North Carolina's Capacity Development Report for Public Water Systems

Calendar Year 2010

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Public Water Supply Section
N.C. Division of Water Resources
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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 6,390 regulated public water systems, about 5,641 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 2010, the PWS Section continued its success in the Capacity Development Program. In the past 10 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 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 6,390 regulated public water systems, 5,641 (88 percent) serve a population of less than 500. The PWS Section viewed these smaller systems as having huge needs that were not being adequately addressed.

Performance Measures: Systems are required to monitor water samples for regulated contaminants identified by the EPA as being potentially harmful to human health if ingested. Water samples are analyzed for regulated contaminants according to EPA-mandated contaminant monitoring schedules and compared to contaminant-specific maximum contaminant levels. The locations and frequency of required samples are determined based on the population, water system type, and source water type. The EPA requires the drinking water program to issue a notice of violation (NOV) for each missed or incorrectly collected sample EPA also requires that systems with contaminants detected above the maximum contaminant level in water samples receive a notice of violation for each exceeding contaminant.

Table 1 (shown on page four) provides compliance information for public water systems in North Carolina under federal and state drinking water regulations. 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. The 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 NOV for failure to monitor for required water quality tests or for water exceeding the maximum contaminant level of a contaminant in water delivered by a public water system. Table 1 also shows the percentage of systems that received an NOV as compared to the total number of active water systems within each system category. These figures indicate that 19 percent of public water systems had at least one monitoring failure in 2010. (A typical system monitors at least monthly and has many required tests, but each missed test must be counted as a violation. It is important to note that having a monitoring violation does not necessarily equate to unsafe water.) These numbers confirm that the vast majority of systems with deficiencies are ones that serve fewer 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 through A.4.

Overall Compliance: 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 2007 through 2010 can be attributed to successful capacity development efforts and subsequent system compliance.

Ongoing 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 water systems with more reliable systems have gradually improved compliance. As shown in Table 1 and Table A.12 (note that Table A.12 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 2007 and 2010. Additionally, maximum contaminant level (MCL) compliance rates have increased during this time period.

Historical variations in compliance levels often correspond to the cyclic occurrence of asbestos monitoring or to implementation of new drinking water rules such as the 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.

New System Measures: One of the areas of focus for the PWS Section is maintaining compliance of new systems. As shown in Table 3, compliance levels of new water systems vary widely over time. Table 4 indicates that all types of new water systems that began operation in the last three years have maintained better compliance with MCL requirements than existing water systems have for the same time period. Additionally, new community and non-transient non-community systems, which must complete the requirements of the Capacity Development Program, exhibited better compliance with monitoring and reporting requirements than existing systems during the same time period. New transient non-community water systems, which are not subject to the requirements of the Capacity Development Program, exhibited lower compliance with monitoring and reporting requirements when compared to existing systems during the last three years. The data gathered may indicate that capacity development initiatives have been effective in reducing noncompliance with new systems because new systems that completed the Capacity Development Program exhibited better overall compliance while systems not subject to the Program's requirements did not. The PWS Section will continue to explore strategies that will assist new systems to achieve fully compliant operations.

The Challenge: 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 residents 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.5 and A.6 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 resource-intensive to address. Violations in a few large water systems can substantially reduce the population served by compliant community water 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%**
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%**
2010	< 500	1,524	39	3%	219	14%	373	8	2%	74	20%	3,744	203	5%	833	22%	5,641	250	4%	1,126	20%
	500-9,999	492	45	9%	64	13%	73	3	4%	12	16%	54	4	7%	14	26%	619	52	8%	90	15%
	10,000-49,999	101	8	8%	9	9%											101	8	8%	9	9%
	≥ 50,000	29	1	3%	3	10%											29	1	3%	3	10%
	Total	**2,146**	**93**	**4%**	**295**	**14%**	**446**	**11**	**2%**	**86**	**19%**	**3,798**	**207**	**5%**	**847**	**22%**	**6,390**	**311**	**5%**	**1,228**	**19%**

* 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. 1999 population data is based on last available record prior to Oct. 1, 2005.

‡ *"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 during 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 during 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)		2007		2008		2009		2010	
	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%	6,913,713	94.4%	6,790,618	91.3%	7,550,874	96.5%
Citizens Served by Community Public Water Systems having No MR† Violations	5,801,083	87.3%	5,295,021	76.8%	6,801,313	92.8%	6,834,719	91.9%	7,291,626	93.2%
Total Service Population	6,644,281		6,891,776		7,327,179		7,440,822		7,821,672	

* *"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.
± 1999 population data is based on last available record prior to Oct. 1, 2005.

Table 3: The Number of Public Water Systems Beginning Operation Between 2003 to 2010 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	%
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%
	2010	24	79%	1	4%	1	4%	7	100%	0	0%	2	29%	65	98%	3	5%	13	20%	96	94%	4	4%	16	17%
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%
	2010	35	89%	3	9%	2	6%	9	100%	1	11%	2	22%	74	100%	1	1%	12	16%	118	97%	5	4%	16	14%
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%
	2010	45	91%	5	11%	11	24%	8	50%	0	0%	1	13%	69	97%	7	10%	13	19%	122	92%	12	10%	25	20%
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%
	2010	34	94%	1	3%	2	6%	5	80%	1	20%	0	0%	65	100%	1	2%	8	12%	104	97%	3	3%	10	10%
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%
	2010	27	93%	5	19%	3	11%	7	57%	0	0%	2	29%	47	100%	1	2%	12	26%	81	94%	6	7%	17	21%
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%
	2010	19	84%	1	5%	1	5%	4	100%	0	0%	2	50%	45	100%	0	0%	7	16%	68	96%	1	1%	10	15%
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%
	2010	7	100%	0	0%	0	0%	4	100%	0	0%	1	25%	50	100%	3	6%	17	34%	61	100%	3	5%	18	30%
2010	2010	26	85%	1	4%	7	27%	10	70%	1	10%	2	20%	66	100%	1	2%	29	44%	102	93%	3	3%	38	37%

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

‡ *Compliance Period (Year)* summarizes the number of new systems that remain active and their compliance for each subsequent compliance period. For example: In 2010, only 24 of the 80 systems that began operation in 2003 were still active.

Table 4: Comparison of Public Water Systems Beginning Operation Between 2008 to 2010 and All Active Public Water Systems During 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																									
2008-2010	2008-2010	53	87%	2	4%	13	25%	19	84%	1	5%	6	32%	166	100%	11	7%	88	53%	238	96%	14	6%	107	45%
All Systems																									
2008-2010	2008-2010	2,144	71%	230	11%	605	28%	464	81%	33	7%	182	39%	3,914	99%	495	13%	1,808	46%	6,522	88%	758	12%	2,595	40%
Found Systems β																									
2008-2010	2008-2010	39						9						60						108					

***** *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.

II.B Program Development

Considering the number of small systems needing improvements in capacity and the limited resources available, the PWS Section made system viability 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.

Capacity Development Program training 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 online 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 residents of North Carolina.

III. PROGRAM STRATEGY: *CAPACITY OBJECTIVES*

III.A Overview of Strategic Objectives

As reported in August 2000, the PWS Section established rules to help improve the capacity of public water supply systems in North Carolina. The rules reflect the agency's decision to focus on new systems and systems with violations that are in greatest need of assistance. Sections II and IV of this report discusses how public water supply systems have increased their capacity since the Capacity Development Program rules took effect.

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 are 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 *Rules Governing Public Water Systems* require the approval of plans and specifications as well as certification that the following have been prepared:

- Water system management plan,
- Operation and maintenance plan and
- Emergency management plan.

A.2 Existing Systems: On Dec. 31, 2010, the state regulated 2,146 community systems, 446 non-transient, non-community systems, 3,798 transient systems and 127 water systems not recognized by federal regulations. There are a total of 6,390 community, non-transient non-community and transient public water systems regulated in North Carolina, 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 provides the most benefit to existing systems in greatest need of improving capacity. Determination for the type of assistance is done on a case-by-case basis. Systems can be identified from:

- EPA's Enforcement Targeting Tool 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 helps ensure that any new or expanding public water system is demonstrating the capacity necessary to operate viably. As of Dec. 31, 2010, water system management plans for approximately 1,610 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. The PWS Section is developing additional guidance materials 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 requires the owner to show that it can operate and maintain the system in compliance with the rules before the system begins providing water to the public. It also ensures that water systems have planned for managing emergency or disaster events that could affect the 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: Many small water systems requested a simple, easy-to-understand report focusing on sampling records alone. The PWS Section responded by creating the Sampling Status Report, which summarizes monitoring schedules for different water systems and shows the number of samples received during the current monitoring period. This report was developed in 2007 and was posted to the PWS Section's public website in 2008. It allows water systems to collect samples properly and receive credit for those samples. For laboratories that report electronically, the schedule also shows 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 (those serving 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 2010, the circuit rider completed 871 contacts to assist 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.

Enforcement Targeting Tool: The Enforcement Targeting Tool was developed by the EPA as a replacement to the significant non-compliance lists. The significant non-compliance lists focused on individual violations, which resulted in large lists that did not focus on overall system compliance and mandated enforcement for a small number of systems. The Enforcement Targeting Tool employs a system-based approach by using a formula to identify water systems in greatest need of compliance assistance. The formula assigns a score for each system based on the severity and duration of violations that the system has received. A system receives 10 points for each acute health-based violation, five points for each other health-based violation, total coliform rule repeat monitoring violation or nitrate monitoring violation, one point for each other monitoring violation and points for the age (in years) of the oldest unresolved violation. The score for each system is determined by adding the points accrued from each unaddressed violation. The EPA has determined that a score of 11 or greater requires formal enforcement action. The EPA expectation is that the PWS Section will issue formal enforcement within six months to every system with a score of 11 or greater unless the system has since returned to compliance. The PWS Section anticipates using the Enforcement Targeting Tool to target North Carolina's most significant violators.

Administrative Orders: An administrative order is a formal enforcement action administered by the PWS Section to noncompliant water systems. Prior to 2010, the PWS Section issued administrative orders to water systems that exceeded maximum contaminant levels. In 2010, the PWS Section expanded the issuance of administrative orders to include monitoring and reporting violations. This modification was in response to a change in oversight of PWS Section enforcement actions by the EPA with the Enforcement Targeting Tool described above. The EPA requires the PWS Section to issue formal enforcement for all unresolved violations to prevent violating systems from accruing a score of 11 or greater on the Enforcement Targeting Tool list. Now every notice of violation is accompanied by an administrative

order. As a result, the PWS Section issued 2,058 administrative orders in 2010 versus 175 orders in 2009. This significant increase in administrative orders issued to systems does not reflect an increase in noncompliant systems but is due to the issuance of orders for monitoring and reporting violations in addition to maximum contaminant level violations.

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*. For monitoring violations, the PWS Section issues "cost-of-avoidance" penalties equal in amount to the cost of water sample analysis. This type of penalty removes the financial incentive for systems to avoid collection and analysis of the required compliance samples without introducing an increased cost burden. These monitoring violation penalties quickly follow notices of violation issued for each contaminant group and each compliance period. Nearly 97 percent of the penalties issued in 2010 were cost-of-avoidance penalties. 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 MCL within reasonable time frames could subject the system to the issuance of an administrative penalty.

