North Carolina's Capacity Development Report for Public Water Systems

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Division of Environmental Health
Department of Environment and Natural Resources

STATE OF NORTH CAROLINA

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

Contents

LIST OF ACRONYMS

Capacity	Technical, Managerial and Financial Capacity
PWS Section	North Carolina Public Water Supply Section
SDWA	Safe Drinking Water Act
USEPA	United States Environmental Protection Agency

I. EXECUTIVE SUMMARY

The Public Water Supply Section (PWS Section) of the North Carolina Department of Environment and Natural Resources is the primary agency responsible for assuring that the people of North Carolina are provided safe drinking water from public systems. Public water systems range from large municipalities to country stores that serve a minimum of 25 individuals for 60 days per year. The complexity of the Safe Drinking Water Act (SDWA) can make compliance difficult to achieve for many small systems. Of the approximately 7,100 regulated public water systems, about 6,300 serve a population of less than 500.

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

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

The 1996 Safe Drinking Water Act Amendments require withholding 20 percent of a state's Drinking Water State Revolving Fund Capitalization Grant unless the state obtains the means to ensure that all new community water systems and new nontransient noncommunity water systems beginning operation after October 1, 1999 demonstrate technical, managerial, and financial capacity with respect to each national primary drinking water regulation in effect, or likely to be in effect, on the date operations start. The PWS Section responded to this requirement by creating the Capacity Development Program. The goal of the Capacity Development Program is to require technical, managerial, and financial planning of new community and nontransient noncommunity water systems to improve the service and sustainability of the systems. It also involves the coordination of the efforts of all the branches and offices of the PWS Section including Technical Services, Compliance Services, Protection and Enforcement, and the Regional Offices.

In October 1999, the PWS Section adopted revised rules requiring community and nontransient noncommunity public water systems that are expanding or altering their system to conduct a self-assessment with documentation describing their technical, managerial, and financial viability and submit it to the state. It includes requirements for describing routine operation as well as emergency response. The new documentation is used to assess whether or not the public water suppliers have the capacity to operate the new expanded or altered water systems. This has placed the PWS Section and the public water suppliers in an excellent position to better determine areas of strengths, weaknesses, challenges and opportunities. This information helps systems and the PWS Section to be more effective in meeting the challenge of providing safe and reliable public drinking water.

In 2004, the PWS Section continues to maintain success in the Capacity Development Program. In the last five years we have:

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

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

II. PROGRAM SETTING: *CAPACITY REQUIREMENTS*

II.A Background

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

Even before the 1996 SDWA Amendments, North Carolina recognized the importance of public water system Capacity. Historically, the PWS Section found that larger municipal systems were generally well managed, but smaller systems were often lacking essential skills or resources to operate properly. Of the approximately 7,100 regulated public water systems, about 6,300 (89 percent) serve a population of less than 500. The PWS Section saw these systems as having huge needs that were not being addressed adequately.

Table 1 provides figures that show the ability of public water systems in North Carolina to comply with federal and state drinking water regulations. These systems are categorized by type and size of population served. The table shows the total number of systems in each category and the number receiving at least one violation with regard to the maximum permissible level of a contaminant in water delivered by a public water system. It also shows the number of systems receiving at least one violation for failure to monitor for required water quality tests for each year over a five-year period. It gives the percentage that these systems represent from the total number of systems in each category. These figures indicate that at least 44 percent of public water systems have had at least one monitoring failure in the past five years. (This failure could include missing one monthly sample that year. Since a typical system monitors at least monthly and has many required tests, missing a single test over the course of a year will be shown as a violation.) These numbers confirm that the vast majority of systems with deficiencies are ones that serve less than 500 people.

It is important to note that having a monitoring violation does not necessarily equate to unsafe water. Another way of looking at compliance is by determining the number of people served by compliant public water systems. As shown in Table 2, compliance rates based on population served have consistently been over 80 percent for monitoring and over 95 percent for contaminant exceedance during the first three years of the program. However, for FY2003 and FY 2004 these compliance rates were unattainable due to two factors: (1) the impact of new drinking water rules on systems as described in the following paragraphs, and (2) increased violation issuance based on improved systematic violation identification (See Table 1.)

