Final Report of the Water Security and Sewerage Systems Advisory Council and Preliminary Report of the Interagency Technical Assistance Committee

December 1, 2004

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Advisory Council

Stephen R. McHenry, Chair
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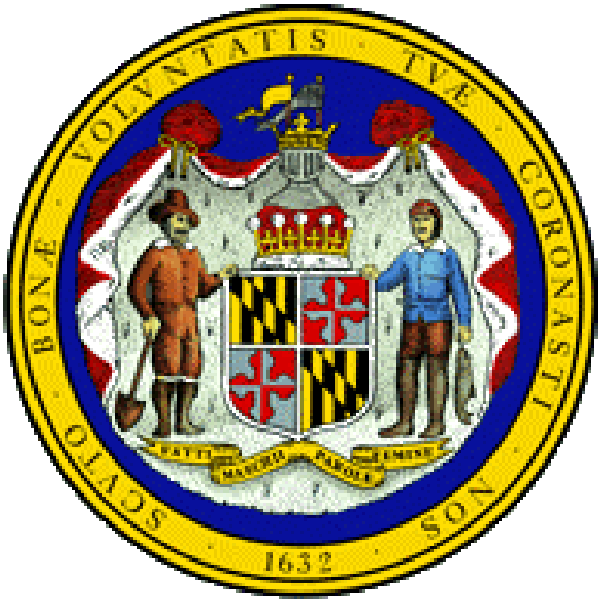

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Acknowledgements

This Report is the product of many individuals of diverse experience and expertise. Each brought to the table his or her own perspective on the issues studied and as a result, the Advisory Council on Water Security and Wastewater Systems has a well-balanced report.

Particular thanks are extended to Steve McHenry who chaired the Interagency Technical Advisory Committee and submitted its Preliminary Report to the Advisory Council in a timely manner, allowing us to meet the very tight schedule imposed by HB 659.

To all the members of both the Advisory Council and the Interagency Technical Committee, I extend my gratitude for your contributions and thank you for the many miles traveled to regularly attend meetings and subcommittee meetings.

No report would be complete without the help and dedication of the unsung heroes of MDE who worked tirelessly to translate all the minutes and our draft writings into the organized text in this Report.

Lastly, I extend my appreciation to Governor Robert L. Ehrlich, Jr. for his faith and trust in appointing me Chair under this legislation.

C. Victoria Woodward, Esq.
Chair, Advisory Council on Water Security and Wastewater Systems
December 2004

WATER SECURITY AND SEWERAGE SYSTEMS ADVISORY COUNCIL AND INTERAGENCY TECHNICAL ASSISTANCE COMMITTEE MEMBERSHIP

In March of 2003, pursuant to HB 659 (2002), Governor Robert L. Ehrlich, Jr. established the Water Security and Sewerage Systems Advisory Council and the Interagency Technical Assistance Committee.

The members selected by the Governor represent a variety of statewide and local interests. Twenty-one (21) members comprise the Water Security and Sewerage Systems Advisory Council:

- Two members of the House of Delegates;
- Two members of the Senate of Maryland;
- Secretary of the Environment or his designee;
- Secretary of Planning or his designee;
- Secretary of Health and Mental Hygiene or his designee;
- One representative from the Chesapeake Bay Commission;
- One representative from the Chesapeake Bay Foundation;
- Two representatives from the environmental community, one of which shall represent Safe Waterways in Maryland (SWIM);
- Two representatives designated by the Maryland Association of Counties, one of which shall represent a county with a combined sewerage system;
- Two representatives designated by the Maryland Municipal League, one of which shall represent a municipal corporation with a combined sewerage system;
- One representative of the Chesapeake Bay Program Office of the United States Environmental Protection Agency;
- One representative of the Johns Hopkins Bloomberg School of Public Health;
- One engineer with expertise in water and sewage issues;
- One representative of the Washington Suburban Sanitary Commission;
- One person from a law enforcement or security agency with specific experience in antiterrorism; and
- One person from a Maryland educational research institution with specific expertise in water disinfection technologies.

Twelve (12) members, one from each of the following entities, comprise the Interagency Technical Assistance Committee:

- the Maryland Department of Housing and Community Development;
- the Maryland Department of Planning;
- the Maryland Environmental Services;
- the FORUM for Rural Maryland;
- the Maryland Center for Environmental Training;
- the Environmental Finance Center;
- the U.S. Department of Agriculture Rural Development;
- the Maryland Municipal League;
- the Maryland Association of Counties;
- the Maryland Rural Water Association;
- the Chesapeake Bay Foundation; and
- Safe Waterways in Maryland (SWIM).

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Acronyms and Abbreviations

Advisory Council	-	Water Security and Sewerage Systems Advisory Council
BOD	-	Bio-Chemical Oxygen Demand
BNR	-	Biological Nutrient Removal
CIP	-	Capital Improvement Program
CSO	-	Combined Sewer Overflow
CSS	-	Combined Sewer System
CWNS	-	Clean Watersheds Needs Survey
CWS	-	Community Water System
CWSRF	-	Clean Water State Revolving Fund
ITAC	-	Interagency Technical Assistance Committee
Council	-	Water Security and Sewerage Systems Advisory Council
DOJ	-	Department of Justice
DBPs	-	Disinfection Byproducts
DBPR	-	Disinfection Byproducts Rule
ENR	-	Enhanced Nutrient Removal
EPA	-	U.S. Environmental Protection Agency
FY	-	Fiscal Year
GIS	-	Geographic Information System
HAA5	-	Halo-acetic acids
I/I	-	Infiltration & Inflow
ITAC	-	Interagency Technical Assistance Committee
LTCP	-	Long Term Control Plan
MACO	-	Maryland Association of Counties
MDE	-	Maryland Department of the Environment
MG	-	million gallons
mgd or MGD	-	million gallons per day
MML	-	Maryland Municipal League
NPDES	-	National Pollutant Discharge Elimination System
NPS	-	Non-point Source
NTNC	-	Nontransient Noncommunity Water Systems
O&M	-	Operation & Maintenance
PATAS	-	Public Awareness and Technical Assistance Subcommittee
PDWIS	-	Public Drinking Water Information System
POTW	-	Publicly Owned Treatment Works
PWSS	-	Public Water System Supervision Program
SNC	-	Significant Non-Compliance
SRF	-	State Revolving Fund
SSES	-	Sanitary Sewer Evaluation Study
SSO	-	Sanitary Sewer Overflow
SSS	-	Sanitary Sewer System
2001 Task Force Report	-	Task Force on Upgrading Sewerage Systems Final Report, December 2001
TARSA	-	MDE, Technical and Regulatory Services Administration
TMDL	-	Total Maximum Daily Loads
TSS	-	Total Suspended Solids
TTHM	-	Total Trihalomethanes
UV	-	Ultraviolet
WMA	-	MDE, Water Management Administration
WWTP	-	Wastewater Treatment Plant

Executive Summary

EXECUTIVE SUMMARY

The first draft of House Bill 659 (2002) was a legislative follow-up to the 2001 Task Force on Upgrading Sewerage Systems. Due to its similarity, in draft form, to two other bills before the General Assembly, HB 659 was finally signed into law as a consolidated bill with numerous mandates. Simplified, it directed that an Advisory Council on Water Security and Sewerage Systems be formed to examine multiple issues, including security issues, regarding water and wastewater systems. A second draft bill examining the use and safety of chlorine in water and wastewater systems was added. A third draft bill that created an Interagency Technical Assistance Committee (ITAC) was consolidated into HB 659. The formation of the ITAC was one of the original recommendations of the 2001 Task Force. This Report addresses the major topics mandated by the bill.

The Advisory Council addressed chlorine and water and sewerage plans; and the Interagency Technical Assistance Committee addressed the finance, public awareness and technical assistance recommendations from the 2001 Task Force. The Advisory Council and Interagency Technical Assistance Committee met from March through December 2004 to fulfill their missions.

The Advisory Council voted to form the Security Subcommittee and meet in closed session in order to address in detail Maryland's vulnerabilities regarding water and wastewater security and to make recommendations to reduce those vulnerabilities and protect critical assets. The second Report addresses the water and wastewater security issues discussed by the Security Subcommittee. It will be presented as a secured document to Governor Robert L. Ehrlich, Jr.

Advisory Council

CHLORINE

Findings

The Advisory Council addressed the legislative requirements for chlorine security and its use in the drinking water and wastewater industry in the State of Maryland. The Council's approach was to develop reasonable, meaningful, and substantive recommendations to reduce the risks created by the use of chlorine gas in the drinking water and wastewater industry.

The use of chlorine as a disinfectant in both drinking water and wastewater has been one of the most important scientific public health breakthroughs in modern times. The reduction of waterborne disease outbreaks in the twentieth century should be noted. The successful use of disinfectants in water to protect public health must be thoroughly examined.

The September 11, 2001 terrorist attack on the continental United States compelled the drinking water and wastewater industries to reconsider use of chlorine. Any examination

must identify the tradeoffs between public health benefits as a disinfectant and the risks associated with a chlorine gas release as the result of terrorist activities. From an engineering design perspective it is possible to use alternative disinfectants; however, any change must be analyzed for impacts to drinking water safety and quality. The storage of gaseous chlorine and other hazardous materials present risks to surrounding communities. This Report discusses disinfection of drinking water and wastewater associated with the use of gaseous chlorine and other alternative disinfection methods.

Gaseous chlorine from the compressed liquid stored in cylinders is the most commonly used microbiocide/bactericide for disinfection of treated drinking water and wastewater. Gaseous chlorine is a powerful disinfectant, relatively inexpensive, and has the lowest production and operating costs for large continuous disinfection operations. When used as a disinfectant, chlorine creates a residual that must be carefully controlled, and in some instances, any residual must be dechlorinated prior to discharge into the State's waters. Chlorine gas is hazardous and must be stored in secure areas. In some states, the transportation of chlorine gas is restricted. Chlorine has also been shown to induce certain serious health effects from exposure. The use of chlorine can also lead to harmful Disinfection Byproducts (DBPs). EPA has promulgated a Stage I Rule on controlling DBPs and is currently preparing a Stage 2 Rule.

Recommendations

- For drinking water treatment, the only option that can be recommended at this time is the continued use of chlorination.

- Utilities that utilize surface water should increase their filter performance capabilities to remove organic material from water and wastewater before disinfectant treatment in order to reduce the amount of chlorine needed and reduce the formation of DBPs.

- The Council recommends that a survey of the major wastewater facilities with a treatment capacity greater than one MGD and large drinking water treatment facilities that serve over 10,000 persons be performed by the State to determine if the current use of gaseous chlorine is the best disinfectant alternative. The purpose of the survey is to document the current status of these facilities and future plans related to the use of gas chlorination. The survey should be completed by June, 2005 and submitted to MDE to develop an action plan based on the survey results. The survey should consider all public health effects with respect to the use of chlorine as a disinfectant. Examples of survey goals include**:**

    - Each wastewater facility should evaluate whether the use of gaseous chlorine should be phased out and replaced by either ultraviolet radiation, sodium hypochlorite, on site chlorine generation, or other acceptable disinfection processes.

- Each drinking water facility should evaluate their use of gaseous chlorine for disinfection of drinking water and whether the use of alternative methods of disinfection is feasible.

- The Council recommends that the State review existing State regulations. If necessary, regulations that define standards for security of all gaseous chlorine storage areas should be developed and implemented. Such regulations should include:
  - Physical standards for bulk chlorine storage and feed buildings including locks, doors, windows, and other building access points;
  - Physical security measures for bulk chlorine storage and feed buildings including cameras, alarms on entry and increased police patrols of treatment facilities to keep out intruders;
  - Intrusion detection standards for bulk chlorine storage and feed buildings;
  - Gas system standards for bulk gaseous chlorine storage and feed systems including detectors, auto shut-off, alarms, leak proof vacuum systems, and scrubber systems to protect against leaks;
  - Bulk chlorine storage improvements to reduce physical disruption or catastrophic release;
  - Mandated, certified training efforts for utility staff, including hands-on drills to better respond to a chlorine related emergency;
  - Standards for the transport of gas chlorine; and
  - Consideration of purchasing in smaller sized containers or getting several smaller deliveries at any one time.
- The Council recommends that all wastewater treatment plants with a treatment capacity less than one million gallons per day using gaseous chlorine should convert to other disinfectant products.
- The Council recommends that the Maryland Department of the Environment establish early communication with facilities that are studying changing disinfection practices.

Joint Subcommittee

WATER AND SEWERAGE PLANS

Findings

House Bill 659 directs the Advisory Council on Water Security and Sewerage Systems to "review the effectiveness of Water and Sewer Plans". The Advisory Council and the Interagency Technical Assistance Committee (ITAC) determined that this mandate was appropriate for the mission of both groups, so a Joint Subcommittee was formed to address this issue. This Report presents the preliminary findings and recommendations of the Joint Subcommittee to date.

Many communities in Maryland are undergoing growth, and some are experiencing unprecedented rapid growth. The water and sewerage planning process is a critical early step in the development process. Each community must provide adequate water and sewer systems to serve current needs, new development and redevelopment. Adequate water and sewer systems are necessary in order to support economic development, and to protect public health and water quality. The Water and Sewerage Plan is the infrastructure plan for water and wastewater facilities in a local jurisdiction.

At the State level, the work force dedicated to managing the Water and Sewerage Planning Program has been reduced over the years as other pressing issues have been given higher priority. Local jurisdictions now face a myriad of environmental priorities that also compete for funding with infrastructure planning. Adequate funds are needed to properly manage the County Water and Sewerage Plan process to ensure that safe and adequate facilities will be available to support local Comprehensive Plans and economic development in ways that support Smart Growth.

The Joint Subcommittee members used their expertise and the results of a recent MDE survey on the tracking and allocation of water capacity to develop a series of findings and recommendations for this Report. Several other work groups are also currently focusing on issues that are relevant to this Joint Subcommittee. These groups are evaluating issues such as TMDL implementation, Tributary Strategy implementation, system security, and system capacity management. All of these issues factor into water and sewerage planning. Therefore, to more fully evaluate the many water and wastewater issues identified by the Subcommittee in a systematic manner and to incorporate the results of these other work groups into comprehensive recommendations, the Subcommittee will continue to evaluate water and sewerage planning in Maryland and will present final recommendations by September 30, 2005.

Recommendations

- Local jurisdictions should enact and implement a procedure to ensure that adequate water and sewer facilities are available to meet projected needs that are consistent with County and Municipal Comprehensive Plans.
- MDE and MDP, in conjunction with MACO, MML and other stakeholders, should identify ways to fund State and local water and sewerage planning staff and to develop information technology capabilities to improve the effectiveness and efficiency of the program.
- In cooperation with local jurisdictions, MDE and MDP should update guidance for Water and Sewerage Plan content; provide necessary State data and technical assistance to local governments; and provide training for local officials and staff for Plan preparation.
- MDE and MDP, in cooperation with MACO, MML, and other relevant State agencies, should encourage inter-jurisdictional and regional cooperation for water and wastewater facilities.
- MDE and MDP should initiate a series of technical and policy meetings with stakeholders to integrate multiple water resource management objectives into the comprehensive planning process and the water and sewer planning process.
- MDE should provide oversight and guidance to those water and wastewater systems at critical capacity levels to ensure that necessary capital improvements are planned and constructed.

Interagency Technical Assistance Committee (ITAC)

FINANCE

Findings

The ITAC identified three items in the 2001 Report on Upgrading Sewerage Systems (2001 Task Force Report) that warranted attention:

1. Refinement in Targeting of Funds
2. State Funding Programs
3. Local Efficiencies and Actions

The ITAC reviewed the findings and recommendations of the 2001 Task Force Report. One of the tasks of the ITAC was to identify areas of the 2001 Report that could be updated to reflect more recent information and to add any new programs or initiatives undertaken since the 2001 Task Force Report was published.

In updating the 2001 Task Force Report, the ITAC found one major change in the availability of State funds, specifically the Bay Restoration Fund. Other than this significant new program, the other programs remain essentially unchanged.

The updated, total State estimated capital improvement needs are now $5.3 billion over the next twenty years, which is an increase of $961,907 since the last Clean Water Needs Survey (CWNS). The largest portion of this change is due to the newly identified needs for ENR. Since the needs generated for the 2001 Task Force Report already included a 3% inflationary factor, this was not adjusted for the update.