Beginning in 2010 and continuing into 2011, the PWS Section commenced piloting an amended penalty process in response to a downward trend in monitoring violations. The amended process takes advantage of the overall increase in monitoring compliance by enabling the PWS Section to distinguish between systems with generally good compliance records from chronic violators and potentially withhold or reduce penalties to systems with good compliance records.

During 2010, a total of 2,959 administrative penalties were issued to systems. Approximately $321,145 was assessed during the 2010 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. During 2010, 56 field personnel provided technical assistance to systems during 7,489 on-site contacts. Sanitary surveys comprised 3,046 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. The PWS Section regulates 3,798 transient water systems, which amounts to 59 percent of all regulated systems in North Carolina. 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 Priorities Guidance was rescinded and 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.

During 2010, the PWS Section's regional offices performed 2,546 site visits to transient water systems. 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.

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 2010, the PWS Section conducted 88 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 about 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 by providing compliance incentive. 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:

- Coordinating the review of treatment change proposals with the Plan Review Unit and Regional Offices to determine potential impact on compliance schedules for contaminant groups such as lead and copper and disinfection byproducts;
- Changing the format of lead and copper monitoring schedules on Drinking Water Watch to clarify the months and years that water systems on triennial monitoring are required to monitor;
- Increasing enforcement of water quality parameter and source water monitoring requirements under the Lead and Copper Rule;
- Significantly increasing enforcement actions to address non-compliant systems on EPA's new Enforcement Response Policy / Enforcement Targeting Tool list;
- Developing a methodology / procedure for addressing Public Notification violations with the approval of EPA, which was later recommended by EPA to other states;
- Developing new guidance, forms and public notices to address new federal and state rules and/or changes in section procedures and placed these documents on the PWS Section website. Examples include materials for the Ground Water Rule compliance monitoring and corrective action forms and Monthly Operating Reports (MOR);
- Implementing electronic reporting of MOR data for surface water systems and began development of MORs for groundwater systems;
- Coordinating with programming staff to develop online application for small laboratories to report bacteriological samples electronically;
- Uploading violation letters to the website for viewing by regional offices;
- Increasing use of email to remind systems of upcoming deadlines for compliance samples and reports. As a result of these efforts, monitoring violations for the current 3-year period have been reduced by as much as 80 percent for inorganics, volatile and synthetic organic compounds, compared to the previous 3-year period;
- Revised laboratory reporting forms, in particular the bacteriological analysis form to accommodate the requirements of the Ground Water Rule and electronic reporting;
- Increasing efforts on enforcement for transient system non-compliance (issued more small

penalties);
- Escalating penalty amounts for repeat offenders;
- Training water systems and regional office staff on new rule requirements; and
- Participating in numerous database training and technology webinars to stay abreast of new developments.

In addition to these initiatives, the Compliance Services Branch continues to:
- Send letters and sample schedules explaining monitoring requirements to all new systems;
- Prepare and distribute mass-mailings to all water systems informing them of the new rule requirements, based on system type;
- Notify existing systems of increased or decreased monitoring requirements;
- Mail unsatisfactory analyses back to laboratories and supply copies to the North Carolina Laboratory Certification Program;
- Send lists of candidates for monitoring violations to regional staff and laboratories in order to reduce the number of notices of violation sent to systems that sampled but did not have results submitted to the PWS Section;
- Include required forms for public notification as attachments to violation letters and provide other attachments, as necessary, such as public education templates and forms for performing lead and copper calculations and corrosion control studies;
- Enforce on non-compliance more strictly;
- Develop contact protocols for interaction with sister agencies such as Children's Environmental Health and Dairy 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, and get support from the regional offices to resolve these problems;
- 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 Program) during 2010. The N.C. 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, coordination with other state agencies and program creation designed to initiate SWP Program efforts. These activities allow public water systems to protect their water sources and thus increase capacity. Systems that maintain drinking water sources that are less susceptible to contamination achieve greater financial and technical capacity because fewer resources are spent maintaining water treatment.

The EPA recently recognized the success of North Carolina's SWP Program by concluding that the program "is considered a model for other states" (EPA Quadrennial Evaluation, 2010). Additionally, the N.C. SWP Program staff has been asked to share successful elements and to provide input at various meetings and conferences, including the National River Rally Conference (May 2010), the EPA Regional State Director's Meeting (October 2010), and the Rural Communities Assistance Project Regional Workshop (May 2010).

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 Program data into their agendas and funding priorities. This initiative has been successful and has received national attention. In 2010, the N.C. SWP Program maintained relationships with agencies that fund agricultural best management practices (BMPs), stormwater BMPs, land conservation and stream restoration projects. The SWP Program also initiated interaction with the N.C. DENR Division of Water Quality Construction Loans and Grants Section to offer incentives for local source water protection

planning efforts. Partnering agencies promote source water protection and finance environmental projects consistent with drinking water objectives.

The N.C. SWP Program continued to improve the functionality of its geographic information system 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, NCSWAP info found at http://swap.deh.enr.state.nc.us/swap/. Agencies enlisting drinking water protection as a priority item within their own environmental programs use the PWS Section's geographic information system locator to help find and prioritize environmental projects at http://149.168.87.13/pws/. Maintaining current and reliable data is a hallmark of the N.C. SWP Program, and it instills confidence among partners who use the data to make business decisions. The N.C. SWP Program updated source water assessment information for all of North Carolina's more than 9,000 public water supply sources in May 2010.

The SWP Program participated in Raleigh's final annual Waterfest celebration in May 2010. 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 four-day effort included approximately 18 volunteers explaining and demonstrating concepts regarding surface water filtration, electrolysis to split water molecules, calculations of water volume in the human body and a game to test knowledge.

The N.C. SWP Program continues to administer 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. Also, 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 continues 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. Of these municipalities, Cherryville has completed the SWP planning process to gain eligibility for the loan program.

In October of 2010, the N.C. SWP Program completed its participation in EPA's national effort, the *Enabling Source Water Protection Project*. The project concluded with a comprehensive list of recommendations and initiatives tailored specifically to the state's drinking water protection objectives which have been incorporated into the N.C. SWP Program Long-Term Strategic Plan. Broadly speaking, the recommendations identify incentives and tools conducive to drinking water protection, ranging from website improvements to award presentations designed to motivate local officials.

The N.C. SWP Program promotes and provides technical expertise to assist communities with local SWP plans. A seven-step process has been used successfully across the state to protect ground and surface water sources. To date, the PWS Section has approved five local surface water protection plans which serve to protect drinking water for approximately 220,000 residents. The SWP planning process empowers local stakeholders to define and achieve long-term, proactive drinking water protection goals.

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 groundwater supplies. Upon implementation, the local WHP plan reduces 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.

During the current reporting period (Jan. 1, 2010 through Dec. 31, 2010), the WHP Program continued to implement a process for the review and approval of local WHP plans submitted by public water systems. The WHP Program received 11 plans for review during this period. These plans and WHP plans submitted in previous reporting periods were under active review during the period. Active review involved determining if the WHP plan meets 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 or their consultants.

A total of 10 WHP plans were approved during the current reporting period. Three of the plans approved during the current reporting period were for systems that did not previously have WHP plans while the other seven plan approvals were granted to systems that updated their existing WHP plan. The WHP plans approved during the current reporting period increases the number of public water systems with an approved local WHP plan to 123 (see Figure 1). These 123 public water systems comprise 703 public water supply wells serving a population of 772,059. It is expected that these plans will assist in reducing the susceptibility of these sources of public drinking water to contamination.

In addition to the review of completed WHP plan submittals, the WHP Program 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 (WHPAs) 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 WHPAs. During the current reporting period, 17 public water systems received tentative approval of their delineated WHPAs.

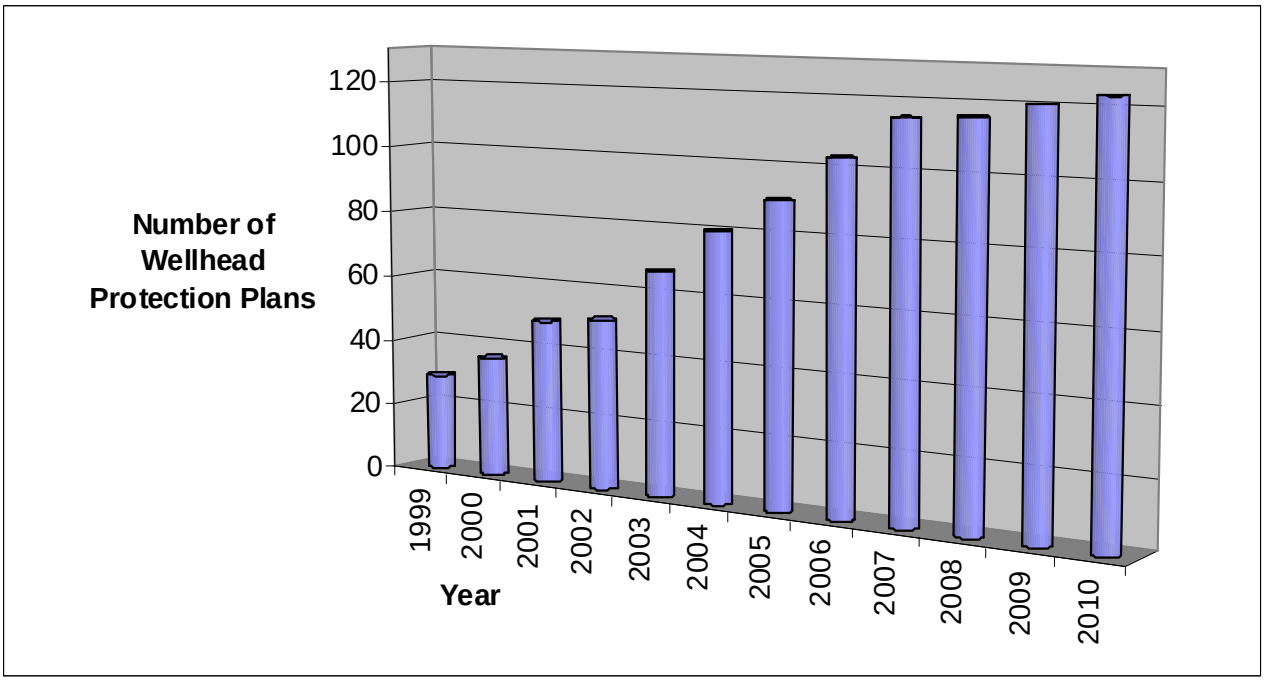
Also during this period, the WHP Program continued the development and maintenance of a Microsoft Access database for tracking State WHP Program information. Additionally, the WHP Program continued to provide program information and assistance to interested parties upon request. Information and assistance included: WHP plan requirements; copies of the North Carolina Wellhead Protection Guidebook; lists of public water supply systems with approved WHP plans; maps of approved WHPAs; source aquifer determination; assessment of the degree of aquifer confinement and aquifer recharge rates; determination of the size, shape and orientation of WHPAs; and information on potential contamination sources. Potential contamination source information provided included recommendations to local governments, public water system managers, environmental consultants, the N.C. Rural Water Association and others on relative risk to groundwater supplies, waste handling practices, standard operating procedures to reduce the potential for groundwater contamination, and best management strategies. Information requests frequently originated from environmental consultants conducting limited site assessments as part of a risk-based analysis of sites with soil and/or groundwater contamination. These limited site assessments require the identification of all PWS wells and WHPAs within a 1500-foot radius of the contaminated site. The WHP Program continued to provide information regarding the location of approved WHPAs to the N.C. Division of Waste Management. The N.C. Division of Waste Management is responsible for review of limited site assessments and oversight of remediation efforts conducted at sites with groundwater contamination resulting from leaking petroleum underground storage tanks.

