

## Metrics and Trends Workgroup

### Recommendations to the Water Conservation Advisory Council

April 1, 2010

#### Summary of GPCD Reporting Today:

**Municipal GPCD:** This is calculated by the TWDB every year. It is intended to represent water usage inside the city limits and excluding industrial and power plant usage. Timing for release of municipal GPCD each year is determined by availability of population data from the state. For example, the most recent Municipal GPCD figures released were from 2007 even though 2009 water use data was just turned in. This is because no official state population data is available for 2008 to do a GPCD calculation by this method. The recently added “residential municipal GPCD” is an estimate of the residential usage inside the city limits.

**Conservation Report GPCD:** Water providers that are required to complete conservation reports each spring fill in a portion on GPCD. This includes a total GPCD, a residential GPCD, and a water lost GPCD. The population is self-reported on the form. There are also targets on the form and dates for these to be achieved. This is an on-line report.

#### Summary of Recommendations:

The Metrics and Trends Workgroup recommends that the Water Conservation Advisory Council work toward a comprehensive approach to GPCD reporting that brings together the work the group did in 2008 with the New Mexico Office of the State Engineer to create a highly functional conservation GPCD report that could be ready to launch in 2012. This report would be intended as a new section of the TWDB Water Conservation Program Annual Report completed by all entities with 3,300 connections.

This very large jump forward in reporting could be possible for large utilities this quickly because the tool has been developed in New Mexico and has been tested by several utilities already successfully (Dallas, Austin, San Antonio). It would require modification for Texas needs, but could be adjusted fairly easily for inclusion with the TWDB Conservation Reports. It would not be necessary for it to replace the TWDB Municipal GPCD if these numbers are necessary for water supply projections.

#### Reasons for Proposal:

##### 1) A Comprehensive Tool Results In Clear Reports

When a GPCD calculation is only partially broken down or when the population is self-reported, there is too much room for doubt and confusion. People do not understand and the format is not the same. Very few people understand that “municipal GPCD” for example does not really represent all water usage within a community or that it is only within a city limits. A

comprehensive tool allows the data to be clearly detailed as to where it came from, exactly which water provider it is from, if it is from an entire community (multiple providers), etc.

## **2) Sector GPCD Analysis Provides Necessary Planning Tools**

The most important reason to have sector data is to drive conservation programs where they are needed. Without a sector analysis, a community can't know if their residential GPCD is a "low hanging fruit." Knowing the average multifamily GPCD is also very important in analyzing the usage of specific apartment complexes. This can help identify specific ones needing help in fixing up leaking fixtures or irrigation.

## **3) Sector GPCD Analysis is Fair to Different Communities**

The commercial GPCD might help a community with a large commuter population explain why their total GPCD is higher. The sector analysis encourages further discussion instead of a quick conclusion that might be incorrect.

## **Specifics of the Proposal:**

The Metrics and Trends Workgroup recommend the following in regards to establishment of a common methodology for the calculation of gallons per capita per day (GPCD) and the determination of a service population between national census years:

1. In regards to **a common methodology for the calculation of GPCD**, the workgroup recommends the use of a tool similar to the one created by the New Mexico Office of the State Engineer (NMOSE). This tool establishes a method to combine consumption data with commonly available population data for the calculation of overall and sector based GPCD. Although it is a good tool in its current format, the workgroup would like to explore modifications to this tool prior to a final recommendation on its use
2. The sectors broken down in the GPCD analysis in the New Mexico model are somewhat different from those analyzed by the Metrics workgroup. It would be recommended that the sectors analyzed by the metrics workgroup be the ones used in the tool for Texas purposes for the water user groups able to break them down in this detailed a manner. For example, if a water utility were able to break down their customer data into: residential, commercial, industrial, multifamily, and institutional then the tool would allow it. But if the utility software made these distinctions impossible then the tool would divide the customer data only as far as the utility could provide. The better the data, the better the resulting report.
3. In regards to **the determination of service population between national census years**, the workgroup would like to recommend a "bottom up" process of calculating service population by using a ratio of customers to connections at the census block level. This will allow for a more precise estimation of population at a very fine level of geography and sector based demand. This "bottom up" process would have the utility apply a predetermined and specific persons-

per-connection ratio at the census block level to determine a population for that block, and then add up all of the block populations for the utility service area.