The five (5) categories of needs from publicly owned wastewater conveyance and treatment facilities are:

Secondary Treatment	$1.2 billion
Advanced Treatment – includes BNR and ENR	$1.8 billion
Sanitary Sewer Overflow (SSO); includes projects to address Inflow and Infiltration	$1.2 billion
Growth derived from new collectors, interceptors and appurtenances	$700 million
Combined Sanitary Overflow (CSO)	$357 million

Additional spending per year may be necessary to meet the total long-term need, and this need will have to be met through a multi-faceted approach among all levels of government. However, it is essential to examine the need for changes in the way funding is allocated and targeted, and to identify and recommend improved efficiencies in system management. The amount of loan funding currently available through the State SRF may be sufficient if other recommendations made here regarding changes in the way that financing is targeted and awarded are implemented.

Rate affordability, equity, and fairness for all systems, regardless of size, needs to be addressed through the availability of grant funding or other means of subsidy. Mandated improvements disproportionately affect smaller systems in their ability to repay or generate income to cover debt service on capital improvements. Improvement cost per user for a smaller system is generally greater than for a larger system, and this situation is frequently exacerbated by differences in social and economic conditions.

Local efficiencies, enhanced training of local managers and system operators, and public education could greatly improve the long-term viability of wastewater systems, especially in small and medium-sized communities.

Education is key to heighten the public's awareness of financial issues in order to gain public acceptance of the need for recurring investment in systems to serve both current and future populations. Additionally, training must be available to enhance the financial management skills of managers and decision-makers.

Certain factors should be used in evaluating project affordability and a community's ability to pay for the project. The first factor is comparable community rate levels (annual user rates) for similar sized communities in the State. The second is the community Median Household Income (MHI) as defined in the U.S Census data, in relation to the statewide MHI. These should be used to define standards for "affordability" and "disadvantaged" in the course of determining eligibility for subsidies.

Recommendations

- The State should actively lobby for changes in the federal Water Quality State Revolving Loan Fund (WQSRF) program to allow for loan forgiveness and 30-year terms to make projects more affordable. Such lobbying should enlist the assistance of other organizations such as the Maryland Congressional Delegation, Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), Council of Infrastructure Financing Authorities (CIFA), Association of Metropolitan Sewerage Agencies (AMSA) and similar interested parties.

- The WQSRF criteria for identifying "disadvantaged" communities and those who qualify for affordability subsidies should be developed using the current criteria for the Drinking Water State Revolving Loan Fund (DWSRF) and the recommendations set forth on page 64 of the 2001 Task Force Report as a guide, specifically:

  Those communities that:
  a. demonstrate a true public health or water quality need,
  b. cannot afford to finance the project entirely through local funds and/or low interest loans, and
  c. agree to accept assistance to improve the technical, financial and managerial capacity of the wastewater system.

- The current standard of user rates which defines "affordable" as 1% of the MHI and "disadvantaged" as 70% of the MHI should be examined to determine if these rates are still workable benchmarks.

- The WQSRF criteria should also consider:

  - The use of funds and the benefits to be derived in relation to the total need for funds, that is, the community's requirements for the project should address cost and per user benefits in the funding award process.

  - Communities that have neglected to repair or upgrade a failing or deteriorating system for whatever reason should be offered incentives to apply for program assistance and to take timely, proactive action on project remedies.

- Communities should be offered incentives to conduct rate analysis studies. The analyses should be prepared periodically and should include all revenue, expense, and reserve calculations. Examples of revenues, expenses and recommended reserve levels can be provided to the systems as guidance for conducting such analyses, along with a list of technical assistance resources available.

- Communities that participate in approved capacity enhancement activities, including training, should be offered incentives in the funding approval process to encourage them to take steps to enhance their management capacities.

- Current levels of State funding must be maintained and revisited periodically to ensure on-going sufficiency.

- Revenues generated by the Bay Restoration Fund should not be deducted from the revised estimate of $5.3 billion in funds needed to improve sewer systems.

- The current level of State grant funds targeted for BNR projects (approximately $18 million annually) should be maintained and redirected as grant funding for other wastewater systems needs once the BNR needs have been met. This recommendation will not have an adverse effect on the State's bond rating, yet will make additional grant funds available to local governments for capital projects where affordability is an issue or as incentives to systems that implement financial, managerial and technical improvements in system management.

- The creation of regional facilities and consolidation of smaller systems should be encouraged, not necessarily required, to achieve economies of scale in financial and systems management. Financial incentives should be provided to systems that make a concerted effort to reduce operating expenses through these or other cost saving measures such as group purchasing.

- Communities should be encouraged, through financial or other incentives, to conduct periodic cost of service and rate analyses to ensure full cost recovery and adequate funding of reserves.

- Communities should implement rate increases as needed based on the results of regularly performed cost of service and rate studies to ensure sustained financial solvency and adequate reserves for the system.

- Communities should be required to participate in financial, managerial, and technical capacity enhancement training, and recognize the requirement to employ qualified operators.

- Local system representatives should be encouraged to participate actively in the county water and sewer planning process, and county representatives should make every effort to obtain local citizen participation.

- The benefits of creating a panel of public financing experts to review financial assistance applications from communities with "hard to fund" projects should be evaluated.

- The ITAC should examine additional enhancements to local systems' efficiencies in the longer term once this initial Report is completed. Such enhancements may include:

    - Establishing minimum training requirements for non-operational, executive, managerial, and administrative personnel.

    - Working with interested parties and organizations to strengthen system operator capability and heighten customer knowledge of the need to structure rates to recover all costs of running a wastewater system, including tangible operating costs and soft costs such as reserves for repair and replacement.

    - Establishing a statewide review ITAC, similar to the West Virginia Infrastructure Council, to review and make recommendations on applications for project financing and to direct financing to the most needed projects.

    - Using the rate studies being compiled pursuant to the 2001 Task Force Report to develop a database of system financial information to track progress of systems in their efforts to improve system capacities and operations.

PUBLIC AWARENESS AND TECHNICAL ASSISTANCE

Findings

The 2001 Task Force Report raised issues relating to the level of public awareness about sewerage operations and needs. One of the most difficult areas to address in the management and operation of water and wastewater systems is the ability to keep the public engaged and interested in the ongoing issues that affect these systems. The public is always concerned when water fails to flow from the tap due to a water main break, or when a large sewage overflow is announced. However, public awareness and knowledge of how water and wastewater systems work, the importance of these systems on a daily basis for protection of public health, and how failures can occur, is a tough message to get across and keep in the forefront of the public.

The ITAC found there is a strong linkage between the level of citizen awareness regarding proper wastewater operation and compliance, and user rates necessary to maintain proper operation and compliance. More effort and means are necessary to distribute public information regarding the costs related to facility operation and sewer system maintenance, and the effect these costs have on system rates targeted to specific audiences. The 2004 passage of the Bay Restoration Fund is a good example of this connection. The campaign to protect and restore the Bay exemplifies successful elevation of public awareness. Similar campaigns are needed to emphasize the

importance of addressing compliance-related capital and operational issues at wastewater treatment plants, particularly the small and medium systems with a limited user base.

The ITAC also considered technical education as a critical component of technical assistance for wastewater treatment/collection systems, as contrasted with general public outreach/education. The ITAC focused on the wastewater system operators and the facilities they operate, and included the superintendents and operators of industrial wastewater works, wastewater collection systems, and wastewater distribution systems. The ITAC identified a growing concern regarding the training received by the operators of small to medium sized wastewater systems.

Persons responsible for the daily operation and maintenance of these wastewater facilities must be prepared to keep up with new technology and be able to run ever more complex systems. Conversely, operators must know how to get the best performance out of older equipment while new facilities may be in planning or design.

It is important to note that, despite the best operator training, excessively aging or failing infrastructure and lack of adequate funding for capital and operational reinvestment may result in non-compliance, water pollution and a threat to public health. Conversely, a state-of-the-art facility run by an inadequately trained operator may have a similar outcome.

Recommendations

- ITAC should develop educational messages to convey the need for adequate funding through user rates to ensure long-term system compliance, environmental improvement to water quality, protection of public health and greater control over local destiny with regard to reasonable economic growth and quality of life issues.

- ITAC should develop targeted messages to ratepayers, State and local elected officials, utility decision makers, parents and school children. The message should be designed to heighten awareness about the necessity for revenues to keep pace, through periodic and justified rate increases, with long term sustainability issues such as capital improvements, system renewal and replacement, compliance-related improvements, and capacity enhancement to accommodate anticipated growth.

- ITAC should perform a review of current educational materials and the development of new educational materials directed at the various public sectors. Additional work is needed to identify the type of media outlets and enhance the delivery methods needed to drive these messages home to the target audiences. Examples of these outlets include public television, radio, news articles that can be distributed to local newspapers, town meetings, festivals, and at venues where the public assembles.

- MDE should enhance its website to provide educational material for the public on the importance of adequate funding for water and wastewater infrastructure

through the user rate process. A primer on water and wastewater processes, along with some information on typical costs to operate and maintain systems is needed. The website should be enhanced to include links to the sites of a number of organizations with specific public outreach and educational materials.

- Funding must be continued to support these training and technical assistance programs, to ensure that training and on-site facility operation assistance is available.

- Current types and levels of training should be evaluated to determine adequacy of quality and quantity to meet ongoing needs.

- Priority should be given to maintaining consistent funding through the State and/or EPA to support the programs in place that deliver on-site technical, financial, and managerial assistance to wastewater systems.

- A database should be kept on operator type, location, size of system, and other statistics to determine the technical, financial, and capacity training of the operators and to help identify training and technical assistance gaps.

- A mentoring program should be established between larger utility operators and smaller system operators for information exchange and guidance.

Introduction

Final Report of the Water Security and Sewerage Systems Advisory Council
and
Preliminary Report of the Interagency Technical Assistance Committee

INTRODUCTION

House Bill 659, History of Legislation, Rationale for Advisory Council and Interagency Committee Organization, Separate Security Report and Reporting Mechanism

In December of 2000, the leadership of the Maryland House and Senate, the Chairs of the Economic and Environmental Affairs and the Environmental Matters Committees, and the Chair of the Maryland Delegation to the Chesapeake Bay Commission wrote to Governor Parris N. Glendening about the wastewater needs of the State. In March 2001, the Governor's Executive Order 01.01.2001.03 created the Task Force on Upgrading Sewerage Systems to assess the wastewater infrastructure needs of the State and to identify other challenges to the successful planning, design and construction of wastewater facilities to accommodate the State's existing and projected population. This Task Force produced a Report in December 2001 identifying the need for $4.3 billion in capital funds to address wastewater treatment plants and collection systems. The Report made several other recommendations, including evaluating and improving the water and sewerage planning process.

In a follow-up to this effort, House Bill 659 was passed in the 2002 session of the Maryland General Assembly. This bill was a combination of three bills before the legislature which called for the study of a wide variety of water security and wastewater systems topics. HB 659 created the Advisory Council on Water Security and Sewerage Systems and the Interagency Technical Advisory Committee (ITAC). The Advisory Council was tasked to study multiple issues ranging from water and wastewater security, funding water and wastewater plant upgrades, reviewing water and sewer plans, and studying the safety of the use of chlorine as a disinfectant. The Advisory Council was required to report its findings and recommendations to the General Assembly on December 1, 2004 and then sunset.

The Interagency Technical Assistance Committee on Wastewater Systems in Maryland (ITAC) was charged with implementing a recommendation of the Governor's 2001 Task Force on Upgrading Sewerage Systems by advising local jurisdictions on the efficient operation and financial management of wastewater treatment systems. In the course of initial joint meetings of the ITAC and the Advisory Council on Water Security and Sewerage Systems (Advisory Council), it was determined that the ITAC would be responsible for updating the 2001 Task Force Report, as well as HB 659 tasks numbered (f) 4, 5, 6 and 7, originally assigned to the Advisory Council (see Appendix 1). The ITAC was required to report its findings to the Advisory Council on or before November 1, 2004.

To accomplish these tasks, several subcommittees were formed. The structure of the subcommittees was as follows:

- Advisory Council
  - Chlorine and New Technology Subcommittee
  - Security Subcommittee of the Advisory Council
- Joint Subcommittee of the Advisory Council and the ITAC to review the effectiveness of Water and Sewerage Plans.
- Interagency Technical Assistance Committee (ITAC)
  - Finance Subcommittee
  - Public Education and Technical Assistance Subcommittee

Two Reports were generated. The first Report is from the Advisory Council, the Joint Subcommittee, and the ITAC. The Advisory Council/Joint Subcommittee portion of the Report (Parts 1.0 through 4.0) provides background on drinking water and wastewater systems in Maryland. It also offers findings and recommendations on chlorine and Water and Sewerage Plans. The ITAC portion of the Report (Parts 5.0 and 6.0) updates the finance, public awareness and technical assistance sections of the original December 2001 "Task Force Report on Upgrading Sewerage Systems" (2001 Task Force Report). This Report will be presented for review to the Maryland General Assembly.

The Advisory Council voted to form the Security Subcommittee and meet in closed session in order to address in detail Maryland's vulnerabilities regarding water and wastewater security; and to make recommendations to reduce those vulnerabilities and protect critical assets. The second Report addresses the water and wastewater security issues discussed by the Security Subcommittee. It will be presented as a secured document to Governor Robert L. Ehrlich, Jr.

Final Report

Water Security and Sewerage Systems Advisory Council

Drinking Water

1.0 DRINKING WATER

1.1 Overview

Under the Safe Drinking Water Act, public water systems are defined as water systems serving 25 or more persons, or 15 or more connections. Community water systems (CWS) are public water systems serving year-round residents. In Maryland, approximately 500 community water systems serve 4.5 million year-round residents. Of those systems, 56 utilize surface water sources and 444 utilize groundwater sources.

Nontransient, noncommunity (NTNC) water systems are public water systems not falling under the "community" definition of serving at least 25 of the same individuals over 6 months per year. Transient noncommunity water systems are noncommunity water systems that do not regularly serve at least 25 of the same individuals over 6 months per year. In Maryland, 570 NTNC water supplies serve the same individuals each day at facilities such as schools, daycare centers, and businesses; and 2,676 transient noncommunity water supplies serve different individuals each day at facilities such as parks, churches, restaurants, and gas stations.

The treatment processes for public water systems vary based on the quality of the raw water sources. Groundwater systems may require no treatment other than disinfection, while surface water sources may require extensive treatment to remove particles and pathogens that contaminate the source. An overview of the treatment processes utilized by community water systems is presented in Table 1.

Table 1: Treatment Practices of Water Systems in Maryland (excluding Disinfection)*

Treatment	Community	Nontransient	Total
Total Number of Systems	500	570	1,070
Conventional Treatment – Surface Water	56	1	57
Iron removal	260	68	328
Iron removal – ion exchange	24	49	73
Nitrate removal – ion exchange	40	49	89
Organics removal	10	13	23
Radionuclides removal	4	9	13
Fluoridation	51	0	51
Corrosion Control	**213**	**232**	**445**

*Note: Some water systems may utilize multiple treatments practices in order to achieve a treatment objective.

1.2 Conventional Treatment

Surface water treatment plants most commonly use treatment processes that are defined as conventional treatment. The processes that remove particles and pathogens include coagulation, sedimentation, and filtration. Conventional treatment is also used by groundwater systems that remove iron and manganese from the raw water.

1.3 Corrosion Control

Corrosion control reduces the concentration of lead and copper that dissolves in the water, provides protection against pipe corrosion, and may improve the coagulation process used in conventional treatment. Chemical treatments that increase pH, sequester iron, and increase alkalinity are different types of corrosion control.

1.4 Disinfection

Most water treatment plants disinfect water prior to distribution. The 1995 Community Water Systems Survey (USEPA, 1997) reports that 81% of all community water systems nationally provide some form of treatment on all or a portion of their water sources. The survey also found that virtually all surface water systems provide some treatment of their water. Of those systems reporting no treatment, 80% rely on ground water as their only source.

Nationwide, the most commonly used disinfectants are chlorine, chlorine dioxide, chloramines, ozone, and potassium permanganate. Table 2 provides information on the disinfection practices of water systems in Maryland. Gaseous chlorine is commonly used by the largest water treatment plants. Most small water systems use liquid chlorine and commonly use sodium hypochlorite. Chlorine has been determined to be effective against viruses, bacteria and some protozoa such as Giardia. However, it is not effective against Cryptosporidium.