The Interim Enhanced Surface Water Treatment Rule became effective in January 2002 for systems serving populations 10,000 and greater and using sources supplied by surface water or groundwater under the direct influence of surface water. The Stage 1 Disinfectants and Disinfection By-Products Rule became effective in January 2002 as well for systems that obtain their raw source water from surface water or groundwater under the direct influence of surface water, that add disinfectant to the water and serve populations of 10,000 and greater. In January 2004, the same rule became effective for all remaining community and nontransient noncommunity systems that add disinfectant to the water.

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

State Fiscal Year	Population	Community					Nontransient Noncommunity					Transient Noncommunity					TOTALS				
		Systems	MCL	%	MR	%	Systems	MCL	%	MR	%	Systems	MCL	%	MR	%	Systems	MCL	%	MR	%
2000	<500	1938	51	3%	765	39%	604	24	4%	263	44%	5293	284	5%	3206	61%	7835	359	5%	4234	54%
	500-9,999	536	19	4%	181	34%	131	2	2%	46	35%	85	3	4%	35	41%	752	24	3%	262	35%
	10,000-49,999	87	3	3%	23	26%	0					0					87	3	3%	23	26%
	>50,000	20	0	0%	2	10%	0					0					20	0	0%	2	10%
	Totals	**2581**	**73**	**3%**	**971**	**38%**	**735**	**26**	**4%**	**309**	**42%**	**5378**	**287**	**5%**	**3241**	**60%**	**8694**	**386**	**4%**	**4521**	**52%**
2001	<500	1884	53	3%	733	39%	565	13	2%	256	45%	4922	165	3%	2949	60%	7371	231	3%	3938	53%
	500-9,999	529	13	2%	204	39%	123	0	0%	41	33%	80	2	3%	33	41%	732	15	2%	278	38%
	10,000-49,999	87	1	1%	23	26%	0					0					87	1	1%	23	26%
	>50,000	20	0	0%	2	10%	0					0					20	0	0%	2	10%
	Totals	**2520**	**67**	**3%**	**962**	**38%**	**688**	**13**	**2%**	**297**	**43%**	**5002**	**167**	**3%**	**2982**	**60%**	**8210**	**247**	**3%**	**4241**	**52%**
2002	<500	1821	96	5%	651	36%	539	29	5%	232	43%	4734	253	5%	2662	56%	7094	378	5%	3545	50%
	500-9,999	524	24	5%	142	27%	117	4	3%	39	33%	77	2	3%	35	45%	718	30	4%	216	30%
	10,000-49,999	86	3	3%	23	27%	0					0					86	3	3%	23	27%
	>50,000	20	1	5%	2	10%	0					0					20	1	5%	2	10%
	Totals	**2451**	**124**	**5%**	**818**	**33%**	**656**	**33**	**5%**	**271**	**41%**	**4811**	**255**	**5%**	**2697**	**56%**	**7918**	**412**	**5%**	**3786**	**48%**
2003	<500	1756	75	4%	630	36%	469	33	7%	251	55%	4293	318	7%	2370	55%	6518	426	6%	3251	50%
	500-9,999	504	35	7%	151	30%	99	1	1%	33	58%	43	6	14%	25	58%	646	42	6%	209	32%
	10,000-49,999	86	12	14%	32	37%	0					0					86	12	14%	32	37%
	>50,000	21	3	14%	8	38%	0					0					21	3	14%	8	38%
	Totals	**2367**	**125**	**5%**	**821**	**35%**	**568**	**34**	**6%**	**284**	**50%**	**4336**	**324**	**7%**	**2395**	**55%**	**7271**	**483**	**7%**	**3500**	**48%**
2004	<500	1731	74	4%	607	35%	456	25	5%	193	42%	4087	267	7%	2035	50%	6274	366	6%	2835	45%
	500-9,999	515	41	8%	204	40%	102	5	5%	24	24%	57	1	2%	27	47%	674	47	7%	255	38%
	10,000-49,999	86	18	21%	16	19%	0					0					86	18	21%	16	19%
	>50,000	23	1	4%	5	22%	0					0					23	1	4%	5	22%
	Totals	**2355**	**134**	**6%**	**832**	**35%**	**558**	**30**	**5%**	**217**	**39%**	**4144**	**268**	**6%**	**2062**	**50%**	**7057**	**432**	**6%**	**3111**	**44%**

