North Carolina's Capacity Development Report for Public Water Systems

Calendar Year 2009

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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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Contents

LIST OF ACRONYMS

ARRA	American Recovery and Reinvestment Act of 2009
Capacity	Technical, Managerial and Financial Capacity
CWS	Community Water System
DCP	Disadvantaged Communities Program
DWSRF	Drinking Water State Revolving Fund
EPA	U.S. Environmental Protection Agency
EFC	Environmental Finance Center
NCRWA	N.C. Rural Water Association
NCWOA	N.C. Waterworks Operators Association
NTNC	Non-transient Non-community Water System
ORC	Operator in Responsible Charge
PWS Section	N.C. Public Water Supply Section
SDWA	Safe Drinking Water Act
SDWIS	Safe Drinking Water Information System (database)
SWP	Source Water Protection Program
TNC	Transient Non-community Water System
UNC	University of North Carolina at Chapel Hill

I. EXECUTIVE SUMMARY

The Public Water Supply Section (PWS Section) of the N.C. 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 water 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 6,463 regulated public water systems, about 5,720 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 SDWA Amendments establish the concept of capacity development. Capacity is comprised of technical, managerial and financial components, and is intended to help water systems meet national primary drinking water regulations. 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 systems' service and sustainability. Community water systems are defined as systems that serve 15 or more service connections or regularly serve at least 25 year-round residents. Non-transient non-community water systems are defined as non-community systems that regularly serve at least 25 persons over six months per year. The Capacity Development Program also involves the state's ability to enforce requirements of the North Carolina Drinking Water Act.

In October 1999, the PWS Section adopted 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 PWS Section. The self-assessment includes requirements for describing routine operation and emergency response activities. It is used to assess whether or not the public water suppliers have demonstrated the capacity to operate. This has placed the PWS Section and public water suppliers in an excellent position to better determine areas of strengths, weaknesses, challenges and opportunities. This information helps both systems and the PWS Section to be more effective in meeting the challenge of providing safe and reliable public drinking water.

In 2009, the PWS Section continued its success in the Capacity Development Program. In the past nine 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 and maintenance plans and emergency management plans.

The PWS Section will continue to grow and adapt to help public water suppliers meet the changing needs of providing safe drinking water in the State of North Carolina.

II. PROGRAM SETTING: *CAPACITY REQUIREMENTS*

II.A Background

The 1996 SDWA Amendments obligated states to ensure that all new community water systems and new non-transient non-community water systems beginning operation after Oct. 1, 1999, demonstrate technical, managerial and financial capacity. These water systems are required to use their technical, managerial and financial capacity to comply with 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 and existing community and non-transient non-community water systems to improve systems' service and sustainability. 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 SDWA.

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 6,460 regulated public water systems, about 5,720 (88 percent) serve a population of less than 500. The PWS Section viewed these systems as having huge needs that were not being adequately addressed.

Table 1, as shown on page four, 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. Data from 1999 is shown for comparison since the capacity development rules took effect Oct. 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. Additionally, Table 1 provides the percentages of systems affected by violations as compared to the total number of active water systems within the given population group. These figures indicate that 20 percent of public water systems had at least one monitoring failure in 2009. (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 throughout the last four years. The overall increase in compliance levels from 2006 through 2009 can be attributed to: (1) successful capacity development efforts and subsequent system compliance; and (2) change of data management programs by the PWS Section.

On-going capacity development efforts have improved compliance levels since the capacity development rules took effect in 1999. Activities such as effective compliance and enforcement, on-site visits, technical assistance and consolidation of problem systems with more reliable ones have gradually improved compliance. 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. Monitoring and reporting compliance levels in community systems increased between 2006 and 2009. Additionally, maximum contaminant level (MCL) compliance rates have increased during this time period.

Historical variations in compliance levels include the cyclic occurrence of asbestos monitoring compliance and implementation of new drinking water rules such as Stage 1 Disinfectants and Disinfection By-Products Rule, Radionuclide Rule, and the 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 Section's change from its traditional database management system (FOCUS) to the Environmental Protection Agency'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.

One of the challenges 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 community, non-transient non-community and transient systems vary widely. Table 4 indicates that new water systems have lower compliance with monitoring and reporting requirements 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 many owners/operators are confused about monitoring requirements, and 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 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. Typically, violations in small water systems have a minimal impact on population served but are very resource-intensive to address. 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 the PWS Section continues to automate and streamline its compliance processes, its 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	Community						Non-transient non-community					Transient non-community					TOTALS				
	Population	Systems	MCL	%	MR	%	Systems	MCL	%	MR	%	Systems	MCL	%	MR	%	Systems	MCL	%	MR	%
1999 (baseline)	< 500	1,710	45	3%	487	28%	552	25	5%	180	33%	6,016	267	4%	3,315	55%	8,278	337	4%	3,982	48%
	500-9,999	557	10	2%	154	28%	132	1	1%	28	21%	85	0	0%	34	40%	774	11	1%	216	28%
	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	**2,383**	**60**	**3%**	**658**	**28%**	**684**	**26**	**4%**	**208**	**30%**	**6,101**	**267**	**4%**	**3,349**	**55%**	**9,168**	**353**	**4%**	**4,215**	**46%**
2006	< 500	1,581	93	6%	405	26%	444	14	3%	156	35%	4,139	205	5%	1,539	37%	6,164	312	5%	2,100	34%
	500-9,999	507	70	14%	128	25%	100	3	3%	34	34%	60	1	2%	12	20%	667	74	11%	174	26%
	10,000-49,999	91	8	9%	23	25%	0					0					91	8	9%	23	25%
	≥ 50,000	26	4	15%	5	19%	0					0					26	4	15%	5	19%
	Total	**2,205**	**175**	**8%**	**561**	**25%**	**544**	**17**	**3%**	**190**	**35%**	**4,199**	**206**	**5%**	**1,551**	**37%**	**6,948**	**398**	**6%**	**2,302**	**33%**
2007	< 500	1,566	73	5%	365	23%	422	20	5%	128	30%	4,041	207	5%	1,327	33%	6,029	300	5%	1,820	30%
	500-9,999	500	67	13%	124	25%	99	0	0%	28	28%	61	3	5%	17	28%	660	70	11%	169	26%
	10,000-49,999	91	8	9%	15	16%	0					0					91	8	9%	15	16%
	≥ 50,000	27	1	4%	6	22%	0					0					27	1	4%	6	22%
	Total	**2,185**	**149**	**7%**	**510**	**23%**	**521**	**20**	**4%**	**156**	**30%**	**4,102**	**210**	**5%**	**1,344**	**33%**	**6,807**	**379**	**6%**	**2,010**	**30%**
2008	< 500	1,552	67	4%	275	18%	391	15	4%	73	19%	3,935	171	4%	1,032	26%	5,878	253	4%	1,380	23%
	500-9,999	494	58	12%	72	15%	93	1	1%	17	18%	54	1	2%	9	17%	641	60	9%	98	15%
	10,000-49,999	96	8	8%	15	16%	0					0					96	8	8%	15	16%
	≥ 50,000	28	1	4%	1	4%	0					0					28	1	4%	1	4%
	Total	**2,170**	**134**	**6%**	**363**	**17%**	**484**	**16**	**3%**	**90**	**19%**	**3,989**	**172**	**4%**	**1,041**	**26%**	**6,643**	**322**	**5%**	**1,494**	**22%**
2009	< 500	1,524	51	3%	206	14%	383	9	2%	62	16%	3,809	193	5%	969	25%	5,716	253	4%	1,237	22%
	500-9,999	488	55	11%	65	13%	80	1	1%	4	5%	53	5	9%	6	11%	621	61	10%	75	12%
	10,000-49,999	98	10	10%	7	7%	0					0					98	10	10%	7	7%
	≥ 50,000	28	2	7%	4	14%	0					0					28	2	7%	4	14%
	Total	**2,138**	**118**	**6%**	**282**	**13%**	**463**	**10**	**2%**	**66**	**14%**	**3,862**	**198**	**5%**	**975**	**25%**	**6,463**	**326**	**5%**	**1,323**	**20%**

* 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 Oct. 1, 2005, includes a record of populations. Violation data for the end of 2006, 2007, 2008 and 2009 are reported based on the latest population reported for the calendar 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.

Systems with MR violations (Table 1) are largely due to the fact that water 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)			2006		2007		2008		2009	
	Population±	Percent		Population∫	Percent	Population	Percent	Population	Percent	Population	Percent
Citizens Served by Community Public Water Systems having No MCL* Violations	6,475,785	97.5%		6,216,081	90.2%	6,330,528	89.5%	6,913,713	94.4%	6,790,618	91.3%
Citizens Served by Community Public Water Systems having No MR† Violations	5,801,083	87.3%		5,295,021	76.8%	5,906,022	83.5%	6,801,313	92.8%	6,834,719	91.9%
Total Service Population	6,644,281			6,891,776		7,074,883		7,327,179		7,440,822	

* *"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 FY 2005 are reported based on the single population of record. Data entered into the SDWIS database on or after Oct. 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.

∫ In 2006, one large system with a population serving 6 percent of the total service population received a monitoring violation.

Table 3: The Number of Public Water Systems Beginning 2002 to 2009 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	%
2002	2002	54	76%	0	0%	22	41%	24	96%	5	21%	18	75%	147	98%	7	5%	83	56%	225	92%	12	5%	123	55%
	2003	53	75%	1	2%	19	36%	24	96%	4	17%	13	54%	139	98%	8	6%	91	65%	216	92%	13	6%	123	57%
	2004	52	75%	1	2%	8	15%	19	95%	0	0%	8	42%	135	98%	9	7%	66	49%	206	92%	10	5%	82	40%
	2005	36	86%	2	6%	7	19%	18	94%	0	0%	6	33%	130	98%	3	2%	46	35%	184	95%	5	3%	59	32%
	2006	34	85%	2	6%	5	15%	16	94%	0	0%	6	38%	120	99%	3	3%	44	37%	170	96%	5	3%	55	32%
	2007	35	80%	2	6%	6	17%	15	93%	1	7%	5	33%	114	99%	3	3%	29	25%	164	95%	6	4%	40	24%
	2008	35	80%	1	3%	6	17%	14	100%	0	0%	1	7%	109	99%	4	4%	27	25%	158	95%	5	3%	34	22%
	2009	31	77%	0	0%	1	3%	14	100%	1	7%	2	14%	105	99%	7	7%	26	25%	150	95%	8	5%	29	19%
2003	2003	80	65%	1	1%	16	20%	9	100%	0	0%	6	60%	80	99%	4	5%	47	59%	169	83%	5	3%	69	41%
	2004	78	64%	5	6%	13	17%	8	100%	2	22%	5	56%	79	99%	10	13%	51	65%	165	83%	17	10%	69	42%
	2005	25	76%	5	20%	6	24%	8	100%	0	0%	4	44%	77	99%	5	6%	31	40%	110	94%	10	9%	41	37%
	2006	24	79%	5	21%	3	13%	8	100%	1	11%	5	56%	75	99%	1	1%	28	37%	107	94%	7	6%	36	33%
	2007	24	79%	3	13%	6	25%	8	100%	0	0%	5	56%	74	99%	3	4%	27	36%	106	94%	6	6%	38	36%
	2008	24	79%	2	8%	4	17%	8	100%	0	0%	5	56%	69	99%	3	4%	21	30%	101	94%	5	5%	30	29%
	2009	24	79%	2	8%	2	8%	8	100%	0	0%	3	38%	65	98%	4	6%	17	26%	97	94%	6	6%	22	23%
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%
	2008	38	89%	5	13%	5	13%	9	100%	0	0%	3	33%	81	99%	4	5%	19	23%	128	96%	9	7%	27	21%
	2009	35	89%	3	6%	4	11%	10	100%	0	0%	3	30%	76	99%	3	4%	17	22%	121	96%	6	5%	24	20%
2005	2005	64	84%	2	3%	22	34%	11	55%	0	0%	5	45%	83	99%	8	10%	45	54%	158	90%	10	6%	72	46%
	2006	57	95%	3	5%	20	35%	11	55%	0	0%	7	64%	80	99%	11	14%	46	58%	148	94%	14	9%	73	49%
	2007	55	95%	1	2%	21	38%	11	55%	1	9%	7	64%	78	99%	8	10%	32	41%	144	94%	10	7%	60	42%
	2008	51	94%	1	2%	16	31%	9	44%	0	0%	1	11%	75	99%	4	5%	19	25%	135	93%	5	4%	36	27%
	2009	47	91%	3	6%	13	28%	8	50%	0	0%	1	13%	72	97%	7	10%	17	24%	127	92%	10	8%	31	24%
2006	2006	39	95%	2	5%	21	54%	13	85%	1	8%	10	77%	77	100%	2	3%	46	60%	129	97%	5	4%	77	60%
	2007	39	95%	3	8%	15	38%	11	82%	1	9%	7	64%	77	100%	6	8%	38	49%	127	97%	10	8%	60	47%
	2008	35	94%	1	3%	7	20%	9	89%	2	22%	2	22%	73	100%	3	4%	14	19%	117	97%	6	5%	23	20%
	2009	34	94%	1	3%	2	6%	7	86%	1	14%	0	0%	66	100%	4	6%	12	18%	107	97%	6	6%	14	13%
2007	2007	27	93%	2	7%	7	26%	10	70%	1	10%	3	30%	54	100%	2	4%	27	50%	91	95%	5	5%	37	41%
	2008	27	93%	6	22%	4	15%	10	70%	0	0%	5	50%	52	100%	1	2%	20	38%	89	94%	7	8%	29	33%
	2009	27	93%	7	26%	3	11%	9	67%	0	0%	2	22%	50	100%	3	6%	17	34%	86	94%	10	12%	22	26%
2008	2008	20	90%	0	0%	3	15%	4	100%	0	0%	0	0%	50	100%	2	4%	22	44%	74	97%	2	3%	25	34%
	2009	19	89%	1	5%	1	5%	4	100%	0	0%	0	0%	48	100%	4	8%	18	38%	71	97%	5	7%	19	27%
2009	2009	7	100%	0	0%	2	29%	5	100%	0	0%	2	40%	50	100%	2	4%	27	54%	62	100%	2	3%	31	50%

* *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 Between 2007 to 2009 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																									
2007-2009	2007-2009	93	92%	13	14%	32	34%	32	84%	3	9%	16	50%	231	100%	24	10%	132	57%	356	97%	40	11%	180	51%
All Systems																									
2007-2009	2007-2009	2,954	72%	265	9%	752	25%	820	82%	39	5%	234	29%	7,256	98%	506	7%	2,066	28%	11,030	90%	841	7%	3,052	28%
Found Systems β																									
2007-2009	2007-2009	39						10						26						75					

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

β *Found Systems* indicates the number of public water systems identified during this three-year period that were not previously on the PWS Section inventory list. It is anticipated that the number of found systems will increase as PWS Section staff perform more inspections. 'Found' systems are regarded as a subset of new systems.