Table 2: Disinfection Practices of Public Water Systems in Maryland*

Treatment	Community	Nontransient	Transient	Total
Total Number of Systems	500	570	2,676	3,746
Pre-Disinfection				
Chlorine, Gas	192	5	4	201
Chlorine, Liquid	413	167	343	923
Chlorine Dioxide	0	0	0	0
Chloramines	1	0	0	1
Iodination	0	1	6	7
Ozonation	0	0	1	1
Ultraviolet Radiation	0	27	204	231
Post Disinfection				
Chlorine, Gas	70	5	0	75
Chlorine, Liquid	89	60	21	170
No Disinfection Treatment				
No Disinfection	48	247	1,622	1,869

*The data includes some water systems that have multiple disinfection treatments.

In Maryland, chloramines are used by one surface water filtration plant. Ozone has been used by two small public water systems in the past.

Chlorine dioxide is currently used by two consecutive public water systems that purchase water from a large water system. However, in an effort to reduce levels of either total trihalomethanes (TTHMs) or haloacetic acids (HAA5), a few surface water systems are evaluating the future use of this disinfectant. The consecutive systems noted above include hospitals and business facilities that use chlorine dioxide in order to inactivate Legionella bacteria.

Ultraviolet radiation (UV) is used by very small water systems having distribution systems that are confined to one or two connections. UV has been determined to be effective against bacteria and pathogens such as Giardia and Cryptosporidium. Because of this, UV treatment is now being considered at larger surface water systems. However, its effectiveness against viruses has been questioned.

1.5 Maryland Operator Certification Programs

1.5.1 Classification of Water Systems and Operators

Maryland classifies water facilities according to treatment technology. This ensures that operators are technically qualified for the treatment process they are certified to operate.

The operators and superintendents must have certifications that qualify them to operate within the classification of the water system. Some certifications also authorize the holder to operate other classifications of facilities. Table 3 presents the classification of water systems and outlines the typical treatment processes found in each classification.

Table 3: Classification of Water Treatment Systems

Class of Plants	Type of Treatment Systems	Typical Processes Included in the Plant
1	Disinfection	Chlorination
2	Chemical Treatment	Chlorination, pH control and fluoridation
3	Simple Iron Removal	Chlorination, pH control, fluoridation, filtration and iron removal utilizing ion exchange or contact oxidation processes
4	Completed Treatment	Chlorination, pH control, fluoridation, aeration, coagulation, sedimentation, filtration and complex iron removal
5	Site specific	Site specific – any alternative technological plants not covered under the classification system
D	Distribution	Water distribution
G	No Chemical Treatment	Well, storage tanks, UV disinfection

Water system compliance with the Operator Certification Program is tracked through the MDE Water Supply Program's ORACLE database that manages all data under the Public Water System Supervision (PWSS) grant. In 2003, the Water Supply Program coordinated updates to the Public Drinking Water Information System (PDWIS) database from the Maryland State Board of Water and Wastewater Operator's administrative database. MDE tracks operator compliance using sanitary surveys, monthly operating reports, mailed surveys and direct communication with drinking water systems.

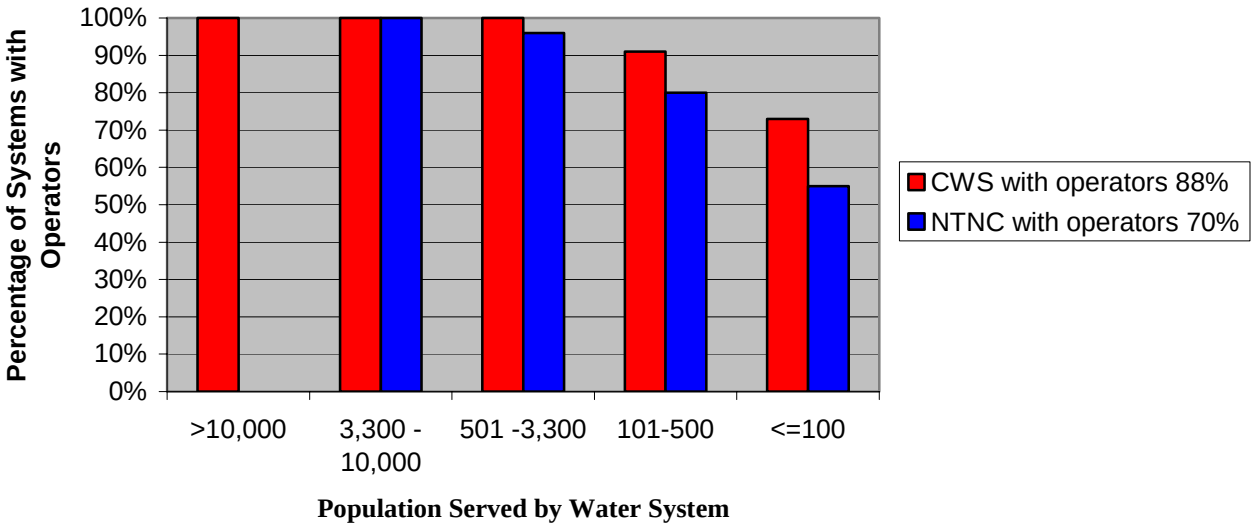
Table 4 summarizes the information that is currently available in the database as of May 2004. As of early 2004, 217 water systems that were without certified operators in 2001 have employed certified operators.

Table 4: Maryland Operator Certification Compliance

Water System Type	Number of Systems		Number of Systems with Operators		Percentage of Systems with Operators	
	2003	Baseline 2001	2003	Baseline 2001	2003	Baseline 2001
Community	501	503	445	402	88%	80%
Nontransient-Noncommunity	570	568	399	225	70%	40%
Total	1,071	1,071	844	627	79%	59%

Figure 1 represents the number of systems in compliance for 2003 based on the population that water system serves.

Figure 1: 2003 Operator Certification Compliance



1.5.2 Certified and Grandparented Water Treatment Plant Operators

The Board of Waterworks and Waste Systems Operators (Board) maintains a database of administrative records for all classifications of operators in Maryland: water, wastewater, and industrial use. The Board also maintains records of operators with temporary certification who are in training for operator certification. A temporary operator is defined as an operator employed at a water system working under the direction of an operator or superintendent, but who has not met the experience requirements for the classification and/or has not passed an examination for the classification. This type of certificate is only used for operators in training.

Grandparented certificates are granted to persons who have acted as water treatment plant operators for facilities that were not required to employ operators prior to February 2001. The grandparented certificates are site-specific, and were granted to qualified recipients through February 5, 2003. Table 5 summarizes the number of water operator certificates that are currently in effect in Maryland.

Table 5: Certified and Grandparented Operators - 2003

CLASS OF SYSTEMS	CERTIFICATE TYPE		
	Temporary	**Operator**	**Grandparented**
G	39	213	*
1	117	201	*
2	175	193	*
3	92	156	*
4	220	420	NA
5	20	3	NA
D	146	263	NA
Total	**809**	**1,449**	**372**

* Number of Grandparented operators is not available from PDWIS.

Wastewater

2.0 WASTEWATER

2.1 General

Wastewater treatment systems consist of wastewater collection systems and wastewater treatment facilities. Household, commercial and industrial wastewater, and in some cases, stormwater enter the collection system and are conveyed to local or regional wastewater treatment facilities. Facilities range in capacity from a few thousand gallons per day (gpd) serving individual communities to upwards of 180 million gpd serving entire metropolitan areas.

2.2 Wastewater Collection Systems

Collection systems capture water and waste discharges from residences, businesses and industries, and some stormwater runoff; and transport these waters to a treatment plant for processing.

There are three types of collection systems: storm sewers, sanitary sewers and combined sewers. Storm sewers carry only rainwater and other runoff from streets and some treated industrial wastewater. Storm sewers convey the stormwater directly to receiving streams, generally by gravity, but sometimes through pumping stations in areas where downhill flow cannot be achieved. Typical access to storm sewers is through stormwater street inlets, stormwater manholes and pipes from industries that treat their wastewater. During periods of heavy rain, storm sewers often exceed their capacity and discharge excess stormwater through manholes and street inlets.

The second type of collection system is the sanitary sewer system (SSS). Sanitary sewers carry untreated wastewater from residential areas, commercial areas and industrial areas to wastewater treatment plants. Commercial and industrial wastewater usually contain toxic substances. A sanitary sewer overflow (SSO) results when the sewer is undersized, has a blockage or broken line or other defect that allows groundwater or excess storm water to enter the line. SSOs occur during dry or wet weather, and lead to millions of gallons of untreated sewage escaping into the environment, exposing humans to unsafe waterborne pathogens. SSOs can back up into residences or other buildings. Since the SSO wastewater is untreated, a public health issue can result due to pathogens or harmful chemicals contained in the wastewater. Beach closures, shellfish bed closures, drinking water supply contamination, and other water quality impairments can result from SSOs. SSOs are often indicative of poor operation and maintenance of the sewer system and are a violation of the existing NPDES permit for the receiving wastewater treatment plant.

In a combined sewer system (CSS), the third type of collection system, stormwater and sanitary wastewater are conveyed to the wastewater treatment plant through the same pipe. Most combined systems are older systems built in the early 20th century. During dry weather, combined systems carry sewage and industrial wastewater only, but during wet weather events, stormwater enters the system and is conveyed to the wastewater treatment plant. Often during wet weather events, the capacity of the treatment plant is exceeded and combined sewer overflows (CSOs) occur. Combined sewers are designed

to discharge flows exceeding their capacity to surface waters prior to treatment. Untreated wastewater is then backed up to city streets and, sometimes, backs up into houses connected to the combined system. Since these sewers convey untreated sanitary and industrial wastewater, CSOs result in similar environmental and public health consequences as SSOs.

Many conveyance systems are very old and undersized, and are prone to SSOs and CSOs. Some of these systems are also prone to failure through inflow and infiltration (I/I). Inflow results, for instance, where water enters through an illegal connection. Infiltration is a result of water entering through cracks and broken joints in the pipelines. Wastewater pumping stations, usually located along streambeds, are also prone to failure, allowing untreated wastewater to overflow and enter the environment.

According to the "Report to Congress: Impacts and Control of CSOs and SSOs" (EPA 833-R-04-001 dated August 2004):

> … 828 NPDES permits authorize discharges from 9348 CSO outfalls in 32 states (including the District of Columbia)… The estimated volume of CSO discharged nationwide is 850 billion gallons per year… EPA estimates that between 23,000 and 75,000 SSO events occur per year in the United States, discharging a total volume of three to 10 billion gallons per year.

CSOs and SSOs contain microbial pathogens (bacteria, viruses and parasites), oxygen depleting substances (measured as BOD5), total suspended solids (decaying plant and animal matter, industrial wastes and silt), toxics (metals, hydrocarbons and synthetic organic chemicals), nutrients (nitrogen and phosphorus) and floatables (trash, debris and other visible material) as their principal pollutants. As a result of the discharges of these pollutants, the "National Water Quality Index 2000 Report" (NWQI) identified CSOs as source of impairment for 1,466 square miles (5 percent) of assessed estuaries and 56 miles (1 percent) of Great Lakes shoreline. Due to inconsistency of information collection and reporting among states, the NWQI is only an indication of the extent of the problem. The Report to Congress comments, however, that the "origin and relative availability of data on pollutant concentrations in discharges were not consistent for the different municipal sources." The Report also stated that "data to characterize actual wet and dry weather SSO discharges … was less readily available" than data on CSOs, urban stormwater, and treated and untreated wastewater.

2.3 Maryland Overflow Events

Wastewater collection systems in Maryland are required by their NPDES discharge permits to report any SSOs and CSOs immediately upon discovery and follow-up in writing within 5 days. This requirement is being formalized by a proposed regulation, COMAR 26.08.10, Overflow or Bypasses, under the authority of Environment Article §9-331.1, Annotated Code of Maryland. This overflow information reported by the wastewater treatment plant is entered into the Overflow Database which can be accessed through the MDE website (http://www.mde.state.md.us). The website contains the number of reported events and volume on a monthly basis as well as the total number of events and volume for the year. Table 6 lists the number of reported Maryland

SSOs/CSOs that occurred in 2002, 2003 and 2004 (through to September, 2004) with the associated volume that overflowed. There is a margin of error due to unreported events.

Table 6: Reported Sanitary Sewer and Combined Sewer Overflow Events and Volumes 2002-2004

Year	Number of Events		Gallons	
	SSO	CSO	SSO	CSO
2002	809	644	52,781,824	47,782,775
2003	1,183	892	371,902,469	356,045,023
2004	665	463	59,224,808	430,975,077

2.3.1 Sanitary Sewer Overflows (SSOs)

MDE performed a mass mailing over five years ago and requested owners and operators of sewer systems to report any overflows to the Water Management Administration's (WMA) Compliance Program. Many reports were received, but there was also an indication that some overflow events were never reported to MDE. During the summer of 2000, there were several large sewer overflow events in Baltimore City that were featured in news stories raising the interest of many concerned citizens about sewer overflows in general. One of these was from the Dundalk pumping station into Colgate Creek (near the former MDE office location at Point Breeze). The overflow occurred when a valve stem broke, blocking the normal channel from the wet well to the sewer line that carries the sewage to the Back River Wastewater Treatment Plant.

In October 2000, MDE issued a letter to all owners and operators of sanitary sewer systems and combined sewer systems in Maryland requiring notification to MDE via telephone within 24 hours of an overflow event. MDE also required submission of a follow-up letter within 5 days and gave interim guidance about notifying the public. Notification to MDE about sewer overflows was made mandatory. The failure to report could result in appropriate enforcement action, including the assessment of penalties. In January 2001, MDE coordinated with health directors, public works officials, and others and developed a guidance document that would assist owners, operators and health department officials in deciding when public notification about sewer overflows is needed and what form it should take. The guidance is tiered, based on the size of the overflow and whether the overflow went to "sensitive" waters such as shellfish waters, drinking water intakes, bathing beaches, or other sensitive areas. MDE also advised the owners and operators of sewage systems that MDE would issue a press release if the local responsible party decided not to notify the public about an overflow event when MDE believes public notification is needed.

In 2001, Maryland enacted legislation that added Environment Article, Section 9-331.1 to the Annotated Code of Maryland. This law requires all owners and operators of sanitary sewer systems and combined sewer systems in Maryland to report overflows to MDE via telephone within 24 hours and provide written notification within five days of the incident. Also in 2001, MDE started tracking all reported sanitary sewer overflows (SSOs), combined sewer overflows (CSOs), and sewage treatment plant bypasses in EXCEL databases. This information is available to the public on MDE's website: http://www.mde.state.md.us.

A federal consent decree negotiated with Baltimore City by MDE, EPA, and the Department of Justice (DOJ), finalized in September 2002, includes extensive injunctive relief valued by the City at over $800 million over 15 years, an up-front penalty of $600,000 (of which half was paid to the MDE Clean Water Fund), and design of biological nutrient removal (BNR) at the Patapsco Wastewater Treatment Plant as a Supplemental Environmental Project (SEP) with the City's contribution toward costs valued at $2.72 million. MDE and Allegany County entered a judicial consent order that addresses Sanitary Sewer Evaluation Studies (SSESs) and improvements to the collection systems for the Celanese and George's Creek WWTPS. MDE has also entered administrative consent orders against Accident, Anne Arundel County, Centreville, Emmitsburg, and Poolesville that address overflows from their sewer systems and/or overflows or bypasses at their treatment plants. MDE, in cooperation with EPA and the DOJ, is currently participating in negotiations of proposed federal consent decrees with two other large municipal jurisdictions in Maryland that have reported numerous SSOs.

In 2002, MDE distributed a preliminary draft of a proposed regulation with specific requirements related to overflows or discharges from a sanitary sewer system, combined sewer system, or wastewater treatment plant bypass to a spectrum of interested parties for initial comment. Because several changes were made to the proposed regulations based on comments received, the first version was withdrawn and a new version was published in the Maryland Register on September 17, 2004. A public hearing was held on October 14, 2004. The comment period ended on November 1, 2004. It is anticipated that the regulations will be promulgated in 2004 or early 2005.