"*Population*" indicates the grouping of systems by the number of people served.
"*Systems*" means the number of public water systems serving the population size indicated.
"*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 more contaminant exceedance or monitoring violations in the given time period. The compliance rates do not account for the ever-increasing number of contaminants required for testing. New complex testing requirements have resulted in more monitoring violations. This will cause a lower compliance rate unless compensating improvements are made in other contaminant testing areas.

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

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

Table 2: Population Served by Compliant Community Public Water Systems

Compliance Measures	State FY 2000		State FY 2001		State FY 2002		State FY 2003		State FY 2004	
	Population	Percent	Population	Percent	Population	Percent	Population	Percent	Population	Percent
Citizens served by Community Public Water Systems having no MCL violations	5,728,588	97.7%	5,893,231	99.0%	5,941,976	97.1%	5,635,738	90.0%	5,883,120	91.6%
Citizens served by Community Public Water Systems having no MR violations	4,870,728	83.0%	4,823,814	81.0%	5,226,605	85.4%	4,414,672	70.4%	4,944,495	77.0%
Total Service Population	5,865,812		5,954,967		6,119,472		6,271,854		6,423,032	

"*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.

Maintaining compliance for each rule is dependent on factors such as raw water quality, atmospheric conditions, and physio-chemical treatment. Another factor impacting compliance is the extent that systems proactively addressed the regulatory requirements prior to the rule's effective date. Because both drought and extreme rainfall conditions existed during the FY2003-FY2004 period and the new rules required lower maximum contaminant levels than during previous years, some systems were either unable to overcome fluctuating water quality through their treatment processes or unable to perform normal distribution system flushing schedules to remain in compliance. Also, monitoring requirements for the new rules are more complex, resulting in improper sampling and subsequent noncompliance.. Additionally, the number of violations has increased significantly because failure to monitor and report residual disinfectant level violations were cited for the first time during the last half of FY 2004.

A comparison of Table 1 and Table 2 highlights the dilemma the PWS Section faces in working with public water systems in North Carolina. Even though a great majority of the citizens of North Carolina are served by compliant community public water systems, the number of small systems needing improvements in Capacity is also large. This has created a resources challenge for the PWS Section in balancing priorities on efforts that would provide the greatest public benefit as well as assisting the greatest number of smaller systems. As we continue to automate and streamline our compliance processes, our limited resources can be shifted somewhat to better assist small systems.

II.B Program Development

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

A comprehensive strategy was developed and implemented through an effort involving stakeholders, interested parties, sister agencies and PWS Section staff. Due to budgetary constraints, the coordination of this effort was provided by only one added position within the PWS Section as a Capacity Development Engineer. However, the entire section would be involved in implementing the goals of the program.

Training for the Capacity Development Program in the spring of 2000 included four day-long seminars that were co-sponsored by the PWS Section, the North Carolina Rural Water Association and the North Carolina Section of the American Water Works Association. More than 400 water system managers and operators attended these one-day seminars held in Asheville, Greensboro, Raleigh and Wilmington in April 2000. The PWS Section also informed community and nontransient, noncommunity water systems of the program through mailings and on its Internet site.