Figure 1: Community Systems Beginning 2002 Through 2009 with MCL Violations

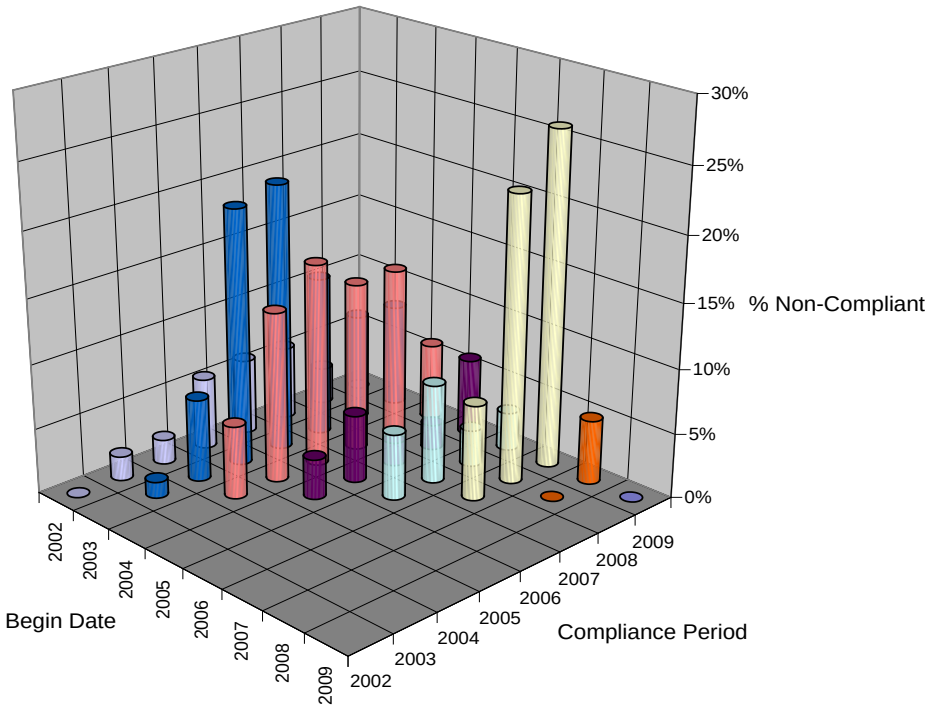


Figure 2: Community Systems Beginning 2002 Through 2009 with Monitoring Violations

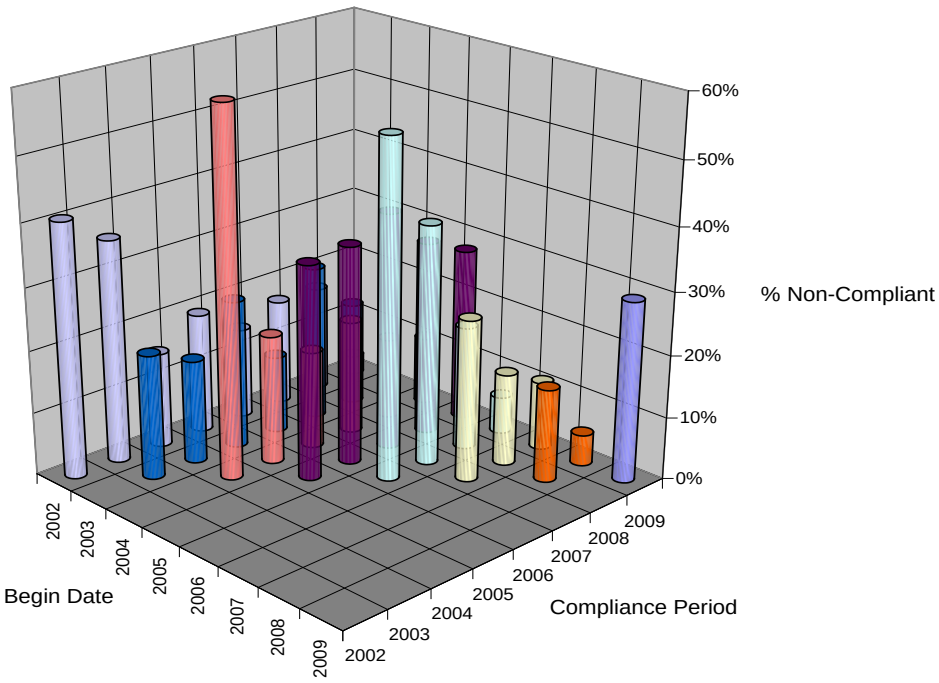


Figure 3: Non-transient Non-community Systems Beginning 2002 Through 2009 with MCL Violations

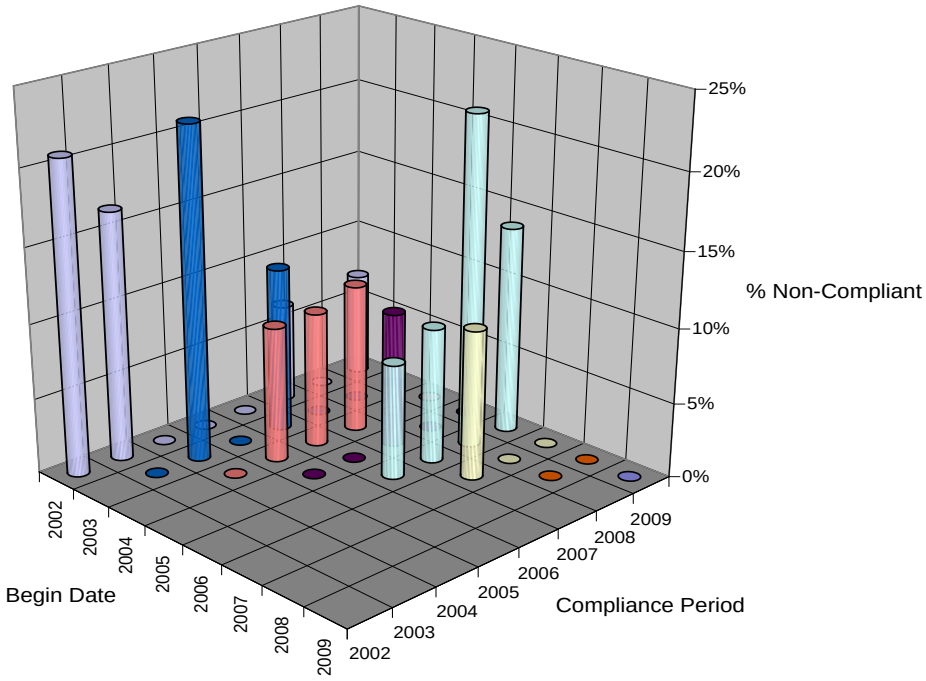


Figure 4: Non-transient Non-community Systems Beginning 2002 Through 2009 with Monitoring Violations

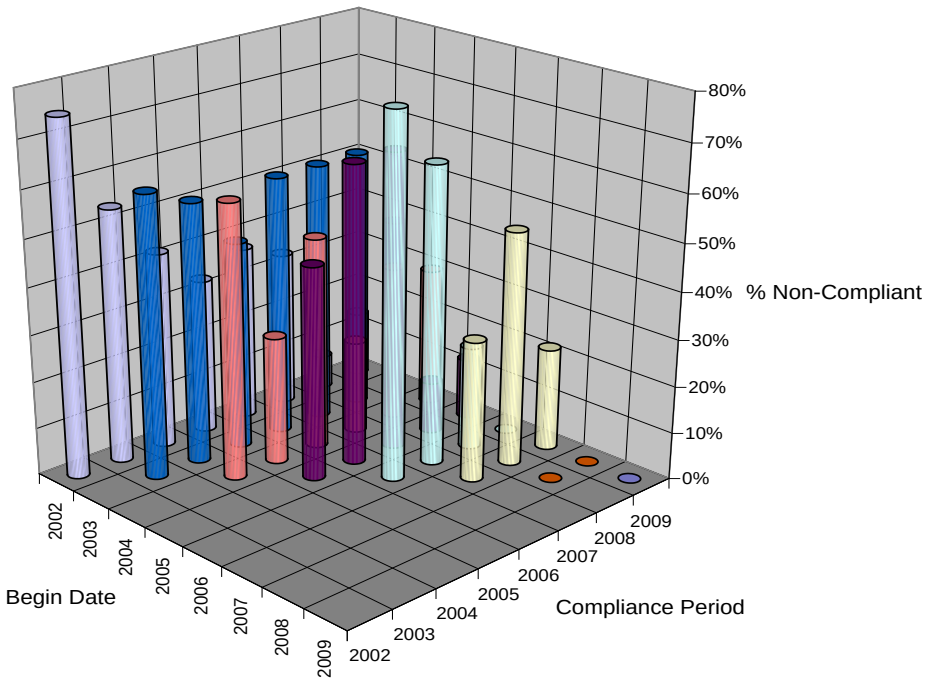


Figure 5: Transient Non-community Systems Beginning 2002 Through 2009 with MCL Violations

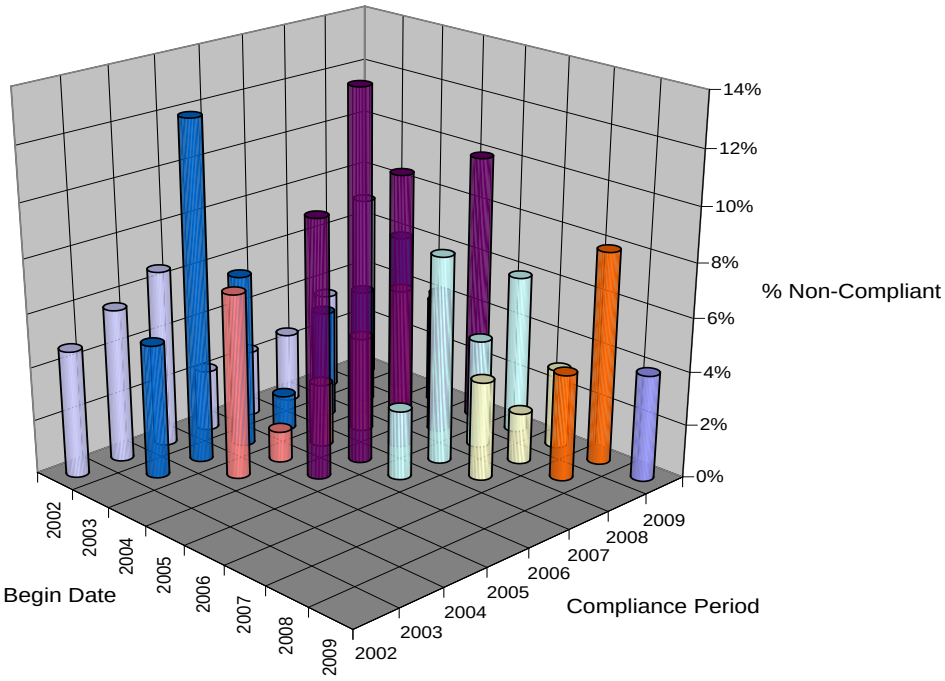
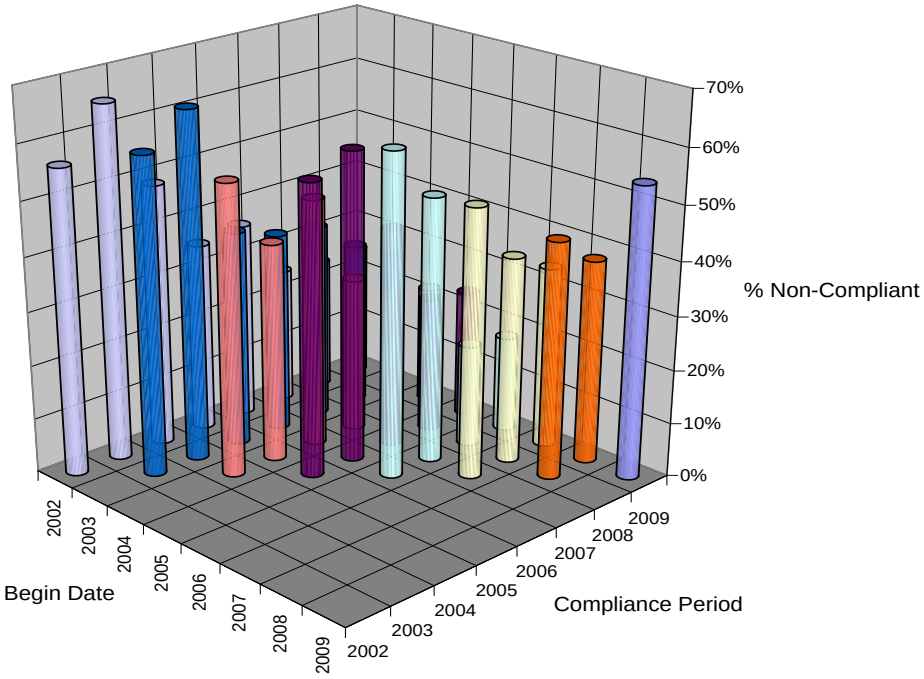


Figure 6: Transient Non-community Systems Beginning 2002 Through 2009 with Monitoring Violations



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 Oct. 1, 1999. The final rules for the program were adopted Aug. 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. In 2008, four positions were added to assist in capacity development in four of PWS Section's regional offices. The team leader coordinates the program and provides guidance, while the other members of the capacity development team work with colleagues in the PWS Section to develop innovative approaches to improve water systems' compliance.