MDE has an EPA-approved project priority system that ranks water quality capital projects according to the severity of public health and environmental impact of the problem. Local governments submit requests for funding to reduce infiltration and inflow into sanitary sewers which contribute to sanitary sewer overflows. MDE assists in funding the repair or replacement of older sewers with inflow/infiltration problems at a grant funding level of about $500,000 per year. Westernport was awarded a $150,000 grant and Cumberland was awarded a $260,000 grant to help in their efforts to address CSOs.

Many millions of dollars in low interest loans are available from MDE. The 2001 Task Force Report focused on the scope of the problem, viable methods of correction, cost estimates, and possible funding mechanisms. If a traditional 50/50 cost share program is initiated and, assuming a total price tag of $1 billion over 20 years, the State would need to invest $500 million or roughly $25 million per year. The State and local governments will have significant difficulty meeting these financial requirements. Federal funding will be essential and Maryland will need help from its Congressional Delegation. Congress has passed federal legislation targeted at providing EPA funding assistance for SSO/CSO problems but no appropriations have been made.

EPA Headquarters is reportedly working on a proposal to develop a significant non-compliance (SNC) definition to apply to wastewater treatment systems that experience overflows. Discussions about what the definition will be are just beginning, but once the definition is adopted, any wastewater system in Maryland that meets the new SNC criteria will be added to EPA's Quarterly Non-Compliance Report (now focused on major NPDES dischargers with effluent or reporting violations). EPA and MDE will then discuss the appropriate enforcement response for each such system. Depending on how the SNC definition is crafted, this could greatly increase the number of enforcement cases in Maryland that may involve EPA, either through advising MDE what should be done to resolve the matter, a joint federal-State action, or an EPA administrative action.

2.3.2 Combined Sewer Overflows (CSOs)

When EPA finalized the CSO control policy in 1996 and requested that states address their specific combined sewer systems, MDE issued administrative orders to seven of the eight known combined systems in Maryland (Allegany County, Baltimore City, Cumberland, Frostburg, LaVale, Salisbury and Westernport). Cambridge, the eighth combined system, was already under a judicial order that included requirements to address overflows into the street from the combined sewer system. MDE inserted CSO requirements into the NPDES discharge permits for the Cambridge, Cumberland, Patapsco (Baltimore City), and Salisbury wastewater treatment plants. New NPDES permits were issued to Allegany County, Frostburg, LaVale, and Westernport with specific language addressing each combined sewer systems. Cambridge made the decision to eliminate its CSOs by performing separation of their storm water system and sanitary sewer system. MDE entered a revised judicial consent order with Cambridge that set a phased schedule for completion of the separation project. Cambridge has completed Phases I and II and is moving forward with the next phase that will result in complete separation of its stormwater and sewage systems.

In the fall of 2000, MDE filed complaints in court due to the delays by the Western Maryland CSO communities to develop Long Term Control Plans (LTCP) with mandated schedules for completion. Negotiations with Allegany County, Cumberland, Frostburg, and LaVale resulted in a consolidated consent order that was finalized in December 2001. LTCPs are to be submitted in a staggered order beginning with Frostburg, then Allegany County, LaVale and finally Cumberland. All LTCPs must be implemented by October 1, 2023. This time frame was negotiated after review of the potential costs (a total of $100 million or more for the four municipalities) and their ability to fund the needed improvements. Each LTCP is shared with the other jurisdictions and their comments are considered when MDE evaluates the LTCP prior to approval. The LTCP for Frostburg and Allegany County were approved by MDE and LaVale's LTCP is currently under review.

Westernport, also located in Allegany County, and MDE finalized a consent decree on August 20, 2002. The decree requires full implementation of the LTCP by July 31, 2022. Westernport requested an extension to submit their LTCP due to a delay in finalizing MDE's funding assistance for this effort.

The Baltimore City CSOs are included in the federal consent decree that was finalized on September 30, 2002. It commits the City to an expenditure of over $800 million to complete all of the requirements by January 1, 2016. This includes specific sewer construction projects; sewershed evaluations and follow up corrective actions; inflow and infiltration studies; close-circuit television and other inspections of the sewer system; computer modeling; Geographic Information System (GIS) development; SCADA improvements; and other activities to improve the condition and management of the sewer system. The City has completed work in the Walbrook CSO area and has stated that the work eliminated sewage from the stormwater discharge. The City is required to complete a similar project for the Forest Park CSO area by 2005 and certify that the sewage has been effectively separated from the stormwater outfall by June 2006.

Salisbury's initial LTCP focused on improvements to prevent storm water from entering the sewer system. MDE and Salisbury are currently negotiating an updated judicial consent order that includes an updated LTCP. The consent order also addresses the BNR upgrade of the wastewater treatment plant and violations of the effluent limitations for silver. Salisbury believes that they will be able to further verify that the CSOs are not active and then close the overflows off permanently. MDE learned in 2002 that Snow Hill still had several possible CSO outfalls. The outfalls were reported to be inactive and were concreted closed by the Town.

The 2002 General Assembly passed a bill (Senate Bill 643/House Bill 1051) to set aside $1.0 million to conduct an Inflow/Infiltration (I/I) investigation of wastewater systems and wastewater rate assessments. The I/I studies will be performed in two phases. Phase I of the program consists of conducting preliminary I/I desktop evaluations using information available from approximately 90 wastewater systems. These are systems with flows less than 12 million gallons per day (MGD) that have expressed an interest in participating in the study. To date, Phase I is 95% complete. Phase II consists of conducting a comprehensive I/I investigation at representative systems from three categories: those with average daily flow rates of less than (1) 0.5 MGD, (2) 0.5 to 1.0 MGD, and (3) greater than 1.0 MGD. The rate assessments of the 67 systems that responded to MDE requesting the assessment will be continued. As of this report, the Maryland Center for Environmental Training (MCET) has completed studies for 19 of the 67 facilities and has 15 more in progress. From the information gathered, a database of rate practices to identify systems requiring further help will be compiled.

2.4 Wastewater Treatment Plants

Collection systems, whether SSS or CSS, all are intended to convey wastewater to wastewater treatment plants. Wastewater treatment plants are designed to treat conventional pollutants and not toxic pollutants. Conventional pollutants are defined under 40 CFR 401.16 as biochemical oxygen demand (BOD), total suspended solids (nonfilterable) (TSS), pH, fecal coliform, and oil and grease. The types of wastewater treatment plants vary, but the processes that the plants employ can be categorized as primary treatment, secondary treatment and tertiary treatment. Primary treatment is a physical process that removes solids such as grit that settle by gravity. Secondary

treatment relies on some sort of biological process such as activated sludge, trickling filters, rotating biological contactors, sequencing biological reactors and other biological mechanisms. Up to 90 percent of the organic matter and suspended solids in wastewater may be removed during primary and secondary treatment. Tertiary treatment removes additional pollutants such as nutrients (nitrogen and phosphorus) and additional organic matter that was not removed during secondary treatment. Tertiary treatment can be biological or physical, depending upon the pollutant being removed. Biological nutrient removal (BNR) and enhanced nutrient removal (ENR) are tertiary processes. The types of wastewater treatment employed in different areas of the State vary due to local conditions, such as the quality of receiving waters, amount of non-domestic wastewater, size of the population served and other regulatory requirements.

Each of the three stages of wastewater treatment generates byproducts called sludge or biosolids that must be stabilized, treated and removed. If the sludge meets the requirements of State and federal regulations, it can be applied to farmland or be put to some other beneficial use. These requirements include limitations on certain heavy metals and pathogens and depend on the ultimate use of the sludge. If the sludge contains viable pathogens or heavy metals in excess of the standards, it must be retreated, diluted with sludge compliant with the standards, incinerated or disposed of in a municipal landfill. Operators of wastewater treatment plants generally prefer to dispose of the sludge on farmland due to reduced costs. Disposal on farmland is environmentally preferred, but, due to public perception issues, this sometimes is not an option.

Most of the larger wastewater treatment plants and some of the smaller ones receive discharges from industrial users. In many cases, these industrial wastewaters contain higher amounts of conventional pollutants that are compatible with wastewater treatment. Some industrial users, however, generate wastewaters containing heavy metals or organics that are not compatible with the processes at wastewater treatment plants, or may interfere with wastewater collection systems or pumping stations, or pose a danger to sewer workers or treatment plant operations personnel. Also, pollutants may pass through the wastewater treatment plant untreated into the receiving stream. In these cases, the wastewater must be pretreated prior to its discharge into the sanitary sewer. Industrial users are sometimes subject to a surcharge for the additional costs of treatment above that of municipal household wastewater.

2.4.1 General Overview of Maryland Wastewater Treatment Plants and Technologies

The following table summarizes the number of wastewater treatment discharge permits issued by MDE under the different categories as of September 22, 2004. MDE does not have a unified database on the treatment processes or the type of disinfection employed at each plant. The number of certified wastewater superintendents as in Table 7, below, is a good indication of the types of technologies utilized at wastewater treatment plants in Maryland. Every wastewater treatment plant in the State is required to have at least one superintendent. The estimate may be slightly inaccurate since many superintendents oversee several smaller plants.

Table 7: Number of Wastewater Treatment Plant Superintendents versus Type of Plant

Type of Certification	General Description	Number of Superintendents
Wastewater 1	Lagoons	26
Wastewater 2	Physical/Biological	0
Wastewater 3	Package Activated Sludge Plants	40
Wastewater 4	Trickling Filters, Rotating Biological Contractors	29
Wastewater 5	Activated Sludge	114
Wastewater 6	Site Specific	4
Wastewater A	Advanced Wastewater Treatment	66

Table 8 lists the number of discharge permits issued by Maryland for various types of wastewater treatment plants and gives an indication of the distribution of their size and purpose.

Table 8: Discharge Permit Numbers as of September 22, 2004

Plant Type	Number	
	< 1 MGD	>1 MGD
Wastewater Public Surface Discharge	147	51
Wastewater Private/Federal Surface Discharge	83/13	0/4
Industrial Surface Discharge	197 total	
Wastewater Public Groundwater Discharge	38 total	
Industrial Groundwater Discharge	103 total	

Municipal wastewater treatment plants in Maryland vary in size from several hundred gallons per day flow to almost 180 million gallons per day. The basic treatment technologies employed by these plants, regardless of size, are very similar and generally use some sort of biological mechanism to reduce the effect of wastewater constituents on the receiving stream. Prior to biological or secondary treatment, a physical removal process is used to settle the heavier, inorganic matter in the wastewater. The wastewater is then disinfected by chlorine, ozone, or UV light before being discharged into the waters of the State. If chlorine is used for disinfection, the wastewater must be dechlorinated prior to discharge to prevent chlorine residual from entering Maryland waters.

2.5 Classification of Wastewater Treatment System Operations

Like water facilities, Maryland classifies wastewater treatment plants according to treatment technology, ensuring that operators are technically qualified for the process they are certified to operate.

Similarly, the operator and superintendent must have certifications that match the classification of the wastewater system. Certain classifications of certificates also

authorize the holder to operate other classifications of facilities. Table 9 presents the classification of municipal wastewater systems and outlines the typical treatment processes found in each classification.

Table 9: Classification of Wastewater Treatment Systems

Class of Plants	Type of Treatment Systems	Typical Processes Included in the Plant
1	Lagoons	Aerated or non-aerated lagoons, filtration, disinfection, and land or wetland treatment.
2	Physical/Biological	Primary treatment, sand filter, land or wetland treatment, and disinfection
3	Package Activated Sludge Plants	Screening, activated sludge, sedimentation, filtration, disinfection, chemical addition, sludge handling, pumping and land or wetland treatment.
4	Trickling Filters, Rotating Biological Contactors (RBC)	Preliminary treatment, primary treatment, sedimentation, trickling filters, RBC, filtration, chemical addition, disinfection, sludge handling, and pumping.
5	Activated Sludge	Preliminary treatment, primary treatment, sedimentation, activated sludge, oxidation ditches, filtration, chemical addition, disinfection, sludge handling, and pumping.
6	Site Specific	Other alternative technology systems not covered under this classification system.
A	Advanced Wastewater Treatment (used in conjunction with other classes)	Filtration, activated carbon adsorption, nitrification, denitrification, phosphorus removal, ammonia stripping, chemical feeding and conditioning, coagulation and flocculation.
S	Solids Handling Only	Chemical conditioning, sludge thickening, sludge digestion, thermal treatment, chlorine treatment, filtration, dewatering, composting, land application.

Table 10 lists the number of active wastewater operator certificates issued in Maryland.

Table 10: Number of Active Wastewater Operator Certificates Issued in Maryland (September 22, 2004)

Class of Wastewater Operator	Superintendent	Operator	Temporary
1	26	72	42
2	0	1	4
3	40	153	88
4	29	182	117
5	114	652	302
6	4	7	18
A	66	481	307
S	13	228	27
Total	293	1,776	905

2.6 Biological and Enhanced Nutrient Removal

2.6.1 Biological Nutrient Removal and Enhanced Nutrient Removal

Biological Nutrient Removal (BNR) and Enhanced Nutrient Removal (ENR) are processes to reduce nitrogen and phosphorus from the liquid effluent of wastewater treatment plants through the application of one or more engineering or operational techniques. Nitrogen removal below approximately 18 milligrams per liter (mg/l), which is the typical concentration from secondary treatment facilities, to 8 mg/l or less is the goal of BNR. This was the concentration used in computer models for the Chesapeake Bay restoration and had been used as the target since 1984. The Chesapeake 2000 Agreement and passage of the Bay Restoration Fund in the 2004 legislature revised nutrient reduction goals. The goal of ENR is nutrient removal of 3 mg/l total nitrogen and 0.3 mg/l total phosphorus, where feasible, to ensure that Maryland will achieve the nutrient reductions necessary to restore the Chesapeake Bay.

2.6.2 The Environmental Benefits of BNR/ENR

BNR/ENR is a cost-effective way to reduce the amount of nitrogen and phosphorus entering the State's streams, rivers, and the Chesapeake Bay. The BNR Program was among the first capital programs created to help in efforts to restore the Bay, and now the ENR Program has been added.

BNR/ENR technology is extremely effective in reducing nutrients. Implementation of state of the art innovative technology will reduce nitrogen in the Chesapeake Bay by an additional 7.5 million pounds per year, and phosphorus by an additional 220,000 pounds per year from wastewater treatment plants in Maryland.

2.6.3 BNR/ENR in Maryland

The current BNR/ENR Programs provide funds for BNR/ENR to retrofit or upgrade the 66 municipal wastewater treatment plants (WWTPs) in Maryland with a flow of 0.5 million gallons per day (mgd) or greater. Smaller plants may be targeted for funding in the future. See Figure 2 for a map showing the location of WWTPs implementing or targeted to implement BNR/ENR.

2.6.4 The Future of BNR and ENR Technologies in Maryland

The largest and among the most cost-effective nutrient reductions are those from WWTP upgrades. The U.S. EPA computer models indicate that if WWTPs simply maintain the current level of pollution control, not only will efforts to reduce nutrient loads be erased as flows increase, but also a million more pounds of nitrogen and phosphorus will be discharged into the Bay and local watersheds over the next decade. The 2000 Chesapeake Bay Agreement calls for Maryland to reaffirm the 1994 Tributary Strategies as a minimum commitment, and also calls for the removal of all nutrient and sediment impairments to the Bay by 2010. These new goals will require additional reductions of sediment and nutrient pollutants. New pollutant reduction target figures have been developed by EPA's Chesapeake Bay Program.

2.7 Bay Restoration Fund Programs

On May 26, 2004, Governor Robert L. Ehrlich, Jr. signed Senate Bill 320 (Bay Restoration Fund) into law. The purpose of the bill is to create a dedicated fund, financed by citizens and businesses, to upgrade Maryland wastewater treatment plants with enhanced nutrient removal (ENR) facilities. Funds generated by onsite sewage disposal system users will be used to upgrade these onsite systems and implement agricultural cover crop activities to further reduce nitrogen loading to the Bay.