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

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

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

III. PROGRAM STRATEGY: *CAPACITY OBJECTIVES*

III.A Overview of Strategic Objectives

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

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

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

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

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

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

A.2 Existing Systems: On July 1, 2004, the state regulated 2,355 community systems, 558 nontransient, noncommunity systems, and 4,144 transient systems for a total of 7,057 regulated public water systems, 89 percent of which serve populations of less than 500 people. With regard to existing public water systems, the PWS Section realized that it had a well-established program that could identify and prioritize systems in need of improved Capacity. The PWS Section expects that focusing on candidates identified from these sources would provide the most benefit to existing systems in greatest need of improving Capacity. Determination for the type of assistance would be done on a case-by-case basis. The PWS Section expects that the Water System Management Plan will be another extremely useful tool in clarifying the causes of non-compliance. Systems could be identified from:

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

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

III.B Efficacy of Strategies

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

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

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

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

The approach that the PWS Section has taken in promoting Capacity development has proven to be quite effective. Requiring the submission of a complete Water System Management Plan for review as part of the plan approval process ensures that any new or expanding public water system is demonstrating the Capacity necessary to operate viably. Starting from the adoption of the rules in October 1999 through June 2004, the PWS Section has accepted Water System Management Plans for 1,318 public water systems. To reduce the administrative burden on the owners of public water systems, the capacity development rules allow a single Water System Management Plan for multiple systems owned by the same person or legal entity.

During the approval process, a new or expanding public water system is also required to submit an Owner's 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. This certification step in the approval process has accomplished a great deal in developing Capacity. It has allowed systems to exhibit the requirements of operating and maintaining the system before it is available for public use. It also allows systems to provide the forethought of managing emergency or disaster events concerning the public water system. With this requirement, the PWS Section is building a strong foundation regarding recent security concerns and federal requirements for vulnerability assessments and disaster preparedness for public water systems.

B.2 Strategy Efficacy - Existing Systems

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

Annual Monitoring Status and Sampling Schedule Report: Since 1999, the PWS Section has been making available an annual Monitoring Status and Sampling Schedule Report. This report is posted on the PWS Section's Internet web site and updated frequently. It provides the latest information on compliance and reporting dates. It also provides information on the frequency of testing and codes used in reporting. This information helps systems collect samples properly and receive credit for those samples, thereby reducing a frequent source of past errors for the systems. System officials may verify this information and report back any discrepancies. This has greatly assisted the section in avoiding unnecessary monitoring and reporting violations.

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

Technical Assistance from the North Carolina Rural Water Association: The PWS Section has a contractual agreement with the Rural Water Association to provide technical assistance to small water systems (<10,000 people) through a circuit rider. This circuit rider receives system referrals from PWS Section as well as requests for assistance from other sources. During FY 2004, the circuit rider assisted 123 systems with issues such as compliance and treatment, operation and maintenance, leak detection, and management techniques and four of these systems were referred by the PWS Section.. Many systems required follow-up visits to insure proper application of procedures, to complete initiated programs, or to review operational records for compliance. The North Carolina Rural Water Association has also jointly sponsored 25 workshops during FY 2004 to assist smaller systems in areas such as new rules and regulations, system operations, and equipment repair and maintenance.

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

Administrative Penalties: The PWS Section has an established enforcement program for issuing Administrative Orders and Administrative Penalties to public water systems that violate the *Rules Governing Public Water Systems*. The consequence for continued non-compliance has been the assessment of a penalty. The Compliance Services Branch of the PWS Section is continuing to issue consolidated penalties that address monitoring deficiencies for all contaminant groups, rather than individual ones as has been practiced in past years. Consolidation of penalties allows the PWS Section to assess a total fine to systems for all drinking water enforcement issues. This approach allows better utilization of the Section's enforcement and provides comprehensive enforcement for systems with persistent drinking water problems. The PWS Section has also included the Water System Management Plan as a mediation item when negotiating the settlement of an Administrative Penalty between the PWS Section and the non-compliant public water system. With this option, the owner of the system would describe specific managerial and/or financial plans to be implemented to ensure future compliance with the *Rules Governing Public Water Systems*

B.3 Strategy Efficacy – Improving Coordination

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

Technical Assistance to Small Water Systems: The Safe Drinking Water Act has added tremendously to the responsibilities and workload of public water system personnel. All areas of water system operation have increased in complexity. Water system officials have called on the state for assistance more than ever before. The result is limited technical assistance available to the water systems. During FY 2004, approximately 43 field personnel provided technical assistance to systems during 2,327 sanitary surveys and 6,391 total other on-site contacts.

