

This presentation premiered at WaterSmart Innovations

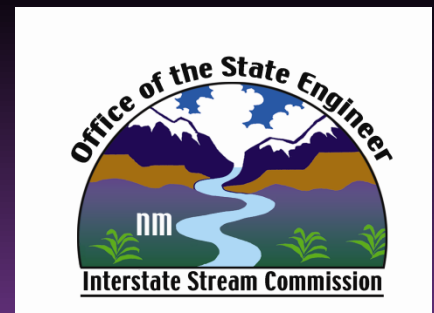
watersmartinnovations.com



The Pros and Cons of New Mexico's Gallons per Capita per Day Methodology and Calculator



Cheri Vogel
NM Office of the State Engineer



Today's Presentation

- Need for Standardized GPCD
- NMOSE Methodology/Tools
- Testing (2007-2008)
- Implementation
- Pros
- Cons
- National Momentum

Need for Standardization

- New Mexico Statute
 - “beneficial use”, “not contrary to conservation”
 - 40-Year Planning
- Everyone has their own method
 - Methods not always shared with NMOSE
 - Creative math
 - Lack of continuity
- Guidance on water conservation
 - Targeting approach
 - Monitoring progress
- Several permits included GPCD requirements

Research

- ▣ Researched other state methods
- ▣ Researched NM water supply methods
- ▣ Developed Methodology
- ▣ Beta Tested
- ▣ Peer Review Process

NMOSE GPCD Methodology

http://www.ose.state.nm.us/wucp_gcpd.html

- By Category/Sector:
 - System Total
 - Single Family Residential (SFR)
 - Multi Family Residential (MFR)
 - ICI
 - Other
 - Reuse
 - Non-Revenue

- Calculate monthly or annually (or both)

Population

Determined by:

- Person per household from US Census Bureau (Standard File 1, Table H12) (**PPH**)
- Number of SFR connection* (**#SFR**)
- Number of Multi-Family Units* (**#MFU**)
- Institutionalized Populations US Census Bureau (**IP**)

* *Vacancy Rate*

Three Population Categories

Single Family Residential Population

$$\diamond (\text{\#SFR units} \times \text{PPH} \times \text{Vacancy Rate})$$

Multi-Family Residential Population

$$\diamond (\text{\#MF units} \times \text{PPH} \times \text{Vacancy Rate})$$

System Total Population

$$\diamond \text{SFpop} + \text{MFpop} + \text{IP}$$

Seven Sector GPCDs

1. System Total

(Annual Water Production /
SyTot Pop) / 365 days

2. SFR

(Annual SFR Billed/
SFR Pop) / 365 days

3. MFR

(Annual MFR Billed/
MFR Pop) / 365 days

Sector GPCDs

4. ICI

(ICI Annual Billed /
SyTot Pop) / 365 days

5. Other

(Other Water Billed /
SyTot Pop) / 365 days

Sector GPCD

6. Reuse

$$\frac{\text{(Reuse Annual Diversions}^* / \text{SyTot Pop)}}{365 \text{ days}}$$

**Not included in any other categories.*

Sector GPCD

7. Non-Revenue Water*

- By Volume

{Total Annual Production - SFR Annual Billed - MFR Annual Billed - ICI Annual Billed – Other Annual Billed}

- By GPCD

(Volume from above / SyTot Pop) / 365 days

**Unmetered*

Tools

▣ Spreadsheet

- Excel
- 7 Input sheets (general info + 1 for each sector)
- 3 Output sheets (summary, annual, monthly)
- Definitions

▣ Module

- Step-by-step instructions to spreadsheet



NMOSE GPCD CALCULATOR

Gallons per Capita - v2.04 Beta

Release Date: Mar, 16,

This spreadsheet-based GPCD calculator is designed to help quantify and track water uses associated with water distribution systems. The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons on the left below. Descriptions of each sheet are also given below.

It should be noted that all the recorded data should be from actual metered results and should not include any estimates.