In April 2003, subsequent to the ENR Executive Order, the Principal Staff Committee of the Chesapeake Bay Program agreed that more reductions in the amount of nutrients flowing into the Bay and its rivers are needed to remove the Chesapeake Bay from the EPA list of impaired waters by 2010. The new nutrient goals, or allocations, call for the Bay watershed states to reduce the amount of nitrogen from the current 285 million pounds per year to no more than 175 million pounds per year, and phosphorus from 19.1 million pounds per year to no more than 12.8 million pounds per year. To meet the new targets, Maryland would have to reduce nitrogen loads by at least 19.6 million pounds per year, from 56.9 million pounds in 2000 to 37.3 million pounds by 2010. Phosphorus loads would have to be reduced by at least 0.91 million pounds per year, from 3.83 million pounds in 2000 to 2.92 million pounds by 2010. Achieving the new targets will require maximum contributions from every sector. Where any one sector does not contribute to nutrient reduction, the remaining sectors will bear the costs of that loss of contribution.

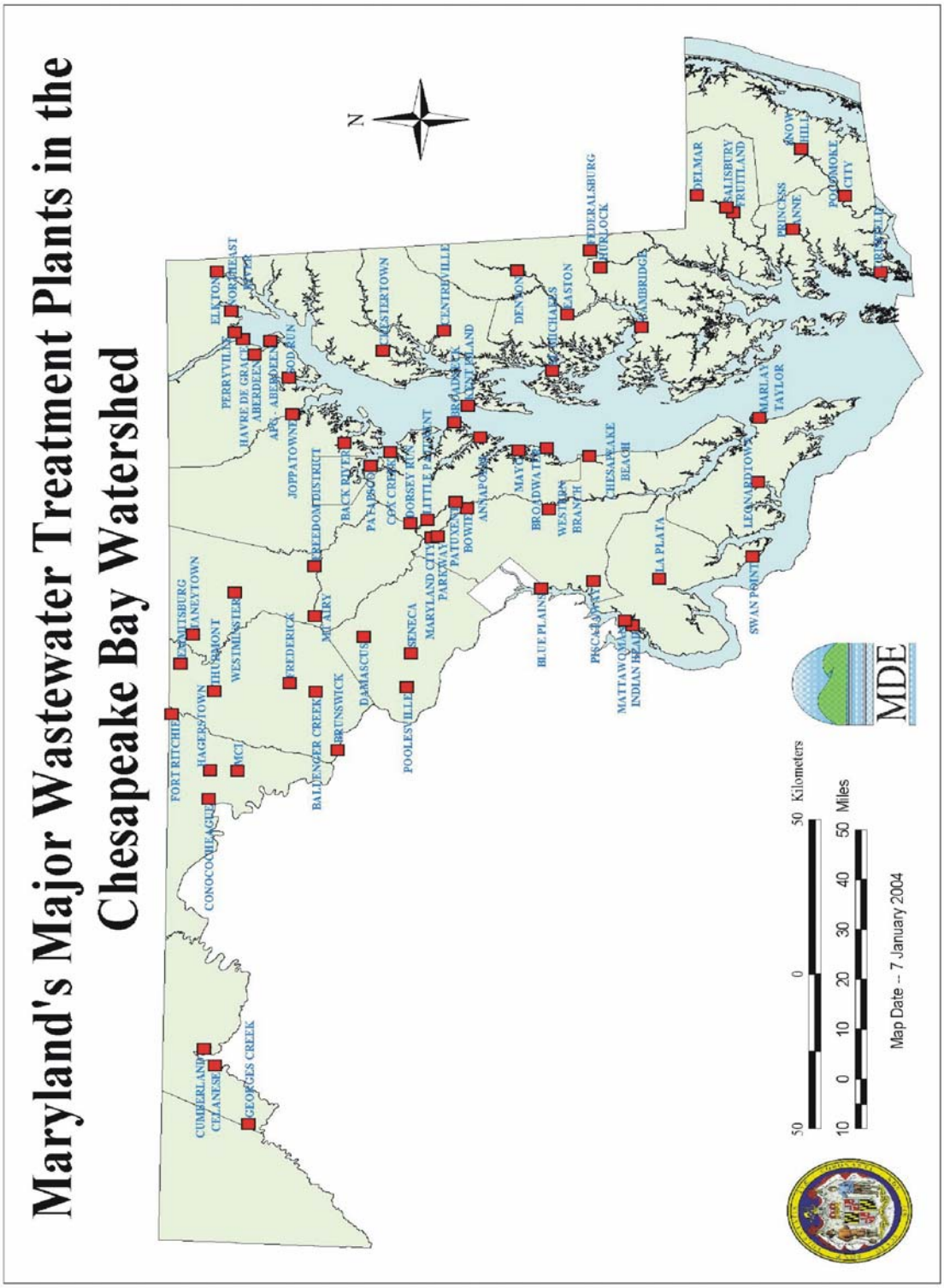
2.7.1 Wastewater Treatment Plants Fund

A $2.50 monthly fee will be collected from each home served by wastewater treatment plants. Commercial and industrial users will be charged at the rate of $2.50 per month per equivalent dwelling unit (EDU). Fees generated from wastewater treatment plant users are estimated at $65,000,000 per year. To expedite the implementation of the program, MDE may issue bonds, pledged in full or in part, by funds generated under this program. The 66 major publicly owned wastewater treatment facilities discharging to the Chesapeake Bay have priority for funding. Smaller, private and industrial wastewater treatment facilities will be considered on a case-by-case basis considering cost effectiveness, water quality benefits, readiness to proceed, and nitrogen/phosphorus contribution to the Bay.

2.7.2 Onsite Systems Fund

A $30 annual fee will be collected from each home served by an onsite system for an estimated total program income of $12.6 millions per year. Sixty percent of these funds will be used for onsite system upgrades and the remaining 40% will be used for agricultural cover crop activities. There are 420,000 onsite systems in Maryland. With priority given to failing onsite systems in critical areas, funds will be used for upgrades of existing systems to best available technology for nitrogen removal, or for the marginal cost of using best available technology instead of conventional onsite systems.

Figure 2: Location of WWTPs Implementing or Targeted to Implement BNR/ENR



Chlorine

3.0 CHLORINE

3.1 Introduction

The Advisory Council addressed the HB 659 legislative requirements for chlorine security and its use in the drinking water and wastewater industry in Maryland. The Council's approach was to develop reasonable, meaningful, and substantive recommendations to reduce the risks created by the use of chlorine gas in the drinking water and wastewater industry. This chapter addresses the following mandates of this House Bill:

- Study and assess the levels, potential health effects, and persistence of chlorination byproducts in the water supply as the chlorination byproducts may affect individuals living and working in Maryland;

- Assess alternative methods of disinfection of the water supply, and the potential health effects, both risks and benefits, that may accrue from using these alternative methods;

- Study the environmental and public health issues surrounding the use of chlorine and alternative methods of disinfection in drinking water and wastewater treatment;

- Perform a risk assessment and cost analysis relating to the use of chlorine and alternative methods of disinfection in drinking water and wastewater treatment; and

- Examine the security issues surrounding the use and storage of chlorine and alternative methods of disinfection in drinking water and wastewater treatment.

3.2 Background

The use of chlorine as a disinfectant in both drinking water and wastewater has been one of the most important scientific public health breakthroughs in modern times. The reduction of waterborne disease outbreaks in the twentieth century should be noted, and the successful use of disinfectants in water to protect public health must be a primary consideration in any discussion of changes in disinfectant use.

The September 11, 2001 terrorist attack on the continental United States compelled the drinking water and wastewater industry to reconsider use of chlorine. Any examination must identify the tradeoffs between public health benefits as a disinfectant and the health risks associated with a chlorine gas release as the result of accidents and terrorist activities. From an engineering design perspective, it is possible to use alternative disinfectants; however, any change must be analyzed for impacts to drinking water safety and quality. The storage of gaseous chlorine and other hazardous materials present risks to surrounding communities. These risks must be balanced with the risks associated with

using other methods to disinfect both drinking water and wastewater to protect public health. These may be level of effectiveness, residual disinfection properties and cost. This Report discusses disinfection of drinking water and wastewater associated with the use of gaseous chlorine and other alternative disinfection methods.

3.2.1 Use of Chlorine in the Treatment of Drinking Water

An effective disinfection system should kill or neutralize most pathogens in the water. It should be safe, inexpensive, and easy to administer and maintain. An ideal system treats water of varying quality and provides residual (long-term) disinfection. The finished drinking water should be relatively odor free and palatable. All chemicals should be easily and safely stored. Unfortunately, no disinfectant meets all of these criteria. Each disinfectant has both positive and negative attributes.

Chlorination and filtration have been used to treat drinking water since the early twentieth century. By using these treatment methods, the occurrence of waterborne diseases has been reduced greatly. However, there can be undesirable health effects that result when chlorine is used for drinking water treatment. Chlorine can combine with decomposing plant material or other organic material to form halogenated organic compounds known as disinfection byproducts (DBPs)[1].

Chlorine is one of the most common chemicals used for water disinfection worldwide. Chlorination is fully effective only when most of the organic matter is removed prior to chlorination. However, filtration is not always successful in removing all organic matter. Unfortunately, the presence of these organic matters reduces the efficacy of chlorine as a disinfectant by depleting chlorine levels used to oxidize organic compounds, therefore requiring greater quantities of chlorine for effective decontamination. This process could cause formation of undesirable chemical compounds such as trihalomethane, known to be potentially carcinogenic in nature. In addition, inadequate chlorine because of the presence of the organic compounds in water can cause the bacterial water test results to misrepresent the safety of drinking water, causing health concerns if appropriate tests are not performed.

Chlorine in drinking water can provide a barrier to protect against both the classic water contaminants and many biological and chemical agents. Of the 500 community drinking water systems in Maryland, all but 48 use some form of chlorine. Most of these 48 water systems serve mobile home parks or very small residential water systems. One hundred ninety two (192) systems use gaseous chlorine and the others use liquid chlorine. Gaseous chlorination is the most cost-effective method and does not require large storage facilities. Stored gaseous chlorine does not degrade over time as does a liquid chlorine product. Since drinking water regulations for surface water systems or groundwater under the influence of surface water require a chlorine residual in treated drinking water, some form of chlorine is necessary. Past industry usage indicates that gaseous chlorine systems are the preferred method of disinfection for larger systems.

3.2.2 Use of Chlorine in the Treatment of Wastewater

Wastewater has been treated by chlorination since the early twentieth century. By using this treatment method, it has been possible to reduce the occurrence of enteric diseases[3]. In water, chlorine breaks down into hypochlorous acid and hypochlorite[4]. In the presence of organic compounds derived from decomposing plant matter, these chlorine breakdown products react with humic and fulvic acids to form numerous halogenated organic compounds.

Unlike treated drinking water, chlorine disinfectant residuals, with few exceptions, are not permitted to be present in the wastewater plant effluent. This creates the need for a variety of alternative methods to meet regulatory disinfection requirements. Using chlorine or chlorine compounds is prohibited at wastewater treatment plants that discharge effluents into natural trout waters. In discharges to other waters, where use of chlorine or chlorine compounds is permitted, chlorine concentrations in effluent discharges must be non-detectable. COMAR §26.08.03.06, sets forth the requirements for the use of chlorine and other chlorine-containing compounds in treated wastewater.

3.2.3 Alternatives to Gaseous Chlorination

Every technique has its specific advantages and its own application area. In the table below some of the advantages and disadvantages are shown. Listed in Table 11 are several of the leading applications for disinfecting drinking water and their advantages (+) or (++) and their disadvantages (-) or (--) :

Table 11: Advantages and Disadvantages of Drinking Water Disinfection Applications [18]

Technology	Environmentally Friendly	Byproducts	Effectiveness	Capital Costs	Operational Costs
Ozone	+	+	++	-	+
UV	++	++	+	+/-	++
Chlorine dioxide	+/-	+/-	++	++	+
Gaseous Chlorine	--	--	++	+	++
Hypochlorite	--	--	-	+	++

<u>Sodium Hypochlorite and Other Related Disinfectants</u>

Liquid sodium hypochlorite is used commonly as a bactericidal chemical alternative to gaseous chlorine. There are few apparent operational drawbacks associated with the use of sodium hypochlorite for wastewater disinfection; and questions exist regarding its use as a drinking water disinfectant. In both cases, storage is an issue as sodium hypochlorite loses effectiveness over time requiring a substantial increase in timely deliveries.

Ozone

Ozone is a very powerful oxidizing chemical compound. However, ozone reacts on contact and does not have the capacity to provide residual protection. Ozone has been used for drinking water disinfection in the municipal water industry in Europe for over 100 years. It is used by a large number of water companies, where ozone generator capacities in excess of 100 kilograms per hour are common. Ozone use for wastewater disinfection in the United States was developed during the late 1970s when there was a controversy over the toxic effect of residual chlorine on aquatic life. Requirements for maintaining chlorine residual in larger drinking water systems in the United States preclude the widespread use of ozone alone.

On-site ozone generation produces ozone from air, requiring a substantial amount of power. Routine maintenance of ozone generation equipment is intensive and may stress operational personnel requirements. Tertiary treatment with filtration has become a required process for ozonation to be effective.

Ozonation has been used successfully in many American systems; however the use of ozone disinfection at one Maryland wastewater treatment plant was not successful. The use of ozone should be considered on a case-by-case basis. There is new scientific concern that the use of ozone may lead to the formation of disinfection byproducts, the risks of which have not been fully studied. The EPA has begun to look at these potential disinfection byproducts and has not reached any conclusions[17].

Ultraviolet Light Radiation

The microbiocidal effect of ultraviolet (UV) energy results from its absorption by various organic molecular components essential to a cell's functioning. The bactericidal effect is correlated with the function of the UV wavelength and it is critical for proper operation that the UV light intensity matches the flow of the water being treated. Thus, flow must be constantly monitored and the wavelength adjusted.

In some facilities, the drinking water industry is using this application as a secondary step to reduce parasite viability such as *Cryptosporidium* and *Giardia* cysts. There are ongoing studies by the Environmental Protection Agency to determine the effectiveness of UV in treating drinking water. UV treatment of drinking water has been approved by EPA for use in conjunction with chlorination.

The wastewater industry is showing increasing acceptance of this technology. A side benefit is eliminating the need for dechlorination, equipment, and the risks of chlorine byproducts. Ultraviolet technology is reliable for disinfection, if the wastewater does not contain significant amount of minerals (especially iron salts), organic compounds, or suspended solids that will interfere with the microbial absorption capability of ultraviolet energy. Interference decreases the lethal effect on microorganisms. Filtration of the wastewater may be necessary before UV treatment to assure adequate disinfection.

Chlorine Dioxide

During the 1950's chlorine dioxide was introduced as a drinking water disinfectant because of its powerful disinfectant characteristics.

The major uses of chlorine dioxide are:

- Pre-oxidant to control tastes and odor,
- Disinfection of pathogens for drinking water treatment,
- Control of iron and manganese, and
- Control of hydrogen sulfide and phenolic compounds.

Chlorine dioxide cannot be compressed or stored commercially as a gas because it is explosive under pressure. As a result, it is generated on site in the quantity required for treatment. When added to water, chlorine dioxide reacts with organic and inorganic compounds. The reactions produce chlorite and chlorate as end products. It does not, however, produce DBPs such as TTHMs and HAAs. [14]

Chloramines

The disinfectant potential of chlorine-ammonia compounds or chloramines was identified in the early 1900s. Chloramines are formed by the reaction of ammonia with aqueous chlorine. Initially, chloramines were used for taste and odor control. Chloramines are generated on site by the addition of ammonia to chlorinated drinking water. The chemical reaction between hypochlorous acid and ammonia forms chloramines. Increased interest in chloramines has occurred in the last 20 years because these compounds form very few disinfection byproducts.

3.2.4 Health Effects of Chlorine

Chlorine is a naturally occurring element and is a gas in its natural state. Highly reactive, chlorine commonly is found in nature bonded to elements such as sodium, potassium and magnesium. Water and wastewater treatment plants use chlorine as a disinfectant to reduce levels of microorganisms that can spread disease to humans.

Chlorine is the traditional chemical disinfectant of choice in potable water and has been used since the early 1900s to inactivate or chemically kill microorganisms in potable water. Chlorine provides a degree of public health reliability in drinking water safety that cannot be easily replaced. While disinfectants are effective in controlling many microorganisms, these compounds react with naturally occurring organic and inorganic matter in source water and distribution systems to form potentially harmful disinfectant byproducts. Many of these DBPs have been shown to cause cancer and developmental health effects in laboratory animals. More than 200 million people consume disinfected water.