Training for the Capacity Development Program held in April 2000 included four one-day seminars that were co-sponsored by the PWS Section, the NCRWA and the N.C. 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 via its website. 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 PWS Section's branches;
- Instructing professional engineering organizations involved in plan preparation; and
- Enhancing the PWS Section's on-line plan review tracking system.

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 Dec. 31, 2009, the state regulated 2,138 community systems, 463 non-transient, non-community systems, 3,862 transient systems and 123 water systems not recognized by federal regulations. There are a total of 6,463 community, non-transient non-community and transient public water systems regulated in North Carolina, and 88 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:

- EPA's significant non-compliance list,
- Sanitary surveys and technical assistance,
- Administrative penalties,
- Administrative orders,
- Notices of violation, and
- Plan review process.

A.3 Improving Coordination: The PWS Section recognized opportunities among its own branches and programs to improve coordination 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 community and non-transient non-community public water suppliers exists before construction:

1. The applicant submits an engineer's report, engineering plans and specifications, and a water system management plan.
2. If the engineer's report is complete and the engineering plans and specifications meet all requirements, the PWS Section approves engineering plans and specifications.
3. 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.
4. The applicant prepares or updates an operation and maintenance plan and an emergency management plan for the system.
5. The applicant submits an engineer's certification and an applicant certification.
6. The PWS Section issues a final approval letter.
7. 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 help ensure that any new or expanding public water system is demonstrating the capacity necessary to operate viably. As of Dec. 31, 2009, water system management plans for approximately 1,580 active public water systems have been accepted by the PWS Section. To reduce the administrative burden on the public water system owners, 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 additional outreach for new public 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). The applicant certification 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 uses the tools listed below to improve capacity of existing public water supply systems.

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 SDWIS, and the report was replaced by Drinking Water Watch. Drinking Water Watch is a reporting system that provides extensive data on water system inventory, sampling and compliance.

Many small water systems requested a simple, easy-to-understand 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 receive credit for those samples. For laboratories that report electronically, the schedule will also show the credit for recently completed analyses even before the end of the monitoring period. This gives vigilant systems the ability to oversee what their laboratory has submitted to the PWS Section.

Inspection Dates Report: The PWS Section has developed and implemented an automated report that provides staff with information important for scheduling sanitary surveys. A sanitary survey is an on-site review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the system's ability to produce and distribute safe drinking water. The report informs the user of when the last sanitary survey was performed and when the next sanitary survey must be conducted. Data can be sorted by regional office, inspector and due date of next inspection. This report allows all regional offices to access information from a centralized location and has aided in the coordination of field activities.

Technical Assistance from the NCRWA: The PWS Section has a contractual agreement with the NCRWA to provide technical assistance to small water systems (less than 10,000 people) through an individual called a circuit rider. This circuit rider receives system referrals from the PWS Section as well as requests for assistance from other sources. During 2009, the circuit rider assisted approximately 390 systems with issues such as compliance and treatment, operation and maintenance, water loss and leak detection, management techniques, wellhead protection, 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 promote the systems' compliance.

List of Significant Noncomplier Systems: The EPA'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 incorporate the review of water systems in significant non-compliance and develops strategies to return systems to compliance.

In 2009, the PWS Section reviewed a triennial list submitted by the EPA containing systems that have appeared on multiple significant non-compliance lists in the time period of 2005 through 2008. Analysis and review of the systems appearing on the triennial list showed that most of the compliance issues were short-term in nature and have since been resolved.

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 Noncompliers.'

Beginning in 2007 and continuing through 2009, 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 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 time frames may result in the issuance of an administrative penalty.

During 2009, 176 administrative orders and 988 administrative penalties were issued to systems. Approximately $226,033 was assessed during the 2009 calendar year.

B.3 Strategy Efficacy – Improving Coordination

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

Technical Assistance to Small Water Systems: The ongoing updates to the SDWA 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 2009, approximately 55 field personnel provided technical assistance to systems during 7,568 on-site contacts. Sanitary surveys comprised 3,122 contacts while other contacts encompassed technical assistance visits and audits of on-site system records.

Transient non-community Water Systems: From the inception of the SDWA in 1974, 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 transient water system compliance problems. For years, North Carolina implemented the drinking water program in accordance with the "Priorities Guidance" from the 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 in the central office and staff in each regional office monitor and assist transient systems. Central office activities include:

- Coordinating and updating inventory,
- Training system owners and operators,
- Tracking compliance and generating enforcement, and
- Developing and overseeing related computer programming.

Regional office activities 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 2009, the PWS Section performed 2,294 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. 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 allowed 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 PWS Section's Compliance Services Branch 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 deficient in lead and copper compliance have been returned to more frequent monitoring schedules often requiring sampling from an increased number of sampling locations. During audit activities, PWS Section staff also educates water systems on lead and copper monitoring requirements. During calendar year 2009, the PWS Section conducted 98 lead and copper audits.

The Compliance Services Branch staff reviews system sampling histories and sample siting plans to ensure that all initial sampling requirements have been met before a system is placed on a reduced monitoring schedule. If a system is 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 has developed several initiatives that complement the goals of the Capacity Development Program. The initiatives improve the issuance and tracking of enforcement activities as well as the overall administration of the PWS Section's compliance program. Initiatives include:

- Development of new guidance, forms and public notices as required by new federal and state rules and/or changes in PWS Section procedures;
- Placement of new guidance, forms and public notices on the PWS Section website [examples include materials for the new Ground Water Rule and monthly operating reports (MORs)];
- Electronic reporting of MOR data and laboratory analyses;
- Increased use of e-mail to remind systems of upcoming deadlines for compliance samples and reports;
- Revision of laboratory reporting forms, in particular the bacteriological analysis form to accommodate the requirements of the Ground Water Rule;
- More concentrated efforts spent on enforcement for transient system non-compliance (issued more penalties);
- Escalation of penalty amounts for non-compliant repeat offenders;
- Mass-mailing to all water systems informing them of the new rule requirements;
- Training presentations provided to water systems and regional office staff on new rule requirements; and
- Other projects underway, but not yet completed include use of a program that allows systems to generate consumer confidence reports using data from the PWS Section database and automation of total organic carbon compliance tracking.

In addition to these initiatives, the Compliance Services Branch staff continues to:

- Send letters and sample schedules explaining monitoring requirements to all new systems,
- Prepare and distributing annual "Regulatory Updates" to each water system by type,
- Notify existing systems of increased or decreased monitoring requirements,
- Mail unsatisfactory analyses back to laboratories and supplying copies to the North Carolina Laboratory Certification Program,

- Send lists of candidates for monitoring violations to regional staff and laboratories in order to resolve violations more quickly,
- Include required forms for public notification as attachments to violation letters,
- Enforce non-compliance more strictly,
- Develop contact protocols for interaction with sister agencies such as the Dairy, Children's Environmental Health, and Food Protection Branches,
- Clarify and revise enforcement letters (notices of violation, administrative orders and administrative penalties) and use standardized templates for their ease of preparation,
- Identify systems with invalid addresses,
- Improve the tracking and follow-up of contaminant violations by carefully reviewing remedial plans submitted by water systems, and
- Incorporate remedial plans and public notices into enforcement proceedings.

North Carolina's Source Water Protection Program: The PWS Section continued to improve and implement North Carolina's Source Water Protection Program (SWP) during 2009. The SWP Program evaluates the susceptibility to contamination and initiates protective strategies for the state's public drinking water resources. Activities include delineation and assessment, wellhead and surface water protection, and coordination with other state agencies. These activities allow public water systems to protect their water sources and thus increase capacity. Systems that maintain water sources that are less susceptible to contamination achieve greater financial and technical capacity because less money and time is spent on maintaining additional water treatment.

The EPA recently recognized the success of North Carolina's SWP Program by concluding the program "is considered a model for other states" (EPA Quadrennial Evaluation, 2010). Additionally, the SWP Program staff has been asked to share its successful elements at various national meetings and conferences, including the Rural Communities Assistance Project National Conference (September 2009, Washington DC), National Source Water Collaborative (November 2009, Washington DC), and National River Rally Conference (May 2010, Utah).

Partnership arrangements with other agencies and programs are a major component of the PWS Section's source water protection strategy. Specifically, other agencies have been recruited to integrate SWP data into their agendas and funding priorities. This initiative has been successful and has received national attention. In 2009, the SWP Program maintained relationships with agencies that fund agricultural best management practices (BMPs), stormwater BMPs, land conservation, and stream restoration projects. In a typical budget year, partnering agencies leverage more than $125 million to fund environmental projects across the state. Participating agencies not only promoted source water protection but also financed environmental projects consistent with drinking water objectives.

The SWP Program continued to improve the functionality of its GIS mapping applications, which exist to assist local governments, water system owners, volunteer organizations and other agencies with information vital to drinking water protection. Susceptibility ratings and associated assessment results are key components of this data and are summarized in reports made available via the PWS Section's geographic information application, NCSWAPinfo (http://swap.deh.enr.state.nc.us/swap/). Agencies enlisting drinking water protection as a priority item within their environmental programs use the PWS Section's GIS locator to help prioritize environmental projects (http://204.211.239.202/pws/).

The SWP Program participated in the City of Raleigh's annual Waterfest celebration in May of 2009. Waterfest provided an excellent opportunity for staff to interact with thousands of area school children and deliver an educational message connecting drinking water with public health concepts. This effort included approximately 18 volunteers over a four-day period to explain and demonstrate concepts regarding surface water filtration, electrolysis to split water molecules, calculations of water volume in the human body, and a game to test knowledge.

In early 2009, the N.C. Rural Community Assistance Project joined the SWP Program to assist small communities with drinking water protection and planning issues. Together, they organized a series of

workshops designed to promote drinking water protection to local officials, utilities, and Councils of Government. The SWP Program delivered presentations and literature, and led breakout sessions to encourage discussion among the participants. The SWP Program was actively promoted throughout the state to encourage development of local surface water protection plans. This effort included presentations and consultations with local government officials, public water providers and stakeholder groups. To date, six public water providers have formally agreed to participate in the PWS Section's voluntary SWP Program. Additionally, the NC Rural Community Assistance Project made a commitment to provide assistance to any small community that has interest in source water protection planning.

The NC SWP Program administered a low-interest loan program to assist communities with land conservation projects. This program was designed to provide economic incentive for drinking water protection. The intent of conservation projects must be protection in ways that serve to safeguard a public drinking water source. Additionally, the applicant must complete comprehensive source water protection planning to qualify for the loan program. Land acquisition projects financed with this program must be protected with permanent conservation easements. The loan program is funded through DWSRF set-asides and receives approximately $1.5 million per year. The program continued to be well received, with the cities of Raleigh and Cherryville desiring to use funding and protect public drinking water from Falls Lake and Indian Creek, respectively.

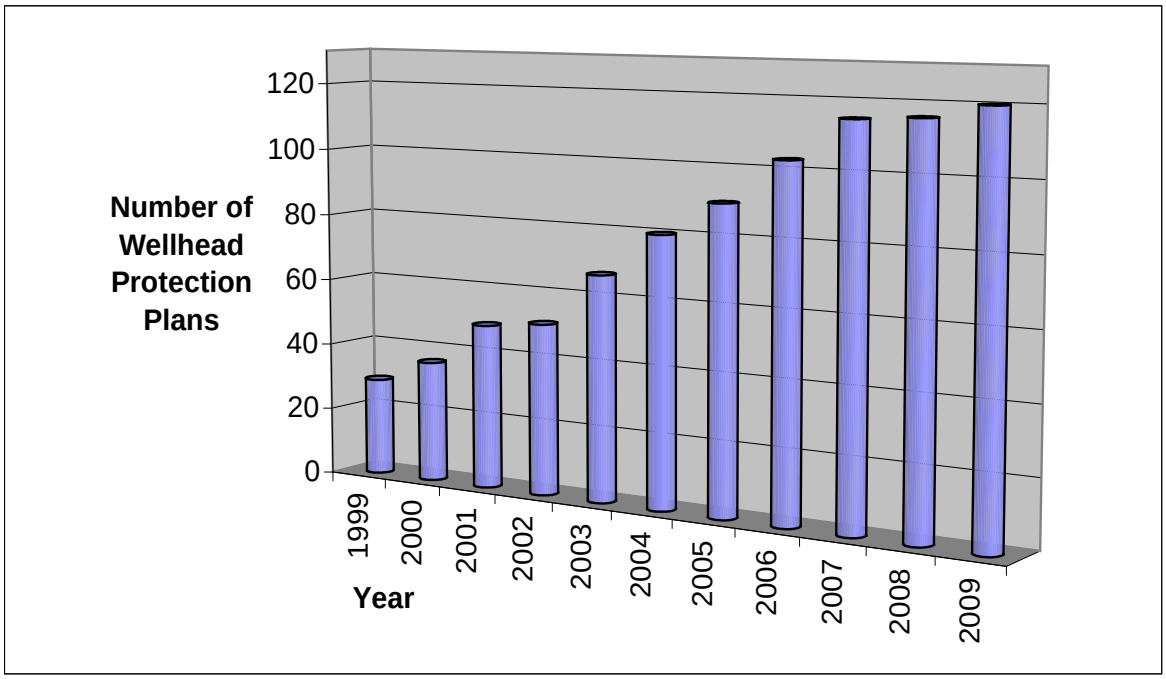
In August of 2009, the NC SWP Program launched its participation in EPA's national effort, the *Enabling Source Water Protection Project*. Since that time, a national team of consultants comprised of the Trust for Public Land, Smart Growth Leadership Institute, River Network, and Association of State Drinking Water Administrators has worked with the SWP Program to identify incentives and tools conducive to local drinking water protection.