To improve the efficiency of providing program information, the WHP Program continued to maintain a website where this information can be obtained. Information available on this website included WHP plan

requirements, a downloadable version of the North Carolina Wellhead Protection Guidebook, a list of approved WHP plans and an ArcIMS Viewer that allows an interested party to view all approved WHPAs on an interactive map of the state either by querying the underlying database, or by panning and zooming to a particular area.

The WHP Program continued to develop and maintain ArcView geographic information system shapefiles for all approved WHPAs. Maps of approved WHPAs on USGS 7.5 minute topographic quadrangle base maps were produced from these shapefiles and were included with the WHP plan approval letters sent to public water systems. Copies of these maps were also provided to regional office staff and to the N.C. Division of Waste Management. Shapefiles and electronic copies of maps were also provided upon request via email to environmental consultants conducting limited site assessments, as part of a risk-based analysis of sites with soil and/or groundwater contamination.

Figure 1: Cumulative Wellhead Protection Plan Approvals



Operator Certification and Training: North Carolina has approximately 5,013 certified water system operators who possess approximately 6,936 active operator certifications. The N.C. Water Treatment Facility Operator Certification Board, which was realigned to the PWS Section from the Division of Environmental Health's Office of Education and Training in 2009, certifies training providers. 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 increased the capacity of public water systems by directly influencing the training and certification provided public water system operators. In 2010, notices of violation were sent to 14 systems for failure to have a properly certified operator.

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. The EFC updated deliverables from previous contracts and executed new projects. The key deliverables are identified below.

The EFC updated a detailed quantitative assessment of current regional and partnership practices across the state (state inventory). 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. Additionally, the EFC developed an assessment tool to determine the feasibility of potential water system interconnections in North Carolina. The assessment considered topography, hydrology, existing infrastructure, and protected lands to estimate the potential interconnections of least cost and greatest feasibility.

The EFC and the North Carolina League of Municipalities conducted the 2010 North Carolina Water and Wastewater Financial Practices and Policies Survey. The purpose of the survey was to identify trends and characteristics of water and wastewater utilities' financial policy and administration in North Carolina. This survey helps water systems compare their practices to other water systems in the state, as well as helps the PWS Section target areas of water system operation that could improve system viability.

The EFC is currently working with the PWS Section on the following projects:

- Developing financial management tools to assist decision makers,
- Updating the rate setting dashboard,
- Assessing the managerial capacity of water systems in North Carolina,
- Improving inter-system partnerships and cooperation, and
- Training and assistance on capital improvement planning to utilities throughout North Carolina.

The projects 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 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. The majority of 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:

- Project submittal,
- Review procedures,
- Fundamental aspects of design,
- Environmental review requirements,
- Requirements for new well systems,
- Source water development requirements, and
- Water treatment, storage, pumping and distribution requirements and recommendations.

Completed portions of this guidance document are available online at www.ncwater.org/pws/PlanReview/EPD_Guidance.pdf.

Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 DBP Rule) Compliance Forecast: Beginning in April 2012, community and non-transient non-community systems must comply with the Stage 2 DBP Rule. As part of the implementation of the Stage 2 DBP Rule, all community systems and non-transient non-community systems that serve at least 10,000 people and use a residual disinfectant were required to complete the Initial Distribution Evaluation (IDSE) process. Approximately 420 systems were required to do the following: sample in locations of high DBP concentration potential, calculate locational running annual averages, select Stage 2 DBP Rule sampling locations and report their findings in a Standard Monitoring Report to the PWS Section. Another 28 systems chose to perform a System-Specific Study and report findings to the EPA. Additional systems that received 40/30 certifications, or very small system waivers, were not required to submit Standard Monitoring Reports or System-Specific Studies.

The results of Standard Monitoring Reports submitted by water systems were reviewed to forecast the number of systems that may be noncompliant under the Stage 2 DBP Rule. The forecast indicates that the number of noncompliant water systems will likely increase under the Stage 2 DBP Rule. Systems that are forecast to be noncompliant with the Stage 2 DBP Rule have been targeted for outreach by the PWS Section. The outreach activities that occur as a result of the Stage 2 DBP Rule forecast are proactive steps taken by the PWS Section to reduce noncompliance due to implementation of the upcoming Stage 2 DBP Rule.

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, treatment of water with ultraviolet light, water storage tanks, standards for waterline fabrication, pipe bursting technologies and pitless pumps. These forums provide PWS Section staff the opportunity to interact with local and regional experts and discuss issues pertinent to water 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.

Area Wide Optimization Program (AWOP): Since 1998, the United States Environmental Protection Agency developed several new regulations to reduce the risk of biological contamination while limiting the risk from disinfecting chemicals and their byproducts. AWOP was developed to help water systems meet increasingly stringent regulations and achieve higher levels of water quality.

AWOP is a joint program between the EPA and states. North Carolina has participated in AWOP since 2000. North Carolina works cooperatively with water systems to use existing equipment and treatment processes to improve or optimize water quality.

The first phase of AWOP activities focused on comprehensive performance evaluations. Water systems that failed to meet turbidity performance criteria were required to perform a detailed review of treatment processes and practices. Several surface water systems in North Carolina voluntarily participated in the comprehensive performance evaluation process in order to improve plant operations. Water treatment plants that consistently achieve low levels of turbidity achieve significant water quality benefits.

The next phase of AWOP is performance-based training. Performance-based training joins water systems and state representatives together for hands-on training sessions. Small groups practice plant management and laboratory procedures and learn ways to better use existing equipment. Performance-based testing sessions typically consist of five or six sessions where water system operators study their own plants for homework assignments. The sessions focus on ways to use existing knowledge and equipment and challenge the operators to improve some treatment process at their home plant. Participants in performance-based training sessions can expect to further develop investigative, reporting and presentation skills and become more familiar with other water treatment professionals in the area.

In order to meet both disinfection byproducts regulations and microbial removal requirements, many surface water plants must carefully control their multiple barrier treatment processes, including source water selection and protection, coagulation, sedimentation, filtration and disinfection, as well as managing water age and consistency in the distribution system. Performance-based testing may also provide a valuable way for water plants to learn disinfection byproducts control techniques. By actively participating and developing special studies, water plant representatives can learn how to control these compounds while still meeting microbial removal requirements.

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 an 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 uses 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, is used to measure improvements in capacity.
>
> Also, the PWS Section tracks 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
Dec. 31, 2010	2,594	1,701	65.6	1,503	57.9	1,606	61.9	1,385	53.4	1,336	51.5	1,328	51.2
Increase from 1st period†		1,151	47.8	1,033	42.7	759	34.5	1,243	48.8	1,298	50.3	1,287	49.9

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

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

† % value indicates the increase in the percentage of public water systems that have completed the particular capacity development measure indicated since the 1st period (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.

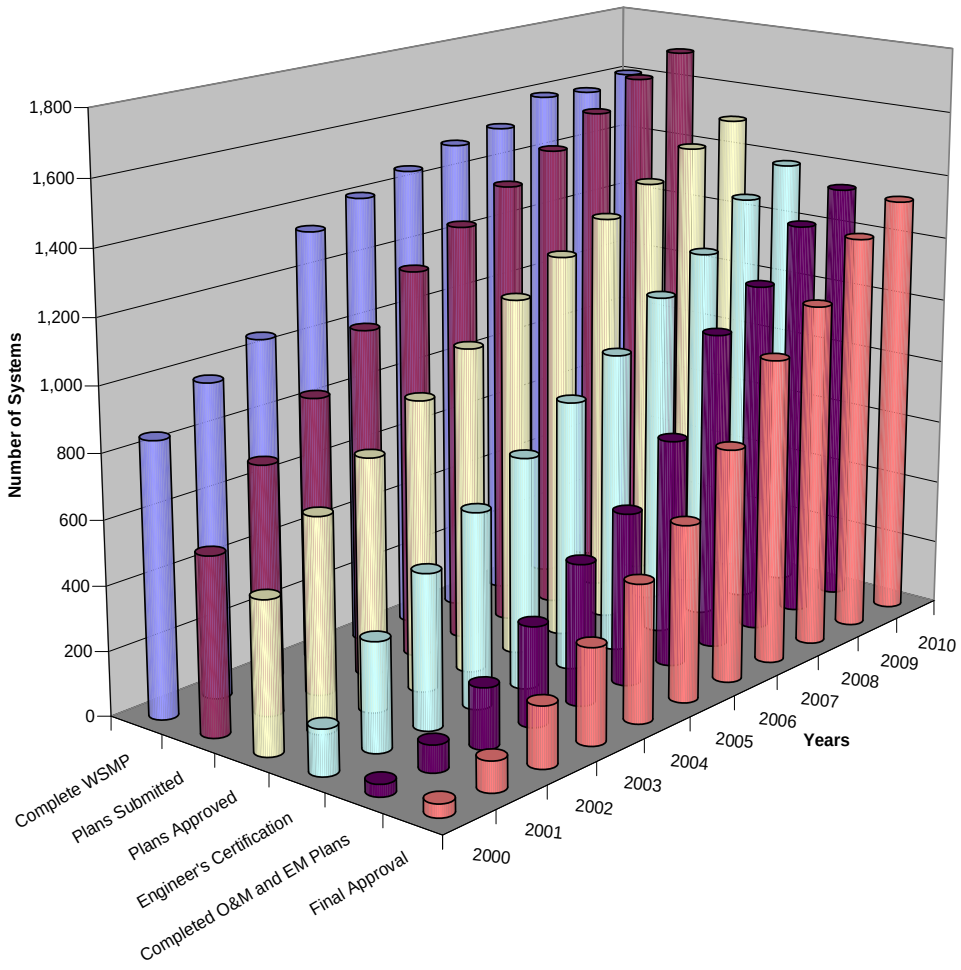
"*Systems with Final Approval"* means the number of systems meeting all our capacity development requirements during the indicated period and for which a permit to operate was issued.

Table 5 is summarized graphically in Figure 2 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.

Approximately 97 percent of plan submittals received by the PWS Section are approved or provided with comments by the review engineer within 30 days of applicant submittal. Similarly, greater than 99 percent of approvals issued by the PWS Section are issued in fewer than 90 days. It is important to note that not all plan submittals receive approval. Some plans are withdrawn from review by the applicant or terminated due to prolonged inactivity on the part of the applicant.