Chlorine exposure can occur in the workplace or in the environment following releases to air, water, or land. People who use laundry bleach and swimming pool chemicals containing chlorine products seldom are exposed to free chlorine. Gaseous chlorine is generally found only in industrial settings. The largest users of chlorine are companies that make ethylene dichloride and other chlorinated solvents, polyvinyl chloride (PVC) resins, chlorofluorocarbons, and propylene oxide. Paper companies use chlorine to bleach paper.

Elemental chlorine enters the body through inhalation or when consumed with contaminated food or water. It does not remain in the body due to its reactivity. Effects of chlorine on human health depend on the amount of chlorine that is present, and the length and frequency of exposure. Effects also depend on the health of a person or condition of the environment when exposure occurs. Elemental chlorine is a respiratory irritant, irritates mucus membranes, and burns skin. Breathing small amounts of chlorine for short periods adversely affects the human respiratory system. Chlorine odor can be detected at concentrations as low as 3.5 parts per million (ppm) and exposure to a level of 1000 ppm is fatal after several breaths. Effects of excessive exposure to chlorine gas range from coughing and chest pain, to edema (water retention) in the lungs, to death. These effects will not occur at normal concentrations in drinking water. The maximum residual level for chlorine allowed in drinking water is 4 ppm. Human health effects associated with breathing or otherwise consuming small amounts of chlorine over long periods are unknown. There are some studies that show some workers develop adverse effects from repeated inhalation exposure to chlorine.

A number of studies have investigated the relationship between exposure to chlorinated drinking water and cancer. Some studies have suggested an increased cancer risk to those exposed to chlorinated waters while others have demonstrated none. Adverse health effects associated with the use of chlorine in the disinfection of drinking water have been reported in this country and abroad include: death [6-7]; low birth weight [8]; small for gestational age fetuses/infants, neural tube defects and spontaneous abortions [9]; increased risk for stillbirths [10]; cardiac defects [10]; cancers of the rectum [11] and bladder [11-12]; and, urinary tract cancers [13]. These studies suggest that increases in adverse health outcomes may occur as a function of increased chlorine and decomposition of waste material.

Fewer studies have evaluated the association between exposure to disinfection byproducts and reproductive and developmental effects. There remains considerable debate in the scientific community on the significance of these contradictory findings concerning chlorinated water and disinfection byproducts. As with cancer, EPA stated in its Stage 1 Disinfectants/Disinfection Byproducts Rule that the agency could not conclude there is a causal link between exposure to disinfection byproducts and reproductive and developmental effects.

In Maryland, all wastewater treatment plants using chlorine are required to dechlorinate before the effluent is discharged into surface waters. Human exposure to disinfection byproducts from treated wastewater may result in greater increases in adverse health outcomes when compared to treated drinking water.

3.2.5 Environmental Effects of Chlorine

Chlorine dissolves in water and returns to gas in the air under certain conditions. Most direct releases of chlorine to the environment are to air and to surface water. Once in air or in water, chlorine reacts with other chemicals. In water, chlorine reacts with inorganic material to form chloride salts, and with organic material to form chlorinated organic chemicals. Because of its reactivity, chlorine is not likely to move through the ground and enter groundwater. Plants and animals are not likely to store chlorine. However, laboratory studies show that repeat exposure to chlorine in air can affect the blood; heart; and immune and respiratory systems of animals. Chlorine in its elemental state causes environmental harm at low levels. Chlorine is especially harmful to organisms living in water and in soil.

3.2.6 Disinfection Byproducts

Disinfection byproducts (DBPs) are formed when disinfectants used in water treatment plants react with natural organic matter (i.e., decaying vegetation) present in the source water. Different disinfectants produce different types or amounts of disinfection byproducts. Disinfection byproducts, for which drinking water regulations have been established, include trihalomethanes, haloacetic acids, bromate, and chlorite. Trihalomethanes have four regulated compounds (chloroform, bromodichloromethane, dibromochloromethane, and bromoform). The haloacetic acid is a family of nine compounds, of which only five are presently regulated (dichloroacetic acid, trichloroacetic acid, monochloroacetic acid and mono-and dibromoacetic acids).

EPA stated in its Stage 1 Disinfectants/Disinfection Byproducts Rule (DPBR) that the EPA could not conclude that there is a causal link between exposure to chlorinated surface water and cancer. EPA adopted the Stage 1 DPBR to regulate total trihalomethanes (TTHM) at a maximum allowable annual average level of 80 parts per billion (ppb), and total haloacetic acids (HAA5) of 60 ppb.

Currently, the EPA is in the process of finalizing a new rule to address the health risks associated with DBPs. The Stage 2 DPBR focuses on public health protection by limiting exposure to DBPs. This rule will apply to all community water systems (CWSs) and nontransient noncommunity water systems (NTNCWSs) that add a primary or residual disinfectant or purchases water that has disinfectant present. The goal of this rule is to improve the control of disinfection byproducts in drinking water systems. The EPA estimates that full implementation of the Stage 2 DBPR will reduce the incidence of bladder cancer cases by up to 182 cases per year with an associated reduction of up to 47 premature deaths per year.

Table 12, extracted from the EPA's National Primary Drinking Water Standards (40 CFR §141) lists the regulatory limits associated with each disinfectant byproduct and the associated health risk.

Table 12: Regulatory Limits Associated with DBPs and the Associated Health Risk

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT (mg/L)	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Disinfection Byproducts				
Bromate	Zero	0.010	Increased risk of cancer	Byproduct of drinking water disinfection
Chlorite	0.8	1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection
Haloacetic acids (HAA5)	n/a[3]	0.060	Increased risk of cancer	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs)	n/a[4]	0.080	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection
Disinfectants				
Chloramines (as Cl_2)	MRDLG=4	MRDL=4.0	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes
Chlorine (as Cl_2)	MRDLG=4	MRDL=4.0	Eye/nose irritation; stomach discomfort	Water additive used to control microbes
Chlorine dioxide (as ClO_2)	MRDLG= 0.8	MRDL=0.8	Anemia; infants & young children: nervous system effects	Water additive used to control microbes

1. Definitions:

   Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

   Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs provide for a margin of safety and are non-enforceable public health goals.

   Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

   Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

   Treatment Technique - A required process intended to reduce the level of a contaminant in drinking water.

2. Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million.

3. Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

   Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L). Chloroform is regulated with this group but has no MCLG.

   Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.6 mg/L). Monochloroacetic acid, bromoacetic acid, and dibromoacetic acid are regulated with this group but have no MCLGs.

4. MCLGs were not established before the 1986 Amendments to the Safe Drinking Water Act. Therefore, there is no MCLG for this contaminant.

3.2.7 Simultaneous Compliance

Implementation of any change in disinfection treatment requires study by the water utility to recognize competing demands of regulations (simultaneous compliance). The utility should act to eliminate the potential of unintended consequences and possible noncompliance with other regulations designed to keep our drinking water safe. Any change in disinfectant use requires approval by the Maryland Department of the Environment.

From an engineering design perspective, it is possible to switch to an alternate disinfectant; however, this change must be evaluated for its impact on the overall drinking water safety and quality. Many potential conflicts may arise as water systems strive to comply with competing regulatory requirements. These rules include the Total Coliform Rule, DBPR, Interim Enhanced Surface Water Treatment Rule, Lead and Copper Rule and in the future, the Ground Water Rule. The goal of one rule cannot be overlooked in order to meet the goal of another rule. Known in the industry as "simultaneous compliance" these conflicts present significant challenges to water systems, particularly the smaller ones.

Adequate disinfection is a critical drinking water treatment process and must be balanced with the creation of disinfectant residuals and DBPs. The process must protect the public from waterborne disease outbreaks without exposing them to adverse health effects from elevated DBP levels. The following examples from EPA's *Microbial and Disinfection Byproduct Rules Simultaneous Compliance Guidance Manual* [15] highlight these potential conflicts:

(1) The Stage 1 DBPR focuses on minimizing the formation of DBPs, and thereby reducing the consumer's exposure to potentially carcinogenic compounds, through enhanced coagulation or enhanced softening. Enhanced coagulation lowers pH which increases the formation of haloacetic acids, while enhanced softening raises pH which promotes trihalomethane formation. A water system can raise the pH of water through the treatment process, which favors DBP precursor removal, but may also reduce the disinfection effectiveness of free chlorine. Any lessening of disinfection effectiveness increases the risk of the presence of coliform bacteria or other pathogens.

(2) Removal of organic material using enhanced coagulation under the DBPR may upset the operating chemical stability of the treated water by lowering pH. Lowering of pH will increase the corrosive nature of the water and increase the leaching of lead and/or copper from pipes. This could cause the water system to violate the Lead and Copper Rule, expose the public to elevated levels of lead or copper 16, and increase the risks of adverse health effects.

3.2.8 Financial Implications

Conversion to ultraviolet or sodium hypochlorite from gas chlorination has both a capital and operating expense associated with it. Work performed by the Maryland Department of the Environment in 2002 estimated capital conversion costs (2002 dollars) to ultraviolet disinfection as follows for all Maryland wastewater treatment plants of various sizes in Maryland:

- 20 MGD = $1,100,000
- 10 MGD = $ 840,000
- 5 MGD = $ 660,000
- 2 MGD = $ 120,000
- 1 MGD = $ 100,000
- 0.5 MGD = $ 56,000

The total cost for publicly owned wastewater plants located in the State of Maryland was estimated at $75 million. The actual cost for ultraviolet conversions being constructed at several 30-MGD plants is estimated to be two million dollars per plant. A recent sodium hypochlorite conversion at a 7.5 MGD plant cost less than $200,000. These figures represent only the capital costs. Additional operating costs for ultraviolet disinfection include substantial power and maintenance costs associated with bulb cleaning and replacement.

Current cost data for conversion from gas chlorination at drinking water facilities is not available due to the variability of treatment systems. This should be evaluated on a case-by-case basis.

3.2.9 Findings

Gaseous chlorine from the compressed liquid stored in cylinders is the most commonly used microbiocide/bactericide for disinfection of treated drinking water and wastewater. Gaseous chlorine is a powerful disinfectant, relatively inexpensive, and has the lowest production and operating costs for large continuous disinfection operations. It is a stable compound that may be stored for an extended period as a liquefied gas under high pressure. Storage containers vary in size from 150-pound cylinders to 55-ton tank cars. The size of containers used by a utility depends on the facility design and the treatment and disinfection capabilities of the system. Commonly, larger facilities use multiple one-ton cylinders. Smaller systems typically use smaller or fewer containers.

Chlorine gas is hazardous, and must be stored in secure areas. Generally, chlorine storage and feed systems are located in buildings to protect the equipment from weather and to address safety concerns. Recently, buildings for large treatment systems have been provided with scrubber systems capable of neutralizing one ton of gaseous chlorine in the event of a release. In addition to the scrubbers, leak detection systems with remote monitoring capabilities have been installed at a number of sites. Transportation of chlorine gas should be continuously monitored and is severely restricted in some states.

Federal and State regulations have been promulgated detailing accidental release prevention requirements for certain facilities. Under the chemical accident prevention provisions in 40 CFR Part 68 Subpart G, owners and operators of stationary sources of regulated substances in a process must provide employee safety training and prepare a risk management plan. The risk management plan must incorporate the requirements for the safe management of highly hazardous chemicals. This OSHA standard "contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals" (29 CFR § 1990.119) Under 29 CFR §1990.119 (d), prior to conducting a process hazard analysis, employers are required to complete a compilation of written process safety information.

The compilation of written process safety information is to enable the employer and the employees involved in operating the process to identify and understand the hazards posed by those processes involving highly hazardous chemicals. The process safety information shall include information pertaining to the:

- hazards of the highly hazardous chemicals used or produced by the process;
- technology of the process; and
- equipment in the process.

In 2004 Maryland passed legislation to revise Environment Article, Title 7 of the Annotated Code of Maryland. The legislation requires facilities that store, dispense, use, or handle threshold amounts of hazardous materials (as defined under federal law), by October 1, 2005, and at least every five years thereafter, to conduct a self-audit of the security of the facility.

3.2.10 Recommendations

The challenge is seeking the balance between the benefits of gaseous chlorine use and the risk its use may pose to human health. Chlorine is currently considered the most effective and economical disinfectant for drinking water and wastewater. It is with this balance in mind that the Council makes its recommendations.

- The only drinking water treatment option that can be recommended at this time, is the continued use of chlorination. Utilities that utilize surface water should increase their filter performance capabilities to remove organic material from water and wastewater before disinfectant treatment in order to reduce the amount of chlorine needed, and reduce the formation of DBPs .
- The Council recommends that a survey of the major wastewater facilities with a treatment capacity greater than one MGD and large drinking water treatment facilities that serve over 10,000 persons be performed by the State to determine if the current use of gaseous chlorine is the best disinfectant alternative. The purpose of the survey is to document the current status of these facilities and future plans related to the use of gas chlorination. The survey should be completed by June 2005 and submitted to MDE to develop an action plan based on the survey results. The survey should

consider all public health effects with respect to the use of chlorine as a disinfectant. Examples of survey goals include:

- Each wastewater facility should evaluate whether the use of gaseous chlorine should be phased out and replaced by either ultraviolet radiation, sodium hypochlorite, on-site chlorine generation, or other acceptable disinfectant processes.
- Each drinking water facility should evaluate whether using gaseous chlorine for disinfection of drinking water and the use of alternative methods of disinfection is feasible;
- The Council recommends that the State review existing State regulations. If necessary, regulations that define standards for security of all gaseous chlorine storage areas should be developed and implemented. Such regulations should include:
    - Physical standards for bulk chlorine storage and feed buildings including locks, doors, windows, other building access points;
    - Physical security measures for bulk chlorine storage and feed buildings including cameras, alarms on entry, and increased police patrols of treatment facilities to keep out intruders;
    - Intrusion detection standards for bulk chlorine storage and feed buildings;
    - Gas system standards for bulk gaseous chlorine storage and feed system including detectors, auto shut-off, alarms, leak proof vacuum systems, and scrubber systems to protect again leaks;
    - Bulk chlorine storage improvements to reduce physical disruption or catastrophic release;
    - Mandated, certified training efforts for utility staff, including hands-on drills in how to better respond to a chlorine related emergency;
    - Standards for the transport of gas chlorine; and
    - Consideration of purchasing in smaller sized containers or getting several smaller deliveries at any one time.
- The Council recommends that all wastewater treatment plants with a treatment capacity less than one million gallons per day using gaseous chlorine should convert to other disinfectant products.
- The Council recommends that the Maryland Department of the Environment establish early communication with facilities that are studying changing disinfection practices.

3.2.11 References for Chlorine Report

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[16] 40 Code of Federal Regulations, Part 141. (National Primary Drinking Water Regulations).

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3.2.12 Current Guidance/Regulations and Statutes

- Chlorine Institute Guidelines - available at http://www.cl2.com.
- EPA's Clean Air Act / Risk Management Programs (40 CFR Part 68) - Provides information to reduce chemical risk at the local level (i.e. fire, police, emergency response personnel responding to chemical accidents) and is useful to citizens in understanding chemical hazards in communities.
- OSHA's Emergency Action Plan (29 CFR Part 1910.38) - Provides documented procedures / plans for emergency evacuation, reporting of fires or other emergencies, and makes available to employees, requires training, and routine updates.
- OSHA's Process Safety Standard (29 CFR Part 1910.119) - Intended to prevent or minimize consequences of catastrophic release of toxic, reactive, flammable or explosive highly hazardous chemicals through training and distribution of safety information on chemicals and equipment, operating procedures, contractor awareness, incident investigations, process hazard analyses, emergency planning and response.
- OSHA's HAZWOPER (29 CFR Part 1910.120) - Broad hazardous materials emergency response standard (primarily for hazardous waste sites and/or emergency responders) with requirements for PPE, training, medical surveillance, material handling and labeling, emergency response plans.
- OSHA's Confined Space Entry (29 CFR Part 1910.146) - Provides confined space entry requirements.
- OSHA's Respiratory Protection (29 CFR Part 1910.134) - Provides proper respirator fit testing for, and routine monitoring of, employees.
- OSHA's Personal Protective Equipment (29 CFR 1910.132-139) - Requires use of proper personal protective safety gear.
- OSHA's Hazard Communication Standard (29 CFR Part 1910.1200) - Requires evaluation of potential chemical hazards and communication of those hazards and appropriate protective measures to employees.
- Uniform Fire Code, Section 80 - Requires installation of standby scrubbers to contain release of toxic gases such as chlorine and sulfur dioxide.

