North Carolina's Capacity Development Report for Public Water Systems

Calendar Year 2007

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Public Water Supply Section
Division of Environmental Health
Department of Environment and Natural Resources

STATE OF NORTH CAROLINA

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http://www.deh.enr.state.nc.us/pws/

Contents

LIST OF ACRONYMS

Capacity	Technical, Managerial and Financial Capacity
DCP	Disadvantaged Communities Program
EPA	United States Environmental Protection Agency
NCRWA	North Carolina Rural Water Association
NCWOA	North Carolina Waterworks Operators Association
ORC	Operator in Responsible Charge
PWS Section	North Carolina Public Water Supply Section
SDWA	Safe Drinking Water Act
SDWIS	The Safe Drinking Water Information System (database)
SWAP	Source Water Assessment Program

I. EXECUTIVE SUMMARY

The Public Water Supply Section (PWS Section) of the North Carolina Department of Environment and Natural Resources is the primary agency responsible for assuring that the people of North Carolina are provided safe drinking water from public systems. Public water systems range from large municipalities to country stores that serve a minimum of 25 individuals for 60 days per year. The complexity of the federal Safe Drinking Water Act (SDWA) can make compliance difficult to achieve for many small systems. Of the approximately 6,700 regulated public water systems, about 5,900 serve a population of less than 500.

The PWS Section has a long history of responding to needs of public water suppliers through:

- surveillance of all public water supplies;
- enforcement of public water supply rules;
- consultation and assistance in planning and designing water supply systems;
- assistance with source water protection;
- review of technical plans and specifications for water supply construction;
- providing training programs for water works operators;
- investigation of hazards that may affect public water supplies; and
- administration of loans, grants, and bonds available for system improvements.

The 1996 Safe Drinking Water Act Amendments establish the concept of capacity development. Capacity includes technical, managerial, and financial components. States must develop a process to help water systems develop the capacity to meet national primary drinking water regulations. The 1996 amendments required withholding 20 percent of a state's Drinking Water State Revolving Fund Capitalization Grant unless the state implemented a capacity development program for all community and non-transient non-community water systems beginning on or after October 1, 1999. The PWS Section responded to this requirement by creating the Capacity Development Program. The goal of this program is to require technical, managerial, and financial planning of new community and non-transient non-community water systems to improve the service and sustainability of the systems. The Capacity Development Program also involves the State's ability to enforce requirements of the North Carolina Drinking Water Act. The Capacity of the PWS Section is enhanced by the coordination of these efforts.

In October 1999, the PWS Section adopted revised rules requiring a self-assessment from new and altered community and non-transient non-community water systems. The self-assessment must document the water system's technical, managerial, and financial viability and must be submitted to the State. The self-assessment includes requirements for describing routine operation as well as emergency response and is used to assess whether or not the public water suppliers have the capacity to operate. This has placed the PWS Section and the public water suppliers in an excellent position to better determine areas of strengths, weaknesses, challenges and opportunities. This information helps systems and the PWS Section to be more effective in meeting the challenge of providing safe and reliable public drinking water.

In 2007, the PWS Section continues to maintain success in the Capacity Development Program. In the last eight years the PWS Section has:

- reduced the number of public water suppliers operating in non-compliance;
- reduced the risk of system expansion without adequate capacity;
- reduced errors in system monitoring and reporting violations;
- increased coordination within the PWS Section; and
- increased the number of systems with complete Operations & Maintenance and Emergency Management Plans.

The PWS Section hopes to continue growing and changing to help public water suppliers meet the need of providing safe drinking water in the State of North Carolina.

II. PROGRAM SETTING: *CAPACITY REQUIREMENTS*

II.A Background

The 1996 federal Safe Drinking Water Act (SDWA) Amendments require withholding 20 percent of a state's Drinking Water State Revolving Fund unless the state created a Capacity Development Program. States needed to obtain the means to ensure that all new community water systems and new non-transient non-community water systems beginning operation after October 1, 1999 demonstrate technical, managerial, and financial capacity with respect to each national primary drinking water regulation in effect, or likely to be in effect, on the date operations start. Each state could develop a unique program to meet its specific needs. The goal of the Capacity Development Program is to require technical, managerial, and financial planning of new community and non-transient non-community water systems to improve the service and sustainability of the systems. Therefore, "Capacity" as used in this report refers to the technical, managerial, and financial capabilities of a water system to comply with the provisions of the Safe Drinking Water Act.

Even before the 1996 SDWA Amendments, North Carolina recognized the importance of public water system Capacity. Historically, the PWS Section found that larger municipal systems were generally well managed, but smaller systems were often lacking essential skills or resources to operate properly. Of the approximately 6,800 regulated public water systems, about 5,900 (89 percent) serve a population of less than 500. The PWS Section saw these systems as having huge needs that were not being adequately addressed.

Table 1 provides figures that show the ability of public water systems in North Carolina to comply with federal and state drinking water regulations. These systems are categorized by type and size of population served. The table shows the total number of systems in each category and the number receiving at least one violation with regard to the maximum permissible level of a contaminant in water delivered by a public water system. 1999 data is shown for comparison since the capacity development rules took effect October 1, 1999 and were not fully implemented until the year 2000. Table 1 also shows the number of systems receiving at least one violation for failure to monitor for required water quality tests for each year over a four-year period. It gives the percentage that these systems represent from the total number of systems in each category. These figures indicate that 30 percent of public water systems had at least one monitoring failure in 2007. (This failure could include missing one monthly sample that year. Since a typical system monitors at least monthly and has many required tests, missing a single test over the course of a year is shown as a violation.) These numbers confirm that the vast majority of systems with deficiencies are ones that serve less than 500 people. The data included in Table 1 are also shown in graphical format in Appendix A. A large percentage of the water systems in violation each year are transient water systems, which is clearly demonstrated in Figures A.1 and A.2.

It is important to note that having a monitoring violation does not necessarily equate to unsafe water. Another way of looking at compliance is by determining the number of people served by compliant public water systems. As shown in Table 2, compliance rates based on population served have increased over the last four years. The overall increase in compliance levels from 2004 through 2007 can be attributed to: (1) successful Capacity Development efforts and subsequent system compliance; and (2) the change of data management programs by the PWS Section.

On-going Capacity Development efforts have enabled compliance levels to increase since the capacity development rules took effect in 1999. Activities such as effective compliance and enforcement, onsite visits, technical assistance and consolidation of "problem" systems with more reliable ones have gradually improved compliance for the last several years. As shown in Table 1 and Table A.2 (note that Table A.2 appears in Appendix A), monitoring and reporting compliance levels in transient non-community water systems have increased significantly since 1999. Compliance levels in community water systems and non-transient non-community water systems decreased between 1999 (baseline year) and 2004. Monitoring and reporting compliance levels in these systems increased between 2004 and 2007, while MCL compliance levels have varied year to year.

Possible reasons for variations in compliance levels include the cyclic occurrence of asbestos monitoring compliance and the implementation of new drinking water rules such as Stage 1 Disinfectants and Disinfection By-Products Rule, Radionuclide Rule, Interim Enhanced and Long-Term 1 Surface Water Treatment Rules. A history of recent rule implementation is included in Appendix B.

Compliance measures were also affected by the PWS Sections's change from its traditional database management system (FOCUS) to EPA's Safe Drinking Water Information System (SDWIS). For reporting purposes, compliance levels are calculated based on the end of the compliance period for a given contaminant. Compliance levels were calculated based on federally defined water system types. Some water systems that were included in capacity development reports published during the time period of 2001-2006 are "nonpublic" systems (not subject to federal regulation) and are not included in the current report.

Compliance measures are calculated on a calendar year basis. Compliance measures in previous reports were calculated on a state fiscal year basis. State fiscal year 2008 ended on June 30, 2008, only three months prior to publication of this report. Calendar year 2007 ended nine months prior to publication in this report. Compliance evaluations are ongoing and records are continually revised as water systems submit revised data. Calculating compliance measures on a calendar year basis is expected to promote more consistent and more accurate reporting year to year. Calculations were also updated to include water systems active during only a portion of a calendar year.

Another challenge presented to the PWS Section is maintaining compliance of systems that began operation within the last three years (new systems). As shown in Table 3 and Figures 1 through 6, compliance levels of new systems vary widely. Table 4 indicates that new water systems have lower compliance with monitoring and reporting violations in the first three years of operation than existing water systems do for the same time period. The data gathered suggests that these systems experienced difficulty performing the required monitoring necessary to remain compliant. One study performed by the PWS Section of new system compliance activities indicated that: (1) many owners/operators are confused about monitoring requirements; and (2) the proper number of lead and copper samples are not collected due to rule misinterpretation or misunderstanding. Further investigation is needed to determine why systems that began operation within the last three years have these compliance issues. The PWS Section will continue to explore strategies that will assist new systems to achieve fully compliant operations.

A comparison of Tables 1 through 4 highlights the dilemma the PWS Section faces in working with public water systems in North Carolina. Even though a great majority of the citizens of North Carolina are served by compliant community public water systems, the number of small systems needing improvements in Capacity is also large. Figures A.3 and A.4 are included in Appendix A. These tables further demonstrate the dichotomy between the number of community water systems with violations and the population served by non-compliant community water systems. Violations in small water systems typically have a minimal impact on population served. Violations in a few large water systems can substantially reduce the population served by compliant community water systems.

This has created a resources challenge for the PWS Section in balancing priorities on efforts that would provide the greatest public benefit as well as assisting the greatest number of systems. As we continue to automate and streamline our compliance processes, our limited resources can be shifted somewhat to better assist small systems.

Table 1: The Number of Public Water Systems with Contaminant and Monitoring Violations

Calendar Year	Population	Community					Non-transient non-community					Transient non-community					TOTALS				
		Systems	MCL	%	MR	%	Systems	MCL	%	MR	%	Systems	MCL	%	MR	%	Systems	MCL	%	MR	%
1999 (baseline)	< 500	1,709	45	3%	494	29%	554	24	4%	184	33%	6,017	267	4%	3,318	55%	8,280	336	4%	3,996	48%
	500-9,999	555	9	2%	156	28%	131	1	1%	30	23%	85	0	0%	34	40%	771	10	1%	220	29%
	10,000-49,999	92	4	4%	15	16%	0					0					92	4	4%	15	16%
	≥ 50,000	24	1	4%	2	8%	0					0					24	1	4%	2	8%
	Totals	**2,380**	**59**	**2%**	**667**	**28%**	**685**	**25**	**4%**	**214**	**31%**	**6,102**	**267**	**4%**	**3,352**	**55%**	**9,167**	**351**	**4%**	**4,233**	**46%**
2004	< 500	1,705	80	5%	558	33%	473	27	6%	234	49%	4,417	334	8%	1,771	40%	6,595	441	7%	2,563	39%
	500-9,999	654	64	10%	183	28%	100	3	3%	47	47%	67	8	12%	25	37%	821	75	9%	255	31%
	10,000-49,999	90	13	14%	19	21%	0					0					90	13	14%	19	21%
	≥ 50,000	24	2	8%	6	25%	0					0					24	2	8%	6	25%
	Total	**2,473**	**159**	**6%**	**766**	**31%**	**573**	**30**	**5%**	**281**	**49%**	**4,484**	**342**	**8%**	**1,796**	**40%**	**7,530**	**531**	**7%**	**2,843**	**38%**
2005	< 500	1,603	76	5%	423	26%	457	23	5%	146	32%	4,250	242	6%	1,551	36%	6,310	341	5%	2,120	34%
	500-9,999	505	88	17%	139	28%	105	5	5%	36	34%	66	3	5%	14	21%	676	96	14%	189	28%
	10,000-49,999	92	11	12%	19	21%	0					0					92	11	12%	19	21%
	≥ 50,000	23	2	9%	3	13%	0					0					23	2	9%	3	13%
	Total	**2,223**	**177**	**8%**	**584**	**26%**	**562**	**28**	**5%**	**182**	**32%**	**4,316**	**245**	**6%**	**1,565**	**36%**	**7,101**	**450**	**6%**	**2,331**	**33%**
2006	< 500	1,580	92	6%	411	26%	454	14	3%	162	36%	4,138	206	5%	1,540	37%	6,172	312	5%	2,113	34%
	500-9,999	508	69	14%	128	25%	100	3	3%	34	34%	61	1	2%	12	20%	669	73	11%	174	26%
	10,000-49,999	91	8	9%	24	26%	0					0					91	8	9%	24	26%
	≥ 50,000	26	4	15%	5	19%	0					0					26	4	15%	5	19%
	Total	**2,205**	**173**	**8%**	**568**	**26%**	**554**	**17**	**3%**	**196**	**35%**	**4,199**	**207**	**5%**	**1,552**	**37%**	**6,958**	**397**	**6%**	**2,316**	**33%**
2007	< 500	1,563	71	5%	392	25%	433	20	5%	134	31%	4,035	208	5%	1,336	33%	6,031	299	5%	1,862	31%
	500-9,999	501	67	13%	132	26%	99	0	0%	28	28%	62	3	5%	17	27%	662	70	11%	177	27%
	10,000-49,999	91	10	11%	16	18%	0					0					91	10	11%	16	18%
	≥ 50,000	27	1	4%	5	19%	0					0					27	1	4%	5	19%
	Total	**2,182**	**149**	**7%**	**545**	**25%**	**532**	**20**	**4%**	**162**	**30%**	**4,097**	**211**	**5%**	**1,353**	**33%**	**6,811**	**380**	**6%**	**2,060**	**30%**

* Data were generated from the SDWIS database. Data in previous reports were generated from the legacy database and data for all years have been recalculated based on the SDWIS database. The classification of some water systems has been adjusted to match EPA water system type codes; a number of water systems included in previous reports are considered by EPA to be nonpublic systems and are not subject to federal regulation. Information is believed to be reliable and has been verified and revised as part of the data migration process.

† *"Population"* indicates the grouping of systems by the number of people served. The legacy database did not maintain a record of historical population of a water system and violation data for 1999-2004 and part of 2005 are reported based on the single population of record. Data entered into the SDWIS database on or after October 1, 2005 includes a record of populations. Violation data for the end of 2005, 2006 and 2007 are reported based on the latest population reported for the fiscal year.

‡ *"Systems"* means the number of public water systems serving the population size indicated.

(Footnotes continued on page 5.)

(Footnotes continued from page 4.)
§ *"MCL"* means a violation with regards to the maximum permissible level of a contaminant in water delivered by a public water system.
¶ *"MR"* means a failure to monitor for required water quality tests as defined by federal and state regulations.
Table 1 is a summary of the number of systems receiving one or more contaminant exceedance or monitoring violations in the given time period. The compliance rates do not account for the ever-increasing number of contaminants required for testing. New complex testing requirements have resulted in more monitoring violations. This will cause a lower compliance rate unless compensating improvements are made in other contaminant testing areas.

The high percentages of systems with MR violations (Table 1) are largely due to the fact that systems have numerous opportunities to collect and report on water quality. A typical system monitors at least monthly and has a large number of required tests. A system missing a single test over the course of a year will be shown as a violator.

The MCL violations (Table 1) indicate the number of systems with at least one contaminant exceeding permissible levels during the given year. A typical system has many opportunities to test over the course of one year. Most systems receiving bacteriological MCL violations return to compliance by the next compliance period. However, a public water system receiving at least one violation will appear on this table.