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

In North Carolina, development of a local WHP plan is not mandatory but is viewed as a valuable supplement to existing state groundwater protection programs. North Carolina's WHP 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 WHP plan reduces (but does not eliminate) the susceptibility of wells to contaminants. The reduction of susceptibility to contamination increases the capacity for water systems to provide compliant drinking water by eliminating the need to install costly treatment options to remove contaminants.

The PWS Section assumed responsibility for administering the state's EPA-approved WHP Program on July 24, 1998. During the current reporting period (Jan. 1, 2009 through Dec. 31, 2009), the PWS Section continued to implement a process for the review and approval of local WHP plans submitted by public water systems. From assuming responsibility for the WHP Program through the end of the current reporting period, the PWS Section has received a total of 184 local wellhead protection plans submitted for review and approval. Of these, 21 were renewals or updates of previously submitted plans and three were complete revisions of previously submitted plans which had failed to receive approval and for which significant time had elapsed since their original submittal. This brings the total number of unique public water systems that have submitted a WHP plan for review and approval to 160.

Figure 7: Cumulative Wellhead Protection Plan Approvals



As of the end of the 2009 calendar year, the PWS Section has approved a total of 139 local WHP Plans. Of this number, 19 were renewals or updates of previously approved plans. As depicted in Figure 7, there are 120 public water systems with an approved WHP plan in North Carolina. The 120 public water systems with approved local WHP plans comprise 633 public water wells serving a population of 732,887. It is expected that these plans will assist greatly in improving the capacity of public water systems in North Carolina. The majority of the remaining unapproved plans were under active review. Active review involves determining if the WHP 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, correction of deficiencies, or clarification with regard to the submitted information and often involves meetings held with the applicants and their consultants. In addition to the review of these completed WHP plan submittals, the PWS Section also reviewed draft wellhead protection area delineations submitted by public water systems in the early stages of plan development. This allows the systems to receive tentative approval of their wellhead protection areas prior to proceeding with development of the remaining plan components (i.e., potential contamination source inventory, management plan, etc.), which could be impacted by changes to the wellhead protection areas.

Operator Certification and Training: The State of North Carolina has approximately 4,864 certified water system operators who possess approximately 6,703 active operator certifications. The N.C. Water Treatment Facility Operator Certification Board, which was recently realigned to the PWS Section from the Division of Environmental Health's Office of Education and Training, is responding to the need to provide certification and training to these operators by providing an active certification program. The certification program helps to ensure that water system operators have the necessary training and qualifications to properly operate a water system, which increases capacity for water systems. A network of volunteers and member organizations conducts the program. The PWS Section together with the North Carolina Waterworks Operators Association (NCWOA), the NCRWA, and the N.C. American Water Works Association coordinate schools, seminars, workshops, and conferences. PWS Section staff provides technical training and assistance at these events. 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 the EPA,

the state provides funding to the NCWOA for a training coordinator position. This funding will end Jan. 1, 2011.

In 2009, notices of violation were sent to approximately 40 systems for failure to have a properly certified operator.

Automated Site Inspection Forms: The PWS Section revised and automated site inspection forms to be used during site visits and sanitary surveys by agency staff. These automated forms accomplish the following:

- Reduction of staff time who complete the forms and enter the data, respectively;
- Storage of data at a central location, meaning there are no longer multiple versions of the same site visit;
- Ability to query site visit information by using simple reports;
- Ability to easily track system deficiencies, allowing the PWS Section to adopt a quicker response time to assist systems with corrective actions and, if necessary, engage in enforcement proceedings;
- Collection of information about a system's operator, which is shared with the N.C. Water Treatment Facility Operator Certification Board.

These forms have increased the coordination between the central office and regional staff as well as coordination between the PWS Section and water systems.

Electronic Monthly Operating Reports: Water systems that use surface water as their water source must submit monthly operating reports. The operating reports are completed by the system operator and submitted to the PWS Section for compliance review. Beginning in 2008, the PWS Section developed electronic versions of the monthly operating reports, which perform all needed calculations and notify the operator if required information has not been input. The operator then uploads the completed report to the PWS Section database. The PWS Section review engineer inspects a summary sheet that was generated by the electronic operating report for the compliance elements. Use of the electronic monthly operating reports has resulted in fewer operator reporting errors and decreased the time required for compliance review. Currently, 150 surface water treatment plants are using the electronic reports. All of North Carolina's 153 surface water treatment plants will be using electronic reporting by October 2011.

The PWS Section has also developed a program that will input selected contents of the electronic reports directly to the compliance database, thus allowing for easier access to the information and automated compliance review.

Enhanced Database Management: The PWS Section continues to improve its database management system and capabilities. During 2009, the PWS Section made improvements in its data collection methods and implemented the EPA application "Lab-To-State" (LTS) that is for use with SDWIS. This application, along with "Migrate-To-State" (MTS), has allowed the PWS Section to receive laboratory results electronically from certified laboratories. The PWS Section applied to the EPA and received a determination of compliance on July 9, 2009, with the requirements of the Cross Media Electronic Reporting Rule (CROMERR). The successes of these initiatives make it possible for the PWS Section and certified laboratories to meet the requirements of new legislation for electronic reporting of laboratory results.

The PWS Section has further improved electronic reporting by allowing laboratories to view data that has been uploaded. This verification step allows labs to correct any reporting errors before water systems receive violations due to incorrectly uploaded laboratory results. Additionally, the PWS Section is developing a tool that will allow small laboratories with no data management system to enter analysis results online for electronic submittal.

Financial Capacity Support: The PWS Section, through partnership with the UNC School of Government's Environmental Finance Center (EFC), has developed support to assist water systems in establishing and strengthening partnerships and collaboration between water systems, maintaining sustainable finances, and rate setting. Two of the key deliverables are identified below.

The EFC developed a detailed quantitative assessment of current regional and partnership practices across the state (state inventory) for those systems willing to provide information. The assessment included an inventory of interconnections and the institutional agreements that control their usage. The database contains a series of attributes for each interconnection that includes connected parties, institutional arrangement governing the interconnection, line size and material, elevation, and estimate of the transfer capacity range.

As a complement to the analysis of system interconnections in North Carolina, the EFC developed guidelines to help systems establish contractual agreements for the purchase and sale of drinking water. The PWS Section anticipates that the new contract guidelines developed by the EFC will assist systems in maintaining viable interconnections in order to increase system capacity. The contract guidelines encourage systems to consider the following:

- Expected duration of the purchase agreement,
- Future demand requirements,
- Emergency water supply agreements,
- Agreements that require the construction of infrastructure,
- Responsibilities for water that may exceed MCL values,
- Determination of how and if purchased water can be resold, and
- Financial ramifications of the agreement.

The second deliverable was the development of concise general rate setting guidelines for water usage that take into consideration state and local policy goals and objectives. The guidelines provide an overview of the legal framework, description of different rate structures, and the impacts of different rate structures on rates and usage.

The EFC is currently working with the PWS Section to develop or improve upon the following tools that can be used by water systems and regulators:

- Coordination of long term capital improvement planning practices, guidelines and training;
- Update the rate setting dashboard;
- Development and completion of financial planning survey with summary report of survey responses;
- Development of prototype database to collect and store infrastructure needs data electronically;
- Capital improvement planning training and assistance to utilities throughout North Carolina; and
- Educational sessions on water partnerships to educate water systems about what should be specified in a water partnership agreement.

The tools currently under development will assist water systems with financial planning and enable the PWS Section to increase financial capacity of water systems throughout North Carolina.

Engineering, Planning and Development Guidance: The PWS Section is currently developing a comprehensive guidance document to assist engineers in the design and submittal of water system infrastructure plans, specifications and reports. The PWS Section receives approximately 2,000 plans for water system improvements per year. Many of the submitted plans contain errors or omissions that must be corrected and resubmitted. The *Engineering, Planning, and Development Guidance* will assist design engineers by providing a comprehensive explanation of all design parameters required or recommended by the PWS Section, and will contain detailed information on the following aspects of water system infrastructure plan review:

- Methods to properly submit plans for review,
- Details about how plans are reviewed,

- Fundamental aspects of design that must be considered during the development of water system projects,
- Ways to know when a project requires environmental review and procedures for completing environmental review if required,
- Requirements for new well systems,
- Source water development requirements, and
- Water treatment, storage, pumping and distribution requirements and recommendations.

The PWS Section anticipates that this guidance will improve the quality of plans submitted for review by providing a standard reference for design engineers while simultaneously reducing review time.

Professional Development: The PWS Section annually hosts several forums that discuss a range of topics related to the water industry. Recent forums have addressed water treatment plant infrastructure, disinfection byproducts, reclaimed water, water storage tanks, and hazard mapping. These forums provide PWS Section staff the opportunity to interact with local and regional experts and discuss issues pertinent to systems in North Carolina. This interaction increases the technical expertise of PWS Section employees, which is passed on to water systems through the actions of the Technical Services Branch and Compliance Services Branch.

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," identified indicators the PWS Section is using to determine the progress of its Capacity Development Program. They are shown below.

> 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 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 its 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 (Oct. 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 the specific Capacity Development Program activities identified in IV.A. This table 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	3,088	550	17.8	470	15.2	847	27.4	142	4.6	38	1.2	41	1.3
Dec. 31, 2001	3,126	766	24.5	658	21.0	970	31.0	336	10.7	84	2.7	95	3.0
Dec. 31, 2002	3,104	916	29.5	779	25.1	1,055	34.0	479	15.4	188	6.1	189	6.1
Dec. 31, 2003	3,087	1,075	34.8	901	29.2	1,340	43.4	606	19.6	309	10.0	298	9.7
Dec. 31, 2004	3,045	1,212	39.8	1,012	33.2	1,405	46.1	718	23.6	439	14.4	428	14.1
Dec. 31, 2005	2,776	1,310	47.2	1,118	40.3	1,453	52.3	839	30.2	538	19.4	549	19.8
Dec. 31, 2006	2,749	1,399	50.9	1,210	44.0	1,500	54.6	939	34.2	711	25.9	727	26.4
Dec. 31, 2007	2,705	1,477	54.6	1,291	47.7	1,521	56.2	1,076	39.8	995	36.8	954	35.3
Dec. 31, 2008	2,654	1,564	58.9	1,366	51.5	1,591	59.9	1,173	44.2	1,104	41.6	1,077	40.6
Dec. 31, 2009	2,601	1,644	63.2	1,445	55.6	1,577	60.6	1,310	50.4	1,255	48.3	1,247	47.9
Increase from 1st period†		1,094	45.4	975	40.4	730	33.2	1,168	45.8	1,217	47.1	1,206	46.6

*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 (Oct. 1, 1999 through Dec. 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.

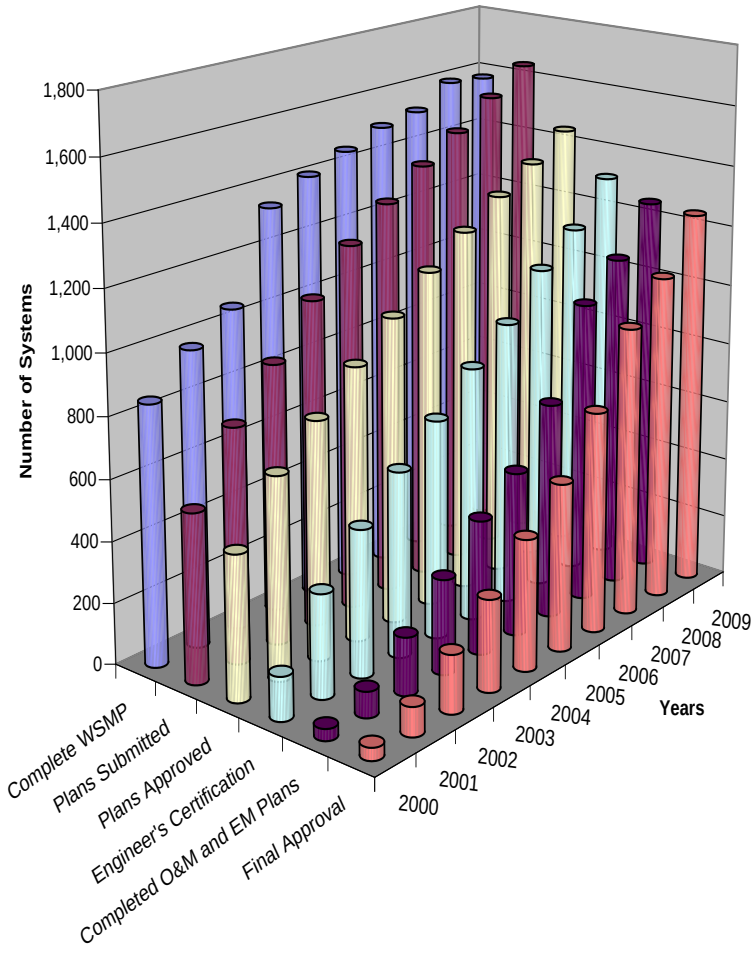
"Systems with O&M and EM Plans" means the number of systems having at least one applicant certification during the indicated period that a project had an operation and maintenance plan and an emergency management plan..