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

- identifying transient noncommunity water systems not on inventory;
- verifying and maintaining the transient noncommunity 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.

The transient system compliance unit maintains an updated inventory and oversees regulation of these systems. The central office activities include inventory coordination and updating, compliance and enforcement activities, and development and oversight of related computer programming. Additional duties in the regional offices included:

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

During this FY 2004, 3,225 site visits were performed. In addition to transient system work, some technical assistance activity was performed for all other types of public water systems. While much progress has been made and compliance improvements have been the result, there are still insufficient resources at the PWS Section to respond to the needs of systems with on-site assistance, such as water quality test results showing bacterial contamination (which may indicate a serious health risk).

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

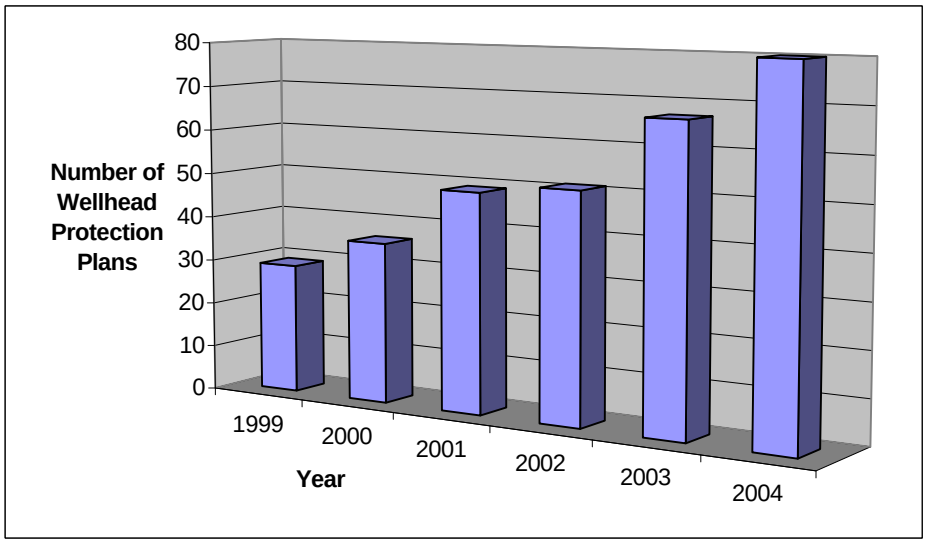
- preparation and distribution of annual "Regulatory Update," which includes monitoring charts for each contaminant group, to each water system by type;
  .
- creation and implementation of consolidated contaminant group notices of violations, administrative orders and penalty letters;
- standardization of laboratory reporting forms (including training and workshops for laboratories);
- continued clarification and revision of enforcement letters (Notices of Violation, Administrative Orders and Administrative Penalties);
- inclusion of required forms for public notification attached to violation letters;
- improvements to the tracking and follow-up of MCL violations, submittal of remedial plans, and public notifications;
- combination of public notice and certification forms to single sheet, easing system's public notice reporting requirement burden;
- automation of daily identification of public water systems exceeding bacteriological and nitrate/nitrite MCLs and weekly identification of those systems required to increase monitoring due to detection(s) of volatile organic compounds, synthetic organic compounds, inorganics, and nitrates/nitrites;
- automation of nitrate administrative order letters; and
- automation of "returning systems to compliance" when justified

North Carolina's Source Water Assessment Program: The PWS Section has made major strides in the Source Water Assessment Program and is progressing in protection activities. In accordance with North Carolina's approved Source Water Assessment Program plan, the PWS Section completed the development of a Geographic Information System database and computer application to automate the completion of the program's results and reports. The completed assessments have been made available to the public through the computer application for viewing via the PWS Section's website. The PWS Section has also held workshops across the states to inform water system owners, operators and interested parties about the application of the program online.