Value to be entered by user
 Dropdown box, pick from list
 Value calculated based on input data
 No longer available for input

THE FOLLOWING KEY APPLIES TO THE ENTIRE SHEET:

Please begin by providing the following information, then proceed through each sheet

NAME OF CITY OR UTILITY:

REPORTING YEARS: Enter the most recent reporting year: Data can be entered back to:

NAME OF CONTACT PERSON: E-MAIL: TELEPHONE:

SELECT THE REPORTING UNITS FOR VOLUME DATA: For unit converter click here:

-
-
-
-
-
-
-
-
-
-
-

This sheet
Census data and the portal to get the data from the Census website
Single-Family residential gallons and population
Multi-Family residential gallons and population
Other data including Commercial, Industrial and Institutional [1.3] and Other metered [1.4] categories
Data related to water reuse projects
Total Production and Diverted Water
The calculated data graphical review of most common performance indicators
The calculated data graphical review of annual performance indicators
The calculated data graphical review of monthly performance indicators
Use this sheet to understand terms used in the audit process

All parties reserve the right to validate the data recorded in this document. This does not bind the OSE or the Utility to the results. It is a tool used for planning purposes.

Questions or comments regarding the software please contact us at osw@ose.mn.us

Census Information Data Table 2.1

Info



OR



	TO	
2007	TO	2001

Use the most recent census data



DATA

US Census Table	Description		INPUT
		CENSUS YEAR	2000
P37	Group Quarters Population	Total	775
H3	Occupancy Status	Total	7,449
from H3		Occupied	6,810
from H3		Vacant	539
H12	Ave. Household Size of Occupied Housing Units	Total	2.85

Formula: Household Size = Total Population / Total Number of Housing Units

Vacancy Rate % 7.2%

COMMENTS:

3. SINGLE-FAMILY RESIDENTIAL (SFR)

MONTHLY DATA

Example Mod

Instructions

2007 TO 2007

TABLE 3.1 **SFR BILLED WATER CONSUMPTION (Millions [USE])**

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	27,282,865	23,983,255	18,492,476	21,588,206	21,225,288	26,892,526	33,858,482	29,487,904	31,688,252	24,288,266	22,425,083	22,002,372
2006	20,415,979	43,351,238	21,490,180	16,924,976	35,748,581	25,793,778	25,894,217	21,079,857	35,460,318	22,351,620	20,149,542	18,710,829
2005	27,819,786	21,572,118	22,148,817	26,548,779	22,668,452	34,322,122	37,893,762	31,484,741	29,966,148	24,305,617	23,445,948	23,566,722
2004												
2003												
2002												
2001												

TABLE 3.2 **NUMBER OF SFR CONNECTIONS (Monthly)** **Active Connections Only** You have chosen to enter Active Connections Only, enter the monthly values below, or enter annual values in table 3.8. Check message above Table 3.3 to see if additional data is required.

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	5,223	5,228	5,228	5,228	5,223	5,223	5,223	5,228	5,228	5,228	5,223	5,223
2006	5,198	5,198	5,223	5,228	5,228	5,223	5,223	5,223	5,228	5,228	5,223	5,223
2005	5,200	5,199	5,202	5,200	5,199	5,198	5,196	5,223	5,228	5,228	5,232	5,238
2004												
2003												
2002												
2001												

TABLE 3.3 **INACTIVE (ZERO USE) SFR CONNECTIONS (Monthly)** You have entered Active Connections Only in Table 3.2; leave the cells below blank

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007												
2006												
2005												
2004												
2003												
2002												
2001												

TABLE 3.4 **SFR POPULATION (Monthly)** Formula = (No. of Connections - No. of Zero Use Accounts) * Avg. Household Size

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	14,888	14,900	14,900	14,911	14,886	14,899	14,925	14,951	14,877	14,891	14,906	14,911
2006	14,814	14,909	14,909	14,911	14,900	14,911	14,888	14,888	14,900	14,931	14,877	14,891
2005	14,822	14,817	14,825	14,822	14,817	14,814	14,829	14,866	14,900	14,822	14,811	14,828
2004	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2003	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2002	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2001	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