"*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 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 and 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

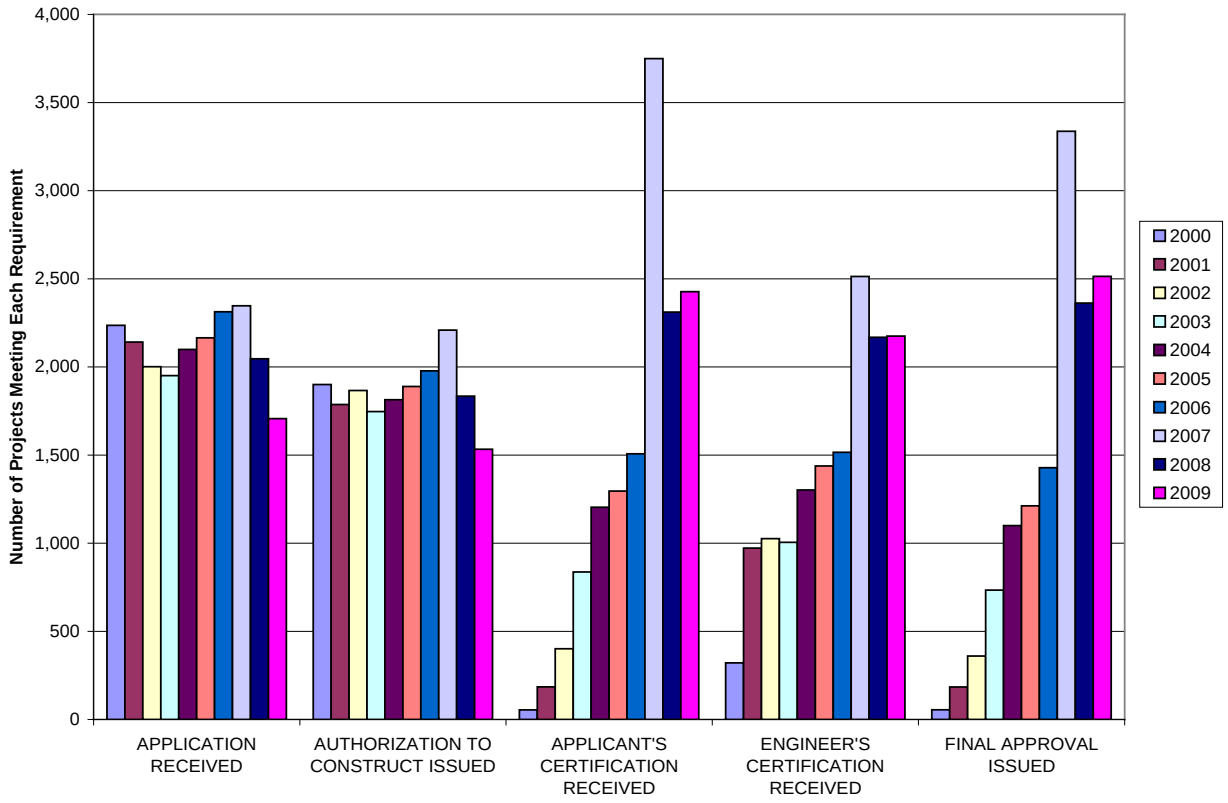


"*WSMP*" indicates the documentation of the water system management plan.
"*O&M Plan*" indicates certification of the completion of an operation and maintenance plan.
"*EM Plan*" indicates certification regarding the completion of an emergency management plan.
"*Final Approval*" indicates the completion 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 1,640 systems entered the plan evaluation process with a total of 1,250 of these systems completing all of the requirements necessary to reach final approval status. As of Dec. 31, 2009 approximately 1,580 systems were covered by a WSMP self-assessment deemed satisfactory by the PWS Section. 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.

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 and 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 supply the labor-intensive assistance to these systems presents a challenge.

The PWS Section wants to provide assistance to all public water systems regardless of size. Some of the initiatives and opportunities experienced in 2009 are discussed in this section.

Emergency Management: The PWS Section has devoted significant staff time to emergency response preparedness and coordination. PWS Section staff has participated in seminars, tabletop 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 Association of State Drinking Water Administrators (ASDWA).

A tabletop exercise was conducted in March 2009 involving representatives of state agencies, local agencies, and the Federal Bureau of Investigation. The recently developed communication techniques, in conjunction with the existing Emergency Planning and Response guidance document, were used to assist in the simulated response activities during the exercise.

In April 2009, the security and emergency planning engineer updated the state Emergency Operations Plan to accurately describe activities of the PWS Section that should take place in the event of earthquakes. This is a new section of the State Emergency Operations Plan that addresses an event that is less likely to happen.

In September of 2009, another tabletop exercise was conducted that enhanced the community's preparedness for a water contamination event. Additionally, PWS Section regional staff has organized tabletop exercises with water systems throughout North Carolina.

The security and emergency planning engineer is now the PWS Section's liaison with the North Carolina Drought Advisory Council, which meets every week by phone if there is any abnormally dry weather in the state. The PWS Section liaison is charged with the strategic task of informing the group about water system supplies throughout the state, and is involved with planning and preparation of procedures that will ensure the ongoing delivery of water to all citizens through a drought period. NOAA has congratulated the North Carolina Drought Advisory Council and asked other states to attend these meetings.

Disaster Preparedness Training: The security and emergency planning engineer is now the chairperson of the Disaster Preparedness Committee of NC AWWA. This staffer is in the process of preparing presentations at the prompting of this committee for a 2010 workshop, entitled "Encouraging Active Planning in the Community: Tabletop Exercises" and "Utilizing New Communication Technologies during an Emergency: A Standard Begins to Develop." The participants agreed to bring in outside speakers on water sector specific security topics in future meetings and hold two workshops about emergency response plans and algal blooms respectively. The committee and PWS Section have created training for water systems outlining the opportunities that are currently available to systems to upgrade their resilience and preparedness. The committee has also presented at the AWWA-WEA Spring Conference that explained how tabletop exercises fit in the planning cycle for disaster preparedness. The presentation was a strong invitation to water systems to contact the PWS Section for support and guidance as they learn how to run tabletop exercises.

Central Coastal Plain Capacity Use Area: Public water systems located in the Central Coastal Plain Capacity Use Area face unique challenges with regard to maintaining and increasing their capacity. 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 were required to begin curtailing water production by as much as 25 percent by 2008 with future reductions up to 75 percent by 2016. 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. The majority of projects identified have been initiated with several nearing completion.

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 2007 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 2005 and 2030. The 2007 Infrastructure Needs Survey allowed more replacement of a water system's existing infrastructure, and estimated that water systems would require $10 billion in capital improvements by 2027.

North Carolina is in the process of obtaining water system information for the 2011 Needs Survey. 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 more than 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 the 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 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 in the SDWA, 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 lines to and replace the distribution system in the disadvantaged community public water system. These projects are initiated by the PWS Section, and thus no application is necessarily required. Currently the PWS Section is working to consolidate 16 non-viable public water systems with more reliable systems. These 16 systems serve a total population of approximately 2,400 residents. Completion of these consolidation projects will give these residents access to water systems with greater capacity.

To date, the PWS Section has completed or is currently providing oversight for consolidation of a total of 27 non-viable systems with water systems that can supply water with greater capacity, 11 of which were consolidated since the program's inception in 2004. Outside of the DWSRF process, PWS Section regional office staff has also been effective in helping small and also non-viable systems interconnect, as evidenced by the decreasing numbers of regulated water systems.

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."* Since 2007 and continuing into 2009, circuit riders with the North Carolina Rural Water Association began visiting new water systems to educate such systems on monitoring and operations requirements.

Approximately 26 percent of systems that began during FY 2006 through FY 2008 were placed on at least one of the EPA's Significant Noncomplier (SNC) lists for that time period. Analysis of systems that began operation during FY 2007 through FY 2009 indicates that 13 percent of systems were placed on at least one of the EPA's SNC lists. Only nine percent of systems that began operation during FY 2008 through FY 2010 were placed on any of the EPA's SNC lists. The PWS Section is encouraged by the increase in compliance of new systems during the most recent three-year period. 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 EPA'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 the EPA. Funding for this grant is currently slated to expire Jan. 1, 2011.

American Recovery and Reinvestment Act (ARRA): The American Reinvestment and Recovery Act of 2009 was passed by Congress and signed in to law on Feb. 17, 2009. The purpose of ARRA is to assist national and state economic stimulus activities by providing timely funding for eligible infrastructure projects. Approximately $65.6 million was allocated to North Carolina's drinking water program for distribution to projects that met ARRA requirements. In order to implement ARRA, the PWS Section was tasked with:

- Targeting funds to maximize job creation and economic benefit;
- Using the priority system developed in the North Carolina Operating Agreement to rate projects by public health and compliance need;
- Developing procedures to streamline the application preparation and review process in order to make project funding available as soon as possible;
- Confirming all projects use iron, steel and manufactured goods produced in the United States;
- Confirming that projects adhere to the Davis-Bacon Act;
- Ensuring that 20 percent of the funds support green infrastructure projects in accordance with ARRA requirements;
- Ensuring that 50 percent of the funds are provided as principal forgiveness loans; and
- Entering all project data into the DWSRF Project Benefits Tracking and Reporting (PBR) system and any state mandated reporting system within one week of data availability.

In November 2008, the PWS Section began preparatory work to address the expected volume of applications for funding in anticipation of the finalization of ARRA. In December, 2008 The PWS Section announced acceptance of supplemental applications for potentially eligible projects with a submittal deadline of Feb. 27, 2009. Water systems throughout North Carolina responded by submitting a total of 1,108 letters of intent for potentially eligible projects with a combined value of approximately $2.3 billion. The volume and scope of work reflected in the letters of intent demonstrated that systems throughout North Carolina have a great need for infrastructure improvements. ARRA funding was to be parceled out in two rounds, with 50 to 65 percent of funding granted in the first round. The PWS Section received 494 supplemental applications from systems that expressed interest in beginning projects funded with ARRA monies. The projects proposed by these Supplemental Applications totaled approximately $809 million. The PWS Section staff reviewed each application in order to determine the priority level of each project for funding purposes. The projects of highest priority that were "ready to proceed" by March 30, 2009, were considered for funding in the first round. In the first round, 35 projects valued at approximately $40.4 million were funded. The second round of funding was comprised of 30 projects totaling approximately $23.9 million that were ready to proceed by June 3, 2009.

ARRA-funded projects were required to execute all construction contracts by Feb. 17, 2010, to remain eligible for funding. The PWS Section worked extensively with these water systems to ensure that all of the ARRA projects secured contracts for construction and satisfied ARRA requirements. In order to help systems achieve the tasks required to meet the Feb. 17, 2010, deadline, the PWS Section implemented the following time-saving actions:

- Coordinated with the State Historic Preservation Office and the U.S. Fish and Wildlife Service to allow qualifying systems to receive Categorical Exclusions more quickly,
- Streamlined the Disadvantaged Business Enterprise information submittal process by reducing the amount of information submitted to the PWS Section, and
- Allowed water systems to award contracts prior to receiving approval for their required Disadvantaged Business Enterprise activities.

In addition to maintaining 73 ARRA-funded projects, the PWS Section has maintained an "over-commitment" listing of projects that can be substituted in the event that some ARRA projects drop out of contention for funding. The projects on the over-commitment list had agreed to finance their construction activities through traditional Drinking Water State Revolving Fund loans with the understanding that they could be given ARRA funds if funding became available. Prior to the Feb. 17 deadline, several of the original ARRA-funded green infrastructure projects worth over $3 million opted out of ARRA funding. The PWS Section was able to successfully coordinate other green infrastructure projects and reallocate the necessary funds to meet the 20 percent green infrastructure requirement. Similarly, the PWS Section used the over-commitment list to fund three additional projects after other ARRA-funded projects opted out of funding contention. The PWS Section, through quick response and coordinated efforts, successfully committed all ARRA funds to qualified projects by the federally mandated Feb. 17, 2010, deadline. These ARRA-funded projects will improve North Carolina's water infrastructure.
The PWS Section is currently performing inspections and compliance monitoring for projects that received ARRA funding. Inspections are generally scheduled when a project reaches completion rates of 10 percent, 50 percent, and 90 percent, though smaller projects may require fewer inspections and larger projects may require more. The PWS Section anticipates performing approximately 200 compliance inspections for ARRA-funded projects. During each inspection, PWS Section staff reviews the project for confirmation of the following aspects:

- The project under construction is the same project that has been funded,
- The project meets State Revolving Fund loan requirements, and
- The project meets ARRA requirements.

In order to confirm that the project meets ARRA requirements, PWS Section staff inspects new project infrastructure equipment for compliance with the Buy American requirement and reviews payroll documentation for adherence with the Davis-Bacon Act. Any exceptions noted during the inspection are reported by PWS Section to the N.C. Office of Economic Recovery and Investment.

In addition to providing jobs and increasing the capacity of water systems, the ARRA funding raised the awareness level of the PWS Section Loans and Grants program. The unprecedented response to PWS Section's request for Letters of Intent to apply for ARRA funding displayed the need for water system improvements throughout North Carolina. Infrastructure improvements are required as water systems age, rules and regulations become more stringent, and population increases.

Drinking Water State Revolving Fund (DWSRF) Program: The PWS Section, through the Drinking Water State Revolving Fund, is able to increase the capacity of water systems by providing several funding options for capital improvement projects. Since 1998, the DWSRF Program and the legacy State funding program have committed more than $620 million to approximately 400 water system improvement projects. DWSRF project funding is made available through low-interest loans, principal forgiveness loans, and 50 percent principal forgiveness loans administered under the ARRA provisions.

Water systems must apply to the DWSRF Program in order to be considered for funding. Each applicant is assigned a rating, and the highest priority projects are selected for funding. Systems that are considered non-viable by the PWS Section do not receive funding under the DWSRF Program rules. Systems that

are potentially able to assist or absorb a non-viable system do not necessarily need to submit an application for funding because the PWS Section initiates the review process.

