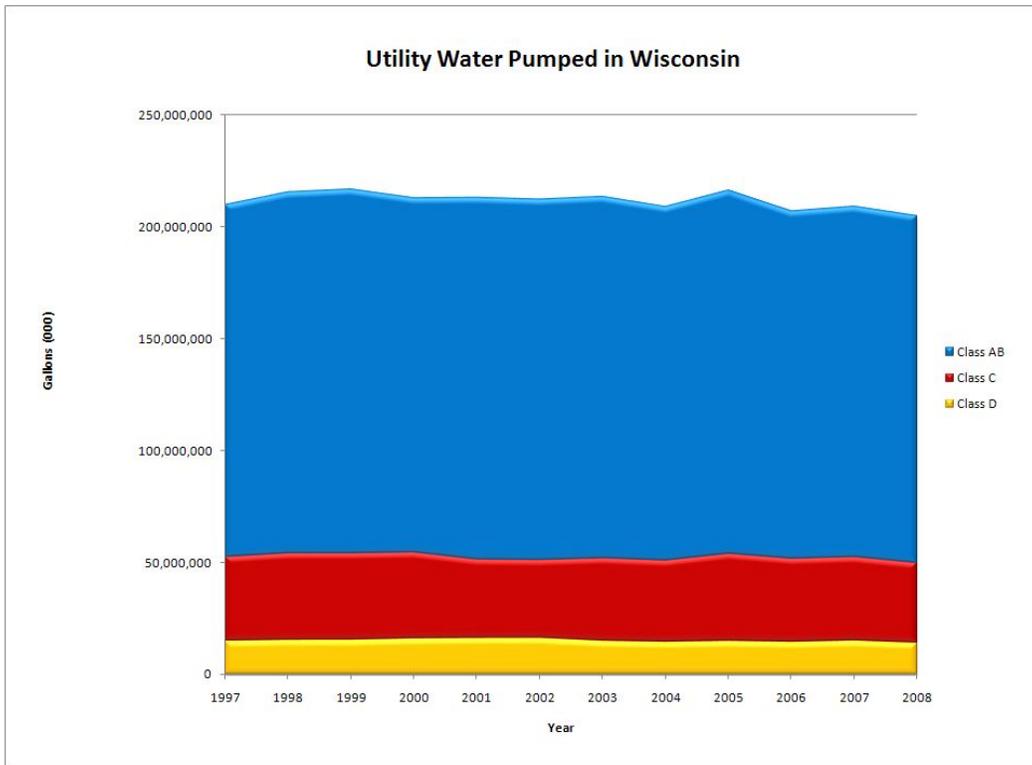
Row Labels	Count of Utility	Average of Total Pumped	Average of Treated	Average of Distribution	Average of Water Sold
AB	69	2,228,251	69,416	2,191,028	1,895,547
C	154	234,877	5,045	232,846	199,046
D	341	40,687	1,247	40,358	33,411
Grand Total	564	361,338	15,838	356,031	306,452

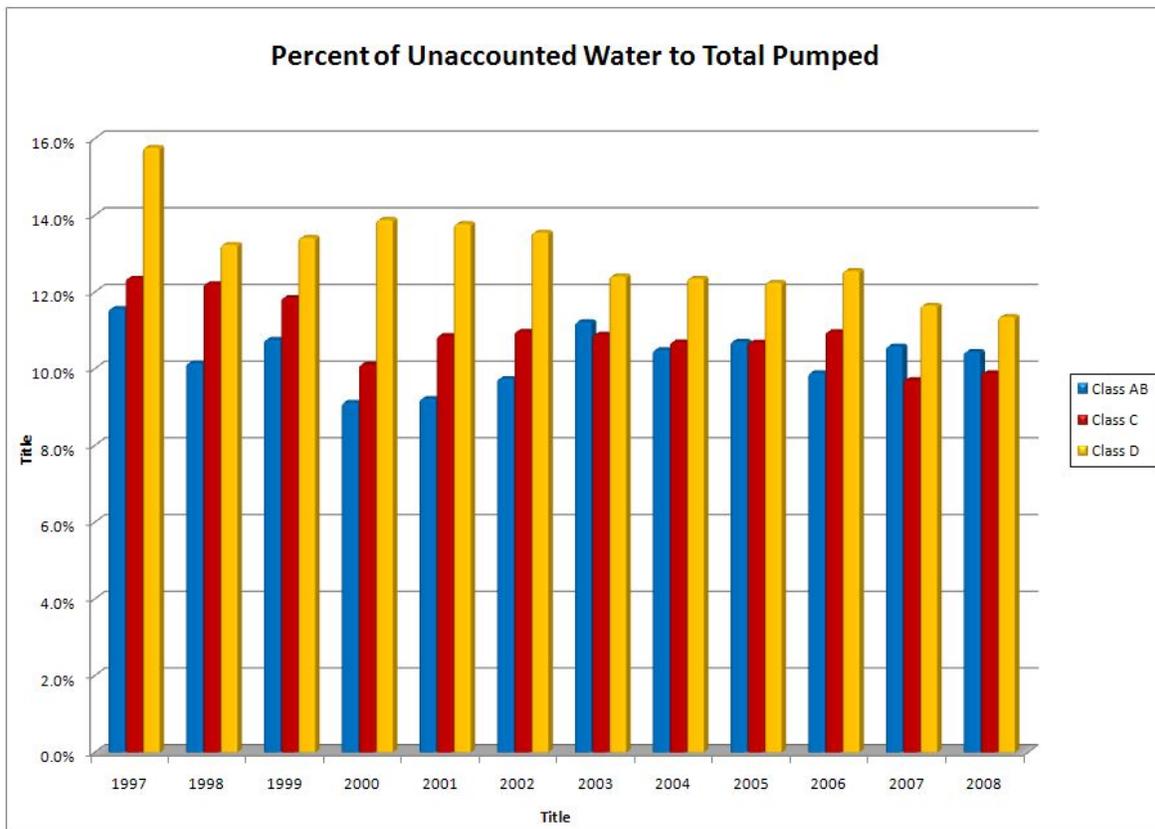
Row Labels	Average of Water Flushed	Average of Fire Protection	Average of Freeze Prevention	Average of Other	Average of Non Metered Use
AB	18,223	6,278	1,164	13,570	31,304
C	3,535	570	706	2,765	5,592
D	702	219	541	640	1,246
Grand Total	3,628	1,254	689	3,265	6,110