TABLE 3.5 **SFR GPCD CALCULATION (Monthly)** Formula = Billed Water Consumption (SFR only) / Calculated Population (SFR only)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	58.71	57.44	49.04	48.26	45.99	66.94	73.20	63.64	71.00	52.61	50.14	47.85
2006	44.46	104.50	48.57	42.34	77.40	57.88	55.82	45.98	79.40	48.16	45.15	56.20
2005	82.55	82.29	48.19	58.71	46.34	77.23	82.55	68.23	67.01	52.60	52.41	50.92
2004	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2003	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2002	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2001	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

COMMENTS
December 2006 partial monthly reading. Jan 2007 is 5 weeks.

ANNUAL DATA

TABLE 3.6 **ANNUAL CONSUMPTION**

329,927,940
357,103,885
334,728,614
333,857,531
341,296,738
354,892,936
385,458,754

TABLE 3.7 **ANNUAL CALCULATION**

329,927,940
357,103,885
334,728,614
333,857,531
341,296,738
354,892,936
385,458,754

TABLE 3.8 **AVG ANNUAL CONNECTIONS**

5,228
5,222
5,212
5,205
5,199
5,198

TABLE 3.9 **AVG CORN. CALCULATION**

5,228
5,222
5,212
5,205
5,199
5,198

TABLE 3.10 **CALCULATED GROWTH RATE**

0.11%
0.12%
0.11%
0.13%
0.25%
0.12%

TABLE 3.11 **NO. VACANT SFR CONNECTIONS**

TABLE 3.12 **SIZE OF HOUSEHOLD**

2.85
2.85
2.85
2.85
2.85
2.85

TABLE 3.13 **SFR POPULATION**

14,899
14,902
14,898
14,897
14,897
14,897

TABLE 3.14 **ANNUAL SFR GPCD**

58.28
58.54
60.28
61.85
64.88
65.85
66.77

DATA INPUT SHEET

Example Mod

4. MULTI-FAMILY RESIDENTIAL (MFR)

BARCEL, DE.
ZASACUCLILLA

Instructions

MONTHLY DATA

2007 TO 2001

TABLE 4.1 **Info**

MFR BILLED WATER CONSUMPTION (Monthly) (Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	9,635,468	8,826,248	7,576,336	7,930,720	8,026,253	9,992,162	10,093,792	9,711,188	9,107,377	8,449,834	7,988,381	8,794,417
2006	10,201,278	10,019,789	9,102,449	8,786,822	9,932,423	10,881,873	9,625,002	11,110,088	8,492,184	9,958,850	8,682,218	7,551,928
2005	16,680,445	9,452,304	11,936,978	11,103,058	10,127,778	12,013,411	12,872,234	12,754,343	12,008,415	10,779,121	10,141,960	10,881,800
2004												
2003												
2002												
2001												

TABLE 4.2

If only Current Number of Units is Known, put this number in Table 4.1

NUMBER OF MFR UNITS (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907
2006	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907
2005	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907
2004	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907
2003	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907
2002	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907
2001	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907

TABLE 4.3

Formula = (Number of Units - Vacant MFR Connections) * Ave. Household Siz

MFR POPULATION (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042
2006	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042
2005	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042
2004	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042
2003	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042
2002	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042
2001	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042	5,042

TABLE 4.4

Formula = MFR Billed Water Consumption (Monthly) / MFR Population (Monthly)

MFR GPCD CALCULATION (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	61.85	62.54	48.49	52.43	51.35	66.06	64.58	62.13	60.21	54.06	52.02	56.27
2006	65.27	70.98	58.24	57.96	63.55	70.49	62.96	71.09	56.15	63.72	57.40	48.32
2005	106.73	66.96	76.37	73.41	64.80	79.43	82.36	81.61	79.39	66.97	67.05	70.26
2004	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2003	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2002	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2001	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ANNUAL DATA