The PWS Section uses the DWSRF Program to address the following short-term objectives associated with water systems:

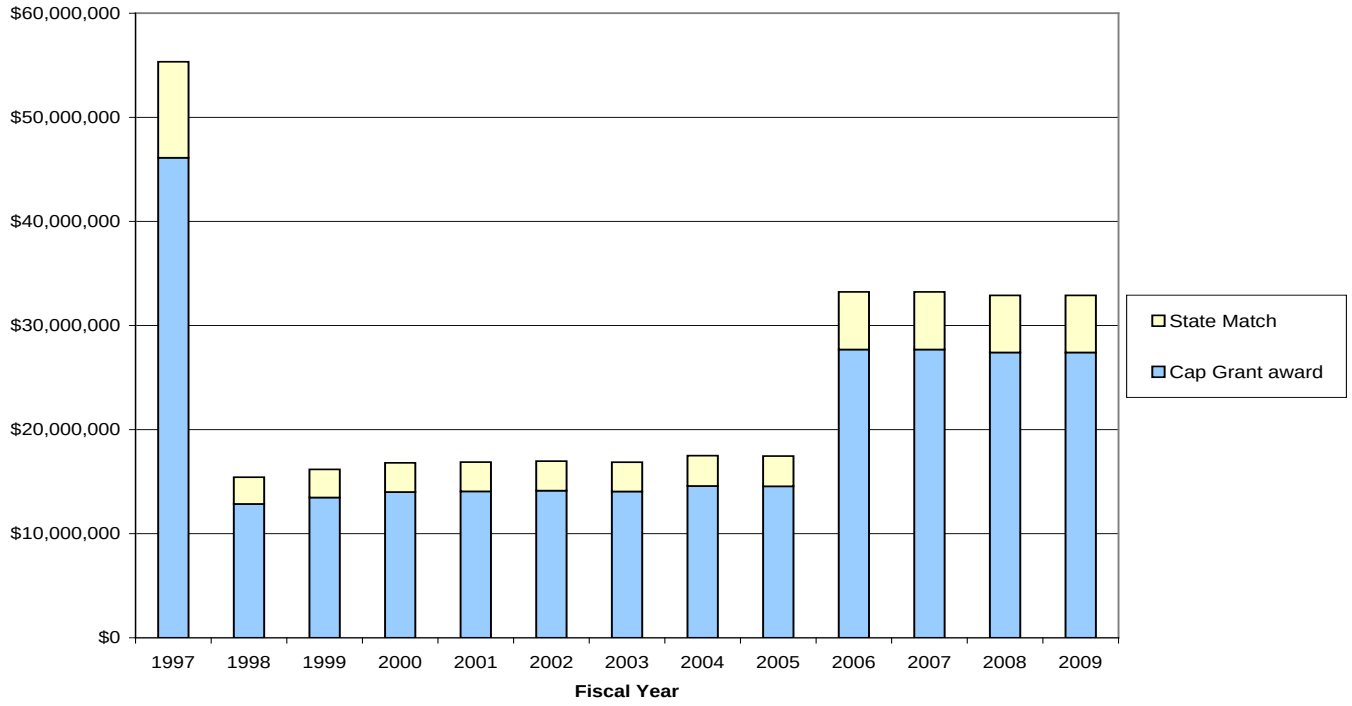
- Provide loans to eligible public water systems to address acute health risks as a priority;
- Provide loans to eligible public water systems with the capacity to consolidate non-viable water systems;
- Provide funding for preventative and efficiency measures, such as source water protection and replacement of aging infrastructure; and
- Increase compliance assistance for transient water systems.

Through its ongoing funding activities, the DWSRF Program increases capacity for water systems throughout North Carolina by promoting the following long-term objectives:

- Increase in the percent of population served by safe public water systems,
- Increase in safety of public water systems,
- Promote safe and affordable drinking water by relieving some of the water systems costs associated with capital improvements,
- Assist water systems to remain compliant with increasingly complex rules under the *Safe Drinking Water Act*, and
- Ensure technical integrity of the proposed water system improvements, advocate self-sufficiency, protect water resources from new pollution sources, and promote sustainability.

As of the end of fiscal year 2009, approximately $260 million of DWSRF Program funds have been committed to systems in the form of low-interest and principal forgiveness loans. The DWSRF Program is able to grow and provide low-interest loans to water systems through receipt of monies from federal capitalization grants, the mandated 20 percent state match and the repayment funding stream. Figure 10 displays the federal Capitalization Grants for each year they are appropriated by the U.S. Congress and the associated North Carolina state matching funds.

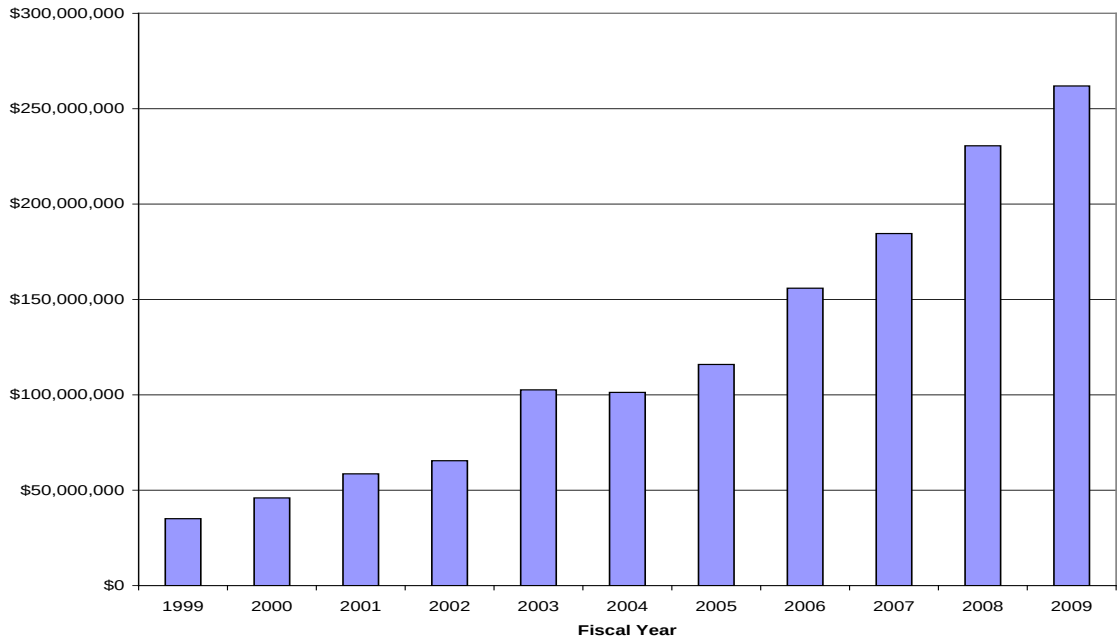
Figure 10: Federal and State Monies Awarded to the NC DWSRF



The federal allocation in fiscal year 1997 was significantly larger than subsequent years because it was based on a combination of two years of higher appropriations (1996 and 1997), and it was based on the State Supervision Grant allocation formula. The reduced Capitalization Grant awards for 1998 through 2005 resulted from lack of state resources to assist with the 1995 EPA Infrastructure Needs Survey, which replaced the Supervision Grant formula for allocation of the federal grant to states. The grant was increased beginning in fiscal year 2006 because the PWS Section's assistance provided to the water system officials in 2003 to explain the purpose of the survey and the benefit of having a complete and thorough inventory of projects.

As shown in Figure 11, the DWSRF Program currently maintains more than $260 million in commitments to water system projects. The decrease in the project commitment dollar amounts from fiscal year 2003 to fiscal year 2004 is due to projects for which the realized cost was less than the originally committed amount. Even though additional projects were funded in fiscal year 2004, the lower revised dollar amounts for previously committed projects reduced the cumulative commitment amount.

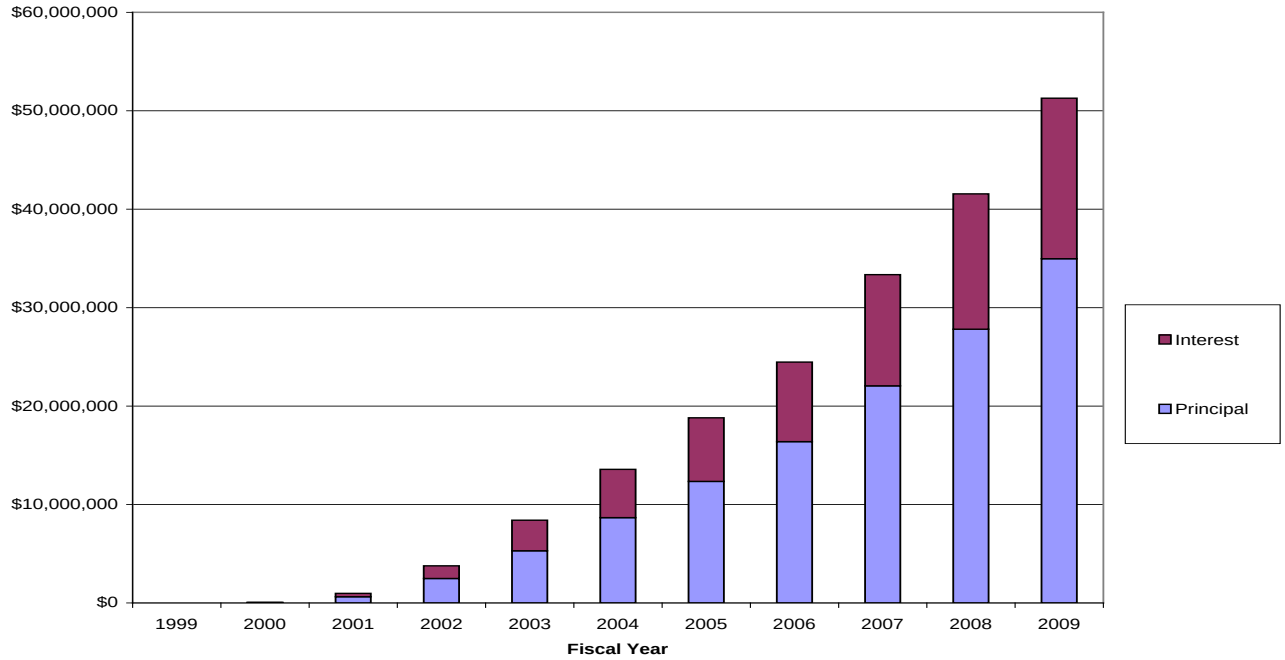
Figure 11: Cumulative DWSRF Commitments to Public Water Systems



The PWS Section, through the DWSRF Program, is able to positively influence the capacity of water systems throughout North Carolina by providing the capital and technical assistance needed to make important water system improvements.

To date, the DWSRF Program has received more than $50 million in loan repayments and interest from water systems. Figure 12 shows the cumulative payments received.

Figure 12: Cumulative DWSRF Program Loan Repayments



The loan repayments are incorporated into the revolving fund. These monies help to grow the fund and allow the PWS Section to commit more monies to public water systems seeking to complete water infrastructure improvement projects. The PWS Section is authorized by DENR's Controller's Office to commit two years of the projected repayment stream, $20 million at present, to projects. This enables the

PWS Section to revolve the fund even faster and reduce the time lag between when funds are available and disbursed.

The DWSRF Loans and Grants Program is ideally suited for the review and funding of water system capital projects that need below-market-rate loans. The DWSRF Program works in coordination with the PWS Section Plan Review Unit and PWS Section Compliance Services Branch to evaluate funding requests and reduce the time required for project review and administration of funding. Projects are evaluated and ranked based on measures that include public health, compliance, reliability and affordability.

V.B Future Reports

Section 1420(c)(3) of the 1996 SDWA 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 Sept. 30, 2002 (2005, 2008…), until otherwise notified by the EPA. The PWS Section plans to prepare an updated report annually and publish it on its website at: **http://www.deh.enr.state.nc.us/pws.**

VI. PUBLIC AVAILABILITY OF THE 2010 CAPACITY DEVELOPLMENT REPORT

As required by the EPA, the PWS Section makes this report available to the public at: **http://www.deh.enr.state.nc.us/pws.**

This website 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, September 2009,**
- **North Carolina's Capacity Development Report for Public Water Systems, September 2008.**
- **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.**

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Appendix A

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

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

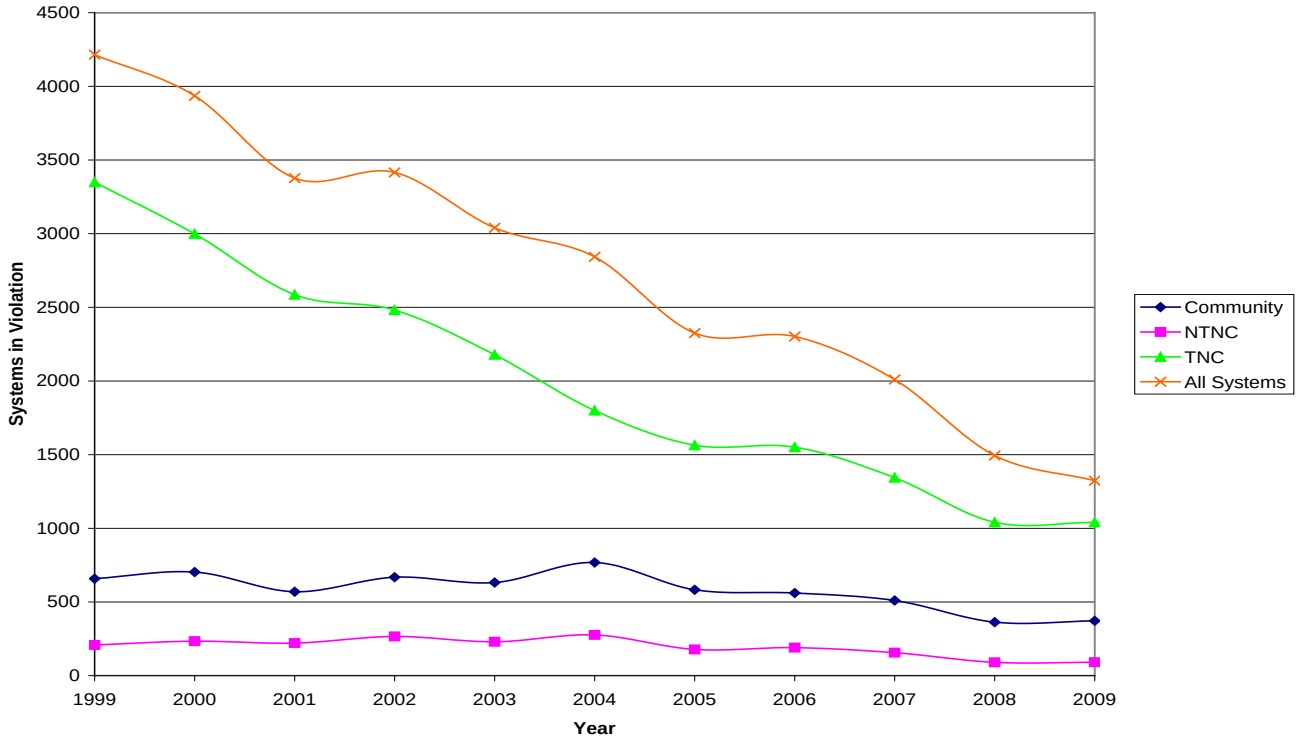


Figure A.3: Community Water Systems with Maximum Contaminant Level Violations Since 1999, Grouped by Population