Table 2: Population Served by Compliant Community Public Water Systems

Compliance Measures	1999 (baseline)		2004		2005		2006		2007	
	Population±	Percent	Population~	Percent	Population∫	Percent	Population£	Percent	Population	Percent
Citizens Served by Community Public Water Systems having No MCL* Violations	6,473,316	97.5%	6,140,090	91.4%	5,392,446	81.8%	6,222,142	90.3%	6,301,499	89.1%
Citizens Served by Community Public Water Systems having No MR† Violations	5,799,401	87.3%	4,750,360	70.7%	5,506,502	83.5%	5,274,530	76.6%	5,922,154	83.8%
Total Service Population	6,641,215		6,717,011		6,591,697		6,889,931		7,071,069	

* *"MCL"* means a violation with regards to the maximum permissible contaminant level in water delivered by a public water system.
† *"MR"* means a failure to monitor for required water quality tests as defined by federal and state regulations and for 1999 through the first half of 2005 includes systems that failed to report on time.
± The legacy database did not maintain a record of historical population of a water system and violation data for 1-FY 2005 are reported based on the single population of record. Data entered into the SDWIS database on or after October 1, 2005 includes a record of populations. Violation data for the latter half of 2005 and years 2006 and 2007 are reported based on the latest population reported for the year.
~Beginning in 2004, small systems were required to conduct additional monitoring for total trihalomethanes (TTHM), haloacetic acids (HAA5) and disinfectant residuals. Changes to radionuclide monitoring requirements for all systems first took effect in 2004. Also in 2004, one large water system serving approximately 10% of the total service population received monitoring violations.
∫In 2005, two large systems received MCL violations that were quickly resolved. The combined population of these two systems is approximately 12% of the total service population.
£In 2006, one large system with a population serving 6% of the total service population received a monitoring violation.

Table 3: The Number of Public Water Systems Beginning 2001 to 2007 with Contaminant and Monitoring Violations

System Begins (Year)	Compliance Period (Year)	Community						Non-transient non-community						Transient non-community						TOTALS					
		Systems	SS*	MCL	%	MR†	%	Systems	SS	MCL	%	MR	%	Systems	SS	MCL	%	MR	%	Systems	SS	MCL	%	MR	%
2001	2001	102	61%	1	1%	9	9%	29	100%	0	0%	16	55%	305	97%	18	6%	183	60%	436	89%	19	4%	208	48%
	2002	99	61%	0	0%	20	20%	26	100%	2	8%	12	46%	294	98%	28	10%	196	67%	419	89%	30	7%	228	54%
	2003	98	60%	0	0%	18	18%	23	100%	1	4%	10	43%	275	97%	19	7%	146	53%	396	88%	20	5%	174	44%
	2004	94	60%	1	1%	13	14%	19	100%	2	11%	10	53%	256	98%	17	7%	101	39%	369	88%	20	5%	124	34%
	2005	37	86%	1	3%	7	19%	19	100%	1	5%	9	47%	241	98%	17	7%	82	34%	297	97%	19	6%	98	33%
	2006	36	83%	2	6%	5	14%	19	95%	2	11%	8	42%	227	98%	14	6%	76	33%	282	96%	18	6%	89	32%
	2007	36	83%	1	3%	5	14%	15	93%	1	7%	7	47%	211	98%	11	5%	72	34%	262	96%	13	5%	84	32%
																						139		1,005	
2002	2002	54	76%	0	0%	22	41%	24	96%	5	21%	18	75%	148	98%	7	5%	83	56%	226	92%	12	5%	123	54%
	2003	53	75%	1	2%	19	36%	24	96%	4	17%	13	54%	140	98%	8	6%	92	66%	217	92%	13	6%	124	57%
	2004	52	75%	1	2%	8	15%	19	95%	0	0%	8	42%	136	98%	9	7%	67	49%	207	92%	10	5%	83	40%
	2005	36	86%	2	6%	7	19%	18	94%	0	0%	6	33%	130	98%	3	2%	47	36%	184	95%	5	3%	60	33%
	2006	34	85%	2	6%	5	15%	16	94%	0	0%	6	38%	120	99%	3	3%	45	38%	170	96%	5	3%	56	33%
	2007	35	80%	2	6%	7	20%	15	93%	1	7%	5	33%	114	99%	3	3%	30	26%	164	95%	6	4%	42	26%
																						51		488	
2003	2003	80	65%	1	1%	16	20%	10	100%	0	0%	6	60%	76	99%	4	5%	47	62%	166	83%	5	3%	69	42%
	2004	78	64%	5	6%	13	17%	9	100%	2	22%	5	56%	75	99%	10	13%	47	63%	162	82%	17	10%	65	40%
	2005	25	76%	5	20%	6	24%	9	100%	0	0%	4	44%	73	99%	5	7%	31	42%	107	93%	10	9%	41	38%
	2006	24	79%	5	21%	3	13%	9	100%	1	11%	5	56%	71	99%	1	1%	26	37%	104	94%	7	7%	34	33%
	2007	24	79%	3	13%	6	25%	9	100%	0	0%	5	56%	70	99%	3	4%	24	34%	103	94%	6	6%	35	34%
																						45		244	
2004	2004	53	92%	3	6%	31	58%	12	100%	0	0%	7	58%	87	99%	6	7%	47	54%	152	97%	9	6%	85	56%
	2005	53	94%	7	13%	11	21%	11	100%	1	9%	3	27%	86	99%	1	1%	35	41%	150	97%	9	6%	49	33%
	2006	38	95%	6	16%	6	16%	11	100%	1	9%	5	45%	84	99%	2	2%	39	46%	133	98%	9	7%	50	38%
	2007	38	95%	5	13%	7	18%	10	100%	1	10%	2	20%	83	99%	3	4%	24	29%	131	98%	9	7%	33	25%
																						36		217	
2005	2005	67	81%	3	4%	23	34%	15	53%	0	0%	5	33%	83	99%	8	10%	45	54%	165	87%	11	7%	73	44%
	2006	61	90%	4	7%	23	38%	15	53%	0	0%	8	53%	80	99%	11	14%	46	58%	156	91%	15	10%	77	49%
	2007	59	92%	1	2%	30	51%	15	53%	1	7%	7	47%	78	99%	8	10%	33	42%	152	91%	10	7%	70	46%
																						36		220	
2006	2006	38	95%	2	5%	21	55%	14	86%	1	7%	10	71%	77	100%	2	3%	46	60%	129	97%	5	4%	77	60%
	2007	38	95%	3	8%	16	42%	12	83%	1	8%	8	67%	77	100%	6	8%	39	51%	127	97%	10	8%	63	50%
																						15		140	
2007	2007	26	92%	2	8%	7	27%	10	70%	1	10%	3	30%	54	100%	2	4%	29	54%	90	94%	5	6%	39	43%

* *Small Systems (SS)* indicates percent of systems that serve less than 500 persons and operated during the indicated year.

Table 4: Comparison of Public Water Systems Beginning Operation Beginning 2005 to 2007 and All Public Water Systems Over the Last Three Years with Contaminant and Monitoring Violations

System Begins (Years)	Compliance Period (Years)	Community						Non-transient non-community						Transient non-community						TOTALS					
		Systems	SS*	MCL	%	MR	%	Systems	SS	MCL	%	MR	%	Systems	SS	MCL	%	MR	%	Systems	SS	MCL	%	MR	%
New Systems																									
2005-2007	2005-2007	132	87%	10	8%	76	58%	39	69%	3	8%	28	72%	214	100%	30	14%	147	69%	385	92%	43	11%	251	65%
All Systems																									
2005-2007	2005-2007	2,927	71%	300	10%	1,036	35%	822	82%	55	7%	337	41%	7,155	98%	563	8%	2,568	36%	10,904	90%	918	8%	3,941	36%

* *Small Systems (SS)* indicates percent of systems that serve less than 500 persons and operated during the indicated state fiscal year.

Figure 1: Community Systems Beginning 2001 Through 2007 with Contamination

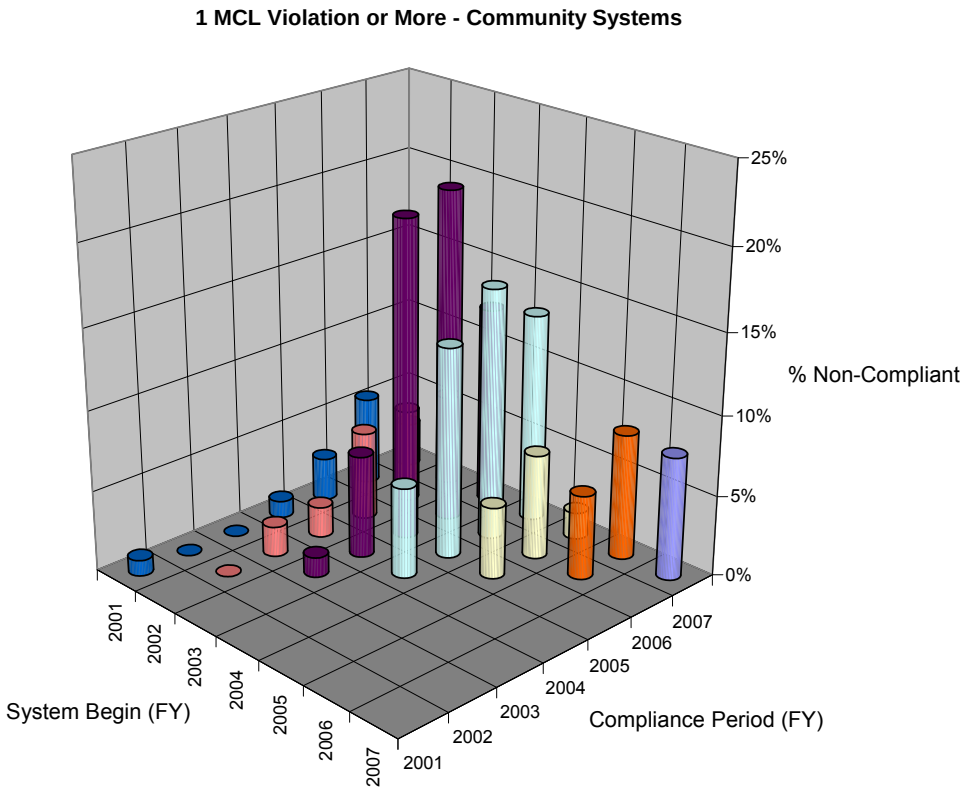


Figure 2: Community Systems Beginning 2001 Through 2007 with Monitoring Violations

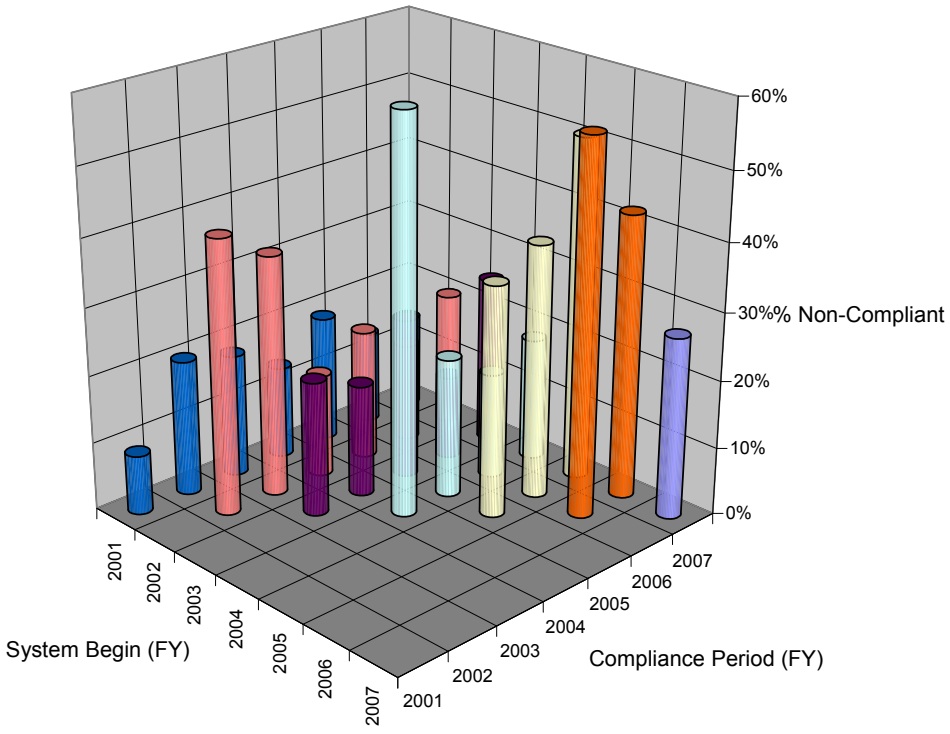


Figure 3: Non-transient non-community Systems Beginning 2001 Through 2007 with Contamination

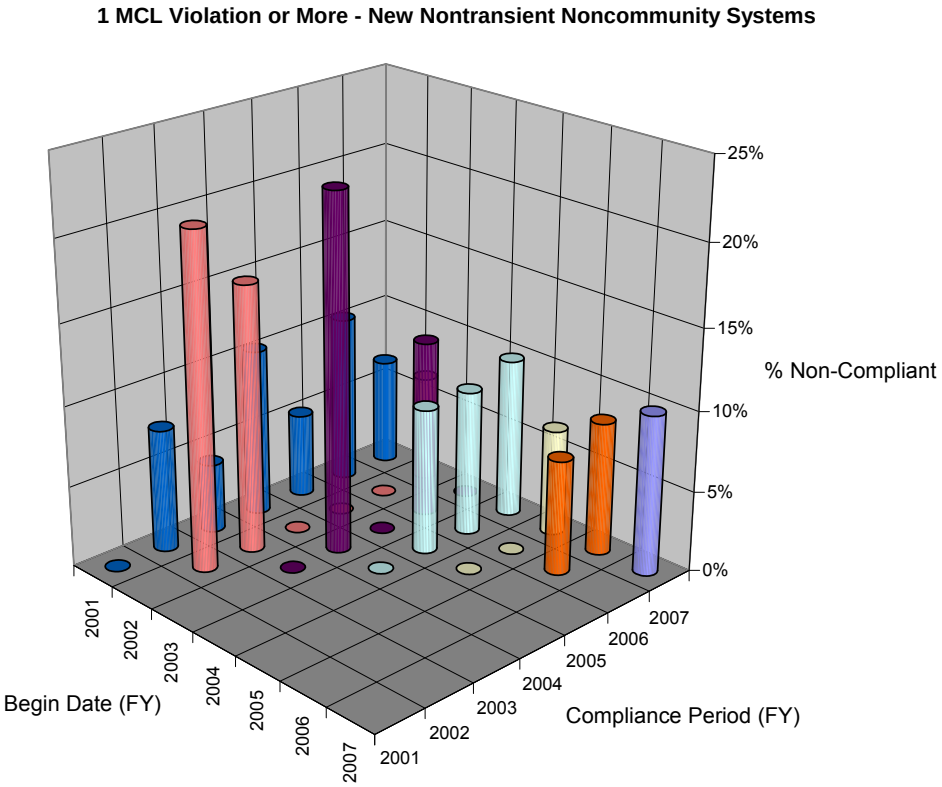


Figure 4: Non-transient non-community Systems Beginning 2001 Through 2007 with Monitoring Violations