Figure 2: Capacity Development Measures

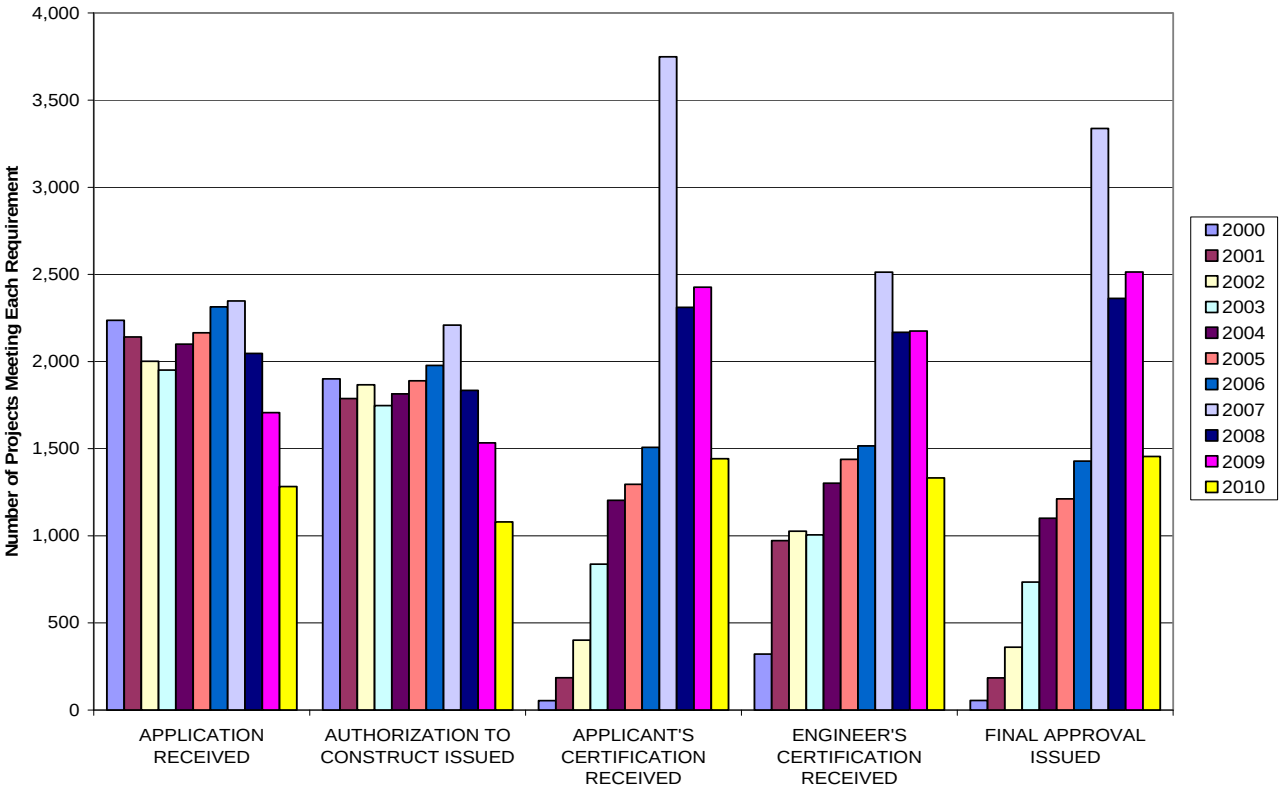


"*WSMP*" indicates the documentation of the water system management plan.
"*O&M Plan*" indicates certification of the completion of an operation and maintenance plan.
"*EM Plan*" indicates certification regarding the completion of an emergency management plan.
"*Final Approval*" indicates the completion of the requirements of the Capacity Development Program.

IV.C Discussion of Progress

The Capacity Development Program has helped assure that an increasing number of public water systems have evaluated their capacity. A water system can submit many projects over time. From Oct. 1, 1999 through the end of 2010, approximately 1,700 systems submitted 22,680 projects for review. A total of 1,330 systems achieved final approval status for 14,741 projects. Figure 3 demonstrates the number of projects for which Capacity Development Program requirements have been achieved for each year since the beginning of the program. The PWS Section sends written correspondence on a monthly basis to systems that have projects approaching their authorization to construct deadline for which no subsequent engineer's certification or applicant certification have been received. This correspondence informs the system to submit the required documentation, request an extension of the authorization to construct or withdraw the application if the project will not be constructed. As a result of this outreach, the number of projects granted final approval has outpaced the number of applications received since 2007. As of Dec. 31, 2010, approximately 1,610 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 3: 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 invaluable tools for the proper maintenance of the system and provide incentive for the system to prepare for emergency and disaster events. With this requirement, the PWS Section has 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 pleased with the progress of the Capacity Development Program. The numbers show that there has been much effort and activity to accomplish 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 identified 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 help all public water systems regardless of size. Some of the initiatives and opportunities experienced in 2010 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 of North Carolina Section of the AWWA, EPA and Association of State Drinking Water Administrators (ASDWA).

The security and emergency planning engineer is now the PWS Section's liaison with the North Carolina Drought Management 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 residents through a drought period. The National Oceanic and Atmospheric Administration has congratulated the North Carolina Drought Management 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 the N.C. AWWA. The committee and PWS Section have created training for water systems outlining the opportunities currently available to systems to upgrade their resilience and preparedness. In 2010, the PWS Section taught a class to prepare water system operators for Incident Command System and National Incident Management System certification. Certification in these disciplines increases the capability of water systems to respond to emergency events.

Central Coastal Plain Capacity Use Area: Public water systems in the Central Coastal Plain Capacity Use Area face unique challenges with regard to maintaining and increasing their capacity. This area in eastern North Carolina is underlain by cretaceous aquifers that are threatened by excessive groundwater withdrawal and 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, interconnections 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 of 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 by 50 percent between 2000 and 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 noncompliance. 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 community served by a public water system that lacks capacity as defined in the SDWA, Sections 1420 and 1452 (a)(3), is defined as a Disadvantaged Community.

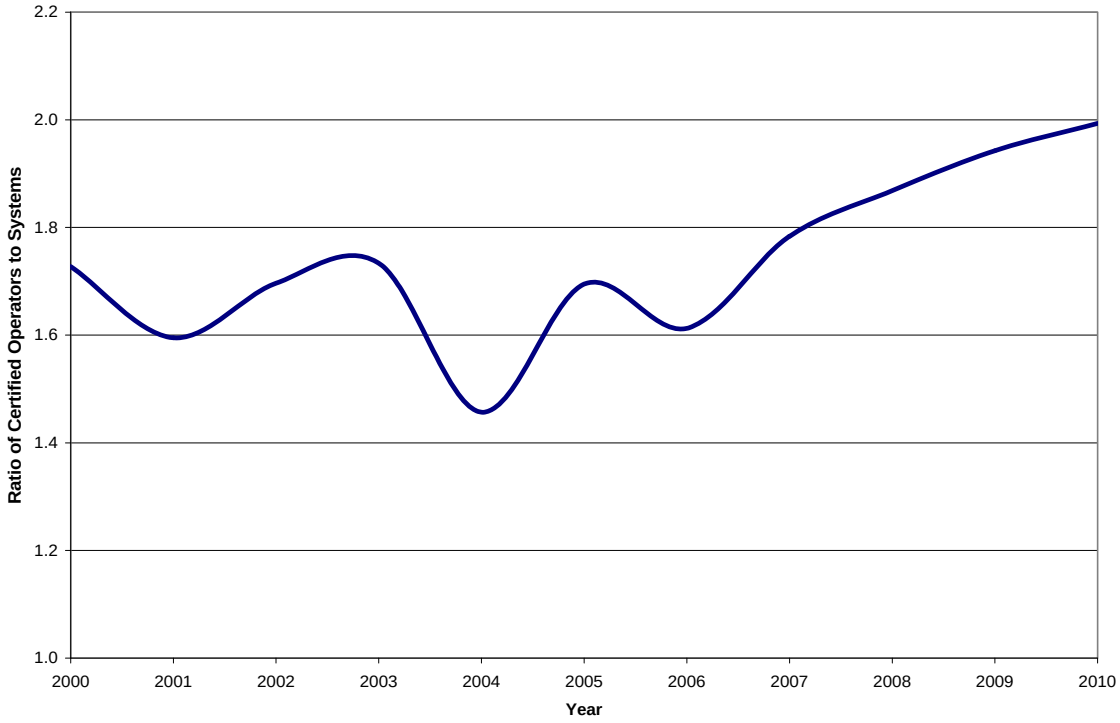
Principal forgiveness loans are made to the most appropriate water system having capacity that is willing to take over the failing system. In most cases, this consists of a project to run supply lines to and replace the distribution system in the disadvantaged community public water system. These projects are initiated by the PWS Section and no application is necessarily required. Currently, the PWS Section is working to consolidate 19 non-viable public water systems with more reliable systems. These systems serve a total population of approximately 2,770 residents. Completion of these consolidation projects will give these residents access to water systems with greater capacity.

In addition to the ongoing efforts to consolidate 19 non-viable systems, the PWS Section has previously consolidated 11 non-viable systems since the program's inception in 2004. Outside the DWSRF process, the 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 2010, 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 fiscal 2006 through fiscal 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 fiscal 2007 through fiscal 2009 indicates that 13 percent of systems were placed on at least one of the EPA's SNC lists. Only 9 percent of systems that began operation during fiscal 2008 through fiscal 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, or risk withholding of 20 percent of the State Revolving Fund Capitalization Grant. The overall number of certified operators has increased in North Carolina since 2000. Figure 4 shows how the ratio of certified operators to community and non-transient non-community water systems has changed from 2000 to 2010.

Figure 4: Ratio of Certified Operators to Community and Non-Transient Non-Community Water Systems



The overall increase in the ratio of certified operators to water systems is significant because it indicates that there are sufficient qualified personnel to perform jobs essential to water systems.

American Recovery and Reinvestment Act (ARRA): The American Recovery and Reinvestment 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.

ARRA-funded projects were required to execute all construction contracts by Feb. 17, 2010 in order 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 money from some ARRA projects can be reallocated to other projects on the priority funding list due to final costs coming in below projections. The projects on the over-commitment list had agreed to finance their construction activities through traditional Drinking Water State Revolving Fund loans while meeting all ARRA special conditions with the understanding that they could be given ARRA funds if funding becomes available. Prior to the Feb. 17 deadline, several of the original ARRA-funded "green" infrastructure projects worth more than $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.

Throughout 2010, the PWS Section performed 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. 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 to be considered for funding. The PWS Section prioritizes each project, and selects the highest priority projects for funding. Systems that the PWS Section considers non-viable do not receive funding under the DWSRF Program rules. Systems 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 preventive and efficiency measures, such as source water protection and replacement of aging infrastructure; and
- Provide technical assistance for small systems.