Completed Source Water Assessment Program reports provide information that can be used by public water system owners, operators, local governments, local volunteer organizations and citizens to develop and implement source water protection strategies. The results of the Source Water Assessment Program and voluntary source water protection activities will enhance the capacity of public water systems to meet safe drinking water standards.

North Carolina's Wellhead Protection Program: The Wellhead Protection Program is a pollution prevention and management program used to protect underground sources of drinking water. In North Carolina, development of a local Wellhead Protection Plan is not mandatory, but is viewed as a valuable supplement to state groundwater protection programs. North Carolina's Wellhead Protection Program is intended for city and county governments and water supply owners that wish to provide added protection to their local groundwater supplies. The Wellhead Protection Plan, once implemented, reduces (but does not eliminate) the susceptibility of wells to contaminants. Figure 1 highlights the success of this program.

Figure 1: Cumulative Wellhead Protection Plan Approvals



Since the beginning of the program, the PWS Section has received 127 local wellhead protection plans submitted for review and approval. Of these 127 plans, 80 have received approval. The majority of the remaining plans are under active review. Active review includes generating review letters requesting additional information and/or clarification regarding the information submitted with the local well head protection plans, as well as attending numerous meetings with the parties involved in the plan development. The 80systems with approved well head protection plans comprise 346 public water supply wells serving approximately 330,629 people. It is expected that these plans will assist greatly in improving the Capacity of public water systems in North Carolina. Through the Drinking Water State Revolving Fund, the state provides funding to the North Carolina Rural Water Association for two positions to assist local governments in the development of these plans.

Operator Certification and Training: The State of North Carolina has approximately 4,800 certified water system operators who possess approximately 6,300 active operator certifications. North Carolina is responding to the need to provide certification and training to these operators by providing an active certification program. A network of volunteer and member organizations conducts the program. The PWS Section together with the North Carolina Waterworks Operators Association (NCWOA), the North Carolina Rural Water Association, and the North Carolina American Water Works Association coordinate schools, seminars, workshops, and conferences. This program has successfully increased the Capacity of public water systems by directly influencing the training and certification provided public water system operators. Through the Expenditure Reimbursement Grant from EPA, the state provides funding to the NCWOA for a training coordinator position.

IV. PROGRAM SUCCESS: *CAPACITY IMPROVEMENTS*

IV.A Indicators for Measuring Capacity Improvement

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

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

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

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

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

IV.B Current Status: Facts and Figures

Table 3 is a summary of the numbers of systems that have completed these specific Capacity Development Program activities and provides the percent completed compared to the total community and nontransient, noncommunity systems.

Table 3: Capacity Development Measures

10/1/99 through:	Total Number of Community and Nontransient Noncommunity 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	
		#	%	#	%	#	%	#	%	#	%	#	%
June 30, 2000	3,316	438	13.2	283	8.5	717	21.6	46	1.4	6	0.2	6	0.2
June 30, 2001	3,208	697	21.7	504	15.7	1,078	33.6	201	6.3	58	1.8	69	2.2
June 30, 2002	3,107	818	26.3	634	20.4	1,169	37.6	386	12.4	148	4.8	146	4.7
June 30, 2003	2,935	976	33.2	757	25.8	1,251	42.6	537	18.3	269	9.2	262	8.9
June 30, 2004	2,913	1,118	38.4	870	29.9	1,318	45.2	621	21.3	369	12.7	356	12.2
*Increase from 1st period**		538	25.2	587	21.4	601	23.6	575	19.9	363	12.5	350	12.0

* - % value indicates the increase in the percentage of public water systems that have completed the particular capacity development measure indicated since the 1st period (October 1, 1999 through June 30, 2000).
†The number of systems covered by complete Water System Management Plans (WSMPs) has been updated to include multiple systems under single ownership with a master Water System Management Plan..