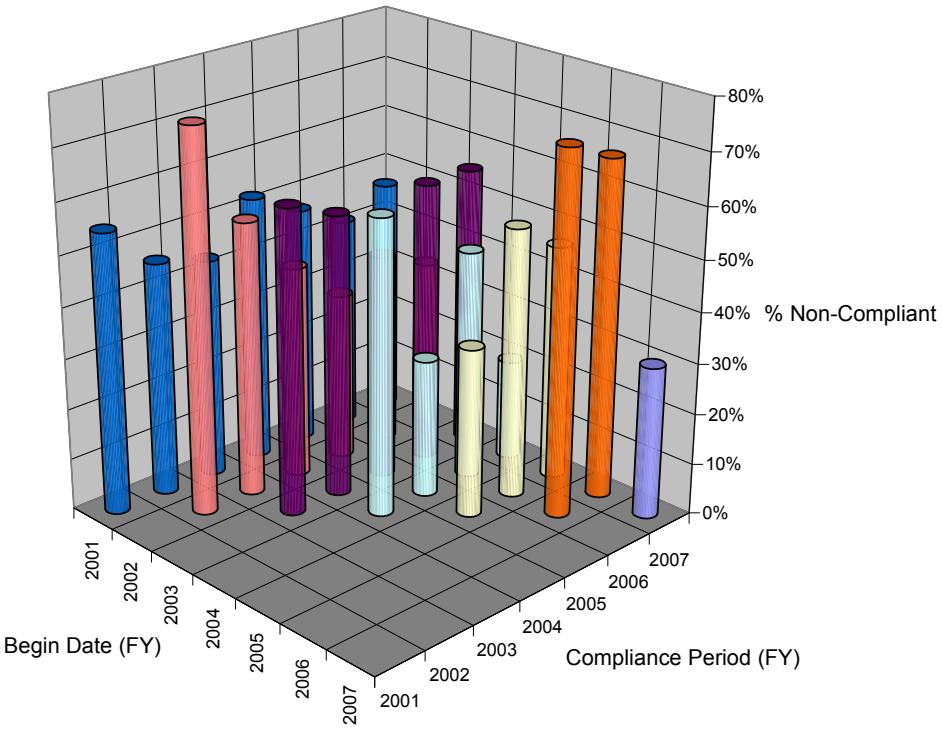


Figure 5: Transient non-community Systems Beginning 2001 Through 2007 with Contamination

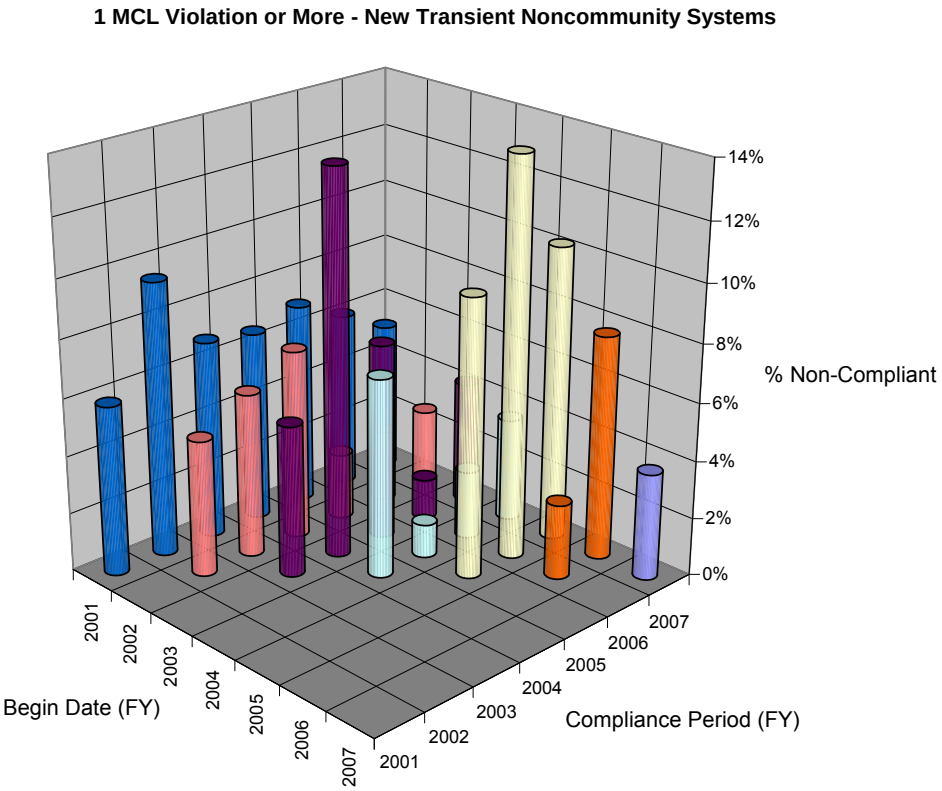
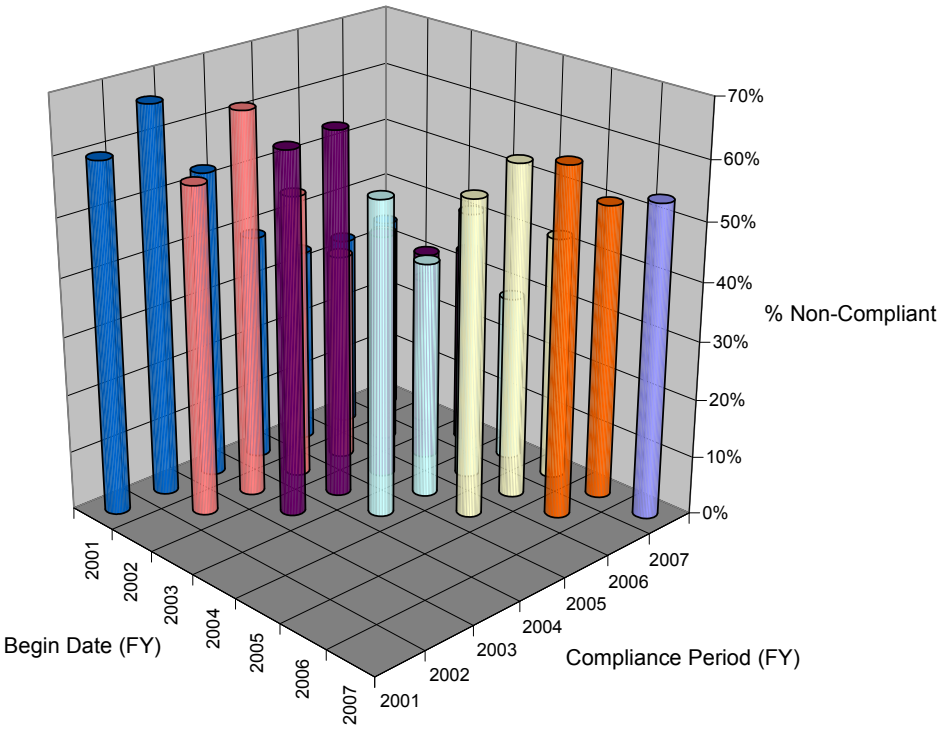


Figure 6: Transient non-community Systems Beginning 2001 Through 2007 with Monitoring Violations



II.B Program Development

Considering the number of small systems needing improvements in Capacity and the limited resources available, the PWS Section took steps regarding system viability that provided the foundation for a Capacity Development Program. A Viability Stakeholders group was formed in May 1995 to assess the operational needs of public water systems. In 1998, a Capacity Development stakeholder group was convened. From this group the Capacity Development rules evolved with temporary rules in place October 1, 1999. The final rules for the program were adopted August 1, 2000 (NCAC Title 15A, Subchapter 18C, .0300).

A comprehensive strategy was developed and implemented through an effort involving stakeholders, interested parties, sister agencies and PWS Section staff. Due to budgetary constraints, the coordination of this effort was provided by only one added position within the PWS Section as a Capacity Development Engineer. However, the entire section would be involved in implementing the goals of the program. New positions were added to the program in 2006 and 2007, including a Team Leader for Capacity Development and an engineering position with responsibilities split between Capacity Development and other program areas. The Team Leader will coordinate the program and provide guidance, while the other members of the Capacity Development team work with colleagues in the Public Water Supply Section to develop innovative approaches to improve water systems' compliance.

Training for the Capacity Development Program in April of 2000 included four one-day seminars that were co-sponsored by the PWS Section, the North Carolina Rural Water Association and the North Carolina Section of the American Water Works Association. More than 400 water system managers and operators attended these one-day seminars held in Asheville, Greensboro, Raleigh and Wilmington. The PWS Section also informed community and non-transient non-community water systems of the program through mailings and on its Internet site. Recent initiatives include monitoring guidance that has been developed for the PWS Section website and extensive outreach to water systems that had not yet completed Capacity Development requirements.

The entire PWS Section staff, both central and field office personnel, has continued to provide the energy and resources to make the Capacity Development Program a success. Several factors have been involved in ensuring the success of the program, including but not limited to the following:

- using an interactive stakeholder process in the adoption of new and revised rules, effective October 1999;
- training PWS Section staff and water system engineers, managers, and operators;
- increasing coordination within the branches of the PWS Section;
- instructing professional engineering organizations involved in plan preparation; and
- enhancing the PWS Section's on-line plan review tracking system.

The PWS Section believes this background continues to provide a strong foundation to ensure that public water systems are receiving the assistance needed to provide safe public drinking water for the citizens of North Carolina.

III. PROGRAM STRATEGY: *CAPACITY OBJECTIVES*

III.A Overview of Strategic Objectives

As reported in August 2000, the PWS Section met the challenge to improve Capacity of public water supply systems in North Carolina by taking a multi-track approach. This was due to the desire by the agency to focus on systems that were in greatest need of assistance. It was also based on budgetary limitations that would necessitate the PWS Section to center its efforts on improvements to systems that would provide the greatest public benefit.

One tool the PWS Section developed to make determinations regarding the Capacity of public water systems is the Water System Management Plan. This plan is a self-evaluation by a system of its Capacity. The plan is required for all new, altered or expanding community and non-transient non-community systems. The Water System Management Plan provides opportunity to evaluate and report on:

- ownership of the public water system;
- contractual arrangements regarding operation or interconnections;
- management structure, qualifications, and training;
- policies regarding the operation of the system; and
- financial information ensuring the continued viability of the system.

These considerations led the PWS Section to adopt the following strategic objectives:

A.1 New, Altered or Expanding Systems: The PWS Section recognized the difficulty of improving Capacity of a public water system **after** construction of a system had already taken place. In addition, systems that are changing their condition may be at greater risk of failure if proper planning and preparation is not done. Therefore, the PWS Section chose a strategy based on the requirement that all new and expanding community and non-transient non-community systems demonstrate Capacity **before** construction. The comprehensive requirements specified by the revised *Rules Governing Public Water Systems* now include the historical approval of engineering plans and specifications as well as certification that the following have been prepared:

- Water System Management Plan;
- Operation and Maintenance Plan (not submitted); and
- Emergency Management Plan (not submitted).

A.2 Existing Systems: On December 31, 2007, the state regulated 2,149 community systems, 491 nontransient, noncommunity systems, and 3,933 transient systems, and 120 water systems not recognized by federal regulations. There are a total of 6,693 regulated public water systems in North Carolina, 89 percent of which serve populations of less than 500 people. With regard to existing public water systems, the PWS Section realized that it had a well-established program that could identify and prioritize systems in need of improved Capacity. The PWS Section expects that focusing on candidates identified from these sources would provide the most benefit to existing systems in greatest need of improving Capacity. Determination for the type of assistance would be done on a case-by-case basis. The PWS Section expects that the Water System Management Plan will be another extremely useful tool in clarifying the causes of non-compliance. Systems could be identified from:

- US Environmental Protection Agency's (EPA) significant non-compliance list;
- sanitary surveys and technical assistance; and
- administrative penalties.

A.3 Improving Coordination*:* The PWS Section recognized opportunities among its own branches and programs to improve coordination in an effort to make the Capacity Development Program more successful. There has been a concerted effort to better coordinate internal activities in order to improve the efficiency of many of the regulatory functions. The Capacity Development Program is being used as the fulcrum in providing the leverage to implement some of these changes, as is highlighted in Section III.B.3 of this report.

III.B Efficacy of Strategies

The following is a discussion on the effectiveness of the strategies the PWS Section has implemented to improve the Capacity of public water systems.

B.1 Strategy Efficacy - New, Altered or Expanding Systems

The plan review process was revised to accommodate the new Capacity Development Program. The following procedure is now in place to ensure that the Capacity of public water suppliers exists before construction:

- The applicant submits an Engineer's Report, engineering plans and specifications, and a Water System Management Plan;
- If the Engineer's Report is complete and the engineering plans and specifications meet all requirements, the PWS Section approves engineering plans and specifications;
- When, in addition to having approved plans and specifications, the PWS Section determines that the Water System Management Plan is complete, the PWS Section issues an Authorization to Construct letter and the system begins construction;
- The applicant prepares or updates an Operation & Maintenance Plan and an Emergency Management Plan for the system;
- The applicant submits an Engineer's Certification and an Applicant Certification;
- The PWS Section issues a final approval letter; and
- The new construction, alteration or expansion project is placed into service.

Requiring the submission of a complete Water System Management Plan for review as part of the plan approval process should ensure that any new or expanding public water system is demonstrating the Capacity necessary to operate viably. Starting from the adoption of the rules in October 1999 through December 2007, the PWS Section has accepted Water System Management Plans for approximately 1,520 public water systems. To reduce the administrative burden on the owners of public water systems, the capacity development rules allow a single Water System Management Plan for multiple systems owned by the same person or legal entity. Table 4 indicates that relative to existing systems, new systems struggle to meet monitoring and reporting requirements. The PWS Section is currently developing outreach for new water systems.

During the approval process, a new or expanding public water system is also required to submit an Applicant Certification. This document certifies that the owner has developed an Operation and Maintenance Plan, an Emergency Management Plan, and has an appropriately licensed operator acting as the Operator in Responsible Charge (ORC). This certification step in the approval process has accomplished a great deal in developing Capacity. It has allowed systems to exhibit the requirements of operating and maintaining the system before it is available for public use. It also allows systems to provide the forethought of managing emergency or disaster events concerning the public water system. With this requirement, the PWS Section is building a strong foundation regarding recent security concerns and has provided a good starting point for systems to meet federal requirements for disaster preparedness for public water systems.

B.2 Strategy Efficacy - Existing Systems

The PWS Section has started to identify systems using information generated from program activities throughout the Section. The systems in greatest need of improving their Capacity based on performance with respect to their compliance with state and federal monitoring requirements for water quality testing are identified using information available within the PWS Section.

Sampling Status Report: The PWS Section first made the Monitoring Status and Sampling Schedule Report available in 1999. During the year 2005, drinking water data were migrated to the Safe Drinking Water Information System (SDWIS) and the report was replaced by Drinking Water Watch. Drinking Water Watch provides extensive data on water system inventory, sampling and compliance. Many small water systems requested a simpler report focusing on sampling records alone. This report was developed in 2007 and was posted to the PWS Section's public website in 2008. The report summarizes monitoring schedules for different water systems and shows the number of samples received during the current monitoring period. It allows water systems to collect samples properly and to receive credit for those samples.

Compliance Inspection Report: The PWS Section developed a Compliance Inspection Report to be used during site visits by agency staff. These reports may be used to document that the system is in compliance with the *Rules Governing Public Water Systems* or may serve as a field-generated Notice of Violation. This report has been in use since July 2000 and has improved the efficiency of communicating systems deficiencies to owners and operators, as well as reducing the requirement of formal letter generation, thus saving resources.

Technical Assistance from the North Carolina Rural Water Association: The PWS Section has a contractual agreement with the North Carolina Rural Water Association (NCRWA) to provide technical assistance to small water systems (less than 10,000 people) through a circuit rider. This circuit rider receives system referrals from the PWS Section as well as requests for assistance from other sources. During 2007, the circuit rider assisted 139 systems with issues such as compliance and treatment, operation and maintenance, water loss and leak detection, management techniques, and emergency response. Beginning in 2007, the Capacity Development Program began referring new community and non-transient non-community water systems to the Circuit Rider. The Circuit Rider conducts initial visits to referred water systems to explain monitoring requirements and to promote the systems' compliance.

List of Significant Noncomplier Systems: The United States Environmental Protection Agency's list of water systems in significant non-compliance is being used to determine systems that may benefit from the Capacity Development Program. The PWS Section has established the Capacity Development Committee to improve the PWS Section's capacity to provide timely and appropriate enforcement actions that incorporates the review of water systems in significant non-compliance and develops strategies to return systems to compliance.

Administrative Penalties: The PWS Section has an established enforcement program for issuing Administrative Orders and Administrative Penalties to public water systems that violate the *Rules Governing Public Water Systems*. The consequence for continued non-compliance has been assessment of a penalty. Through FY 2006, the Compliance Services Branch of the PWS Section issued consolidated penalties that addressed monitoring deficiencies for all contaminant groups for systems considered to be "Significant Non-Compliers."