## **Detail of Recommendations:**

### **1. Common methodology for the calculation of GPCD:**

- a. The workgroup, in general, believes that the GPCD calculation does a very good job of quickly estimating GPCD as a whole and by sector of use and presents the data in an easy to read output of charts and tables.
- b. The NMOSE tool could be used by virtually any utility in the state thanks to its use of commonly available census data for the entire state.
- c. There are some questions that do remain unanswered with regards to this tool. Specifically:
  - i. There is a need to allow for the input of separate single-family and multi-family persons per household statistic. There should be an option to enter another statistic if the utility believes that their population is significantly skewed away from the national averages.
  - ii. There needs to be a better way to account for water that is stored in an aquifer storage and recovery (ASR) facility. It is unclear if this water is accounted for appropriately using the options available in the tool.
  - iii. The output of sector based GPCD numbers should be described and a percentage of the total GPCD, as opposed to a gallon amount. The numbers that are presented in the tool are misleading and are subject to misinterpretation by anyone not intimately familiar with the data.
- d. Provided that modifications can be made to address to aforementioned concerns and questions, the workgroup recommends that the modified tool be distributed quickly, that clear guidelines be developed in the form of a manual for Texas, and that the tool be used for reporting beginning in 2011.

### **2. Determination of service population between national census years:**

- a. In the time period immediately after census figures are released, utilities and other water purveyors can get:
  - i. a good estimate of what their service population is and
  - ii. a good persons-per-service-connection ratio that *can be* used for the calculation of future years service populations.
- b. If the persons-per-service-connection ratio is very generic (i.e. total population as determined by service area divided by number of connections) then, over time, it becomes less reliable if there is great change in the service area demographics. For many larger utilities there is significant change in demographics, both in terms of expansion into new service areas and change in composition of existing service areas.
- c. Because of the variability in the amount of change between utilities over time, the workgroup is recommending a new process in the calculation of the persons-per-service-connection ratio. This new process will help utilities be more flexible and more

- precise in the calculation of population in non census years. Furthermore, the workgroup is recommending that the very generic calculation, as described above, be left available to those utilities that either don't change much demographically over time or don't have access to very detailed information that would be require for the new process.
- d. The basic mechanics of this new process are very similar to the generic process. Simply put, it would remain total population divided by number of connections. The difference would be that this would occur at the census block level and not at the service area level. This would provide beneficial data is a couple of ways.
    - i. A statistically solid **generic persons-per-service-connection ratio** can be developed for census blocks that have a diverse mix of sector demands.
    - ii. Specific **persons-per-sector-of-service-connection ratio** could be developed from census blocks that are either primarily or totally filled by one sector of the service accounts (e.g. all industrial connections, all multi-family connections, etc.)
  - e. Utilities with large service areas that are found in large cities probably have thousands of blocks in their service area.
  - f. The end result of this new process may be a total of several ratios that can be applied in various ways.
  - g. Once the ratios are determined, the utility would take the following steps each year:
    - i. For census blocks that are wholly within the service area boundaries:
      1. Determine the sector characteristics of each census block using the most up-to-date customer data.
      2. Determine if a generic or specific ratio is to be used.
      3. Apply the ratio and calculate the population.
    - ii. For census blocks that are bisected by a service area boundary:
      1. Define the area of the census block that is inside the service area.
      2. Determine the customers that are inside the portion of the block inside the service area.
      3. Determine the sector characteristics of this block sub-area based on customer data.
      4. Apply the specific ratio and calculate the population.
  - h. Once all the blocks (whole and partial) have population estimates, the grand population can be calculated.
  - i. If the utility has some combination of the following characteristics, then the workgroup would recommend that the utility use a single generic ratio as mentioned in b):
    - i. Small service area.
    - ii. Rural location.
    - iii. Small population with lower than average growth rates over time.
    - iv. Less sophisticated customer billing records.