" *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 water system management plan 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 whose plans were submitted on or after 10/1/99 was constructed according to approved plans and specifications.

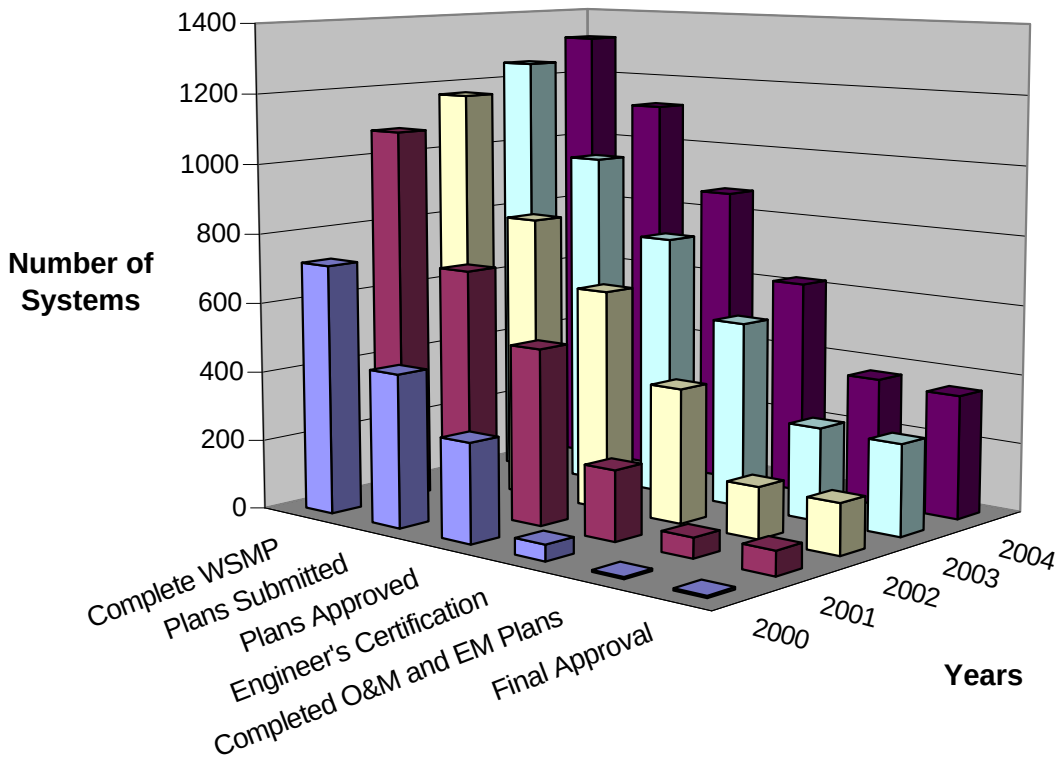
"*Systems with O&M and EM Plans"* means the number of systems having at least one owner's certification during the indicated period that a project whose plans were submitted on or after 10/1/99 has an operation and maintenance plan and an emergency management plan. It also signifies the number of systems meeting all of our capacity development requirements during the indicated period for a project whose plans were submitted on or after 10/1/99 and for which a permit to operate was issued.

"*Systems with Final Approval"* means the number of systems meeting all our capacity development requirements during the indicated period for a project whose plans were submitted on or after 10/1/99 and for which a permit to operate was issued.

Table 3 is summarized graphically in Figure 2 in order to illustrate the number of systems that have submitted plans to the PWS Section; obtained plan approval; and have developed Water System Management Plans, Operation & Maintenance Plans, and Emergency Management Plans; and have received final approval for projects.