Beginning in 2007, the Compliance Services Branch has accelerated its enforcement procedures. For monitoring violations, penalties quickly follow notices of violation issued for each contaminant group and each compliance period. For maximum contaminant level (MCL) violations, a combination notice of violation/administrative order is initially issued with a compliance deadline specified. Follow-up notices of violation are issued each compliance period that the system exceeds the MCL. Failure of a system to comply with the conditions in the administrative order within reasonable timeframes will result in the issuance of an administrative penalty.

During 2007, 119 Administrative Orders and 505 Administrative Penalties were issued to systems. Approximately $143,438 was assessed during 2007.

B.3 Strategy Efficacy – Improving Coordination

The following highlights how the associated programs and initiatives within the PWS Section are being used in coordination with the Capacity Development Program.

Technical Assistance to Small Water Systems: The ongoing updates to the Safe Drinking Water Act have added tremendously to the responsibilities and workload of public water system personnel. All areas of water system operation have increased in complexity. Water system officials have called on the state for assistance more than ever before. The result is limited assistance available to water systems and the public. During FY 2007, approximately 57 field personnel provided technical assistance to systems during 7,910 on-site contacts, 3,012 of which were sanitary surveys.

Transient non-community Water Systems: From the inception of the Safe Drinking Water Act in 1974, the very small transient non-community water systems have been a concern. Examples of the transient water systems include churches, gas stations, restaurants, highway rest stops, and state parks. For states with large numbers of transient systems such as North Carolina, funding was not provided to adequately address the transient water system problem. For years, North Carolina implemented the drinking water program in accordance with the "Priorities Guidance" from EPA, which focused the limited program resources available on the most significant issues leaving little time for oversight of the transient water systems. The State Revolving Fund set aside for State Program Management provided North Carolina with the opportunity to initiate oversight and enforcement activities of the transient systems to include:

- identifying transient non-community water systems not on inventory;
- verifying and maintaining the transient non-community water system inventory;
- performing initial sanitary surveys and follow-up surveys every 10 years;
- conducting compliance and enforcement work including automated violation letters;
- issuing boil water notices and performing follow-up actions; and
- providing technical assistance.

One staff position has been created in the central office and staff positions have been created in each regional office to monitor and assist transient systems. Central office activities include inventory coordination and updating, training and regulatory consultation to system owners and operators, compliance and enforcement activities, and development and oversight of related computer programming. Additional duties in the regional offices include:

- providing on-site technical assistance;
- providing transient non-community inventory updates, site visits and consultation as follow-ups to contamination;
- conducting sanitary surveys;
- issuing boil water notices;
- assisting with public notice of contamination; and
- providing training.

During 2007, the PWS Section performed 2,529 site visits to transient water systems. In addition to transient system work, some technical assistance activity was performed for all other types of public water systems. Recent statutory increases to the operating permit fee structure were phased in through 2007 and early 2008 and several new positions provided have been filled. The additional staff resources provided will allow significant progress to be made on specific needs of water systems including technical assistance to new water systems, audits of operation and maintenance plans and emergency management plans, and lead and copper compliance audits.

Lead and Copper Rule Activities: Many water systems have struggled to understand and to comply with all requirements of the Lead and Copper Rule. Regional office staff has developed detailed audit procedures to ensure that lead and copper sampling is being conducted appropriately. The Compliance Services Branch of the PWS Section has developed educational and outreach materials pertaining to this rule.

In 2006, the PWS Section required water systems to submit Lead and Copper sample siting plans and the PWS Section developed a pilot Lead and Copper audit program. During Lead and Copper audits, Regional Office Staff reviews sampling histories and sampling records with water system representatives. Water systems that are found to be deficienct in lead and copper compliance have been returned to more frequent monitoring schedules often requiring sampling from an increased number of sampling locations. Staff also educates water systems on lead and copper monitoring requirements. During calendar year 2007, the PWS Section conducted 74 lead and copper audits.

Compliance Services Branch staff reviews system sampling histories and sample siting plans to ensure that all initial sampling requirements have been met prior to a system being placed on a reduced monitoring schedule. If a system has been found to be deficient in completing initial sampling requirements, the system's reduced monitoring status is revoked and the system is returned to a standard monitoring schedule to complete the requirements that were missed. Additional efforts include:

- placing forms and guidance on site selection and monitoring on the PWS Section website to simplify and expedite communications with water systems;
- providing training for other PWS Section staff, water systems, and stakeholder groups; and
- targeting education and assistance to several large water systems to resolve questions regarding lead and copper monitoring and water quality parameter monitoring requirements.

Compliance Services Branch Initiatives: The Compliance Services Branch of the PWS Section has developed several initiatives that complement the goals of the Capacity Development Program. They have been aimed at improving the efficiency of compliance reporting requirements of public water systems. The initiatives are also improving the issuance and tracking of enforcement activities, as well as the overall administration of the PWS Section's compliance program. These initiatives include:

- sending letters and sample schedules explaining monitoring requirements to all new systems;
- placing public notices on the PWS Section website;
- preparing and distributing annual "Regulatory Updates" to each water system by type;
- standardizing laboratory reporting forms (including training and workshops for laboratories);
- mailing unsatisfactory analyses back to laboratories and supplying copies to the North Carolina Laboratory Certification Program;
- continually clarifying and revising enforcement letters (Notices of Violation, Administrative Orders and Administrative Penalties) and using standardized templates for their ease of preparation;
- creating new staff positions to perform database queries that more closely track systems with violations;
- including required forms for public notification as attachments to violation letters;
- enforcing non-compliance more strictly;
- improving the tracking and follow-up of contaminant violations by carefully reviewing remedial plans submitted by water systems;
- incorporating remedial plans and public notices into enforcement proceedings;
- automating daily identification of public water systems exceeding bacteriological and nitrate/nitrite contaminant violations and weekly identification of those systems required to increase monitoring due to detection(s) of volatile organic compounds, synthetic organic compounds, inorganics, and nitrates/nitrites;
- developing contact protocols for interaction with sister agencies such as Children's Environmental Health and Dairy and Food Protection Branches

North Carolina's Source Water Program: The PWS Section continued to improve and implement items in accordance with North Carolina's approved Source Water Assessment Program (SWAP) during 2007. SWAP reports for every drinking water source in the state were refined using updated data sets for potential contamination and raw water quality. The new assessments are currently available to the public via the PWS Section's geographic information application, SWAPinfo (http://www.deh.enr.state.nc.us/pws/swap). The information on this website is available for water system owners, operators, local governments, volunteer organizations, and citizens to develop and implement source water protection strategies. The results of the Source Water Assessment Program, along with voluntary source water protection activities, will enhance the capacity of public water systems to meet safe drinking water standards.

The Source Water Protection Program is designed to promote efforts at the local level that result in the creation of source water protection plans. Technical assistance is readily available to any public water provider wishing to develop a source water protection plan. Additional information, including a comprehensive guidance document, is available on the PWS Section website.

The Source Water Protection Program has been actively promoted throughout the state to encourage development of local level SWP plans. This effort includes presentations and consultations with local government officials, public water providers, and stakeholder groups. To date, five public water providers and one regional collaborative have formally agreed to participate in the NC's voluntary Source Water Protection Program. These water providers serve a combined population of over 400,000 consumers. In cooperation with NCRWA, source water protection plans have been initiated for these participants.

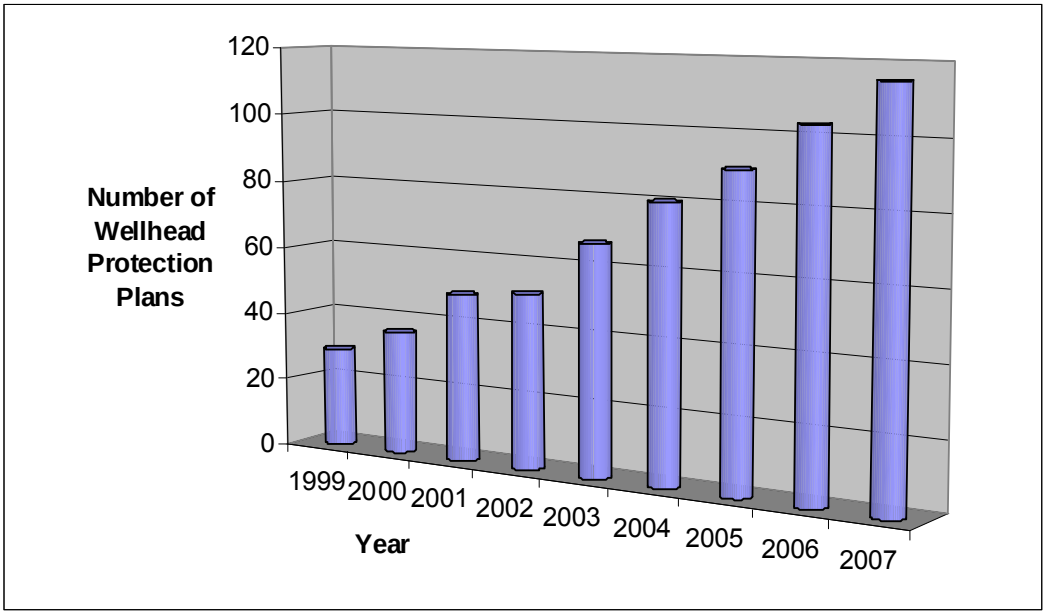
The PWS Section has initiated efforts to introduce drinking water protection into the agendas of other agencies and programs. The emphasis has been to identify such programs, develop a relationship, and establish drinking water protection as a priority concern. In the coming years, these interactions will likely have major impact on statewide drinking water protection efforts. Participating agencies not only promote source water protection, but also finance environmental projects consistent with drinking water objectives.

In cooperation with the US Environmental Protection Agency, the PWS Section has created a new low-interest loan program to assist communities with land conservation projects. The intent of such projects must be protection and conservation in ways that safeguard a public drinking water source. Additionally, the community must complete comprehensive source water protection planning to qualify for the loan program. Land acquisition projects financed with this program must be protected with a conservation easement.

North Carolina's Wellhead Protection Program: The Safe Drinking Water Act Amendments of 1986 established requirements for States to develop Wellhead Protection Programs. These Programs were intended by Congress to be a key part of a national ground-water protection strategy to prevent contamination of ground waters that are used as public drinking water supplies. North Carolina's EPA-approved Wellhead Protection Program is part of this national strategy. The North Carolina Wellhead Protection Program is a pollution prevention and management program designed to protect ground-water sources of public drinking water supply. Public water supply systems that choose to participate in the Program develop and submit a local Wellhead Protection plan to the PWS Section for review and approval.

In North Carolina, development of a local Wellhead Protection plan is not mandatory but rather, is viewed as a valuable supplement to existing State ground-water protection programs. North Carolina's Wellhead Protection Program is intended for city and county governments and water supply operators that decide to provide added protection to their local ground-water supplies. Upon implementation the local Wellhead Protection Plan reduces (but does not eliminate) the susceptibility of wells to contaminants.

Figure 7: Cumulative Wellhead Protection Plan Approvals



Since taking over the Program, the PWS Section has received 165 local wellhead protection plans submitted for review and approval. Of these, 125 have received approval. Ten of these 125 approvals were renewals or updates of previously approved plans. This brings the total number of public water supply systems in North Carolina with State approved wellhead protection plans to 115. The majority of the remaining plans are under active review. Active review involves determining if the Wellhead Protection plan submittals meet the criteria established under North Carolina's EPA-approved Program (e.g., wellhead protection area delineation, potential contamination source inventory, management plan, contingency plan, public participation, etc.). This activity involves the generation of review letters requesting additional information, the correction of deficiencies, or clarification with regard to the submitted information and often involves meetings held with the applicants and/or their consultants. The 115 PWS systems with approved local wellhead protection plans comprise 612 PWS wells serving a population of 709,277. It is expected that these plans will assist greatly in improving the Capacity of public water systems in North Carolina. Through the Drinking Water State Revolving Fund, the state provides funding to the North Carolina Rural Water Association for two positions to assist local governments in the development of these plans.

Operator Certification and Training: The State of North Carolina has approximately 4,634 certified water system operators who possess approximately 6,340 active operator certifications. North Carolina is responding to the need to provide certification and training to these operators by providing an active certification program. A network of volunteer and member organizations conducts the training portion of the program. The PWS Section together with the North Carolina Waterworks Operators Association (NCWOA), NCRWA, and the North Carolina American Water Works Association coordinate schools, seminars, workshops, and conferences. This program has successfully increased the capacity of public water systems by directly influencing the training and certification provided public water system operators. Through the Expenditure Reimbursement Grant from EPA, the state provides funding to the NCWOA for a training coordinator position and for the NCWOA newsletter.

IV. PROGRAM SUCCESS: *CAPACITY IMPROVEMENTS*

IV.A Indicators for Measuring Capacity Improvement

The August 2000 report, "North Carolina's Capacity Development Strategy for Existing Public Water Systems," discussed indicators the PWS Section is using to determine the progress of its Capacity Development Program as follows:

> "The primary component of North Carolina's capacity development program is evaluation of technical, managerial and financial capacity during the planning stages of new construction, expansion or system alteration. Therefore a key indicator of water system capacity is compliance with the requirements specified in Section .0300 of the *Rules Governing Public Water Systems*. Specifically the PWS Section plans to use existing databases to track the following information for public water systems:
>
> - Number of public water systems with approved plans and specifications;
> - Number of public water systems with a complete Water System Management Plan (WSMP);
> - Number of public water system projects with a submitted Engineer's Certification to document that the system is constructed in accordance with approved plans and specifications;
> - Number of public water system projects with an Applicant Certification to document that the system has an Operation and Maintenance Plan and an Emergency Management Plan; and
> - Number of Public Water Supply systems that have an appropriate certified operator in responsible charge.
>
> The above information, in addition to compliance information will be used to measure improvements in capacity.
>
> Also, the PWS Section will track the number of water supply intakes with complete Wellhead Protection Plans and/or Source Water Assessments as a measure of improved capacity."

The PWS Section has therefore adopted the following approach in determining the effectiveness of the Capacity Development Program:

- *Progress*: Progress in the Capacity Development Program is defined as improving the technical, managerial, and financial viability of an increasing number of public water systems;
- *Measuring Progress*: Measuring progress will be accomplished by tracking the number of public water systems that have completed the requirements of the Capacity Development Program as specified in the rules;
- *Benchmark Figures*: The benchmark figures against which this progress is to be measured are the completion rates of the program requirements of the first period of the program (October 1, 1999 to June 30, 2000). The goal of each year is to surpass the completion rate of the previous year. It is expected that an ever-increasing number of public water systems will have completed the requirements of the program.

Supporting activities for Capacity development include Compliance and Enforcement, Wellhead Protection Plans and Source Water Assessments. The PWS Section is looking at ways in which information from these activities can be used to enhance the Capacities of regulated water systems.

IV.B Current Status: Facts and Figures

Table 5 is a summary of the numbers of systems that have completed these specific Capacity Development Program activities and provides the percent completed compared to the total community and non-transient non-community systems. In previous reports, Capacity Development measures were presented on a fiscal year basis. In the current report, measures for all years have been recalculated based on calendar years.