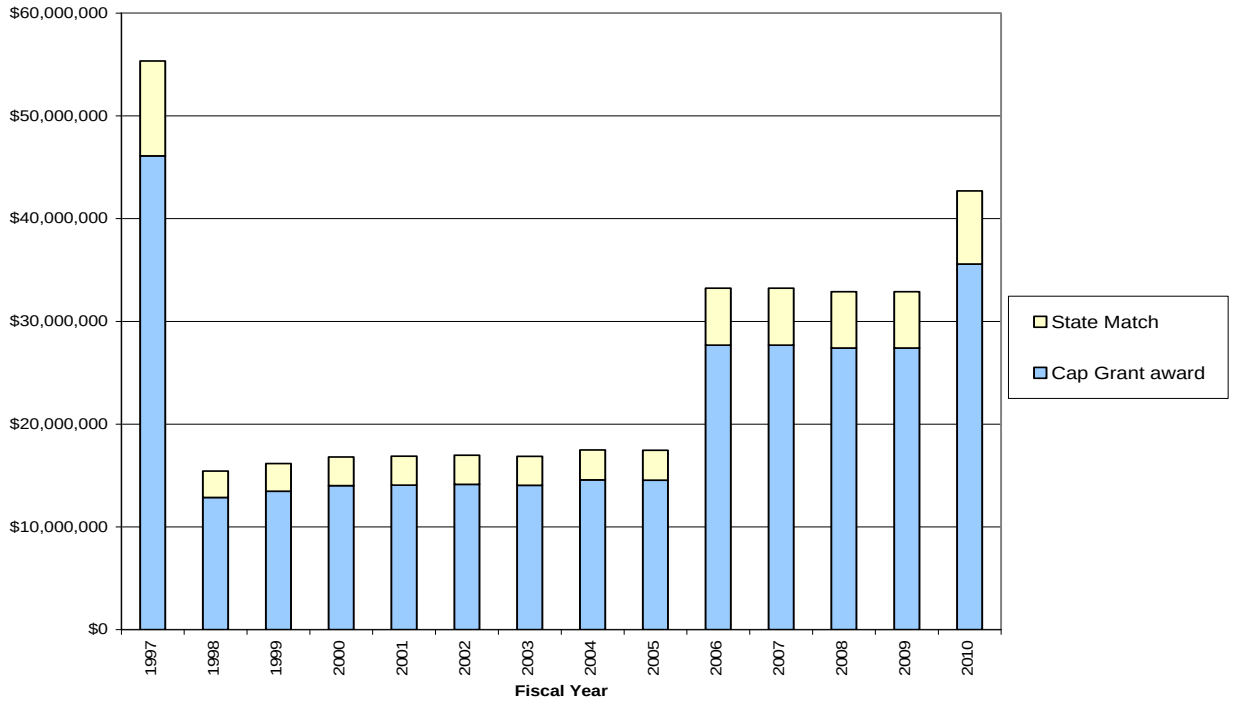
Through its ongoing funding activities, the DWSRF Program increases capacity for water systems throughout North Carolina by promoting the following long-term objectives:

- 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 reducing 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 2010, approximately $296 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 5 displays the federal Capitalization Grants for each year as appropriated by the U.S. Congress and the associated North Carolina state matching funds.

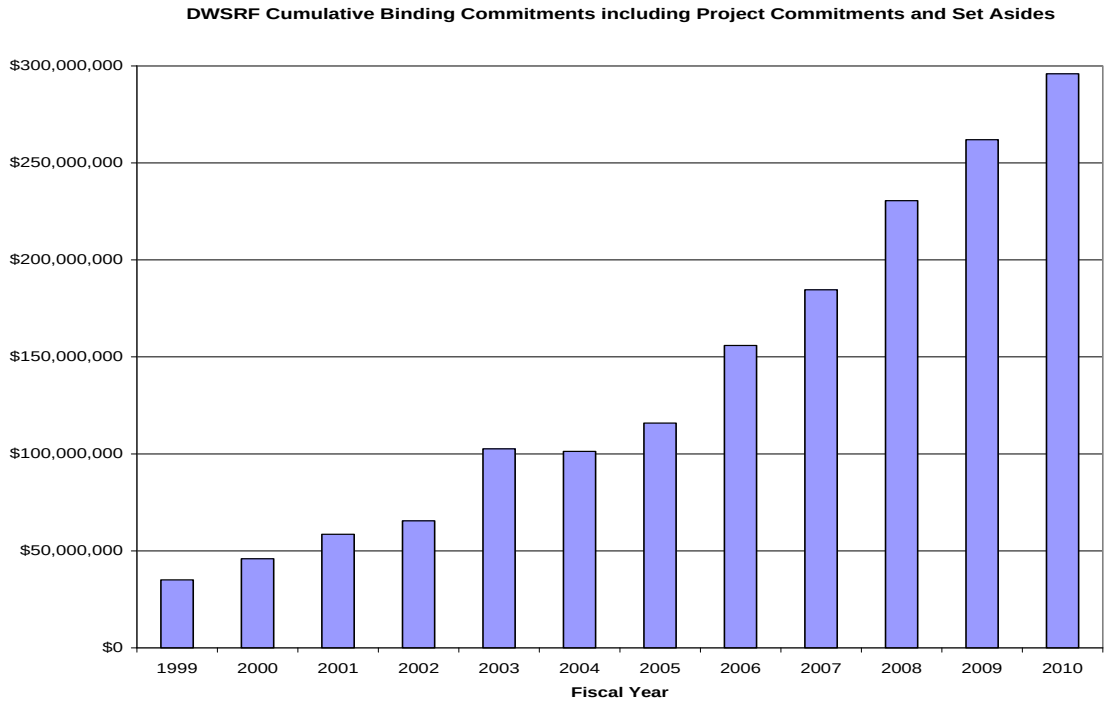
Figure 5: Federal and State Monies Awarded to the NC DWSRF



The federal allocation in fiscal 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 Capitalization Grant award allocations for 1998 through 2005 resulted from 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 2006 because of the intense levels of assistance provided by the PWS Section to water system officials in 2003 to explain the purpose of the survey and the benefit of having a complete and thorough inventory of projects. The federal allocation was larger in fiscal 2010 than previous years because Congress authorized more money for distribution to states. The EPA Needs Survey is conducted every four years. Thus, the PWS Section's annual allocation fluctuates due to changes in the formula developed by EPA based on the Needs Surveys and also by congressional allocation.

As shown in Figure 6, the DWSRF Program committed nearly $300 million to water system projects in fiscal 2010. The decrease in the project commitment dollar amounts from fiscal 2003 to fiscal 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 2004, the lower revised dollar amounts for previously committed projects reduced the cumulative commitment amount.

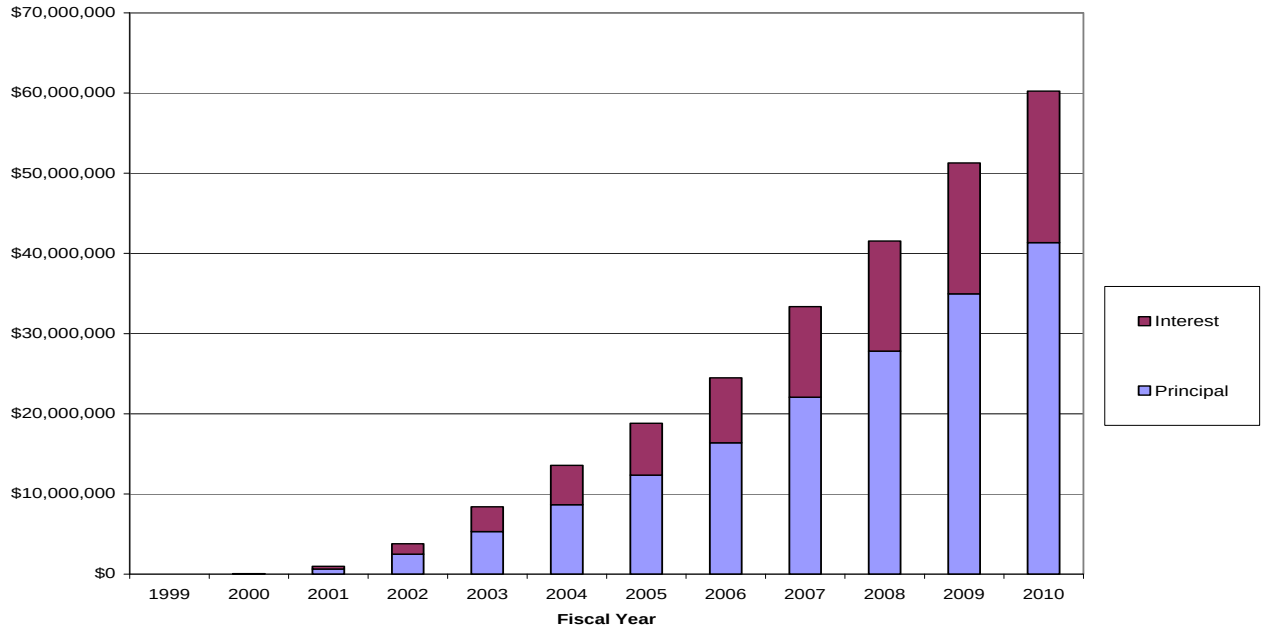
Figure 6: Cumulative DWSRF Commitments to Public Water Systems



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 $60 million in loan repayments and interest from water systems. Figure 7 shows the cumulative payments received.

Figure 7: Cumulative DWSRF Program Loan Repayments



The loan repayments are incorporated into the revolving fund. These monies increase 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.

An issue remains, however, in committed money sitting for long periods while systems work toward the start of construction. The PWS Section is evaluating options that would favor projects closer to construction to make better use of funds on hand.

V.B Future Reports

Section 1420(c)(3) of the 1996 SDWA Amendments requires 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 North Carolina with the required report on the dates specified, starting from Sept. 30, 2002 (2005, 2008, 2011…), until otherwise notified by the EPA. The PWS Section plans to prepare an updated report annually and publish it on its website at: www.ncwater.org/pws/index.htm**.**

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: www.ncwater.org/pws/CapDev/capacity_development_program_rep.htm**.**

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 2010,**
- **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

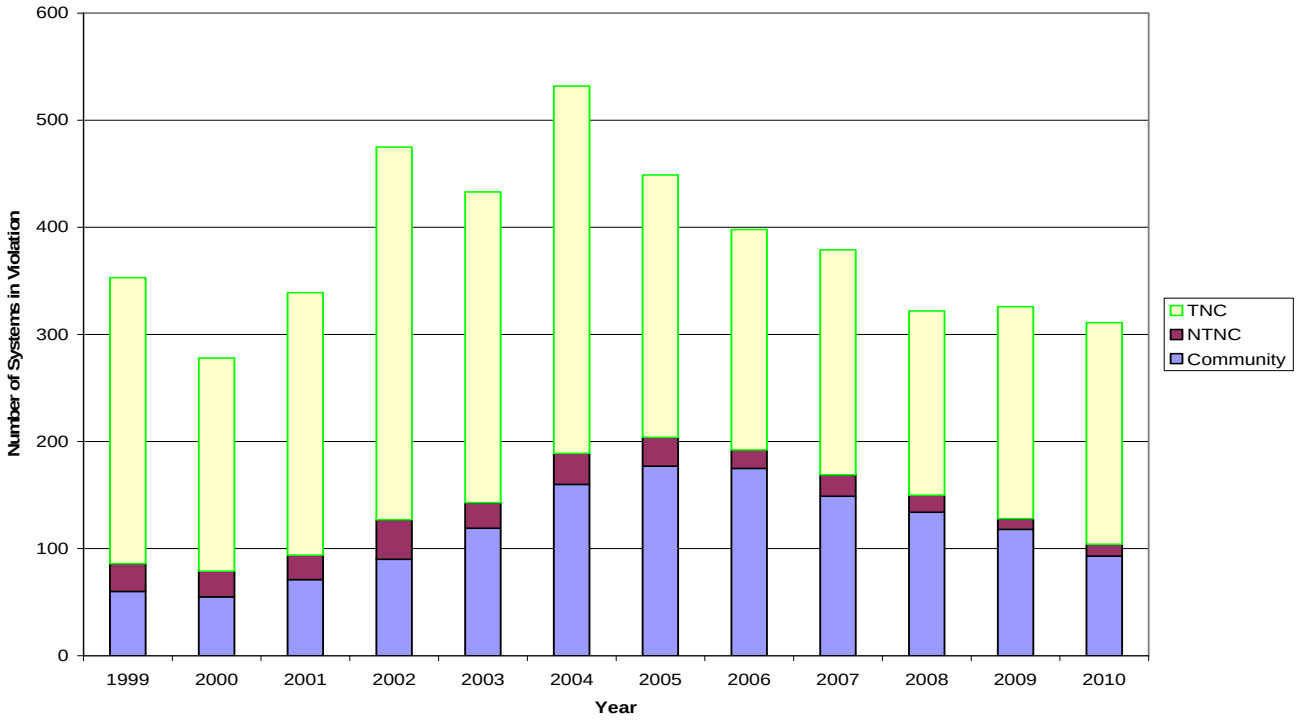


Figure A.2: Water Systems with Maximum Contaminant Level Violations Since 1999, Grouped by Population