## Suggested Changes to NMOSE GPCD Calculator Workbook

We need to think about this as being simply a tool for reporting water use and displaying the results for the reporter to verify that the reported data correctly reflects the actual conditions. **We should not be trying to build a workbook that will give a water provider a full range of analysis and planning tools.** The fact that this is an Excel workbook makes it easy for a water provider to expand the analytical use of the data in whatever manner they might choose. The analytical and planning can, and should, be done outside what is reported and shown in the report charts and graphs. This makes it possible to accurately report the factual history without having to draw any conclusions or make projections on future use.

The changes needed to the NMOSE calculator are very simple:

1. Separate ICI (Industrial, Commercial & Institutional) into separate sectors with the ability to input the "Number of Connections" for each. Some water providers may not want to separate commercial and institutional and it might be desirable to give an option in the workbook to combine these two sectors which would be very easy to do. Also, some providers may not have a significant industrial use and they could easily classify those small industrial uses as commercial and not enter any industrial data.
2. Eliminate the page "8. SUMMARY GPCD REPORTED DATA" as the workbook provides all this information to the reported on the "9. ANNUAL PERFORMANCE" and "10. MONTHLY PERFORMANCE" tabs in the workbook. On tab 10 the reporter can view the monthly GPCD for every sector which is all the bottom two charts on page 8 do for just two sectors. The top chart on Page 8 is duplicated on page 9 with but also shows the sector breakdown.
3. Modify the chart on the annual reporting performance page 9 so that the order of the sectors starting at the bottom are Non-Revenue Water, SFR, MFR, Institutional, Commercial, Other Metered, and finally industrial at the top. This will clearly show the total performance without the industrial component and in fact the chart should include a line that identifies the total performance without the industrial component.
4. Do we want to limit the data to 7 years? It may be worthwhile to provide for data to be achieved for a longer period of time.
5. The handling of REUSE needs to be reviewed and made consistent with the Texas policy decisions re the formula for GPCD given in the Water Conservation Implementation Task Force report which recognizes reuse as a conservation strategy and gives credit to reuse in the calculation of "Total GPCD". The Task Force recommendations were subsequently accepted by the WCAC. This recognition and credit is not a part of the New Mexico approach. It makes more sense and is less confusing to have all of the categories of use separated and then let individuals add up categories as they see fit!
6. The workbook needs to allow separate "persons per meter" ratios for SFR, MFR and Institutional.
7. The definitions need to be reviewed for consistency with Texas policies and practices. We really need to have this reporting system designed for use by all water providers and as such we need to clarify that the reported volumes and population data are for the water provider's service area. Having the term "residential" defined to apply only to an area within a city limits is only going to create confusion. It seems like the definition of "residential" could be changed to make it apply to the service area of the reporting entity. This would allow any report by a city to indeed be within the city limits but would also allow a water provider that has a different service area boundary to make a report for that area.

# Water Supply & Use Report

Water Provider: Example Water Supply System

Water Volume Units million gal/day

Date: July 15, 2008

Supply Source: Untreated Water  
Treated Water

Surface water Diverted	Groundwater Withdrawn	Reuse/Recycle	Purchased Water	Sub Total	Unacct/ Unmetered	
1,000	8,800	500		10,500	55	<b>Total 11,500</b>
	900			1,000	55	

<u>Municipal Use</u>	<u>Agricultural Use</u>	<u>Non-Ag Outdoor Use</u>	<u>Industrial Use</u>
Sub Total Untreated <span style="border: 1px solid black; padding: 2px;">1,220</span>	Sub Total Untreated <span style="border: 1px solid black; padding: 2px;">8,700</span>	Sub Total Untreated <span style="border: 1px solid black; padding: 2px;">-</span>	Sub Total Untreated <span style="border: 1px solid black; padding: 2px;">500</span>
Sub Total Treated <span style="border: 1px solid black; padding: 2px;">870</span>	Sub Total Treated <span style="border: 1px solid black; padding: 2px;">60</span>	Sub Total Treated <span style="border: 1px solid black; padding: 2px;">-</span>	Sub Total Treated <span style="border: 1px solid black; padding: 2px;">40</span>
<b>TOTAL Municipal <span style="border: 1px solid black; padding: 2px;">2,090</span></b>	<b>TOTAL Agricultural <span style="border: 1px solid black; padding: 2px;">8,760</span></b>	<b>TOTAL Non Ag Outdoor <span style="border: 1px solid black; padding: 2px;">-</span></b>	<b>TOTAL Industrial <span style="border: 1px solid black; padding: 2px;">540</span></b>