Table 5: Capacity Development Measures

10/1/99 through:	Total Number of Community and Non-transient non-community Systems	Systems with Plans Submitted		Systems with Plans Approved		Systems Covered by Complete Water System Management Plans		Systems with Engineer's Certification		Systems with O&M and EM Plans*		Systems with Final Approval**	
		#	%	#	%	#	%	#	%	#	%	#	%
Dec. 31, 2000	3,093	548	17.7	467	15.1	847	27.4	142	4.6	38	1.2	41	1.3
Dec. 31, 2001	3,132	765	24.4	656	20.9	970	31.0	335	10.7	84	2.7	95	3.0
Dec. 31, 2002	3,110	916	29.5	778	25.0	1,055	33.9	478	15.4	188	6.0	189	6.1
Dec. 31, 2003	3,095	1,076	34.8	901	29.1	1,340	43.3	605	19.5	310	10.0	298	9.6
Dec. 31, 2004	3,051	1,212	39.7	1,011	33.1	1,405	46.1	719	23.6	441	14.5	429	14.1
Dec. 31, 2005	2,797	1,312	46.9	1,119	40.0	1,453	51.9	840	30.0	538	19.2	549	19.6
Dec. 31, 2006	2,765	1,400	50.6	1,210	43.8	1,500	54.2	941	34.0	711	25.7	727	26.3
Dec. 31, 2007	2,721	1,479	54.4	1,290	47.4	1,521	55.9	1,081	39.7	998	36.7	958	35.2
Increase from 1st period†		931	36.6	823	32.3	674	28.5	939	35.1	960	35.4	917	33.9

*Tank rehabilitation projects do not require an Applicant Certification or a WSMP. A water system may receive Final Approval for a tank rehabilitation project based on a valid Engineer's Certification only.

**It is important to note that not all projects are built during the same fiscal year that plans are approved and that an Authorization to Construct is issued. An Authorization to Construct is valid for a period of two years. Some projects which receive this authorization are not constructed.

† % value indicates the increase in the percentage of public water systems that have completed the particular capacity development measure indicated since the 1st period (October 1, 1999 through December 31, 2000).

‡ The number of systems covered by complete WSMPs has been updated to include multiple systems under single ownership with a master WSMP.

"*Systems with Plans Submitted*" means the number of systems with at least one set of engineering plans and specifications submitted for review during the indicated period.

"*Systems with Plans Approved*" means the number of systems with at least one set of engineering plans and specifications reviewed and approved during the indicated period.

"*Systems with Water System Management Plan Complete*" means the number of systems with at least one WSMP completed during the indicated period.

"*Systems with Engineer's Certification*" means the number of systems having at least one engineer's certification during the indicated period that a project was constructed according to approved plans and specifications.

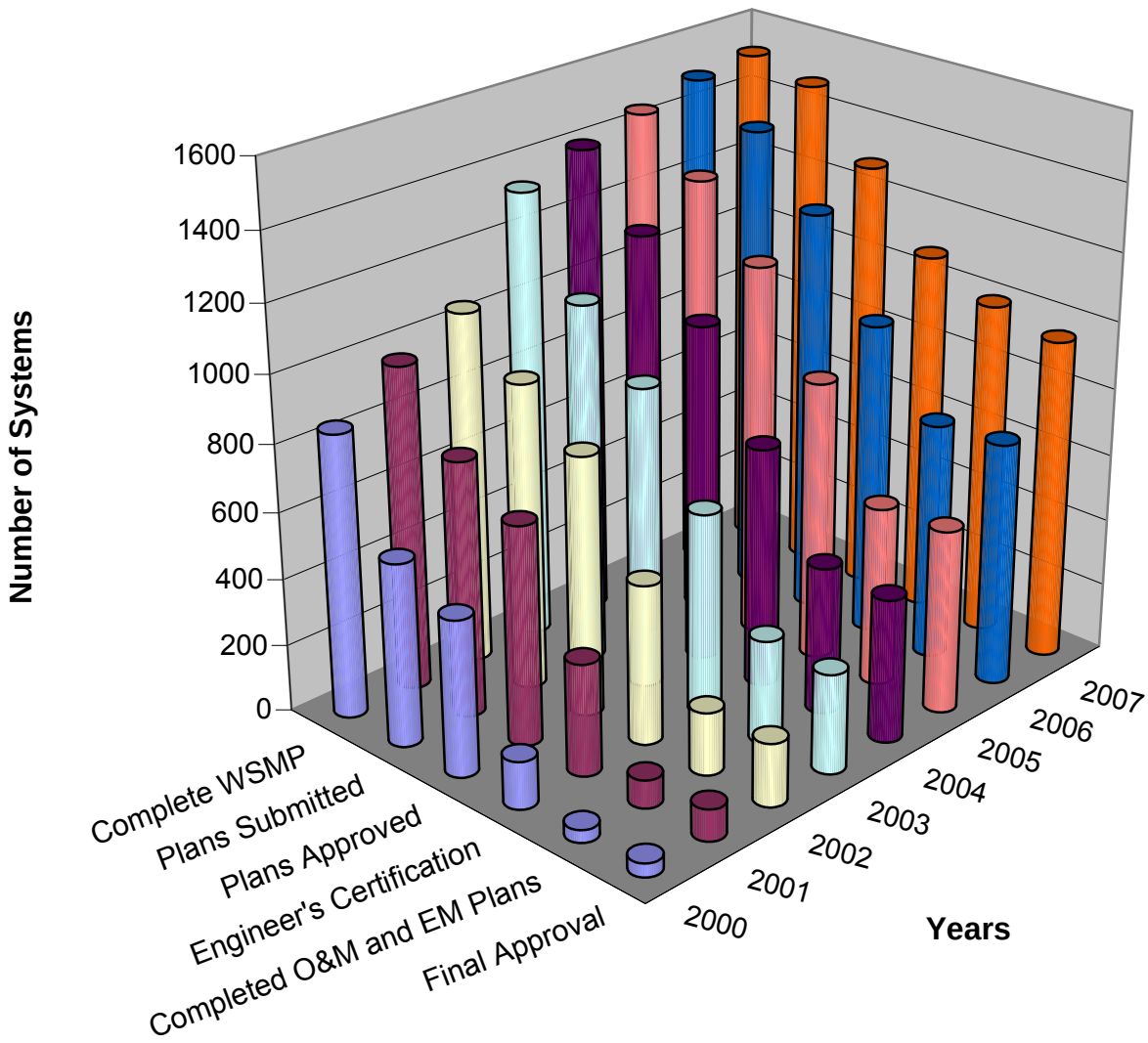
"*Systems with O&M and EM Plans"* means the number of systems having at least one applicant certification during the indicated period that a project had an operation and maintenance plan and an emergency management plan..

"*Systems with Final Approval"* means the number of systems meeting all our capacity development requirements during the indicated period and for which a permit to operate was issued.

Table 5 is summarized graphically in Figure 8 in order to illustrate the number of systems that have submitted plans to the PWS Section; obtained plan approval; and have developed Water System Management Plans, Operation & Maintenance Plans, and Emergency Management Plans; and have received final approval for projects.

Currently, the individual plan review engineer checks plan submittals to ensure a current Water System Management Plan is on file or is being submitted with the application. In the later case, the plan review engineer reviews the Water System Management Plans for completeness.

Figure 8: Capacity Development Measures

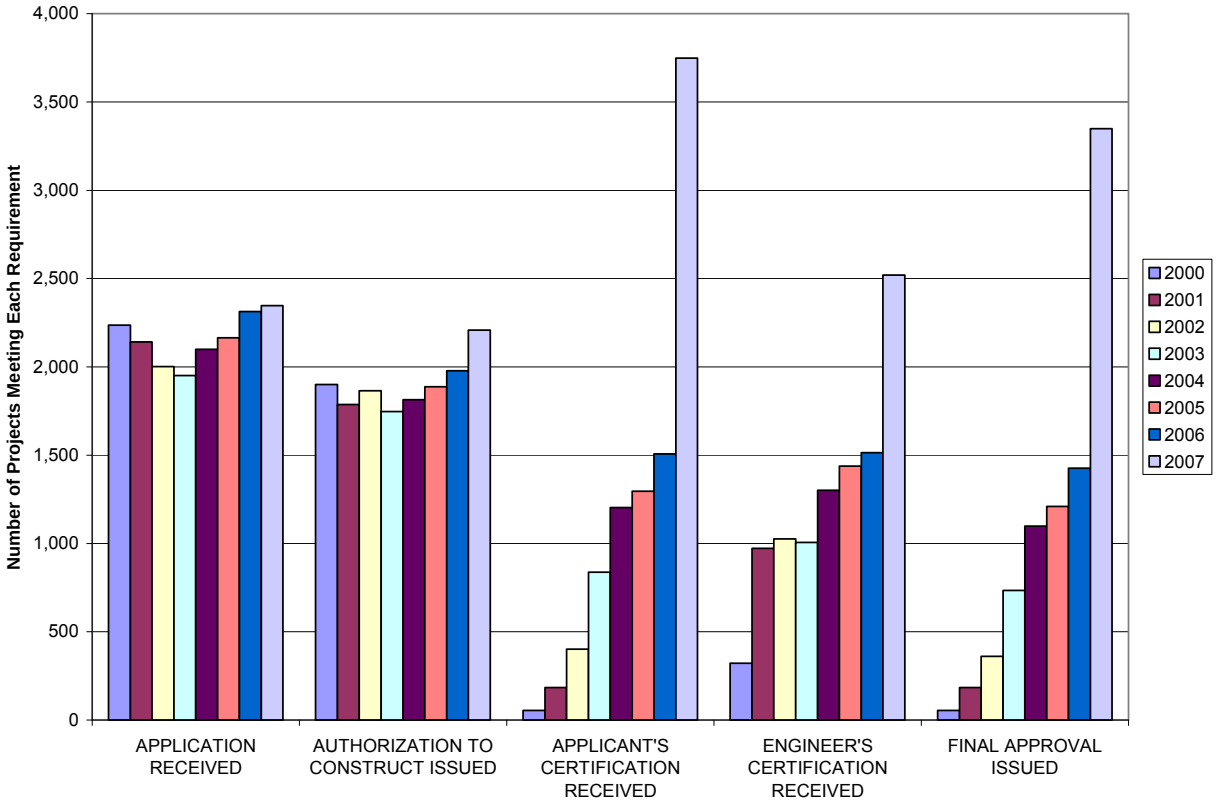


"*WSMP*" indicates the documentation of the Water System Management Plan.
"*O&M Plan*" indicates Certification of the completion of an Operation and Maintenance Plan
"*EM Plan*" indicates Certification regarding the completion of an Emergency Management Plan
"*Final Approval*" indicates the completion of the requirements of the Capacity Development Program.

IV.C Discussion of Progress

As demonstrated in Figure 8, the Capacity Development Program has allowed the PWS Section to make steady progress in assuring that an increasing number of public water systems have evaluated their Capacity. Since 1999, approximately 1,500 systems entered the plan evaluation process with a total of 958 of these systems completing all of the requirements necessary to reach final approval status. As of December 31, 2007 approximately 1,520 systems were covered by a WSMP self-assessment deemed satisfactory by the State. Multiple systems under single ownership, including those not expanding, may be covered by one master WSMP. Each year, more systems complete the Capacity Development Program. However, many systems that began the plan evaluation process have not achieved final approval status. In 2007, the PWS Section has begun developing a process to review the records, to identify non-compliant systems and to notify them of their requirements. As shown in Figure 9, approximately twice as many final approvals were issued in 2007 as in 2006. This increase represents significant progress. More applications for plan approval are received every day and the PWS Section must continue significant effort to see continued progress.

Figure 9. Number of Projects Meeting Capacity Development Measures



Completion of the Capacity Development Program requirements indicates that a public water system has completed Operation & Maintenance and Emergency Management Plans. These plans are not only invaluable tools for the proper maintenance of the system, but they also provide incentive for the system to prepare for emergency and disaster events. With this requirement, the PWS Section built a strong foundation regarding recent security concerns and federal requirements for vulnerability assessments and disaster preparedness for public water systems.

The PWS Section is very pleased with the progress of the Capacity Development Program to date. The numbers show that there has been much effort and activity toward accomplishing the requirements of the program to assist in improving the Capacity of public water systems in North Carolina. The numbers also show that there is much more to do.

V. PROGRAM DIRECTION: *CAPACITY INITIATIVES*

V.A New Challenges and Opportunities

The PWS Section has been able to identify several challenges through the implementation of its Capacity Development Program. The greatest challenge facing the agency is how to identify and assist the individual needs of the smaller public water suppliers (those serving less than 500 people). These small systems are faced with a wide range of hurdles in attaining adequate Capacity as compliant water suppliers. Also, as mentioned previously, the resources necessary for the PWS Section to assist these systems presents a challenge.

The PWS Section wants to provide assistance to all public water systems regardless of size. Some of the opportunities that are available include:

- **Emergency Management**: North Carolina received an initial grant during 2002 and subsequent State Territorial Assistance Grant amendments through federal fiscal year 2007 from the USEPA to initiate and maintain state level activities and/or strategies that assist in emergency planning and response. Beginning in 2005, PWS Section staff received training in the National Incident Management System (which includes Incident Command System components). The PWS Section has devoted significant staff time to emergency response preparedness and coordination. Staff has participated in seminars, Table Top exercises, workshops and web casts sponsored by organizations such as the National American Water Works Association (AWWA), the Disaster Preparedness Committee (DPC) of North Carolina Section of the AWWA, EPA, and ASDWA.

  Two key activities were completed during calendar year 2007. These include an Emergency Planning and Response guidance document for use by PWS Section staff, and training guidance for conducting Table Top exercises.The Emergency Planning and Response guidance document focuses on intentional contamination incidents directed at public water systems. This document is designed for PWS Section staff coordinating response activities with other state agencies. Although the completed guidance document is deemed sensitive and is not available to the general public, a sanitized version has been created and may be loaned in controlled circumstances. The guidance document includes 10 detailed scenarios, classified either as simple, intermediate, or enhanced table top exercises. The PWS Section intends to utilize this Guidance document to further the preparedness of public water systems across the state.

  An Intermediate Level Table Top exercise was conducted on August 30, 2007. This exercise introduced the response concepts available in the guidance document. Participants included representatives of state agencies, local agencies, and EPA Region IV offices with likely response roles in an intentional contamination incident. All participants had extensive interaction and learned valuable response techniques.

- **Improved Database Management:** The Public Water Supply Section successfully completed data migration from our traditional data management system (FOCUS) to EPA's Safe Drinking Water Information System (SDWIS) in April 2006, with deployment to the web version in April 2007. Migration to the new environment has improved the Section's capacity by reducing our dependency on the knowledge base of key individuals while at the same time providing increased functionality.

- **Central Coastal Plain Capacity Use Area:** This area, located in Eastern North Carolina, is underlain by Cretaceous aquifers that are threatened by excessive

groundwater withdrawal and by saltwater encroachment. Systems that withdraw more than 100,000 gallons per day are required to begin curtailing water production by as much as 25 percent by 2008 with future reductions up to 75 percent by 2016. Access to alternative water sources was funded to meet public demands. Strategies for managing demands while meeting withdrawal reductions included construction of new surface water treatment plants, interconnects with other systems, drought management planning and preparation of water conservation plans. A significant portion of available Drinking Water State Revolving Funds were allocated to systems meeting these challenges. The majority of projects identified have been initiated with several nearing completion. In the coming years, customers of the affected water systems will experience financial impacts of the capital improvements.

- **2007 Infrastructure Needs Survey Strategy:** Water systems make significant investments to construct and manage infrastructure in order to deliver safe drinking water and protect public health. Every four years, EPA with the assistance of states, conducts a survey of the anticipated costs of these investments and reports the results to Congress. The results also determine the amount of funding North Carolina receives for its Drinking Water State Revolving Fund program, which funds the types of projects identified in the survey. Prior to the 2007 Infrastructure Needs Survey, the PWS Section provided information, training, and technical assistance in Capital Finance Planning including management of critical assets. Initially the focus was on large and selected medium sized systems. After completion of the 2007 survey, outreach efforts will include the remainder of the medium systems and small systems as resources allow. The results of the 2007 Infrastructure Needs Survey should be available in mid 2009.