Water and Sewerage Plans

4.O WATER AND SEWERAGE PLANS

4.1 Introduction

House Bill 659, directs the Advisory Council on Water Security and Sewerage Systems to "review the effectiveness of Water and Sewer Plans". The Advisory Council and the Interagency Technical Assistance Committee (ITAC) determined that this mandate was appropriate for the mission of both groups, so a Joint Subcommittee was formed to address this issue. This Report presents the preliminary findings and recommendations of the Joint Subcommittee to date. The ITAC will continue to review and evaluate water and sewerage planning in Maryland and will present final recommendations by September 30, 2005.

4.2 Background

4.2.1 Relationship between Local Comprehensive Land Use Plans and Water and Sewerage Plans

County and Municipal Comprehensive Land Use Plans are the guiding documents that describe how a jurisdiction envisions its future land use, development and redevelopment. Local land use regulatory tools such as zoning, site plan, and subdivision regulations are consistent with these plans. Depending on the jurisdiction, Comprehensive Land Use Plans are required under Article 25, Article 66B, or Article 28 of the Annotated Code of Maryland.

The local governments develop and formally adopt Comprehensive Plans, sometimes with the technical assistance of the Maryland Department of Planning (MDP). The Comprehensive Plans are locally adopted and reviewed by MDP. There is no State approval of the Comprehensive Plans.

Municipal Comprehensive Plans often include provisions for future annexation areas beyond the current municipal boundary. The annexation process is specified in Article 23-A of the Annotated Code of Maryland**.** If the proposed municipal zoning in the annexed area is substantially different from the existing county zoning, there is a 5-year delay before the new zoning takes effect unless the county waives this provision.

Land use, zoning, site planning, and annexation are all local responsibilities. However, the assurance of water and sewerage services to annexed areas is central to the annexation process, and the State has significant regulatory responsibility relating to the provision of those services.

The Water and Sewerage Plan is required by State law to be consistent with a County or Municipal Comprehensive Plan. The Water and Sewerage Plan is the infrastructure plan for water and wastewater facilities in a local jurisdiction. As stated in §9-505 (a)(1) of the Environment Article, Annotated Code of Maryland, Water and Sewer Plans shall:

> "Provide for the orderly expansion and extension of safe and adequate water and sewer systems in a manner consistent with all county and local comprehensive plans."

The Water and Sewer Plan regulations (COMAR 26.01.03) implement this mandate by detailing Plan requirements for timing of capital improvements, location, capacities, and service areas of all existing and planned water and sewer facilities. Changes to the Water and Sewerage Plan may be necessary as land is annexed and rezoned. Negotiations between the municipality and the county may be necessary for the provision of adequate water and sewerage services to serve the newly annexed areas.

4.2.2 Maryland Water and Sewerage Plan Law and Regulations

The Maryland General Assembly enacted the Water and Sewer Plan law in 1965. The current regulations were adopted in 1975 in reaction to the rapid growth that occurred during that time without the provision of adequate water and wastewater facilities to serve the new growth. Environment Article Title 9, Subtitle 5, Annotated Code of Maryland (County Water and Sewerage Plans), establishes a process for the local preparation, review, adoption and State approval of County Plans. These Plans identify the water and sewerage needs within the county, including municipal and private systems, for at least ten years following the adoption of the Water and Sewerage Plan.

The law requires Water and Sewerage Plans to include existing and projected water and wastewater treatment needs. In projecting future water and wastewater needs, the law requires the Plans to consider "all relevant planning, zoning, population, engineering, and economic information and all State, regional, municipal, and local plans". (§ 9-505(a)(7) of the Environment Article, Annotated Code of Maryland). The Plan must also be consistent with all County and Municipal Comprehensive Land Use Plans. In addition, the Water and Sewerage Plan must contain a Capital Improvement Program for all water and wastewater facilities in that county. The Environment Article, Annotated Code of Maryland, § 9-503(b) states that "Each county governing body shall review its county plan at least once every 3 years in accordance with a schedule set by the Department." The Environment Article, Annotated Code of Maryland, § 9-503(c) further requires that "each county governing body shall adopt and submit to the Department (MDE) a revision or amendment to its county plan if: (1) the governing body considers a revision or amendment necessary; or (2) The Department (MDE) requires a revision or amendment."

The regulations implementing the State law detail the contents of the County Water and Sewerage Plans. These regulations generally require information organized in chapter order. The regulations also require designated tables and maps illustrating existing and future facilities, planned expansions, information on comprehensive plans and demographics to support the planned expansions, and description of problem areas.

After a Water and Sewerage Plan is adopted, any amendments to the Plan must go through a local and State review, adoption, and approval process, which includes local public hearings. Local governments are directed by State regulation to provide a draft of the local Plan or

amendment to the State for review and comment before it is formally adopted by the local governing body. Locally adopted Plans and amendments to Plans are reviewed by the Maryland Department of the Environment and advisory comments are solicited by MDE from the Departments of Planning, Natural Resources, and Agriculture. MDE is the State approval agency for all Plans and amendments. MDE has 90 days to act on the Plan. MDE may extend the State review period by an additional 90 days for good cause. MDE's failure to act within these time limits constitutes approval of the Plan.

State and local permit issuing authorities may only issue permits for water and wastewater projects that are consistent with the locally adopted, State approved Plan. Further, building permits may not be issued for new development unless the water and wastewater facilities are adequate to support that development.

4.3 Findings and Recommendations

The Joint Subcommittee members used their expertise and the results of a recent MDE survey on the tracking and allocation of water capacity to develop a series of findings and recommendations for this report. Several other work groups are also currently focusing on issues that are relevant to this Joint Subcommittee. These groups are evaluating issues such as TMDL implementation, Tributary Strategy implementation, system security, and system capacity management. All of these issues factor into water and sewer planning. Therefore, to more fully evaluate the many water and wastewater issues identified by the Subcommittee in a systematic manner and to incorporate the results of these other work groups into comprehensive recommendations, the Subcommittee will continue to evaluate water and sewerage planning in Maryland and will present final recommendations by September 30, 2005. The Joint Subcommittee's preliminary findings and recommendations are set forth below:

4.3.1 Finding 1: Track and Allocate System Capacity

Many communities in Maryland are undergoing growth, and some are experiencing unprecedented rapid growth. Each community must provide adequate water and sewer systems to serve current needs, new development and redevelopment. This is an urgent issue that commands immediate attention. Adequate water and sewer systems are necessary in order to support economic development and to protect public health and water quality. The Environment Article, Annotated Code of Maryland, §9-512 (1) requires that water and sewer systems be adequate to serve a proposed new development taking into consideration all other approved development prior to that development connecting to the water and sewer systems. The State or local authority may not issue a building permit unless:

(i) The water supply system, sewerage system, or solid waste acceptance facility is adequate to serve the proposed construction, taking into account all existing and approved developments in the service area; and

(ii) Any water supply system, sewerage system, or solid waste acceptance facility described in the application will not overload any present facility for conveying, pumping, storing, or treating water, sewage, or solid waste.

It is not practical for State government to monitor every building permit or water and sewer connection throughout Maryland to ensure compliance. It is therefore incumbent upon local governments to monitor building activity within their jurisdictions and to evaluate the impact of this building activity on their water and sewer systems. Local governments must adopt and implement local ordinances and procedures to ensure that existing facilities do not become overloaded. The Water and Sewer Plans should describe which local ordinances and procedures are used to:

a. Measure the capacity of the water and sewer systems on a regular or ongoing basis;
b. Monitor existing demands and flows in the water supply and sewer systems;
c. Track existing and proposed connections to the water and sewer systems;
d. Regulate additional connections to the water and sewer systems; and
e. Plan and fund needed rehabilitation, upgrades, and approved system expansion systems.

Recommendation 1

Local jurisdictions should enact and implement a procedure to ensure that adequate water and sewer facilities are available to meet projected needs that are consistent with local County and Municipal Comprehensive Plans.

4.3.2 Finding 2: Provide Funds for Water and Sewerage Planning

Adequate funds are needed to properly manage the County Water and Sewerage Plan process to ensure that safe and adequate facilities will be available to support local Comprehensive Plans and economic development in ways that support Smart Growth. There is a need to provide funding at the State and local level for the preparation and review of Water and Sewerage Plans.

At the State level, the work force dedicated to managing the Water and Sewerage Planning Program has been reduced over the years as other pressing issues have been given higher priority. Local jurisdictions now face a myriad of environmental priorities that also compete for funding with infrastructure planning. Many larger jurisdictions, with a relatively large number of water and sewer users, may be able to dedicate adequate resources to this effort. Many large jurisdictions are using Geographic Information Systems and other automated tools to prepare the updates and revisions more efficiently. Medium and small municipalities as well as rural counties struggle to provide the resources needed to keep the Plans up-to-date, to prepare the required projections of population, to anticipate needed capital improvements, and to update the text and maps of the Water and Sewerage Plans. Both the Maryland Association of Counties (MACO) and the Maryland Municipal League (MML) have raised these issues as matters of concern to local communities. Each of these groups has demonstrated a willingness to work with the State and their local stakeholders to find ways to resolve this funding shortfall.

Recommendation 2

MDE and MDP, in conjunction with MACO, MML and other stakeholders, should identify ways to fund State and local water and sewerage planning staff and to develop information technology capabilities to improve the effectiveness and efficiency of the program.

4.3.3 Finding 3: Provide Guidance, Technical Assistance and Training

There is a need to improve the quality, consistency, and timeliness of Water and Sewerage Plans and updates. There are wide variations in the quality and content of Water and Sewerage Plans. Many jurisdictions have altered the service area categories in a variety of ways, failed to update and utilize charts on population estimates and service demands, or postponed updates well beyond the required three-year cycle. This leads to uncertainty with regard to the future availability of infrastructure. Failure to update these plans through the required public processes also deprives the citizens and developers of an equal voice in how growth and development should occur.

If plans are not kept current, needed replacements to aging infrastructure may not be programmed into capital budgets to support planned development. In some cases, jurisdictions are proposing changes to their Water and Sewerage Plans in response to requests or pressure from developers. A site-by-site approach is shortsighted and inefficient, and frustrates implementation of sound State and local Smart Growth policies.

Many local jurisdictions need technical assistance to prepare their Water and Sewerage Plans. In order to prepare a County Water and Sewerage Plan, the County must assemble many types of technical, policy, and procedural information for its own facilities and for those owned or run by municipalities and other entities. This information includes population projections; mapped data showing water resource availability; the assimilative capacity of receiving waters; facility, permit, and problem area inventories; local Comprehensive Plans; and the procedural practices, fiscal practices and policies of each operating entity. All of this information must be integrated into a coherent countywide Plan that meets both local needs and State regulatory requirements. This is not an easy or inexpensive task to perform. However, investing the time and effort to do it accurately and in a timely manner and is far less expensive than the potential delays in even one project.

State agencies are better positioned to conduct the necessary technical studies and share this information with local jurisdictions. For instance, MDP is able to provide 2030 population projections for small planning areas for many jurisdictions in the State. Also, MDE is able to provide studies of the water supply and demand in the Potomac River Basin in order to assess this resource for future needs. Due to economies of scale, it is often more cost-effective for the State to conduct a technical study for several jurisdictions than for each jurisdiction to conduct its own study. Conversely, there may be instances where local governments must conduct more site-specific and localized studies.

There is a need for local elected officials to fully utilize the water and sewerage planning process for growth management. The Subcommittee found that local government elected officials and staff would benefit from more training in water and sewerage planning activities. These officials must approve capital and operating budgets, explain system deficiencies to the citizens and developers, and answer to the State or federal government if compliance issues occur. Often, the water and wastewater systems are "out of sight and out of mind" until a lack of capacity or a compliance issue is discovered. At other times, a needed change to the Water and Sewerage Plan may be overlooked only to emerge as an issue at the end of the development approval process. Early attention to water and wastewater issues can help avoid confrontational meetings and provide necessary information to stakeholders. Planning for future improvements while maintaining the existing infrastructure in good operational order, is a cost-effective and prudent way to minimize compliance actions. The water and sewerage planning process is a critical early step in the development process.

Recommendation 3

In cooperation with local jurisdictions, MDE and MDP should update guidance for Water and Sewerage Plan content; provide necessary State data and technical assistance to local governments; and provide training for local officials and staff in Plan preparation.

4.3.4 Finding 4: Improve Interjurisdictional Cooperation

There is an increasing need to develop better methods to resolve inter-jurisdictional conflict over competing water and wastewater needs. Development issues frequently arise between county and municipal governments related to conflicts between County and Municipal Comprehensive Plans. There may also be conflicts in proposed growth areas and the water availability, discharge permits, water quality standards, nutrient loadings, and other barriers to Plan implementation.

MDE has the responsibility to State government and to the citizens of Maryland to try to seek the most cost-effective solution to a water quality problem and to eliminate the number of sources of pollution to the State's waters. Although the Water and Sewerage Planning law is sufficiently broad to allow the Secretary of MDE to separately consider municipal plans, updates and amendments even if the county government refuses to adopt these actions, this is not the preferred approach. In order to resolve inter-jurisdictional conflict, it is essential that there be ongoing open dialogue between municipal and county government staff and officials, to reconcile the apparent differences on annexation, provision of vital public services, tax benefits, allocation of available capacity in shared water and wastewater facilities, and other issues. This is best accomplished through MACO and MML setting the venue and tone for the discussions, with State agencies available as informational resources. The goal of such a dialogue is to help the local governments recognize the benefits of working together on issues such as regional water and wastewater facilities, inter-jurisdictional service agreements, and other water and wastewater issues.

In a situation where inter-jurisdictional conflict remains unresolved, the jurisdictions may seek resolution through the use of independent mediation. As a last resort, disputing parties may use the judicial system to resolve the differences. Involvement of interstate agencies is necessary due to the existing water and wastewater facility infrastructure.

Recommendation 4

MDE and MDP, in cooperation with MACO, MML, and other relevant state and interstate agencies, should encourage inter-jurisdictional and regional cooperation for water and wastewater facilities.

4.3.5 Finding 5: Integrate Water Resource Objectives into Water and Sewerage Planning

There is a need to integrate multiple water resources management objectives with the Water and Sewerage Planning process in Maryland. These objectives include source water protection plans, Chesapeake Bay nutrient caps and Tributary Strategies, TMDLs, and new water quality standards. Since the Water and Sewerage Planning law and regulations were passed in the 1970s, many additional federal and State environmental laws have been enacted. These include amendments to the federal Water Pollution Control Act of 1972, now known as the Clean Water Act, and the federal Safe Drinking Water Act. The Clean Water Act limits the amount of pollutants that can be discharged to the nation's waterways, and provides grant and low-interest loan programs to help make improvements to wastewater facilities. The Safe Drinking Water Act sets standards for the quality of drinking water. At the State level, laws have been enacted to mirror the federal laws to provide better protection to wetlands and waterways, to restrict development in the Critical Areas around the Chesapeake and Coastal Bays, and to protect public health and the environment.

Local planners need to be well versed in current and emerging water and wastewater issues that affect their local governments, including water supply limitations, wastewater innovations, and regulatory programs that affect the local government's ability to utilize water and discharge wastewater. For example, the discovery of contaminants in a municipal well field may adversely affect the construction of new homes or businesses and may require unique solutions for the provision of water and wastewater. Regulatory constraints on the discharge of wastewater to surface waters due to TMDLs or other water quality standards may similarly limit growth until and unless alternatives are found.

Recommendation 5

MDE and MDP should initiate a series of technical and policy meetings with stakeholders to integrate multiple water resource management objectives into the comprehensive planning process and the water and sewer planning process.

4.3.6 Finding 6: Strengthen MDE's Oversight Role in Water and Sewerage Planning

MDE has an oversight and regulatory role in the water and sewerage planning process. In situations where local governments have failed to keep their Water and Sewerage Plans up to date, there are mechanisms to ensure that public health and water quality threats are avoided. Many approaches may be used, including either providing or withholding State funds. Water and Sewerage Plan amendments may be denied if the Plan itself is significantly out-of-date. As a last resort, the State may impose moratoria where water or sewerage facilities are not adequate to serve existing or proposed development.