Row Labels	Average of Main Leak	Average of Service Leak	Average of Hydrant Leak	Average of Unauthorized Use	Average of Unaccounted
AB	23,645	12,238	2,244	1,794	232,748
C	4,832	1,741	552	389	23,195
D	843	1,196	689	24	4,619
Grand Total	5,941	3,506	928	519	37,601

Row Labels	Average of Total System Losses	Average of Sold PerCent	Average of Number Main Breaks	Average of Number Service Breaks
AB	264,178	86	65	19
C	28,208	83	5	3
D	5,702	81	2	1
Grand Total	43,469	82	11	4

In 2007, Wisconsin public water utilities pumped 209,241,208,000 gallons, a 1.0 % increase from 2006. In 2007, Wisconsin utilities sold 178,504,386,000 gallons of water, 85.3% of the water they pumped. Of the remaining 30,736,622,000 gallons not sold, 21,976,956,000 gallons were unaccounted for and amount to 10.5% of production. Not all of the 2008 utilities have filed their annual reports at this point, so the following charts will show partial totals for last year.





### Unaccounted-for Water

The PSC views “unaccounted for water” as an indicator of efficiency and management. Water utilities in Wisconsin sell on average about 85% of the water they pump. We review those utilities that sell less than 70% of the volume of water pumped, and we have asked these utilities to provide plans for improvements.

### Changes to the Annual Report Statistical Page

The annual report has been changed to reflect the modifications in the Uniform System of Accounts, the additional data requirements of water conservation and a more specific data set for utility water audits. “Water Loss and Other Statistics” page, pictured below, has gone through a significant revision.

The monthly source of water supply has been put on its own page because of spacing needs. Related to the source of water supply is line 39 on the lower half of the “Water Loss and Other Statistics” page which asks for the percentage of purchased water that is surface water. Line 39 was added to get a better understanding of whether the source of utility water is surface or ground water.

### Water loss statistics

The first half of the “Water Loss and Other Statistics” page is an outline of the water audit that was designed around the Wisconsin Administrative Code PSC 185.85 for system losses:

PSC 185.85 System losses.

- (1) In this section, "system losses" means the difference between the metered pumpage into the distribution system and metered consumption.
- (2) Each utility shall keep its system losses at a minimum level. To accomplish this, all consumption (including that for municipal purposes) shall be metered, where possible. Use of water from hydrants shall be controlled, system leaks shall be reduced to a minimum, and station and customer meters shall be adequately maintained to ensure accuracy.
- (3) A continuing record comparing pumpage with metered consumption shall be maintained.

(4) Unaccounted-for water shall be not greater than 25% of station pumpage for the smaller utilities (Classes C and D) and no greater than 15% for the larger utilities (Class AB).

History: Cr. Register, January, 1997, No. 493, eff. 2-1-97.

Determining system losses starts with the pumpage of water entering the distribution system. Water used in the treatment process, line 3, is deducted from total water pumpage to establish the distribution pumpage.

As stated above, the utilities in Wisconsin sell 85% of the total raw water pumped. This benchmark will change slightly because we will use the percentage of water sold to water entering the distribution system, which can be found on line 20 in the following graphic.