- **Additional Infrastructure Needs in North Carolina:** Water systems in North Carolina will require significant updates to infrastructure in the coming years. The cost of needed infrastructure has been estimated in the EPA Infrastructure Needs Survey and the North Carolina Rural Economic Development Center's Water 2030 Study. The Water 2030 Study (developed in 2005) focused primarily on rural water systems in North Carolina and estimated that water systems would require $7.64 billion in capital improvements to meet needs between the year 2005 and 2030. The 2003 Infrastructure Needs Survey allowed more replacement of a water system's existing infrastructure, and estimated that water systems would require $11 billion in capital improvements by 2023.

  Water system infrastructure across the state is aging and many components will require replacement in the coming years. Maintenance on water treatment plants and water lines cannot be deferred indefinitely. As material costs increase, replacement costs may be significantly greater than previously estimated. Growth and the demands of an ever-increasing population will strain water system budgets even further. The U.S. Census Bureau estimates that the population in North Carolina will have increased 50 percent over 2000 levels by 2030. State and local governments must prepare carefully to meet upcoming water system needs.

- **Disadvantaged Communities Program:** Many systems, especially small ones, lack the resources needed to provide consistent safe drinking water to the public as required by EPA. This frequently results in long-term non-compliance. The PWS Section has developed a strategy to consolidate "problem" systems with more reliable water suppliers in the immediate vicinity. The pilot for the development of this program was funded by state unanticipated bond grant monies. The North Carolina Disadvantaged Community Program eliminates by consolidation non-viable public water systems. In this context a Disadvantaged Community is defined as a community served by a public water system that lacks capacity as defined the Safe Drinking Water Act, Sections1420 and 1452 (a)(3).

Principal forgiveness loans are made to the most appropriate water system having capacity that is willing to take over the failing system. In most cases this consists of a project to run supply to and replace the distribution system in the Disadvantaged Community public water system. These projects will be initiated by PWSS and thus no application is necessarily required. Less than 30 percent of the Capitalization Grant will be dedicated to the Disadvantaged Community Program. The amount will depend on the ability of the PWS Section to identify these projects and secure agreements from both systems in each case. Such agreement shall constitute readiness to proceed for these projects. This amount shall be considered as part of the funds for standard projects and will not be differentiated until committed.

- **New System Assistance:** From the current data analysis, systems that began operation within the last three years appear to have highly variable annual compliance levels as well as difficulty complying with monitoring and reporting requirements of "*The Rules Governing Public Water Systems.*" During 2007, Circuit Riders with the North Carolina Rural Water Association began visiting new water systems to educate such systems on monitoring and operations requirements. The PWS Section continues to investigate new system progress and is developing ways to provide more focused assistance to new systems during their early years of operation.

- **Operator Certification**: The United States Environmental Protection Agency's guidelines require that all community and non-transient non-community public water systems be operated by a certified Operator in Responsible Charge (ORC) or risk withholding of 20 percent of the State Revolving Fund Capitalization Grant. This mandate provides an opportunity to improve Capacity for these existing systems. The PWS Section expects the smaller systems to benefit greatly by having trained operators managing these systems. To assist small systems (serving 3,300 persons or less) with resources needed for initial training and continuing education to acquire or maintain certification, the state provides reimbursement for this training through the Expenditure Reimbursement Grant from EPA. Funding for this grant is currently slated to expire January 1, 2011.

V.B Future Reports

Section 1420(c)(3) of the 1996 Safe Drinking Water Act Amendments require that:

> *"Not later than 2 years after the date on which a State first adopts a capacity development strategy under this subsection, and every three years thereafter, the head of the State agency that has primary responsibility to carry out this title in the State shall submit to the Governor a report that shall also be available to the public on the efficacy of the strategy and progress made toward improving the technical, managerial, and financial capacity of public water systems in the State."*

The PWS Section must provide the governor of the State of North Carolina with the required report on the dates specified, starting from September 30, 2002 (2005, 2008…), until otherwise notified by EPA. The PWS Section plans to prepare an updated report annually and publish it on its web site at: **http://www.deh.enr.state.nc.us/pws.**

VI. PUBLIC AVAILABILITY OF THE 2008 CAPACITY DEVELOPLMENT REPORT

As required by the EPA, the PWS Section makes this report available to the public. The Internet web page of the PWS Section contains a link to the report. The web page can be found at:

http://www.deh.enr.state.nc.us/pws

This Internet web page also has links to the following supporting documentation and recent reports regarding the Capacity Development Program of the North Carolina PWS Section:

North Carolina's Capacity Development Report for Public Water Systems, November 2007.

North Carolina's Capacity Development Report for Public Water Systems, September 2006.

North Carolina's Capacity Development Report for Public Water Systems, September 2005.

North Carolina's Capacity Development Report for Public Water Systems, September 2004.

North Carolina's Capacity Development Report for Public Water Systems, September 2003.

North Carolina's Capacity Development Report for Public Water Systems, September 2002.

North Carolina's Capacity Development Strategy Implementation Report, August 2001.

North Carolina's Capacity Development Strategy for Existing Public Water Systems, August 2000.

Appendix A

Figure A.1: Water Systems with MCL Violations Since 1999, Grouped by Water System Type

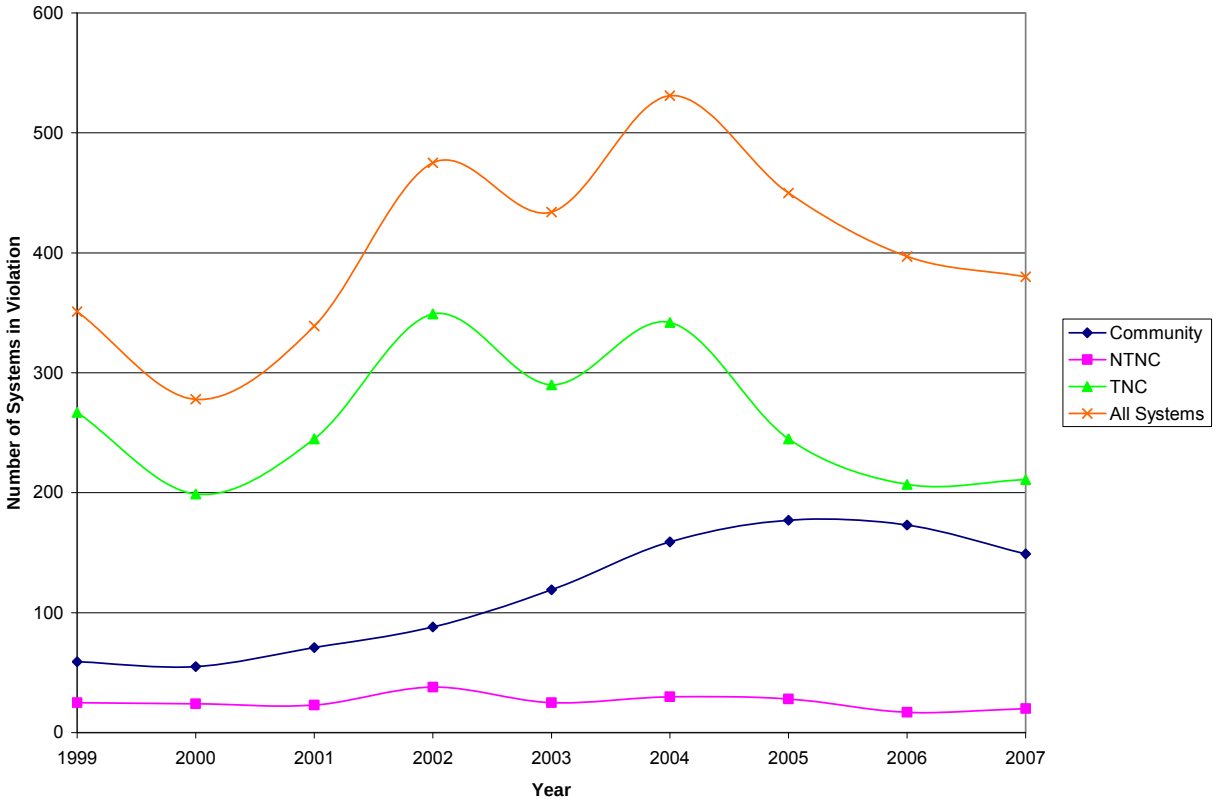


Figure A.2: Water Systems with MR Violations Since 1999, Grouped by Water System Type

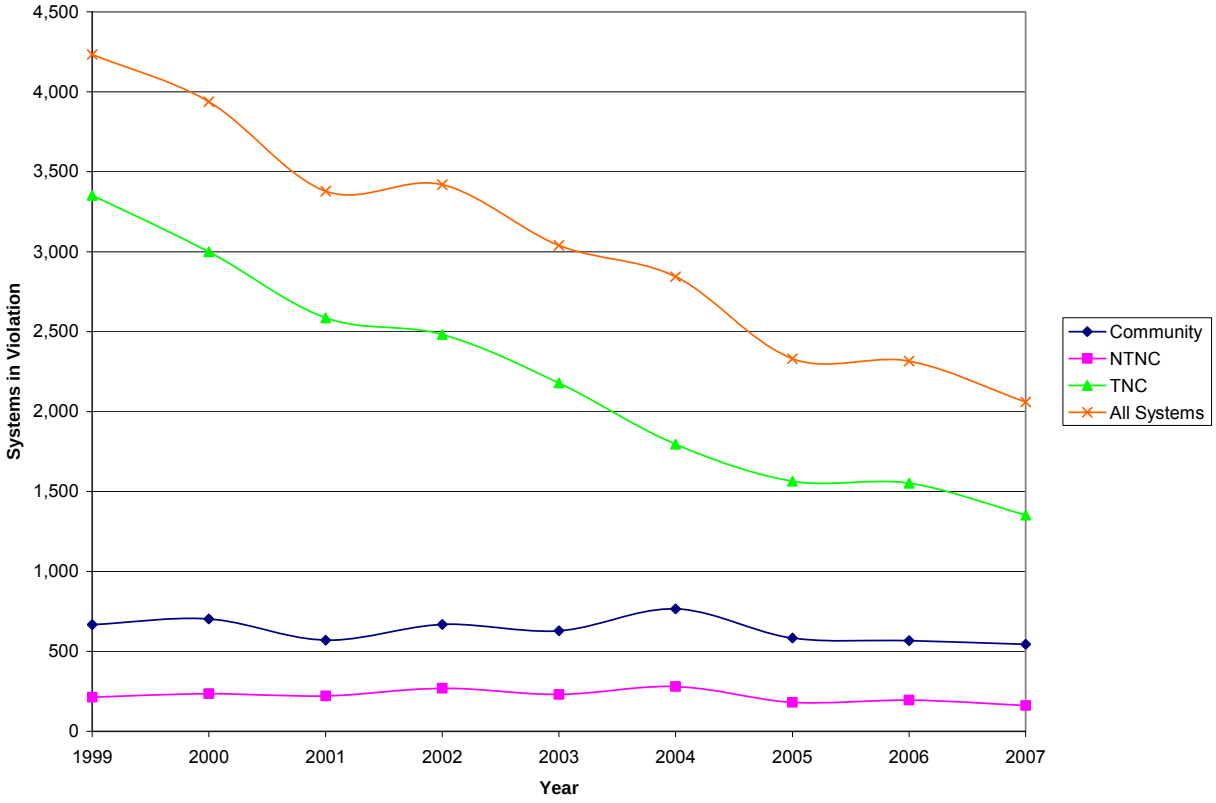


Figure A.3: Community Water Systems with MCL Violations Since 1999, Grouped by Population

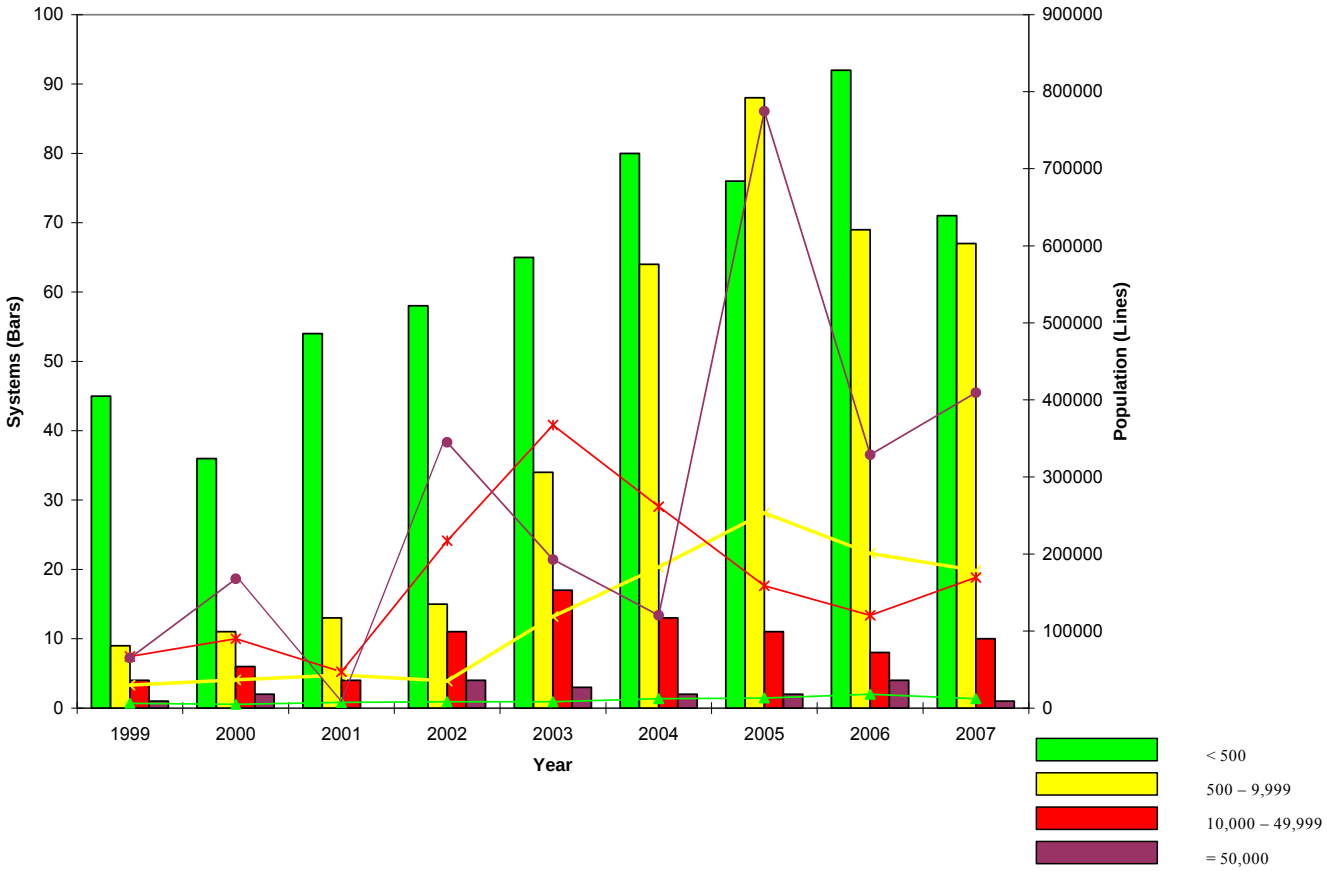


Figure A.4: Community Water Systems with MR Violations Since 1999, Grouped by Population