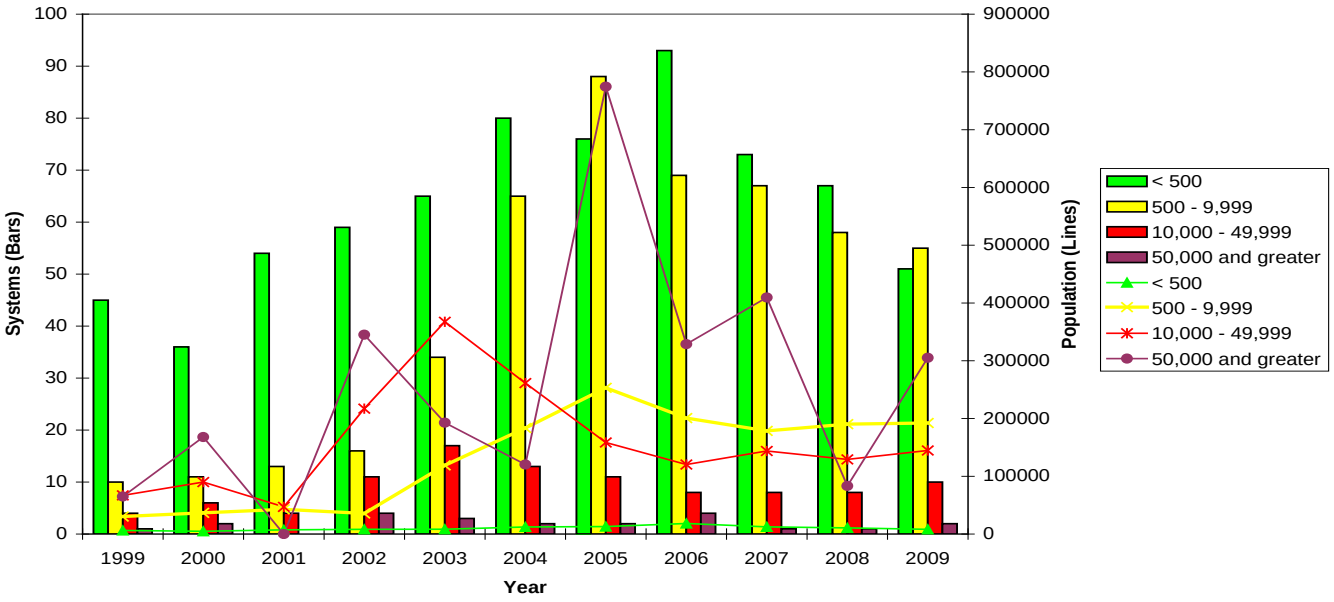


Figure A.4: Community Water Systems with Monitoring/Reporting Violations Since 1999, Grouped by Population

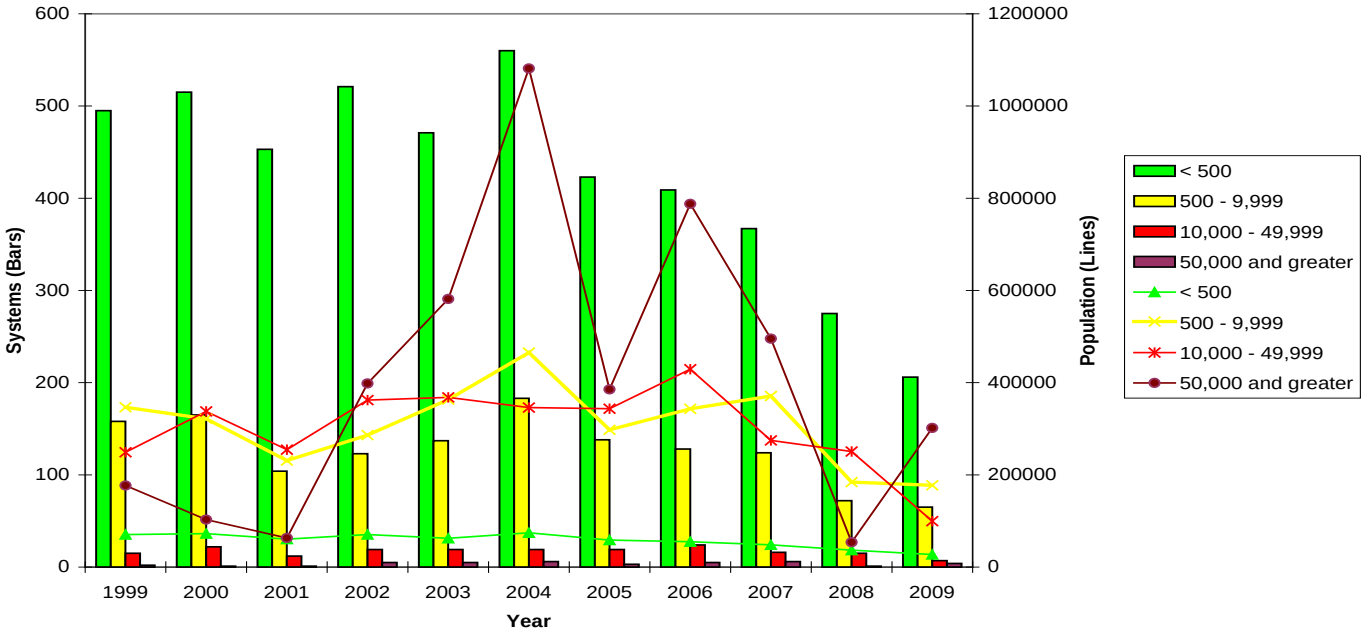


Figure A.5: Community Water Systems with Maximum Contaminant Level Violations Since 1999

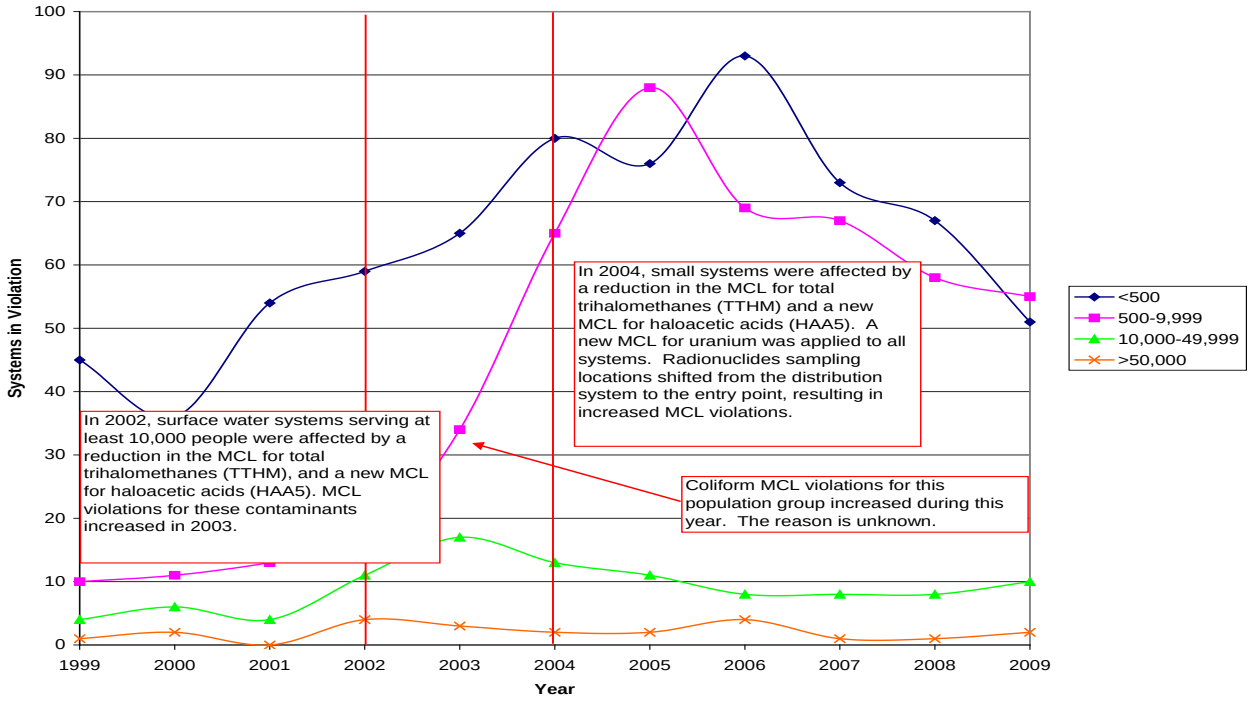


Figure A.6: Community Water Systems with Monitoring/Reporting Violations Since 1999

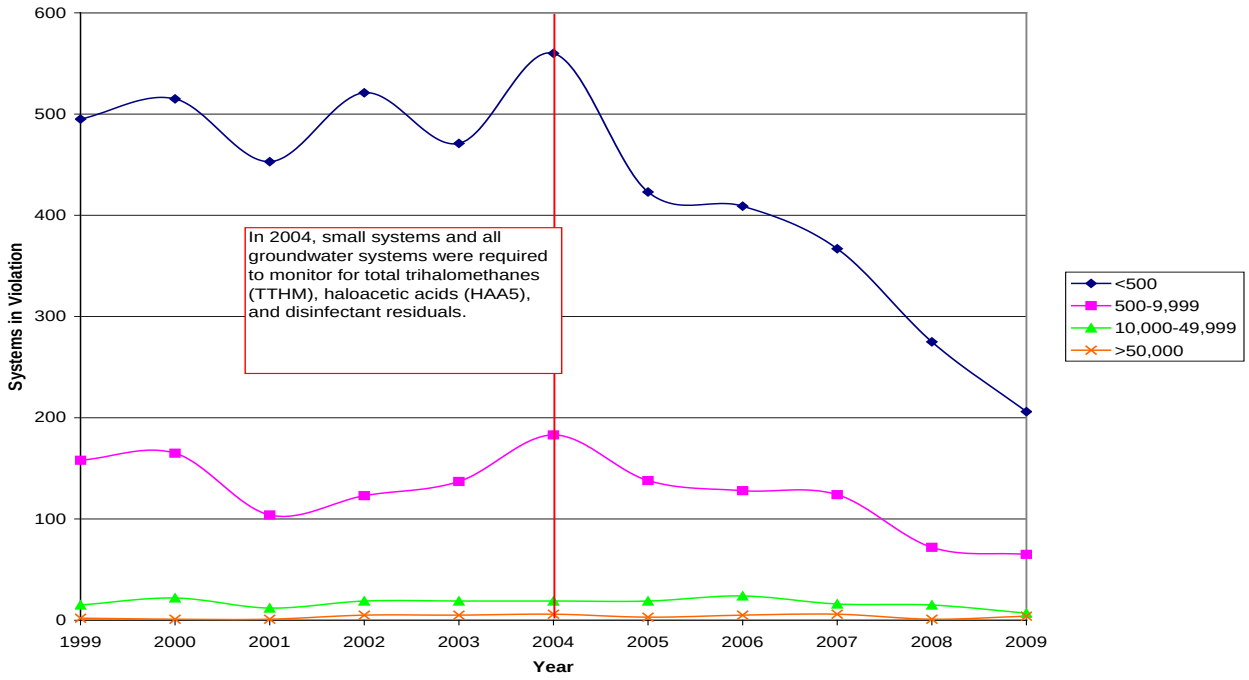


Figure A.7: Non-transient Non-community Water Systems with Maximum Contaminant Level Violations Since 1999