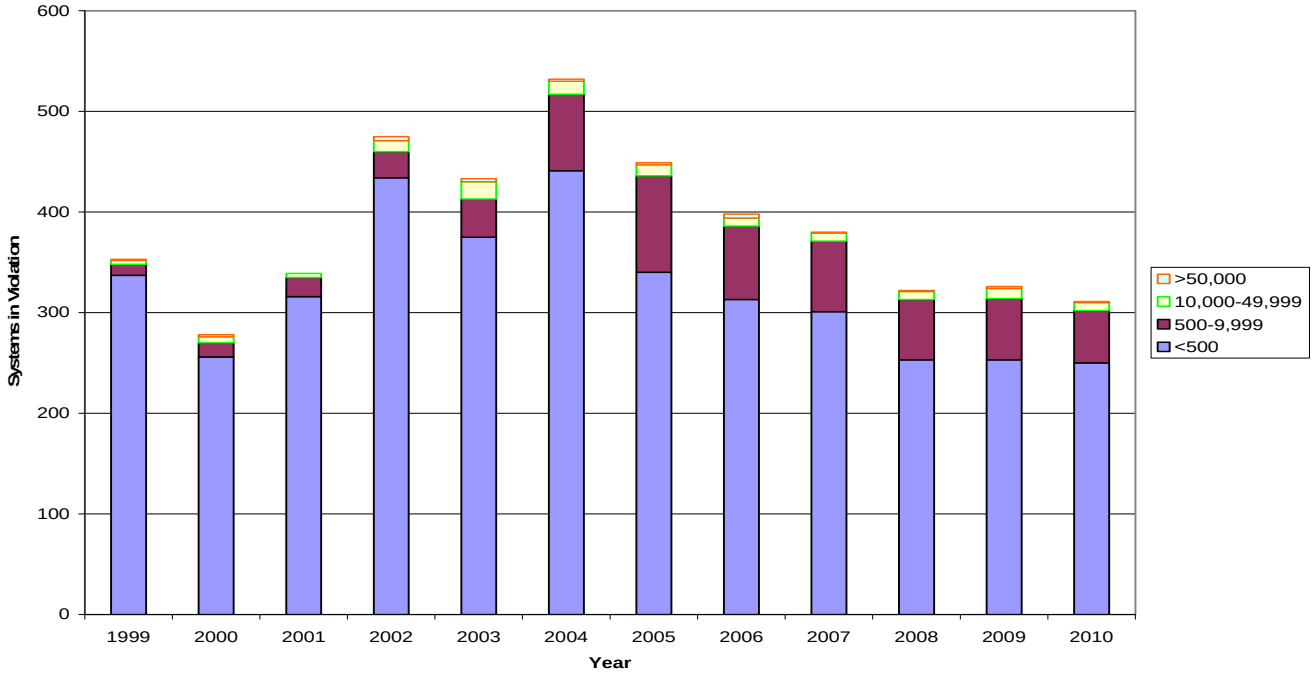


Figure A.3: Water Systems with Monitoring/Reporting Violations Since 1999, Grouped by Water System Type

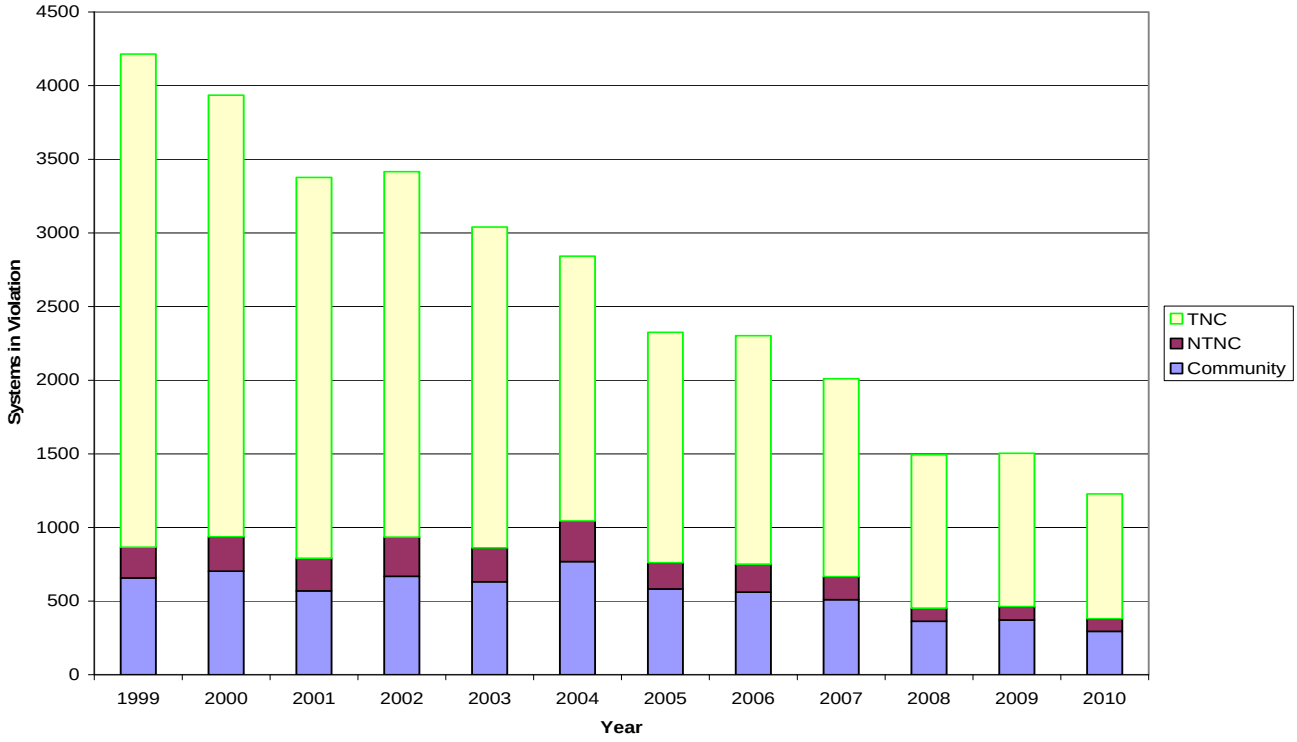


Figure A.4: Water Systems with Monitoring/Reporting Violations Since 1999, Grouped by Population

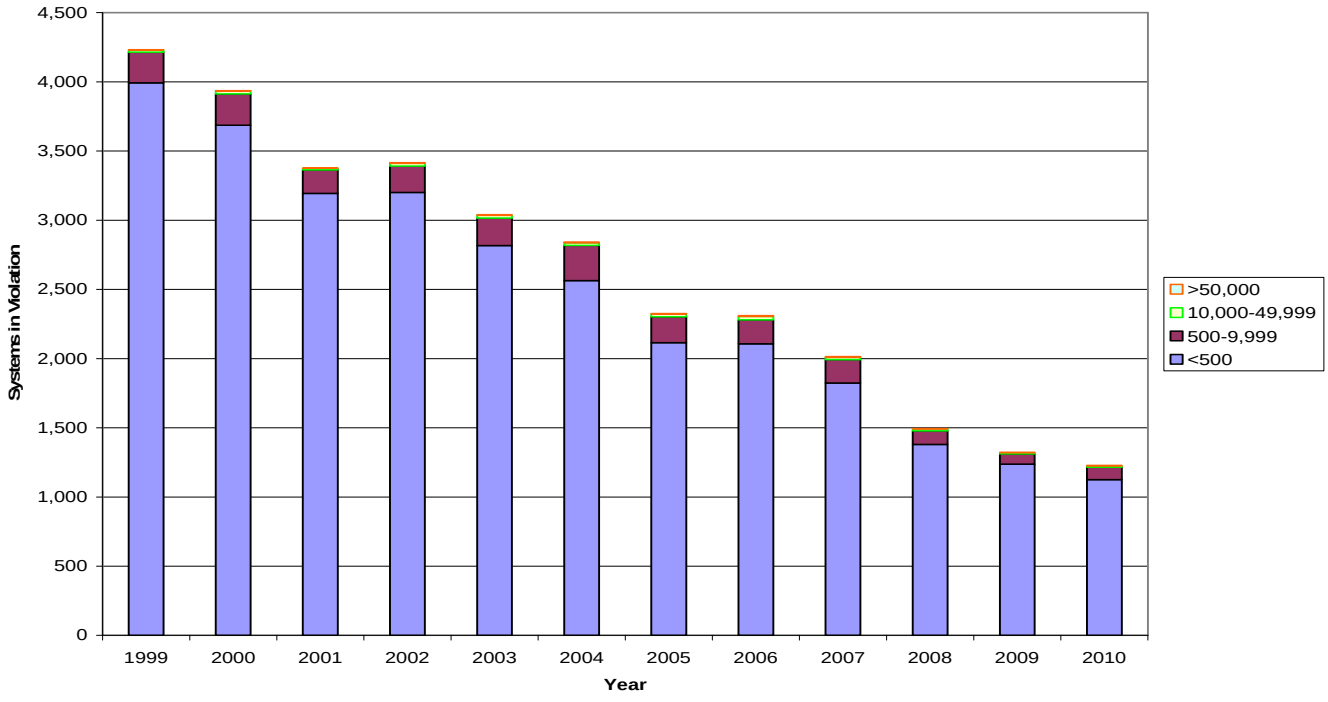


Figure A.5: Community Water Systems with Maximum Contaminant Level Violations Since 1999, Grouped by Population