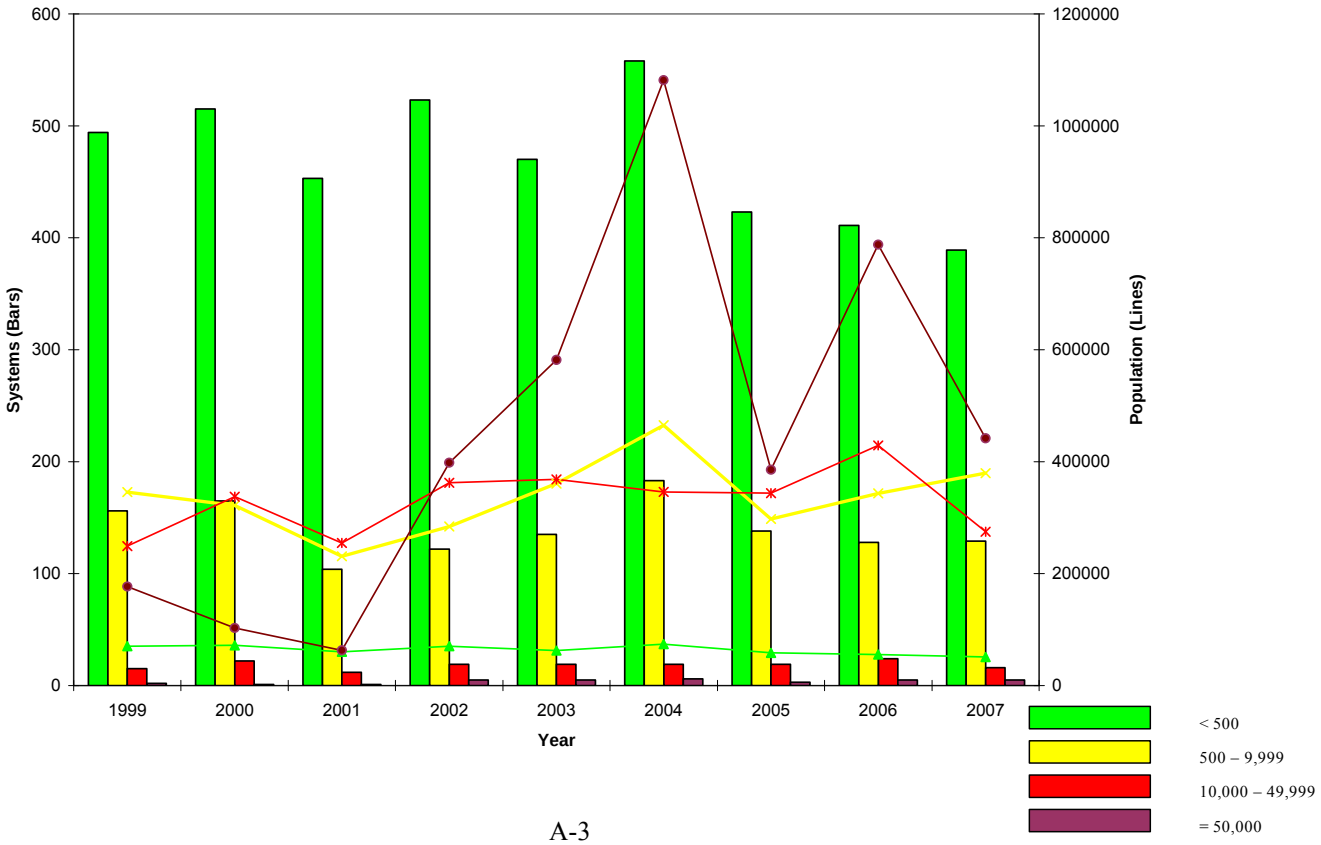


Figure A.5: Community Water Systems with MCL Violations Since 1999

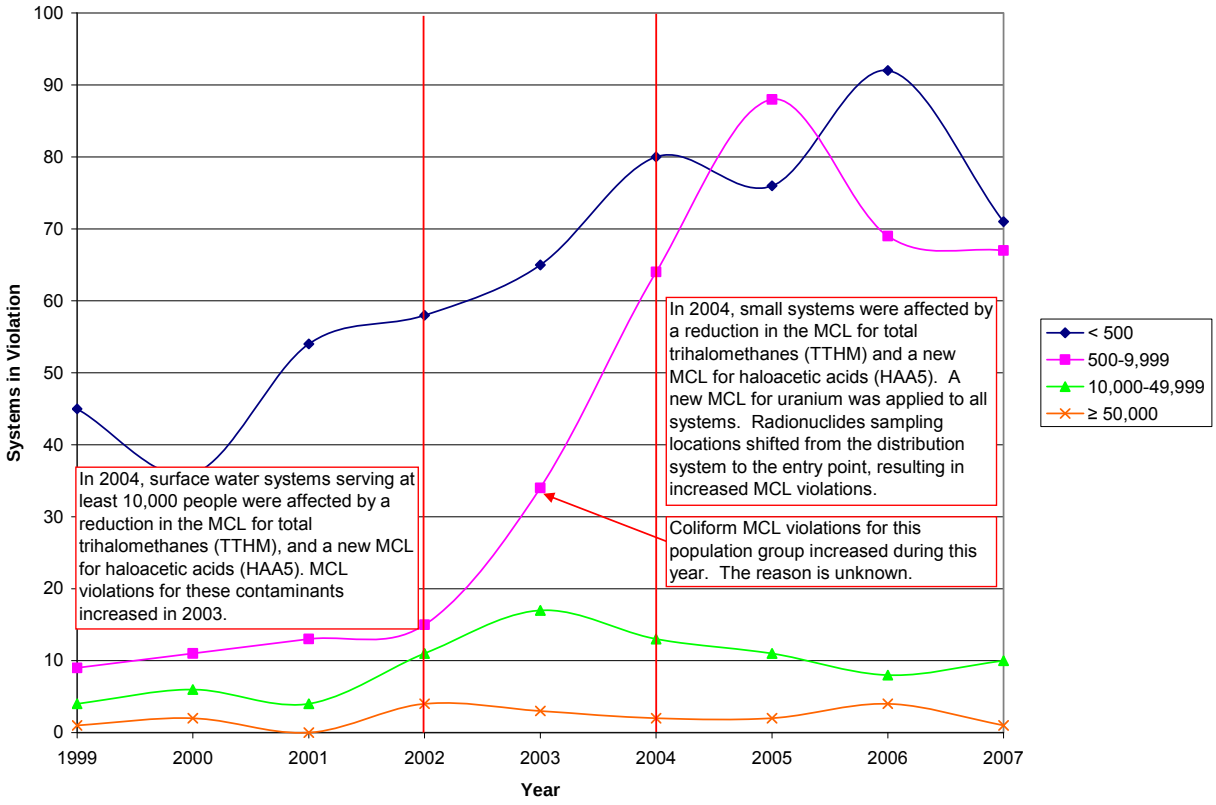


Figure A.6: Community Water Systems with MR Violations Since 1999

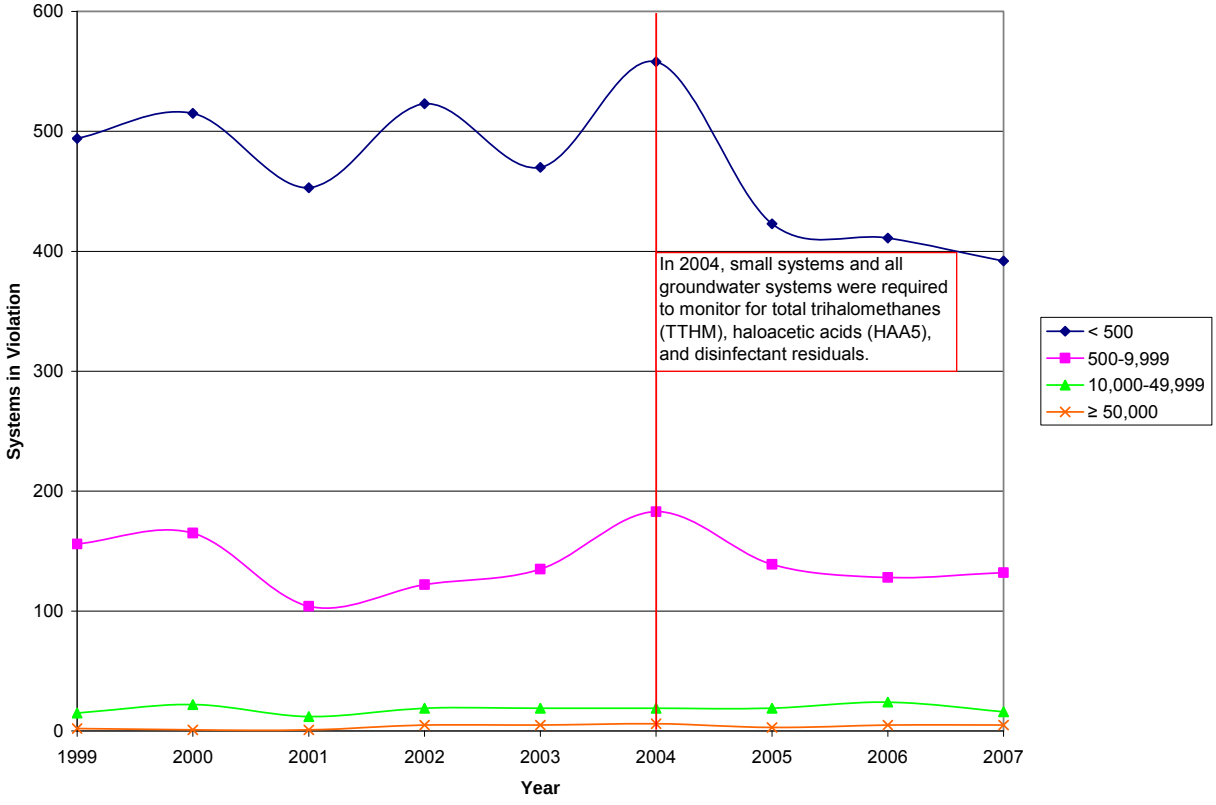


Figure A.7: Non-transient non-community Water Systems with MCL Violations Since 1999

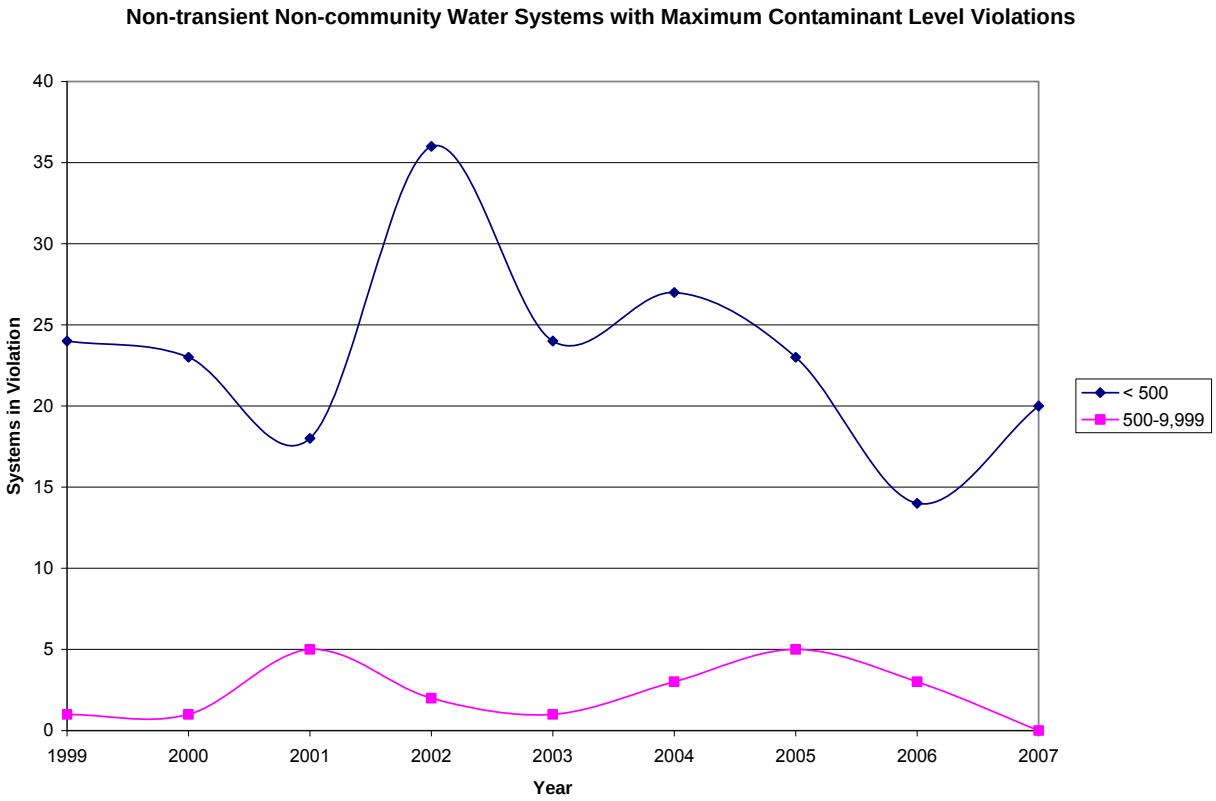


Figure A.8: Non-transient non-community Water Systems with MR Violations Since 1999

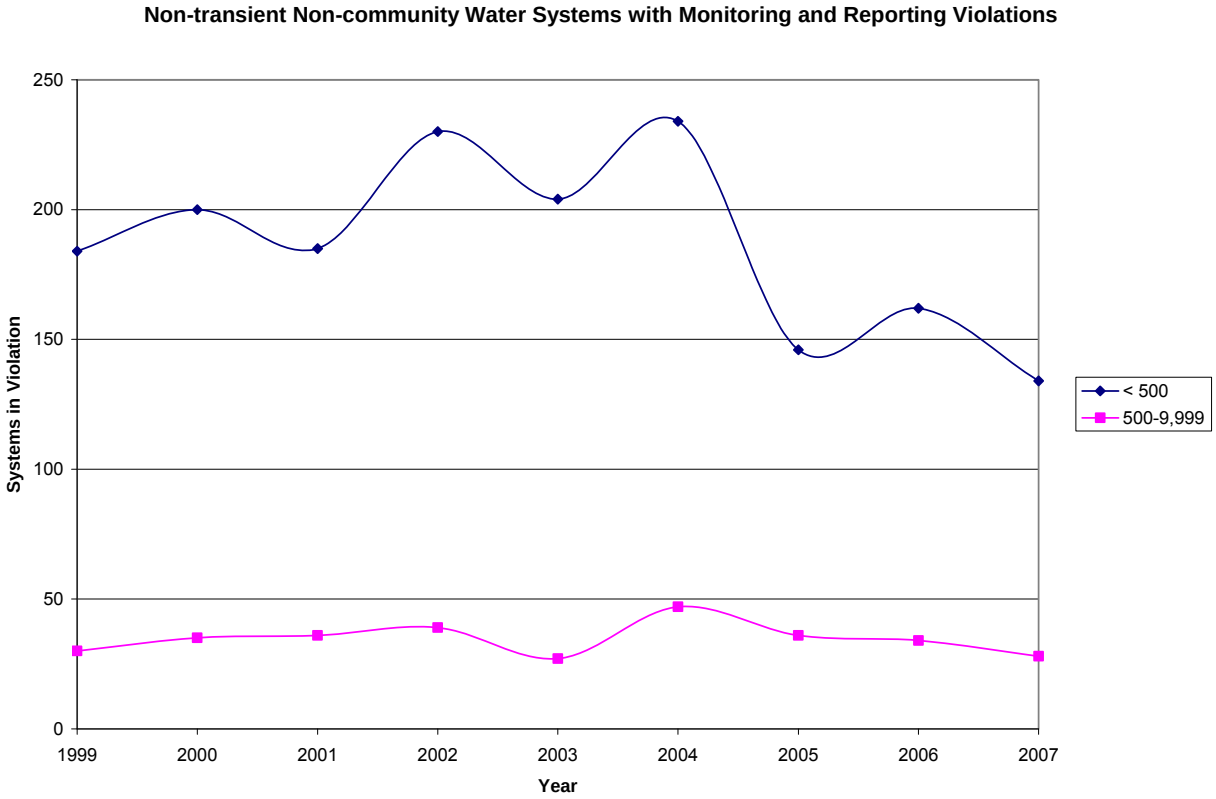


Figure A.9: Transient non-community Water Systems with MCL Violations Since State FY 2000