Residential <span style="border: 1px solid black; padding: 2px;">50</span> <span style="border: 1px solid black; padding: 2px;">600</span>	Crop Irrigation <span style="border: 1px solid black; padding: 2px;">2,200</span>	Public/Private Golf Courses <span style="border: 1px solid black; padding: 2px;"></span>	Mining <span style="border: 1px solid black; padding: 2px;"></span>
Commercial <span style="border: 1px solid black; padding: 2px;">30</span> <span style="border: 1px solid black; padding: 2px;">100</span>	Livestock <span style="border: 1px solid black; padding: 2px;"></span>	Wildlife <span style="border: 1px solid black; padding: 2px;"></span>	Electric Power Generation <span style="border: 1px solid black; padding: 2px;"></span>
Institutional <span style="border: 1px solid black; padding: 2px;">20</span> <span style="border: 1px solid black; padding: 2px;">40</span>	Concentrated Animal Feeding <span style="border: 1px solid black; padding: 2px;"></span>	Wetlands <span style="border: 1px solid black; padding: 2px;"></span>	Refining <span style="border: 1px solid black; padding: 2px;"></span>
Public/Recreation <span style="border: 1px solid black; padding: 2px;">20</span> <span style="border: 1px solid black; padding: 2px;">50</span>	Ag Products storage/processing <span style="border: 1px solid black; padding: 2px;">6,500</span> <span style="border: 1px solid black; padding: 2px;">60</span>	Unacct/Unmetered <span style="border: 1px solid black; padding: 2px;"></span>	Chemical Manufacture <span style="border: 1px solid black; padding: 2px;"></span>
Wholesale <span style="border: 1px solid black; padding: 2px;">1,000</span> <span style="border: 1px solid black; padding: 2px;">50</span>	Aquaculture <span style="border: 1px solid black; padding: 2px;"></span>		Electronics <span style="border: 1px solid black; padding: 2px;">500</span> <span style="border: 1px solid black; padding: 2px;">40</span>
Reuse <span style="border: 1px solid black; padding: 2px;"></span>	Silviculture <span style="border: 1px solid black; padding: 2px;"></span>		Food Processing <span style="border: 1px solid black; padding: 2px;"></span>
Unacct/Unmetered <span style="border: 1px solid black; padding: 2px;">100</span> <span style="border: 1px solid black; padding: 2px;">30</span>	Unacct/Unmetered <span style="border: 1px solid black; padding: 2px;"></span>		Timber & Wood Products <span style="border: 1px solid black; padding: 2px;"></span>
			Equipment/Auto-motive/ Aircraft <span style="border: 1px solid black; padding: 2px;">50</span> <span style="border: 1px solid black; padding: 2px;">10</span>
			Other Industry/Manufacturing <span style="border: 1px solid black; padding: 2px;">30</span> <span style="border: 1px solid black; padding: 2px;">20</span>
			Unacct/Unmetered <span style="border: 1px solid black; padding: 2px;">20</span> <span style="border: 1px solid black; padding: 2px;">10</span>

Residential & Commercial Use Breakdown					
	Total	Outdoor	Indoor	# of Homes	Persons per Home
<b>Residential Total Use</b>	<b>50</b> <b>600</b>	50 500	 100		
<b>Single Family</b>	10 500	10 450	 50	1,250,000	3.20
<b>Multi-Family</b>	40 200	40 50	 150	250,000	3.70
				Residential GPCD =	10
					122
					132

## Retail Table

Retail providers should report all raw and treated water delivered to their customers. This table provides a comprehensive list of the potential customers a retail provider might have.