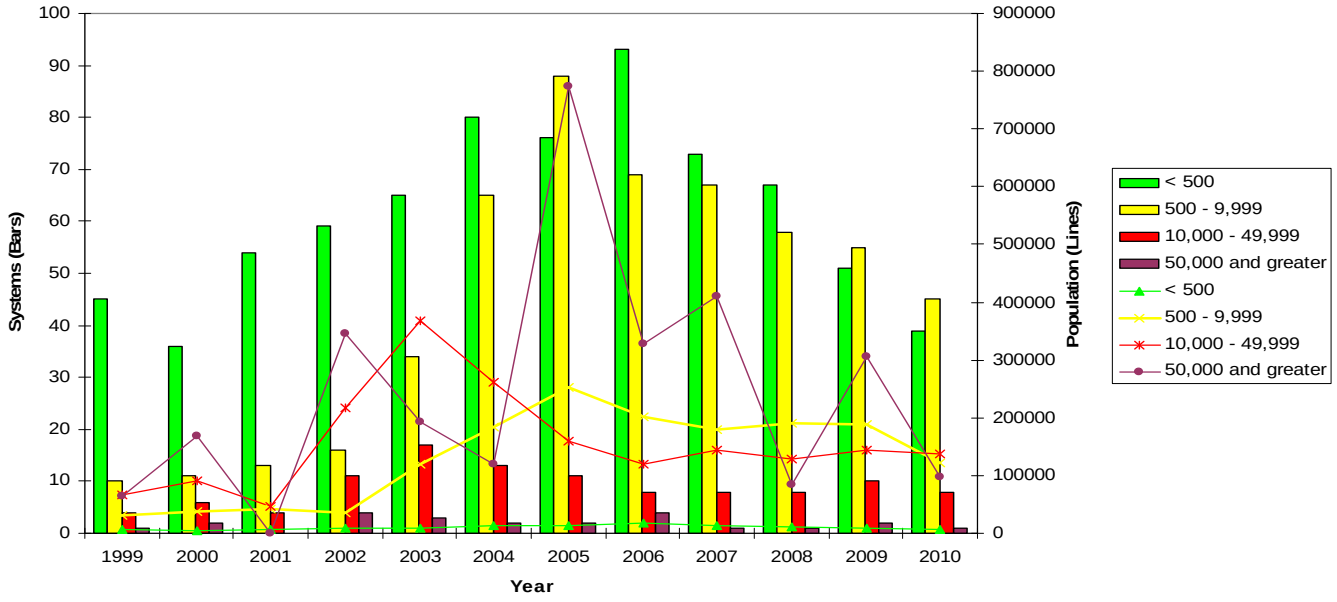


Figure A.6: Community Water Systems with Monitoring/Reporting Violations Since 1999, Grouped by Population

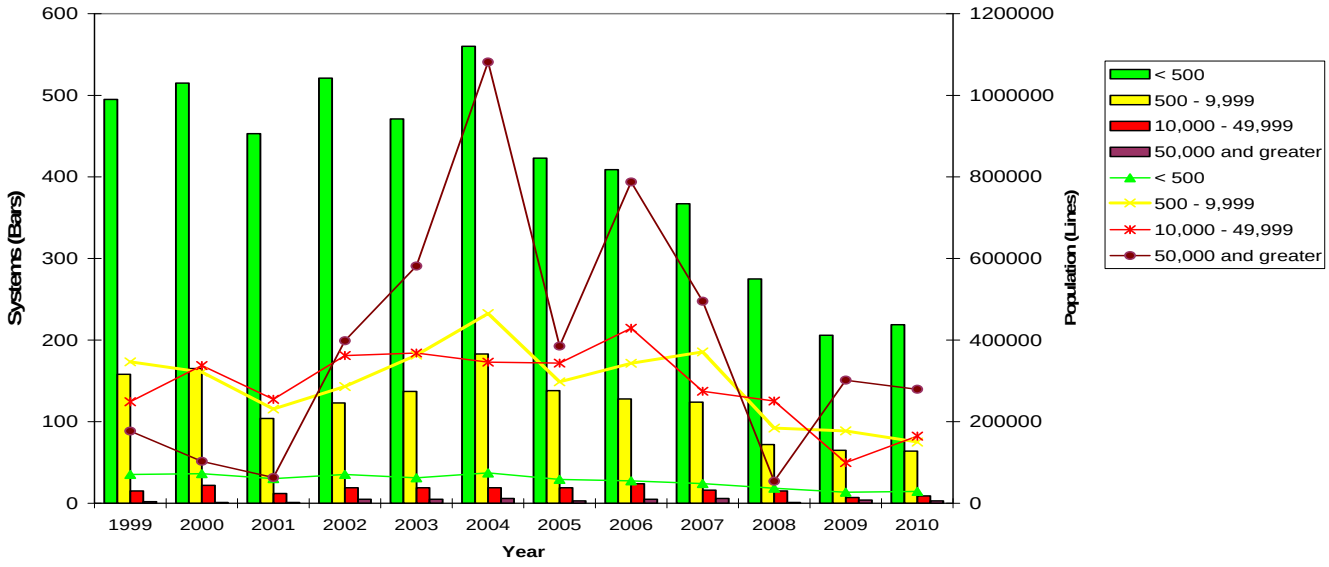


Figure A.7: Community Water Systems with Maximum Contaminant Level Violations Since 1999

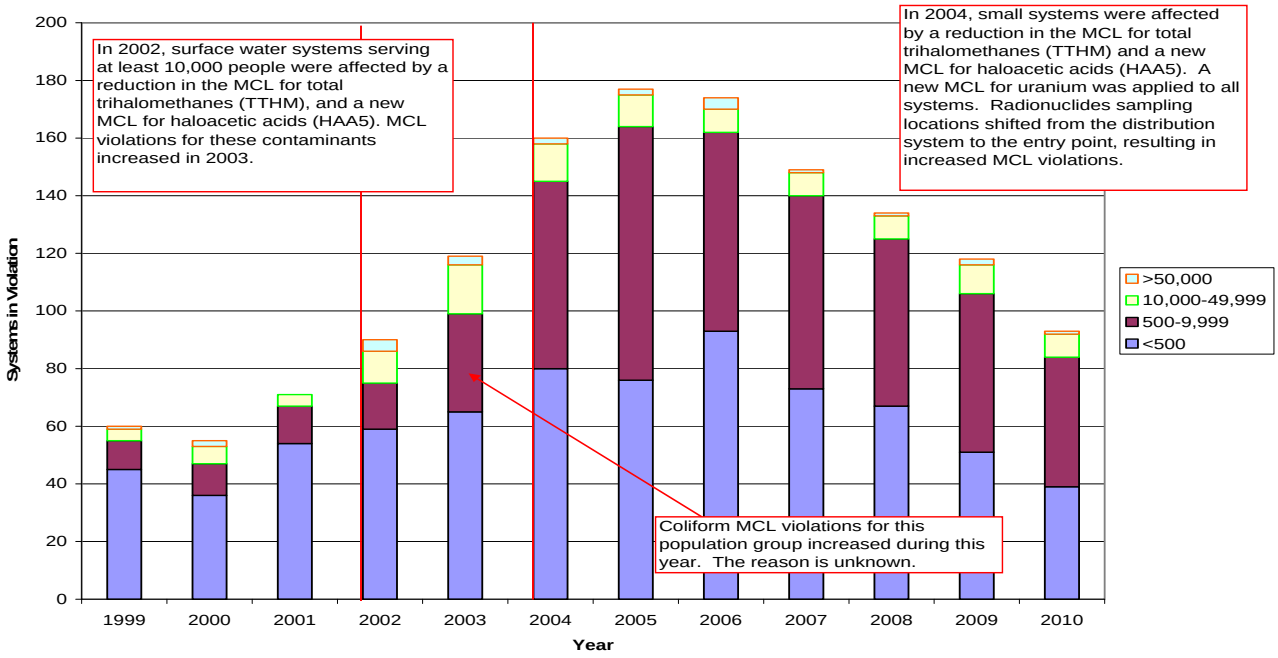


Figure A.8: Community Water Systems with Monitoring/Reporting Violations Since 1999

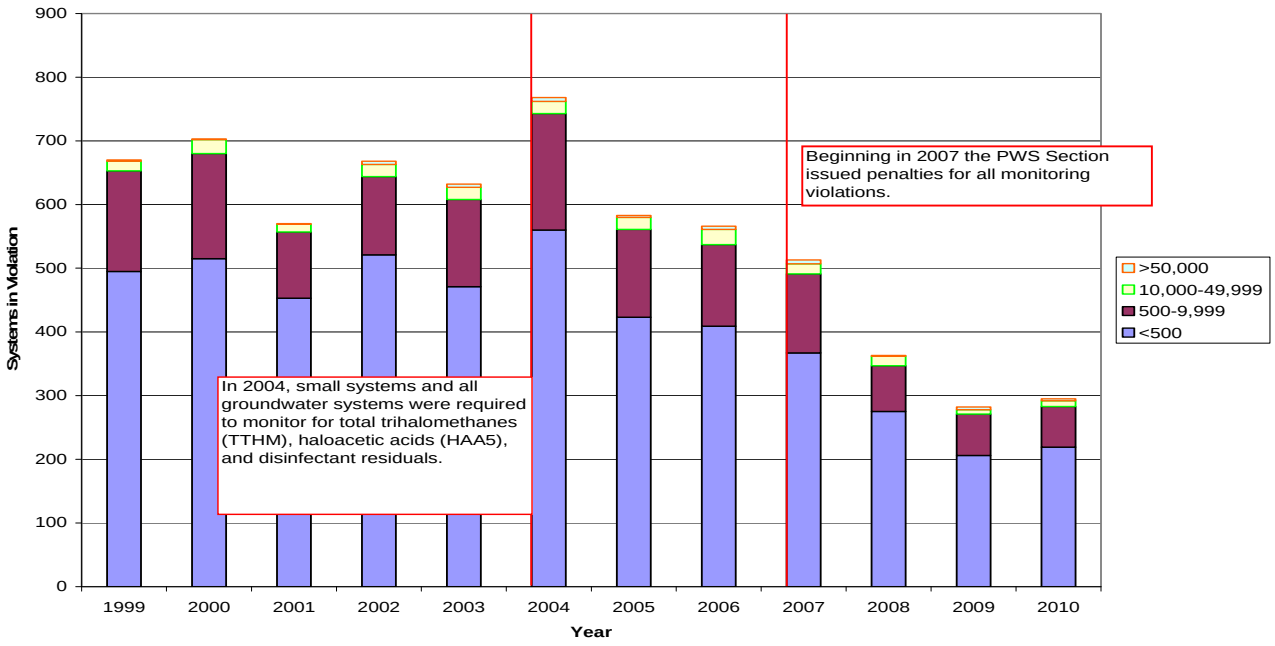


Figure A.9: Non-transient Non-community Water Systems with Maximum Contaminant Level Violations Since 1999