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

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

As demonstrated in Figure 2, the Capacity Development Program has allowed the PWS Section to make steady progress in assuring that an increasing number of public water systems have evaluated their Capacity. Since 1999, more than 1,100 systems entered the plan evaluation process with 1,300 systems being covered by a Water System Management Plan self-assessment deemed satisfactory by the state. A total of 356 of these systems have completed all of the requirements of the Capacity Development Program. As measured against the benchmark of the initial period, this indicates an 84 percent increase in the number of public water systems with complete Water System Management Plans.

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

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

V. PROGRAM DIRECTION: *CAPACITY INITIATIVES*

V.A New Challenges and Opportunities

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

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

- **Operator Certification**: The United States Environmental Protection Agency's guidelines require that all community and nontransient noncommunity public water systems be operated by a licensed operator in responsible charge. This mandate provides an opportunity to improve Capacity for these existing systems. The PWS Section expects the smaller systems to benefit greatly by having trained operators managing these systems. To assist small systems (serving 3,300 persons or less) with resources needed for initial training and continuing education to acquire or maintain certification, the state provides reimbursement for this training through the Expenditure Reimbursement Grant from EPA;;

- **Emergency Management**: North Carolina received a grant from the United States Environmental Protection Agency to assist in the development of Vulnerability Assessments (VA) and Emergency Response Plans for all public water systems serving populations greater than 3,300 persons, as required by the Bioterrorism Act of 2002. All public water systems in NC that serve populations of 50,000 persons or more have completed Vulnerability Assessments and have submitted the same to the EPA by the required deadline. These same systems, pending one confirmation, have completed Emergency Response Plans and have submitted Certifications of Completion to the EPA as well. The remaining systems serving populations greater than 3,300 were required to completed Vulnerability Assessments by June 30, 2004, and update their Emergency Response Plans by December 31, 2004. While official notification from EPA concerning VA submissions from the latter group is not yet available, preliminary information from Public Water Supply Section sources indicates that a majority of those community water systems did meet the VA submission requirements.

- **Improved Database Management:** The Public Water Supply Section plans to migrate from our traditional data management system (FOCUS) to EPA's SDWIS program. Any services not provided by SDWIS will be developed in the IBEAM framework. Request for bids from contracts to implement the database conversion has been initiated and conversion to SDWIS is expected to be completed by the end of 2005. Migration to the new environment will improve the Section's capacity by reducing our dependency on the knowledge base of key individuals such as our contract programmer while at the same time providing increased functionality.

- **Central Carolina Plains Capacity Use Area (CCPCUA):** This area, located in Eastern North Carolina, is underlain by Cretaceous aquifers that are threatened by accelerated drainage from groundwater withdrawal and by saltwater encroachment. Systems that withdraw more than 100,000 gallons per day are required to begin curtailing water production by as much as 25% by 2008 with more future reductions up to 75% by 2016. Access to alternative water sources must be developed and funded to meet public demands. Strategies for managing demands while meeting withdrawal reductions includes construction of new surface water treatment plants, interconnects with other systems, drought management planning and preparation of water conservation plans.

- **Critical Asset Management** Many systems must manage an intricate system of pipes, pumps, valves, and storage facilities that required timely repair or replacement. Careful planning must be implemented and financial resources sought to rehabilitate and replace them when necessary. The Public Water Supply Section acknowledges the need to give assistance and funding to those systems lacking resources.

- **Development of Capacity Development Assistance Team**: Systems that are recurrent violators remain non-compliant for various reasons. The Public Water Supply Section believes that many systems can become compliant with the proper assistance and guidance. Therefore, the Capacity Development Assistance Team is under development to address this challenge. This group plans to draw resources from all facets of the Public Water Supply Section to correct any technical, financial, and/or managerial problem these systems have.

V.B Future Reports

The 1996 Safe Drinking Water Act Amendments require that:

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

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

VI. PUBLIC AVAILABILITY OF THE 2004 CAPACITY DEVELOPLMENT REPORT

As required by the USEPA, the PWS Section will make this report available to the public. The Internet web page of the PWS Section will contain a link to the report. The web page can be found at:

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

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

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