Water Use Category	Sub-Category	Description	Examples
<b>Residential</b>			
	Single Family (Indoor Use)	Residential Properties With Single Family Occupancy	Detached Houses, Duplexes With No More 2 Units
	Single Family (Outdoor Use)	Residential Properties With Single Family Occupancy	Detached Houses, Duplexes With No More 2 Units (Irrigation And Other Outdoor Uses)
	Multi Family (Indoor Use)	Housing For Multiple Families	Apartments, Mobile Home Parks
	Multi Family (Outdoor Use)	Housing For Multiple Families	Apartments, Mobile Home Parks (Irrigation And Other Outdoor Uses)
<b>Commercial</b>	(Indoor Use)	Entities Using Water As Part Of The Business Process	Service Industries, Office Bldgs Including Medical And Dental, Car Wash, Hotels, Large Event Venues, Stadiums/Arenas (Not Open Air) Laundromats, Malls/Shopping Centers, Landscaping/Nursery Operators
	(Outdoor Use)	Entities Using Water As Part Of The Business Process	Service Industries, Office Bldgs Including Medical And Dental, Car Wash, Hotels, Large Event Venues, Stadiums/Arenas (Not Open Air) Laundromats, Malls/Shopping Centers, Landscaping/Nursery Operators. (Irrigation And Other Outdoor Uses)
<b>Institutional</b>	(Indoor Use)	Entities Intended To House People For Non-Permanent Residential Purposes	Universities, Schools, Churches, Hospitals, Nursing Homes, Prisons, Military
	(Outdoor Use)	Entities Intended To House People For Non-Permanent Residential Purposes	Universities, Schools, Churches, Hospitals, Nursing Homes, Prisons, Military (Irrigation And Other Outdoor Uses)
<b>Recreational And Public</b>		Spaces Metered For Recreational Use Or Public	Athletic Fields, Golf Courses, Public Pools, Water Parks, Greenbelts,
<b>Resale Wholesale</b>		Sale Of Municipal Water To Other Entities For Resale	Municipalities, Muds, Puds, Rural Water Supply
<b>Reuse (Direct/Indirect), Recycled</b>		Recycled/Reclaimed Water That Is Treated Effluent	Any Use That Is Treated Effluent
<b>Non-Revenue Water, "Water Loss"</b>		Difference Between What Is Pumped At Source And Metered Usage	System Leaks, Flushing Of Water Line, Treatment Process, Inaccurate Metering, Stolen Water/Illegal Connection
<b>Agriculture</b>		Water Used To Raise Crops, Livestock, Concentrated Animal Feedings, Ag-Products Storage/Processing, Aquaculture, Silviculture	Farm Products, Tree Farms, Orchards, Range Livestock, Poultry Farms Cattle Feeding, Grain Elevators, Slaughter Plants, Shrimp Farms, Fish Farm, Aquatic Plant Farms
<b>Industrial</b>		Process Designed To Convert A Product Of Lower Value To Higher Value.	
	Mining	Extraction Of Rock & Minerals Either Surface Or Subsurface	Oil & Gas Extraction, Coal Mining, Quarries, Insitu-Mining, Geothermal Mining
	Electric Power Generation	Water Used To Generate Electricity	Steam electric power plants, simple cycle gas turbine plants, combined cycle plants, integrated coal gasification plants
	Refining	Processing Raw Materials Into Derivative Products For Retail Or Products To Be Used In Other Manufacturing	Oil & Gas Refining, Steel Mills, Uranium Processing, Precious Metal Extraction, Coal Liquefaction, Ethanol Plants
	Chemical and Petrochemical	Manufacture Of Chemical Products Or Feedstock	Petro-Chemical Plants, Air Product Plants, Hydrogen Generation

	Food Processing	Water Used To Manufacture, Process And Package Food Products	Beverage Manufacture, Breweries & Distilleries, Frozen Food Products, Canned Foods
	Electronics	Water Used To Manufacture Or Operate Electronic Equipment	Computer & Electronic Products, Electrical Equipment And Components, Appliances
	Equipment Automotive/Aircraft	Manufacture, Service And Operation Of Equipment And Machinery	Airports, Auto Assembly Plants, Aircraft Assembly Plants, Machinery And Equipment Manufacturing
	Paper & Wood Products	Harvesting, Processing And Manufacturing Of Timber And Derivative Products	Saw Mills, Paper Mills, Plywood Mills, Furniture Manufacture, Cardboard Manufacture
	Other Manufacturing	Manufacturing Or Other Industrial Purposes That Does Not Fit Into One Of The Other Industrial Use Categories	Plastic And Rubber Products, Non-Metallic Mineral Products, Fabricated Metal Products, Textile Mills Apparel Manufacturing, Leather And Allied Products