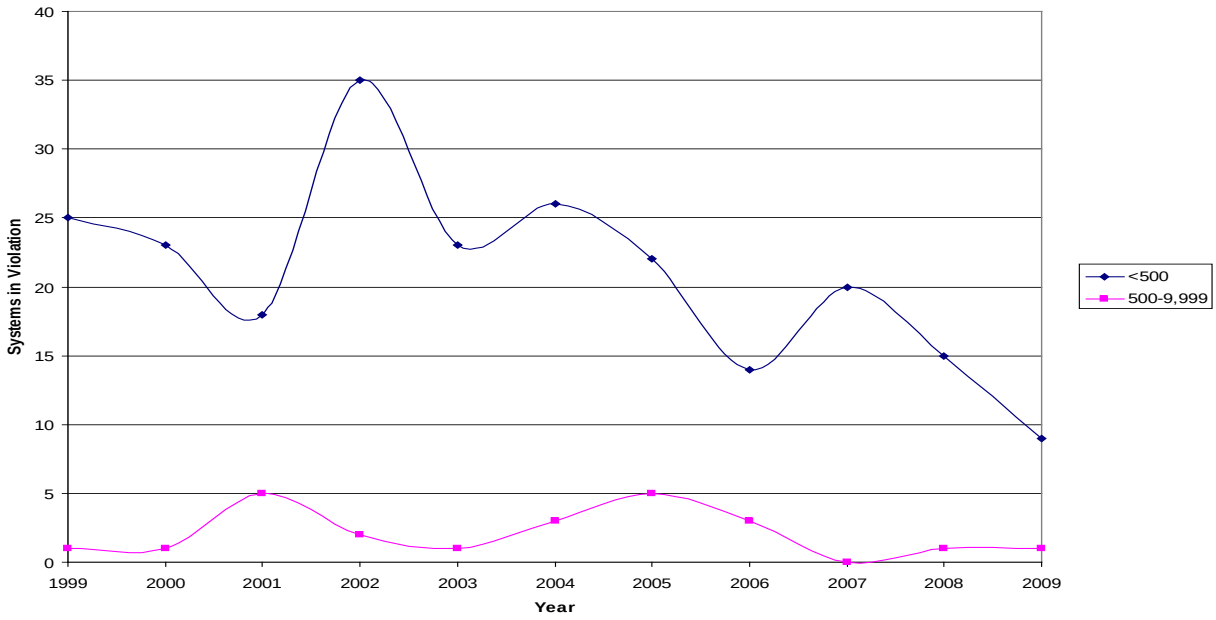


Figure A.8: Non-transient Non-community Water Systems with Monitoirng/Reporting Violations Since 1999

Figure A.9: Transient Non-community Water Systems with Maximum Contaminant Level Violations Since 1999

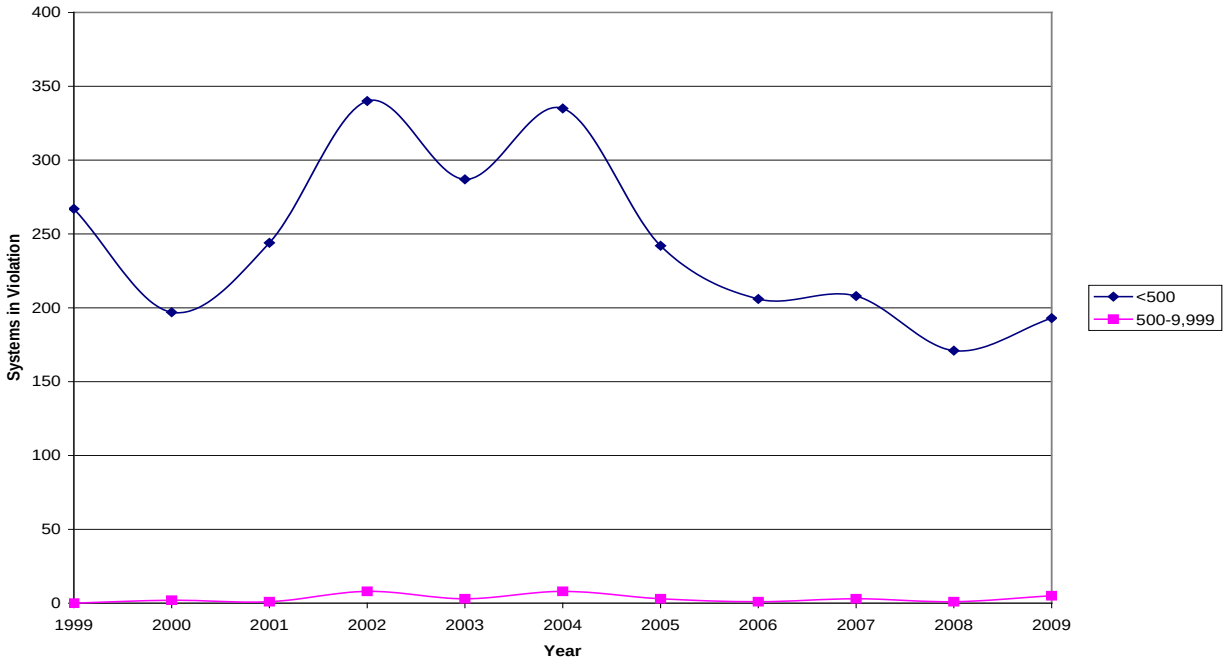


Figure A.10: Transient Non-community Water Systems with Monitoring/Reporting Violations Since 1999

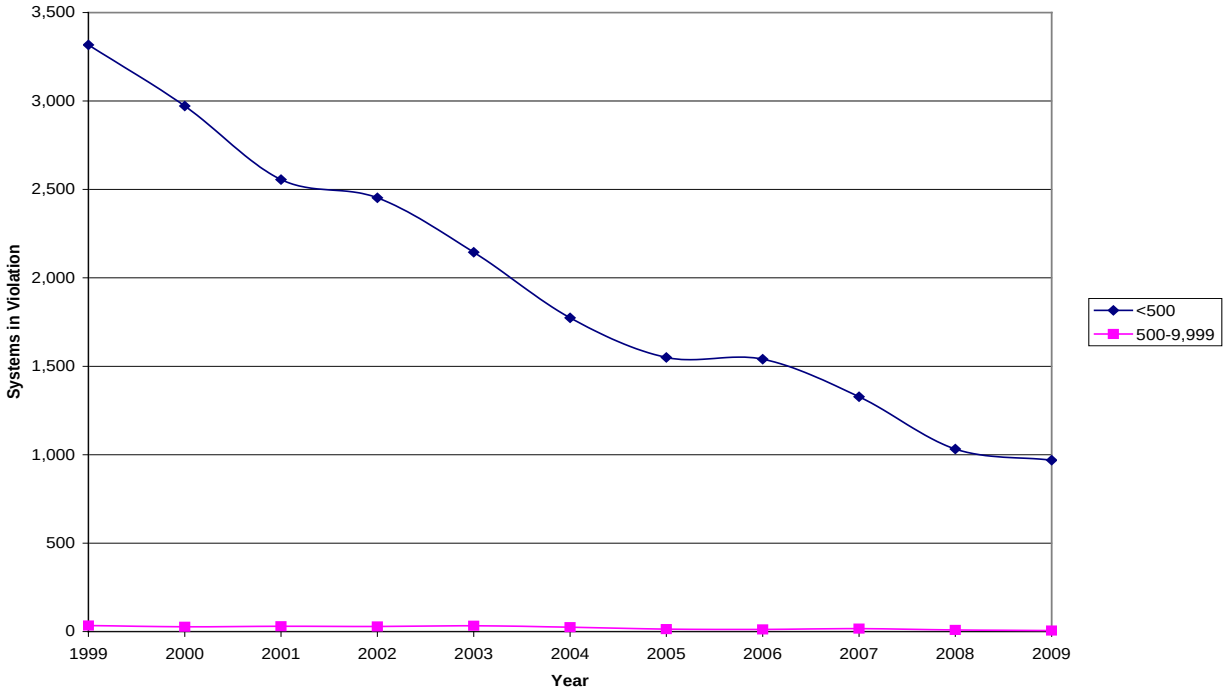


Figure A.11: Water Systems with Maximum Contaminant Level Violations Since 1999, Grouped by Population

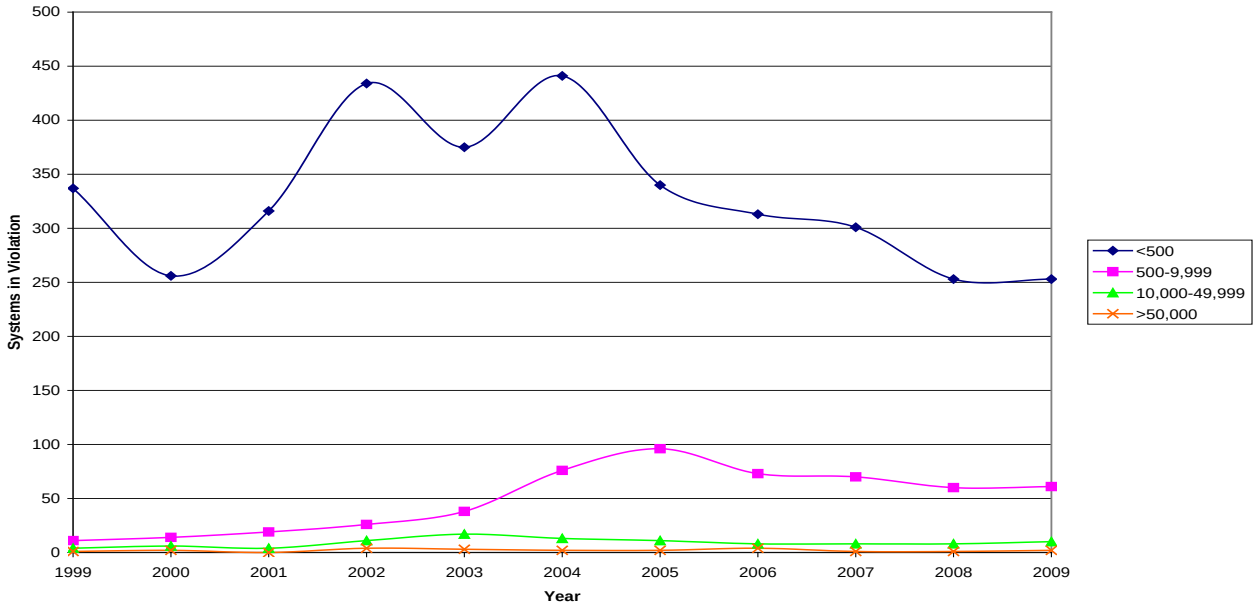
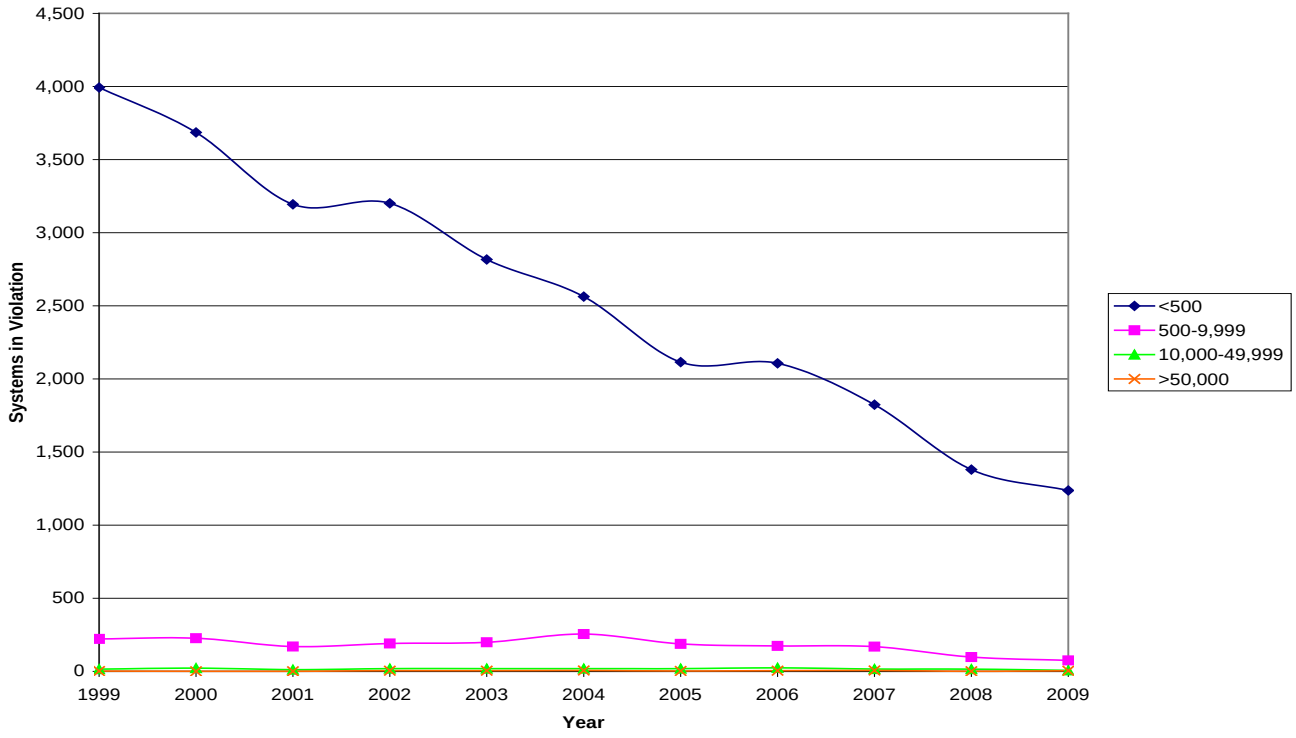


Figure A.12: Water Systems with Monitoring/Reporting Violations Since 1999, Grouped by Population



Appendix B

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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, NTNC
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, NTNC Subpart H, population >= 10,000
2002	DDBP	Disinfectant residual monthly sampling (with total coliform rule schedule)	Chlorine and chloramines maximum residual disinfectant level established at 4.0 mg/L as RAA.	CWS, NTNC Subpart H, population >= 10,000
2002	DDBP	Total organic carbon (TOC) monthly monitoring	Treatment technique for TOC removal; ratio of actual to required removal >= 1.00 as RAA.	CWS, NTNC Subpart H, population >= 10,000
2002	DDBP	Bromate monthly monitoring	Bromate < 0.010 as RAA.	CWS, NTNC 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, NTNC 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, NTNC 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, NTNC Subpart H including populations < 10000
2004	DDBP	Bromate monthly monitoring	Bromate < 0.010 as RAA.	CWS, NTNC 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 <10,000
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 <10,000
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
2009	Ground Water Rule	Microbial source water monitoring	Introduces source water monitoring requirements and treatment technique requirements for groundwater systems.	All system types Not Subpart H