TABLE 4.5

ANNUAL CONSUMPTION

106,018,153
114,304,558
140,895,847
148,895,214
162,854,000
168,854,789
170,598,741

TABLE 4.6

ANNUAL CALCULATION

106,018,153
114,304,558
140,895,847
148,895,214
162,854,000
168,854,789
170,598,741

TABLE 4.7

NO. CURRENT UNITS

1,907
1,907
1,907
1,907
1,907
1,907
1,907

TABLE 4.8

ANNUAL UNIT CALCULATION

1,907
1,907
1,907
1,907
1,907
1,907
1,907

TABLE 4.9 **Info**

MFR POPULATION

5,042
5,042
5,042
5,042
5,042
5,042
5,042

TABLE 4.10

VACANT MFR CONNECTIONS

136
136
136
136
136
136
136

TABLE 4.11 **Info**

ANNUAL MFR GPCD

57.61
62.11
78.54
78.93
88.50
80.67
82.71

DATA INPUT SHEET

7. TOTAL WATER DIVERTED AND SUPPLIED

Inputs to
Dashboard

Example Next

MONTHLY DATA

TABLE 7.1
TOTAL WATER DIVERTED (Monthly)(Gallons (US))

Year	2007 TO 2001											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	89,358,113	85,901,733	88,578,802	86,432,144	94,088,482	100,881,828	114,725,754	101,810,007	88,513,868	85,528,569	81,271,361	84,808,222
2008	89,909,302	84,536,268	89,480,501	94,479,448	106,872,880	105,078,002	108,014,787	96,889,739	93,320,188	88,683,051	82,298,060	88,215,791
2009	92,174,143	89,223,525	85,906,885	94,413,804	102,888,732	114,444,933	126,518,887	108,245,649	97,348,875	88,119,842	88,368,596	90,643,828
2004												
2003												
2002												
2001												

TABLE 7.2
IMPORTED WATER (Monthly)(Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007												
2008												
2009												
2004												
2003												
2002												
2001												

TABLE 7.3
EXPORTED WATER (Monthly)(Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	2,787,390	2,718,361	2,622,296	2,688,156	2,339,108	2,589,519	2,758,949	2,835,238	2,832,267	2,391,276	2,444,870	3,241,289
2008	82,453	2,742,274	8,983,227	2,838,831	2,323,348	2,682,510	2,336,500	1,888,751	2,698,268	2,218,411	2,137,439	2,278,714
2009	2,952,948	2,982,948	2,982,948	2,982,948	2,982,948	2,982,948	2,982,948	2,982,948	2,982,948	2,982,948	2,982,948	2,982,948
2004												
2003												
2002												
2001												

TABLE 7.4
TOTAL WATER SUPPLY (Monthly)(Gallons (US))

Formula = Total Water Diverted + Imported water - Exported Water

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	86,570,723	78,673,352	84,596,506	84,321,982	91,742,373	98,199,047	111,825,802	99,149,481	93,881,301	83,295,700	78,628,481	81,686,933
2008	89,819,209	81,804,015	82,487,274	91,838,618	104,548,511	103,025,492	106,618,287	94,882,978	91,221,890	86,446,640	80,117,621	85,937,277
2009	89,221,195	88,270,577	83,043,917	91,466,858	99,736,784	111,461,985	125,585,939	102,262,701	94,365,727	85,198,894	85,416,648	87,690,878
2004	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 7.5
SYSTEM TOTAL GPCD (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007	135	136	132	135	143	158	174	154	151	130	127	137
2008	140	141	129	145	163	169	169	149	147	125	129	134
2009	139	148	130	142	156	180	190	160	152	150	138	137
2004	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2003	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2002	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
2001	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

COMMENTS:
Monthly data collection implemented in 2005.