### WATER LOSS AND OTHER STATISTICS

1. For Gallons used in the treatment process (line 3), estimate water used in production including filter backwash, pumps, and other utility uses before the point of entry to the distribution system.
2. For Gallons used for other system uses (line 10), report other unmetered water used for system operation and maintenance, water used for non-regulated sewer utility and all other unmetered usage that is known to occur and does not fall into one of the other categories listed under Water Usage.

<b>WATER LOSS STATISTICS</b>		1
Source of Water Supply Statistics - Total Annual Pumpage (000's):	4,689,602	2
Less: Gallons (000's) used in the treatment process:	109,743	3
Subtotal: Gallons (000's) entering distribution system:	<b>4,579,859</b>	4
Less: Gallons (000's) sold:	4,394,217	5
Gallons (000's) entering distribution system but not sold:	<b>185,642</b>	6
Estimated Water Usage:		7
Gallons (000's) used to flush mains:	2,555	8
Gallons (000's) used for fire protection:	740	9
Gallons (000's) used to prevent freezing of distribution system:	5	10
Gallons (000's) used for other system uses:	100	11
Subtotal Estimated Usage:	<b>3,400</b>	12
Estimated Water Losses:		13
Gallons (000's) lost due to main leaks or breaks:	300	14
Gallons (000's) lost due to service leaks or breaks:	100	15
Gallons (000's) lost due to hydrant leaks, tank overflows and pressure reducing valves:	100	16
Gallons (000's) for unauthorized usage such as vandalism and theft:	0	17
Gallons (000's) not accounted for:	<b>181,742</b>	18
Subtotal of Estimated Losses:	<b>182,242</b>	19
Percentage of water entering distribution system sold:	<b>96%</b>	20
Percentage of unaccounted for water:	<b>4%</b>	21
If more than 15%, indicate causes:		22
		23
		24
If more than 15%, state what action has been taken to reduce water loss:		25
		26
		27

In the past, estimated water usage was grouped into several recognized general usages. As can be seen above, the estimated unmetered water usage of flushing mains (line 8), fire protection (line 9), freeze prevention (line 10) and a catchall category (line 11) is a deductible usage in determining unaccounted for water (line 18). In the future these estimated unmetered usages should be useful benchmarks for water utilities.

Estimated water losses include estimated water usage from repaired mains (line 14), repaired service (line 15), and repaired hydrants (line 16). Included in this category is usage from theft or vandalism (line 17). After we have identified all of the different water usages, what remains is "not accounted for" (line 18).

Water not accounted (unaccounted for water) is the difference from what is initially pumped and the usages listed above. The unaccounted number is divided by distribution pumpage to determine the system losses mentioned in Wisconsin Administrative Code PSC 185.85.

<b>OTHER STATISTICS</b>		27
		28
Maximum gallons pumped by all methods in any one day during reporting year (000 gal.)	20,523	29
Date of maximum: 07/31/2008		30
Cause of maximum: Weather related, hot and dry spell		31
		32
Minimum gallons pumped by all methods in any one day during reporting year (000 gal.)	6,413	33
Date of minimum: 12/25/2008		34
Total KWH used by the utility (include pumping, treatment facilities and other utility operations):	6,155,075	35
If water is purchased:		36
Vendor Name:		37
Point of Delivery:		38
What percentage of purchased water is surface water?		39
Number of main breaks repaired this year:	26	40
Number of service breaks repaired this year:	0	41
Population served (estimate the number of individuals served):		42
Inside municipality?	50,000	43
Outside municipality?	10,000	44

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PSCW Annual Report: MAW

The “Other Statistics” portion of the page, pictured above, gathers together a variety of data used for various reasons. The maximum and minimum pumpage data (lines 29–34) helps establish water demand characteristics of the community and is used to establish rates for the utility. Energy is the largest variable cost of a water utility, and the kilowatt-hours (line 35) can be useful data in determining an energy benchmark. When a utility purchases water, it is useful to know the name of the vendor (line 37), point of delivery (line 38), and whether the source of water is ground or surface (line 39). The number of main and service breaks (lines 40 – 41) will be matched up with the estimated gallons lost to provide some interesting benchmark information for the industry. In today’s conservation environment, the size of the population served (lines 43 and 44) has been a frequent question of policy makers.

This is an interesting time for all of us. Given the current economy and the state’s budget crisis, it is more important than ever to make good decisions on how to use our scarce resources. Decisions based on sound data have a better chance of success. This article presents some of the data available to you. If you have questions or data inquiries, please contact Bruce Schmidt, PSC Staff Engineer, at (608) 266-5726 or by e-mail at [Bruce.Schmidt@psc.state.wi.us](mailto:Bruce.Schmidt@psc.state.wi.us).