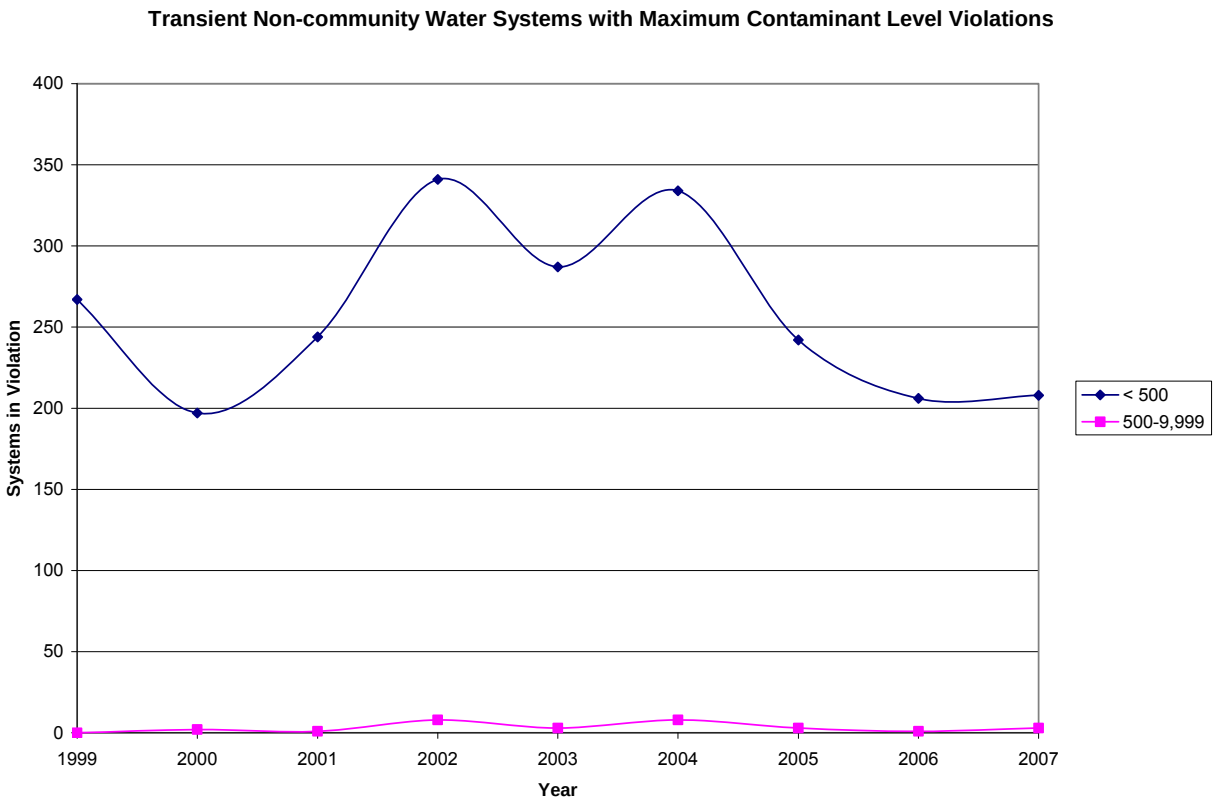


Figure A.10: Transient non-community Water Systems with MR Violations Since State FY 2000

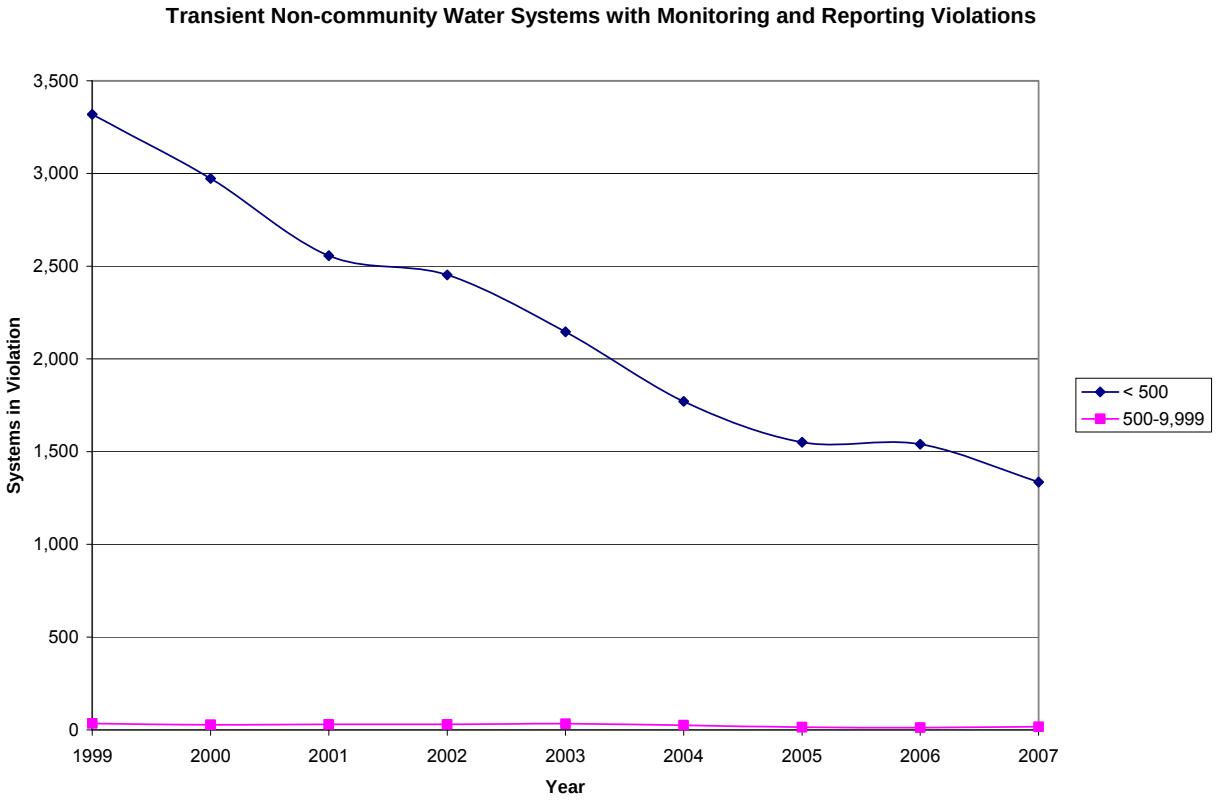


Figure A.11: Water Systems with MCL Violations Since 1999, Grouped by Population

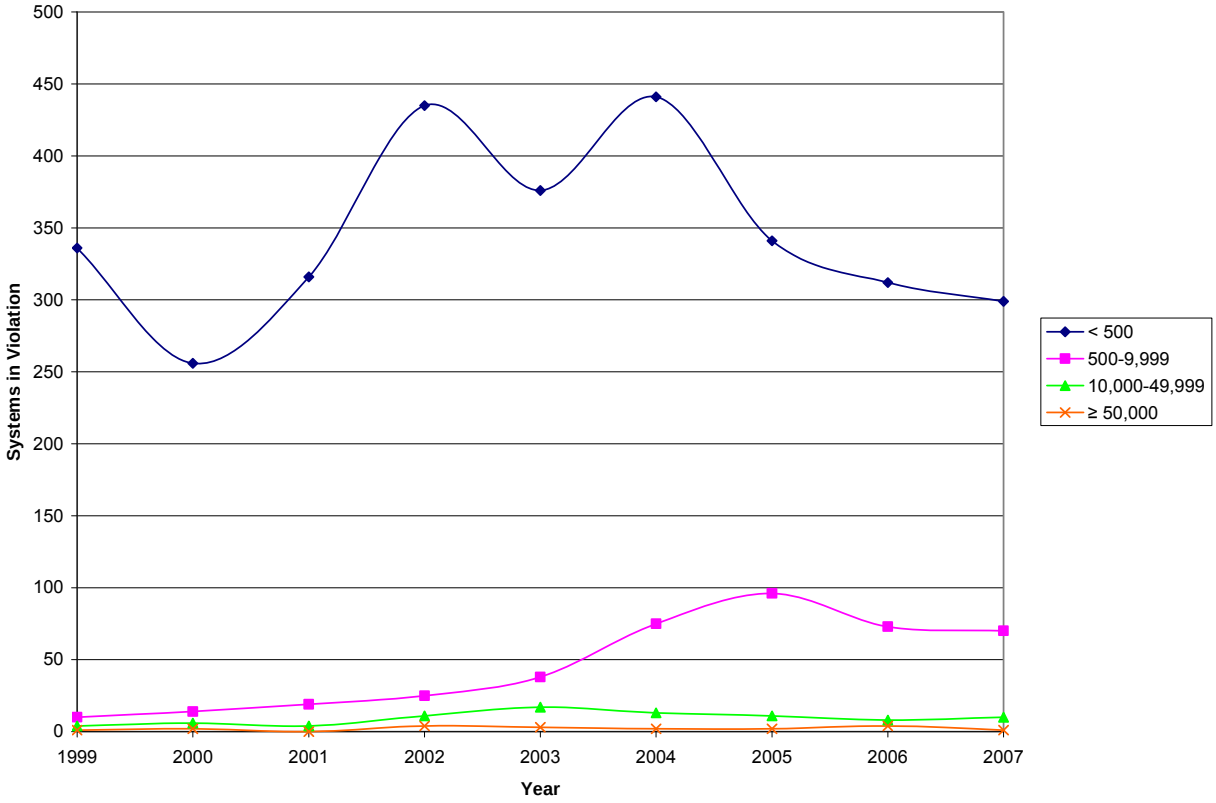
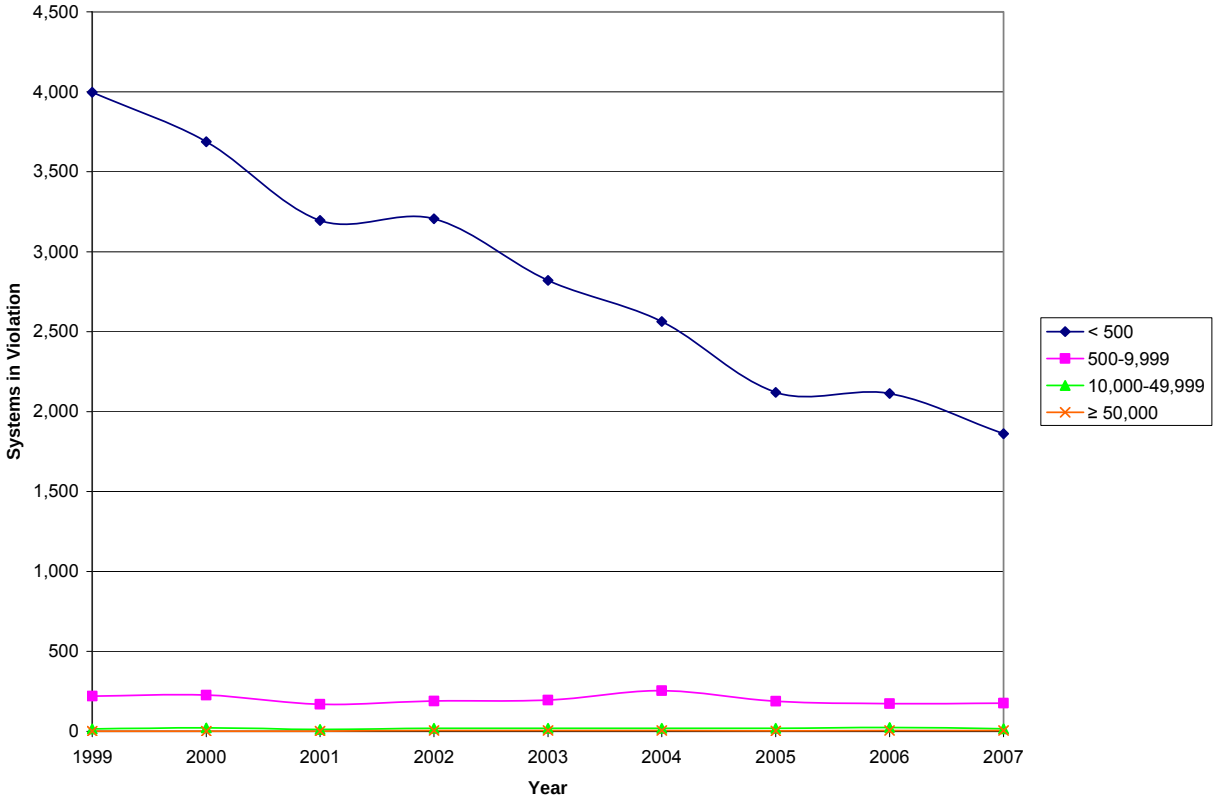


Figure A.12: Water Systems with MR Violations Since 1999, Grouped by Population



Appendix B

Table B.1: Schedule of New Rule Implementation by EPA

Calendar Year	Rule	New Monitoring Requirements	New Level (MCL or Treatment Technique) Requirements	System Description
2002	Arsenic		MCL lowered from 0.05 mg/l to 0.01 mg/l	CWS, NTNCWS
2002	Disinfectants and Disinfection Byproducts Rule (DDBP)	THM and HAA quarterly sampling	THM MCL lowered from 0.10 mg/L to 0.080 mg/L as a running annual average (RAA). HAA MCL established at 0.060 mg/L as RAA.	CWS, NTNCWS Subpart H, population >= 10,000
2002	DDBP	Disinfectant residual monthly sampling (with TCR schedule)	Chlorine and chloramines maximum residual disinfectant level established at 4.0 mg/L as RAA	CWS, NTNCWS Subpart H, population >= 10,000
2002	DDBP	TOC monthly monitoring	Treatment technique for TOC removal; ratio of actual to required removal >= 1.00 as RAA	CWS, NTNCWS Subpart H, population >= 10,000
2002	DDBP	Bromate monthly monitoring	Bromate < 0.010 as RAA	CWS, NTNCWS Subpart H using ozone, population >= 10,000
2002	Interim enhanced Surface Water Treatment Rule (IESWTR)	Profiling and benchmarking		All system types Subpart H, population >= 10,000
2002	IESWTR	Turbidity	Maximum turbidity level lowered from 5 NTU to 1 NTU. 95% turbidity level lowered from 1 NTU to 0.3 NTU.	All system types Subpart H, population >= 10,000
2004	DDBP	THM and HAA quarterly or annual sampling	THM MCL lowered from 0.10 mg/L to 0.080 mg/L as RAA. HAA MCL established at 0.060 mg/L as RAA.	CWS, NTNCWS Subpart H including populations < 10,000; Groundwater
2004	DDBP	Disinfectant residual monthly sampling (with TCR schedule)	Chlorine and chloramine maximum residual disinfectant levels established at 4.0 mg/L as RAA	CWS, NTNCWS Subpart H including populations < 10,000; Groundwater
2004	DDBP	TOC monthly monitoring	Treatment technique for TOC removal; ratio of actual to required removal >= 1.00 as RAA	CWS, NTNCWS Subpart H including populations < 10000
2004	DDBP	Bromate monthly monitoring	Bromate < 0.010 as RAA	CWS, NTNCWS Subpart H including populations < 10,000; Groundwater

Table B.1: Schedule of New Rule Implementation by EPA

Calendar Year	Rule	New Monitoring Requirements	New Level (MCL or Treatment Technique) Requirements	System Description
2005	Long Term 1 Surface Water Treatment Rule (LT1SWTR)	Profiling and benchmarking		All system types Subpart H, populations <10000
2005	LT1SWTR	Turbidity	Maximum turbidity level lowered from 5 NTU to 1 NTU. 95% turbidity level lowered from 1 NTU to 0.3 NTU.	All system types Subpart H, populations <10000
2008	Radionuclides	Radium 228, monitored at each entry point	Although new radionuclides monitoring requirements do not take effect until 2008, a number of systems began monitoring early in order to grandfather data. Early monitoring led to additional MCL violations.	CWS