ANNUAL DATA

TABLE 7.6
ANNUAL TOTAL DIVERTED

Year	ANNUAL TOTAL DIVERTED
2007	1,051,117,802
2008	1,027,515,076
2009	1,185,188,277
2004	1,200,895,321
2003	1,289,858,745
2002	1,309,856,047
2001	1,385,906,541

TABLE 7.7
ANNUAL TOTAL IMPORTED CALC

Year	ANNUAL TOTAL IMPORT CALC
2007	N/A
2008	N/A
2009	N/A
2004	N/A
2003	N/A
2002	N/A
2001	N/A

TABLE 7.8
ANNUAL TOTAL EXPORTED

Year	ANNUAL TOTAL EXPORTED
2007	30,918,012
2008	35,185,324
2009	35,435,578
2004	10,322,541
2003	5,088,852
2002	487,052
2001	0

TABLE 7.9
ANNUAL TOTAL IMPORT CALC

Year	ANNUAL TOTAL IMPORT CALC
2007	N/A
2008	N/A
2009	N/A
2004	N/A
2003	N/A
2002	N/A
2001	N/A

TABLE 7.10
ANNUAL TOTAL EXPORTED

Year	ANNUAL TOTAL EXPORTED
2007	30,918,012
2008	35,185,324
2009	35,435,578
2004	10,322,541
2003	5,088,852
2002	487,052
2001	0

COMMENTS:
Monthly data collection implemented in 2005.

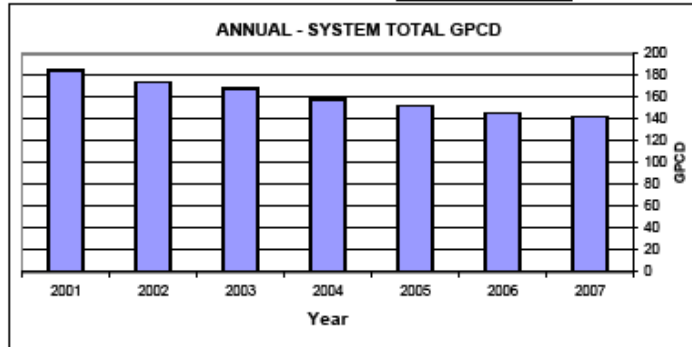
8. SUMMARY GPCD REPORTED DATA

Example Med

2007 To: 2001

ANNUAL

Year	SYSTEM GPCD
2007	141.92
2006	145.25
2005	152.52
2004	157.94
2003	167.95
2002	173.93
2001	184.25

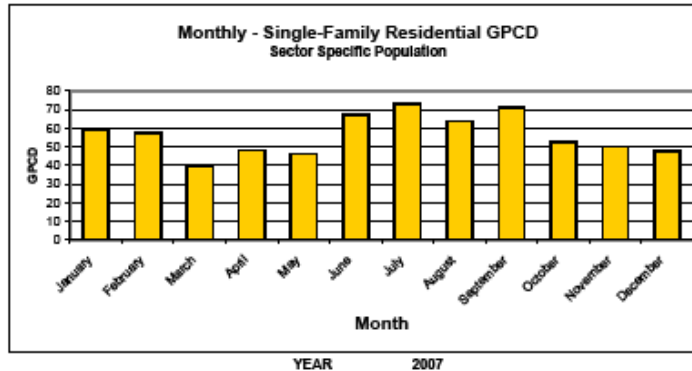


MONTHLY

Month	SFR GPCD
January	58.71
February	57.44
March	40.04
April	48.28
May	45.99
June	66.94
July	73.20
August	63.64
September	71.00
October	52.61
November	50.14
December	47.60