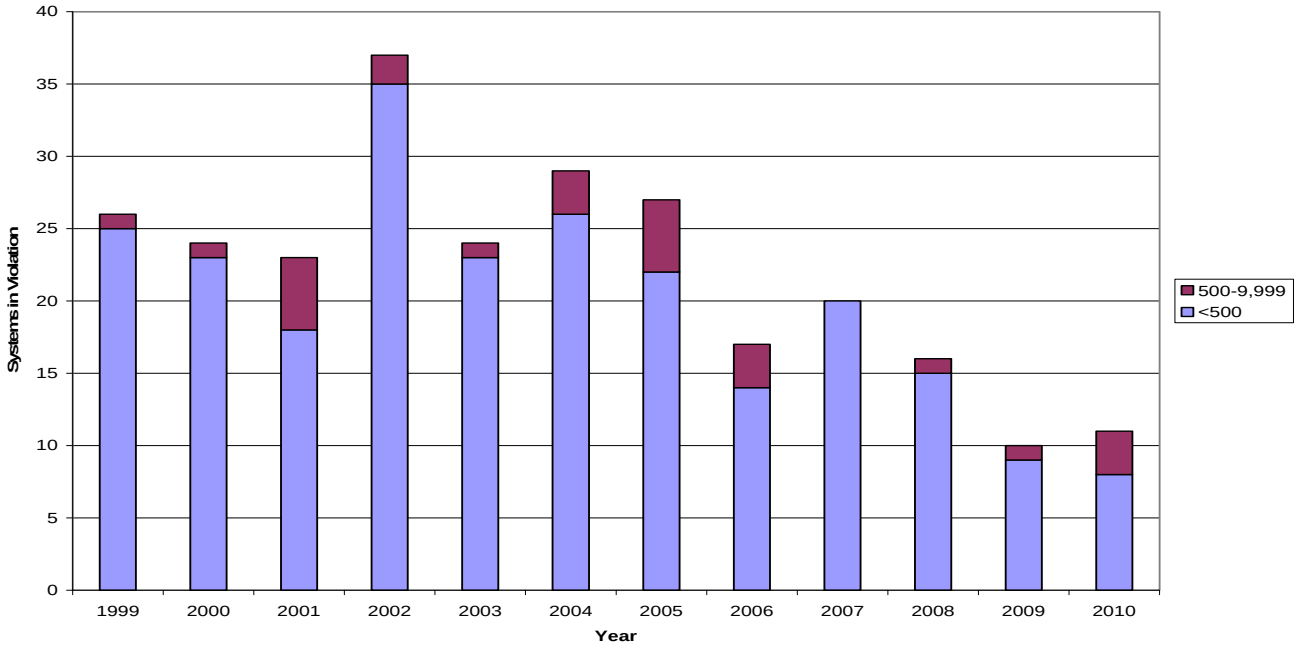


Figure A.10: Non-transient Non-community Water Systems with Monitoring/Reporting Violations Since 1999

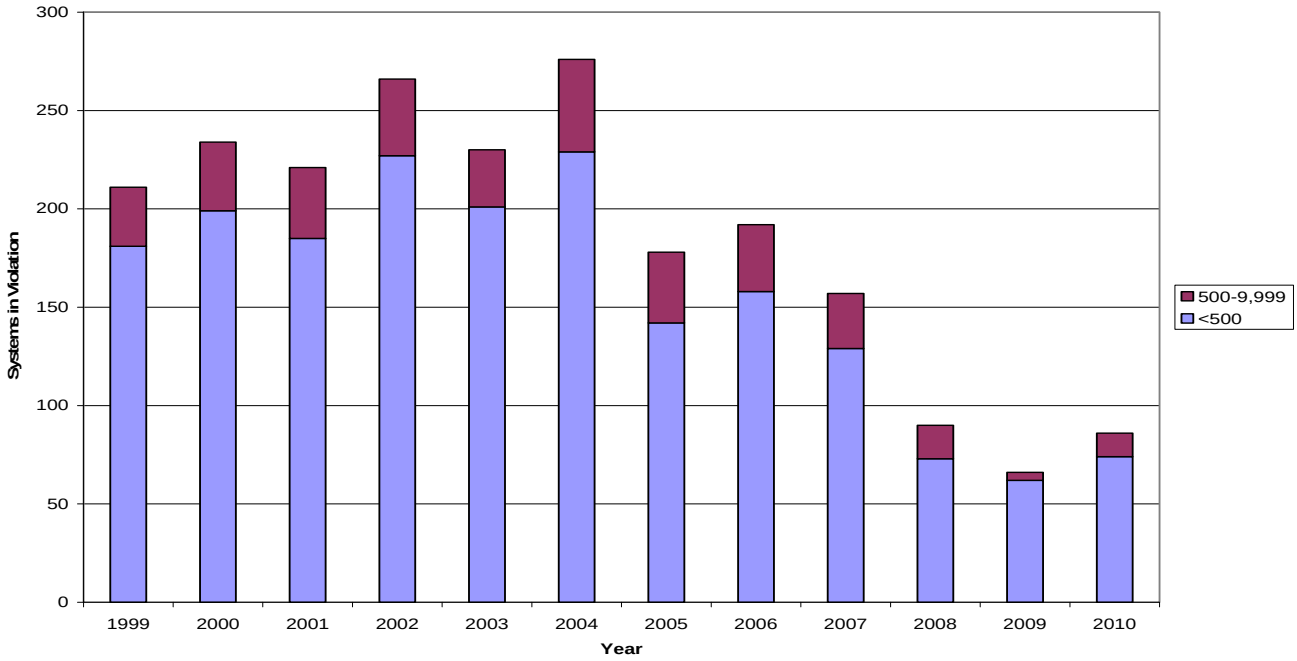


Figure A.11: Transient Non-community Water Systems with Maximum Contaminant Level Violations Since 1999

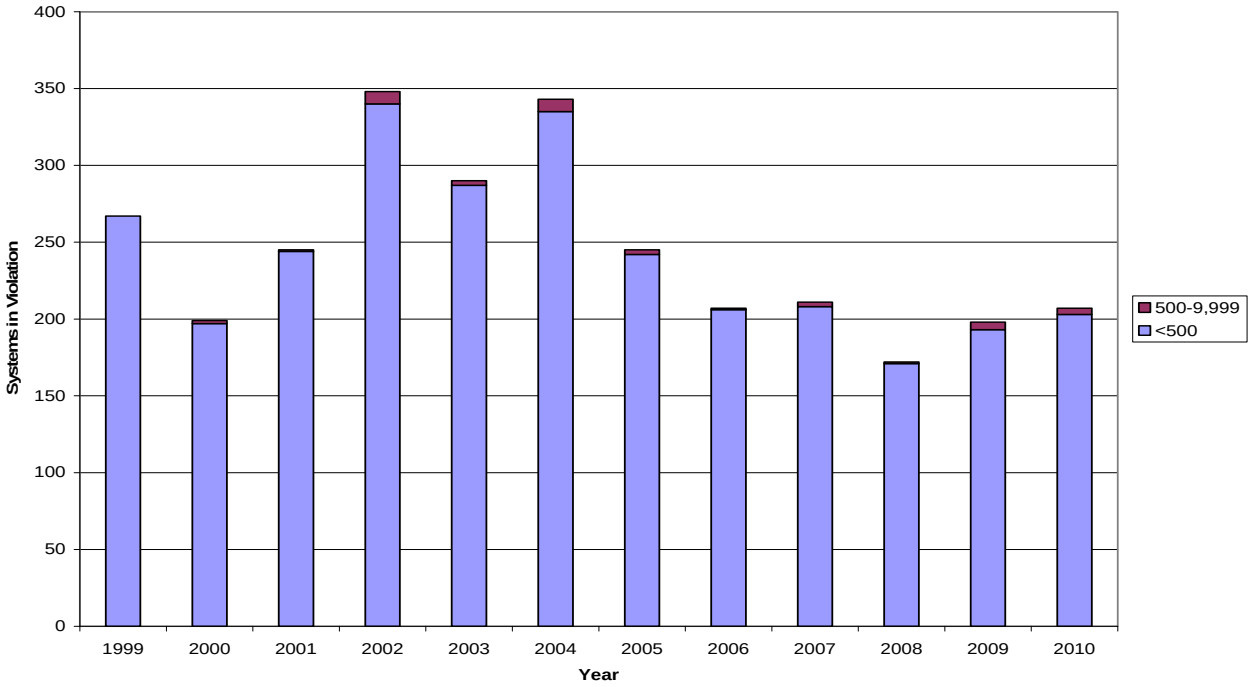
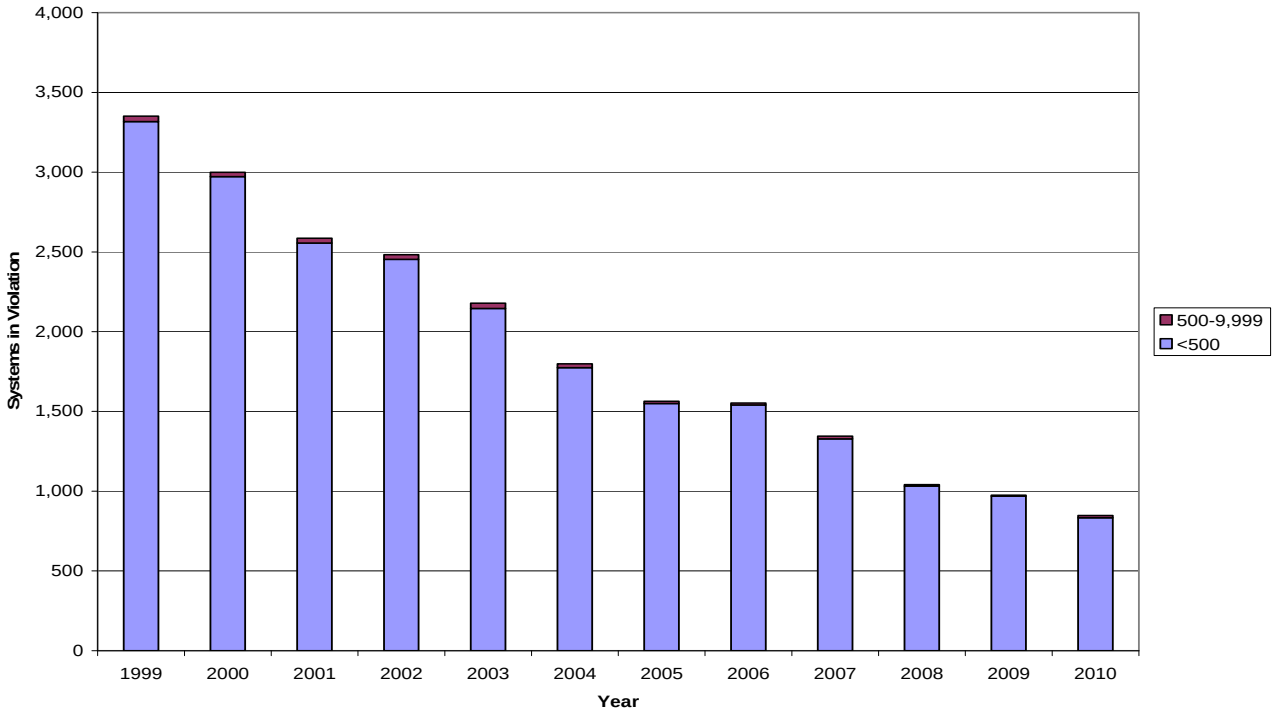


Figure A.12: Transient Non-community Water Systems with Monitoring/Reporting Violations Since 1999



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
2012	Stage 2 Disinfectant / Disinfection Byproducts Rule	Location-specific sampling points in the distribution system	MCLs and regulated contaminants do not change but compliance is calculated by locational running annual average. Every sampling site must be compliant with MCL.	CWS, NTNC