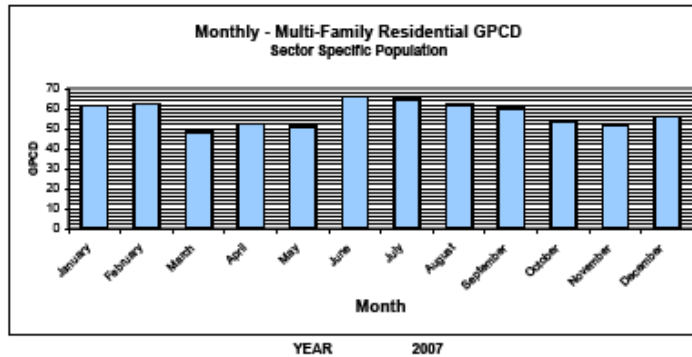
Year 2007

Peak/Ave 1.30



Month	MFR GPCD
January	61.85
February	62.54
March	48.49
April	52.43
May	51.35
June	66.06
July	64.59
August	62.13
September	60.21
October	54.06
November	52.02
December	56.27

Peak/Ave 1.15



Testing

▣ Beta Testing

- 6 drinking water suppliers
- 116 connections to 120,000 connections

▣ Peer Review Process

- Reno AWWA presentation
- Comments provided

Implementation

Release

- Version 2.04 Beta released May 2009 on NMOSE website
- Press release to district offices and newspapers
- Staff provides assistance whenever possible

http://www.ose.state.nm.us/wucp_gcpd.html

Implementation

- Requesting GPCD methodology be used as part of water development and conservation plans
- Permit conditions (existing and new)
 - Requirements to report using NMOSE method
 - Requested as part of annual or five year updates

Round Two

- Second year of requested information
- Data easier to obtain
- Spreadsheet changes made inputting easier
- Negotiations regarding definitions of categories and data placement
- Exploring GPCD “Lite” for smaller, less complicated systems

Pros

▣ NMOSE

- Have a standardized method
- Getting data that we can understand and use
- Sector method allows for distinctions between cities
- Providing guidance on mandated reporting
- Tracking changes over time (beginning stages)



Pros

▣ Utility

- Discoveries about their system
- Establishing a baseline
- Second round easier
- Tracking changes over time



Cons

▣ NMOSE

- Implementation
- Too many options in spreadsheet
- Still ways to manipulate the numbers
- Allowing for transition times
- Credibility issues
- Staff Time



Cons

▣ Utility

- Pulling data
- Defining populations
- Defining sectors
- Public perception
- Staff Time



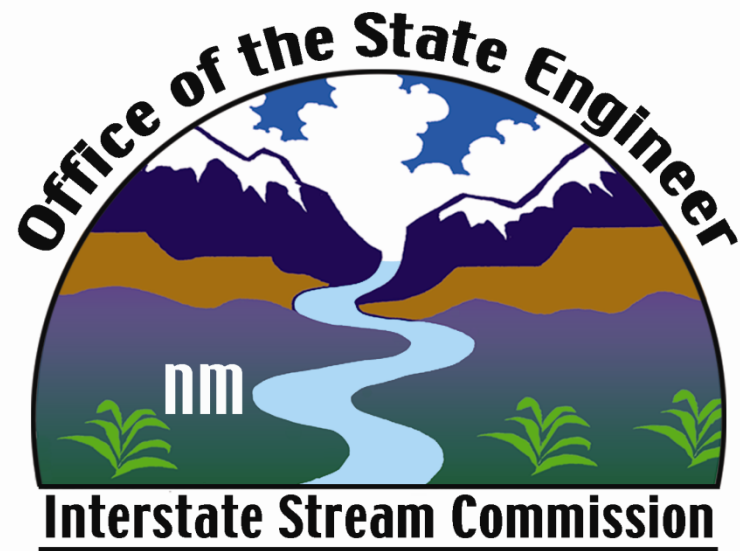
National Effort

▣ AWWARF Grant

- Research one or more benchmarking metrics
- Leverage work now underway by others
- Pilot tests methods

- Currently have a draft guidance document
- Plans for article in the AWWA Journal

Questions?



Contact Information

- cheri.vogel@state.nm.us

- 505-827-4272

- john.longworth@state.nm.us

- 505-827-6121

- [NMOSE GPCD Calculator](#)

- http://www.ose.state.nm.us/wucp_gcpd.html