To ensure that local governments begin water and wastewater expansions in a timely manner, MDE should require a water or wastewater system to take certain planning and design actions when it reaches some critical level in capacity such as 75% or 80% of design capacity. These actions include requests for NPDES planning limits, applications for discharge permit modification, submissions of plans and specifications, or applications for State funding. If the local government fails to initiate action to expand the system and continues to approve connections with the potential to overload the treatment capacity of the system, MDE may be required to initiate an enforcement action or impose a moratorium.

Recommendation 6

MDE should provide oversight and guidance to those water and wastewater systems at critical capacity levels to ensure that necessary capital improvements are planned and constructed.

Preliminary Report

Interagency Technical Assistance Committee

Finance

5.0 FINANCE

5.1 Introduction

Interagency Technical Assistance Committee (ITAC) identified three items in the 2001 Task Force Report that warranted attention:

1. Refinement in Targeting of Funds
2. State Funding Programs
3. Local Efficiencies and Actions

Additional considerations in these and other areas of the 2001 Task Force Report may be part of the ITAC activities through September 30, 2005.

5.2 Background

The ITAC reviewed the findings and recommendations of the 2001 Task Force Report. One of the tasks of the ITAC was to identify areas of the 2001 Task Force Report that could be updated to reflect more recent information and to add any new programs or initiatives undertaken since the 2001 Task Force Report was published.

The ITAC requested that MDE review and revise the 2000 Clean Water Needs Survey last conducted in 2000. This was accomplished by removing from the list of needs any projects that have been funded since the 2000 Survey was conducted. Projects identified and not yet funded since the 2000 Survey were added. The source of the new projects is MDE's Integrated Project Priority List, compiled annually from a solicitation of local governments of projects for which funding is requested from MDE's various wastewater funding programs. Finally, the funding needs required to meet the new Bay Restoration nutrient reduction goals were added. These needs are estimates of the costs to upgrade the State's wastewater treatment plants with nutrient reduction technologies to reduce the total nitrogen concentration in plant effluent to 3 milligrams per liter (mg/l) and the phosphorus concentration to 0.3 mg/l.

In updating the 2001 Task Force Report, the ITAC found one major change in the availability of State funds, specifically the Bay Restoration Fund. Other than this significant new program, the other programs remain essentially unchanged as described below.

5.2.1 State Programs

5.2.1.1 Bay Restoration Fund

On May 26, 2004, Governor Robert L. Ehrlich, Jr. signed Senate Bill 320 (Bay Restoration Fund) into law. Effluent from wastewater treatment plants is one of the top three major contributors of nutrients to the bay (urban runoff and agricultural runoff are the other two). The Bill created a dedicated fund, financed by wastewater treatment plant users, to upgrade Maryland's wastewater treatment plants with enhanced nutrient

removal (ENR) technology to achieve a wastewater effluent quality goal of 3 mg/l total nitrogen and 0.3 mg/l total phosphorus.

Funding priority is given to wastewater facilities discharging into the Chesapeake Bay. The grant funding assistance is up to 100% of eligible costs for planning, design, and construction of wastewater treatment facilities to achieve ENR goals. In addition, in fiscal years 2005 through 2009, the fund provides a portion of the costs of projects relating to combined sewer overflows (CSOs) abatement, rehabilitation of existing sewers, and upgrading conveyance systems, including pumping stations not to exceed an annual total of $5.0 million.

By signing this Bill, Governor Ehrlich initiated Maryland's efforts to further reduce nitrogen and phosphorus loading in the Bay by over 7.5 million pounds of nitrogen per year and over 260,000 pounds of phosphorus per year, which represent over one-third of Maryland's commitment under the Chesapeake Bay 2000 Agreement.

Wastewater Treatment Plants Fund

A $2.50 monthly fee will be collected from each home served by a wastewater treatment plant. Commercial and industrial users will be charged at the rate of $2.50 per month per equivalent dwelling unit (EDU). Fees from wastewater treatment plant users will generate an estimated $65 million per year. To expedite the implementation of the program, the Department may issue bonds backed in full or in part by funds generated under this program. The 66 major facilities discharging to the Chesapeake Bay have funding priority. Other facilities will be considered on a case-by-case basis considering cost-effectiveness, water quality benefits, readiness to proceed, and nitrogen/phosphorus load.

Septic Systems Fund

A $30 annual fee will be collected from each home served by an onsite system. The total estimated program income is $12.6 million per year. Sixty percent of these funds will be used for septic system upgrades and the remaining 40 percent will be used for cover crops. There are 420,000 onsite systems in Maryland. With priority given to failing septic systems in Critical Areas, funds can be provided for upgrades of existing systems to best available technology for nitrogen removal or for the marginal cost of using best available technology instead of conventional technology.

Advisory Committee

A Bay Restoration Advisory Committee has been formed. The main functions of the Advisory Committee will be to evaluate the cost, funding, and effectiveness of the wastewater treatment plant upgrades; consult and advise the counties and the Department regarding the onsite system upgrade program; and recommend future changes to the restoration fee if necessary.

5.2.1.1 Biological Nutrient Removal Cost Share Program

This program is a 50 percent State/50 percent local cost-share grant program to local governments to implement nutrient removal technology at the largest publicly owned wastewater treatment plants in Maryland. The goal of the program is to meet part of Maryland's commitments under the multi-state Chesapeake Bay 2000 Agreement for major reductions of nutrients – nitrogen and phosphorus – being discharged from wastewater treatment plants into the Chesapeake Bay. While the Bay Restoration Fund has been established for further nutrient reductions, the BNR grants are still needed to help the 66 targeted wastewater treatment plants (Appendix 4) complete upgrades already in process prior to the ENR Program.

In addition to the State/local cost share arrangement using the State BNR/ENR grant program, several Maryland communities have received special federal appropriations through the efforts of the Maryland Congressional delegation. Grant recipients have included:

- Somerset County: Princess Anne ($1.8 million) and Crisfield ($2.0 million);
- Worcester County: Snow Hill ($0.8 million), Fruitland ($1.8 million), and Pocomoke City ($1.2 million);
- Dorchester County: Cambridge ($3.3 million);
- Wicomico County: Salisbury ($6.4 million);
- Washington County: Conococheague ($0.5 million);
- Cecil County: Elkton ($.450 million); and
- Caroline County: Federalsburg ($.450 million).

BNR projects in the construction phase will be completed in accordance with the intended design. MDE will, however, work with these facilities to evaluate the feasibility and cost of retrofitting the plants for ENR. BNR projects in the planning or design phase will be evaluated to determine what modifications are necessary and feasible to meet the ENR goal. Available funding will be prioritized for those plants where construction can be retrofitted for ENR or ENR can be incorporated into on-going design or planning.

An additional $1.5 million in capital funding through the FY 2004 Bond Bill was approved for the ENR implementation. The FY 2004 request provides funding for ENR planning and design at 12 facilities that currently implement BNR.

5.2.1.2 Supplemental Assistance Program

This State grant program provides assistance to local governments for necessary improvements to sewer system infrastructure to solve existing wastewater collection and/or treatment problems where the community is unable to afford the project without some type of grant subsidy.

5.2.1.3 The Maryland Water Quality Revolving Loan Fund

This program provides low-interest loans to local governments and eligible private entities to finance water quality improvement projects. The Federal Clean Water Act of 1987 provided for annual federal capitalization grants to states for a Water Quality Revolving Loan Fund program. The capitalization grants require a 20% state match. Loans are made at below-market interest rates with terms not to exceed 20 years following project completion. Loan recipients must establish a revenue source for payment of debt service. Loan repayments and earned interest income go back into the Fund to be loaned out for other projects.

5.2.2 Federal and Regional Programs

5.2.2.1 Special Federal Appropriations or State and Tribal Assistance Grants

These federal funds are typically riders to annual EPA appropriation bills and provide federal grants to projects of special benefit and/or those with affordability issues. Requests for funding are initiated by local government or through specific requests by the State. Federal participation is usually limited to 55% of the estimated project cost. The grants are typically administered by MDE.

5.2.2.2 Community Development Block Grant Program

This program, administered by the Maryland Department of Housing and Community Development, provides federal grant funds for a wide variety of capital improvements to reinvest in existing communities. In the area of wastewater, this program has helped many Maryland communities repair or upgrade wastewater systems to bring these systems into compliance with federal and State requirements. These funds can also be used to lower the connection costs to low and moderate-income homeowners.

5.2.2.3 USDA Rural Development/Rural Utilities Service

This federal agency provides grants and loans to rural and small communities needing to construct new water and /or wastewater systems or make improvements to existing infrastructure. Funding is limited to communities with 10,000 or fewer residents and is awarded through a competitive process. Projects that are able to leverage USDA funding with other fund sources are favorably reviewed. USDA's grant/loan determination is based on an affordability review of existing and proposed user rates and median household income, and whether other fund sources are being provided. MDE and USDA routinely co-fund projects and coordinate project reviews.

5.2.2.4 Appalachian Regional Commission

Limited to Western Maryland counties, this federal grant funding has been used for a variety of local government projects, including water and wastewater infrastructure, and

is specifically targeted to projects where affordability is at issue. Requests for funding are initiated by the local governments and the process is competitive.

The following list summarizes the range of annual funding from these numerous federal, State and regional sources:

Program	**Estimated Annual Appropriation**
Maryland Bay Restoration Fund	$65 million
Maryland Water Quality Revolving Loan Fund	$70 million
USDA Rural Utilities Service	$10 million
BNR	$18 million
Supplemental Assistance	$5 million
Community Development Block Grant	$1 million
USDA Rural Utilities Service	$10 million
Appalachian Regional Commission	$1 million
State and Tribal Assistance Grants	$5 million
Total Available Funds	**$175 million**

5.3 Findings and Recommendations

5.3.1 General Findings

The ITAC agrees with and reiterates the general recommendations outlined on page 66 of the 2001 Task Force Report which read:

> The Task Force identified numerous actions that should be undertaken at the local level to optimize operations, improve efficiencies, and strengthen the managerial, financial and technical capabilities of sewerage systems.
>
> - Strongly encourage new energy efficiencies throughout systems in Maryland.
> - Implement certain cost-effective process automations.
> - Strongly encourage new water conservation practices at home and business.
> - Schedule and complete subsidized comprehensive cost of service, periodic audits, and rate studies.
> - Implement rate increases as needed, based on rate studies, to ensure eligibility for grant and loan funds and for long-term system viability.
> - Participate in required financial, managerial and technical capacity training, and employ qualified system operators.
> - Investigate, and where applicable, implement innovative technologies to save money and other resources.
> - Participate to fullest extent in State and federal Needs Surveys to ensure representation of Maryland's needs.
> - Review of local plumbing codes to identify opportunities to avoid sanitary sewer backups and water conservation practices.

The updated, total State estimated capital improvement needs are now $5.3 billion over the next twenty years, which is an increase of $961,907 since the last Clean Water Needs Survey (CWNS). The largest portion of this change is due to the newly identified needs for Enhanced Nutrient Removal. Since the needs generated for the 2001 Report already included a 3% inflationary factor, this was not adjusted for the update. (Appendix 5). The five (5) categories of needs are:

I. Secondary Treatment - $1.2 billion
II. Advanced Treatment – includes BNR and ENR - $1.8 billion
III. Sanitary Sewer Overflow (SSO); includes projects to address Inflow and infiltration - $1.2 billion
IV. Growth derived from new collectors, interceptors and appurtenances - $700 million
V. Combined Sanitary Overflow (CSO) - $357 million

The above categories reflect the Clean Water Needs from publicly owned wastewater conveyance and treatment facilities. These categories do not include nonpoint source capital projects, which are eligible for other federal and State grants and loans.

5.3.2. Findings and Recommendations Concerning Refinement of Targeting of Funds

The ITAC finds that additional spending per year may be necessary to meet the total long-term need, and that this need will have to be met through a multi-faceted approach among all levels of government.

However, the ITAC believes that it is essential to examine the need for changes in the way funding is allocated and targeted, and to identify and recommend improved efficiencies in system management.

The affordability of and the ability to re-pay loans for capital improvement projects is more critical than the total amount of program assistance funds currently available for such projects.

Comparable community rate levels (annual user rates) for similar sized communities in the State and community are very valuable in evaluating project affordability and a community's ability to pay for the project. Median Household Income (MHI) as defined in the U.S Census data, in relation to the statewide MHI, is also used to define standards for "affordability" and "disadvantaged" in the course of determining eligibility for subsidies. The current standard for "affordable" water or wastewater user rates is typically 1% of the MHI. The current standard for "disadvantaged" is a community that is at or below 70% of the MHI.

Recommendations

- The ITAC agreed that implementation of the recommendations outlined below can play a big role in meeting current needs:

- The State should actively lobby for changes in the federal Water Quality State Revolving Loan Fund (WQSRF) program to allow for loan forgiveness and 30-year terms to make projects more affordable. Such lobbying should enlist the assistance of other organizations such as the Maryland Congressional Delegation, Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), Council of Infrastructure Financing Authorities (CIFA), Association of Metropolitan Sewerage Agencies (AMSA) and similar interested parties.

- The WQSRF criteria for identifying "disadvantaged" communities and those who qualify for affordability subsidies should be developed using the current criteria for the Drinking Water State Revolving Loan Fund (DWSRF) and the recommendations set forth on page 64 of the 2001 Report as a guide, specifically:

"…those communities that:

- demonstrate a true public health or water quality need,
- cannot afford to finance the project entirely through local funds and/or low interest loans, and
- agree to accept assistance to improve the technical, financial and managerial capacity of the wastewater system."

- The WQSRF criteria should also consider:

  - The use of funds and the benefits to be derived in relation to the total need for funds, that is, the community's requirements for the project should address cost and per user benefits in the funding award process.

  - Communities that have neglected to repair or upgrade a failing or deteriorating system for whatever reason should be offered incentives to apply for program assistance and to take timely, proactive action on project remedies.

  - The current standard of user rates as reasonably reaching 1% of the MHI as "affordable", and use of 70% of the MHI as "disadvantaged" should be examined to determine if these rates are still workable benchmarks.

  - Communities should be offered incentives to conduct rate analysis studies. The analyses should be prepared periodically and should include all revenue, expense, and reserve calculations. Examples of revenues, expenses and recommended reserve levels can be provided to the systems as guidance for conducting such analyses, along with a list of technical assistance resources available.

  - Communities that participate in approved capacity enhancement activities, including training, should be offered incentives in the funding approval process to encourage them to take steps to enhance their management capacities.

5.3.3 Findings and Recommendations Concerning State Funding Programs

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The ITAC agreed that the amount of loan funding currently available through the State SRF is sufficient if other recommendations made here regarding changes in the way that financing is targeted and awarded are implemented.

Rate affordability, equity, and fairness for all systems, regardless of size, needs to be addressed through the availability of grant funding or other means of subsidy. Mandated improvements disproportionately affect smaller systems in their ability to repay or generate income to cover debt service on capital improvements. Improvement cost per user for a smaller system is generally greater than for a larger system, and this situation is

frequently exacerbated by differences in social and economic conditions. Census data indicate that many small communities operating wastewater treatment facilities have median household income (MHI) well below statewide averages. The ITAC recognizes that changes in the standards for subsidy of project costs through grants and principal forgiveness can help to alleviate some of these inequities.

ENR funding needs are still being developed. It is likely that, since not all systems have conducted thorough engineering studies of their total system needs, other wastewater needs are underestimated.

Recommendations

- Current levels of State funding must be maintained and revisited periodically to ensure on-going sufficiency.

- Revenues generated by the recently approved Bay Restoration Fund to improve water quality in the Chesapeake Bay should not be deducted from the revised estimate of $5.3 billion in funds needed to improve sewer systems. The ITAC agreed that the needs should be evaluated after the 2004 National Clean Water Needs Survey is completed

- The current level of State grant funds targeted for Biological Nutrient Removal projects (approximately $18 million annually) should be maintained and redirected as grant funding for other wastewater systems needs once the BNR needs have been met. This recommendation will not have an adverse effect on the State's bond rating, yet will make additional grant funds available to local governments for capital projects where affordability is an issue or as incentives to systems that implement financial, managerial and technical improvements in system management.

5.3.4 Findings and Recommendations Concerning Local Efficiencies and Actions

The ITAC finds that many local efficiencies, enhanced training of local managers and system operators, and public education could greatly improve the long-term viability of wastewater systems, especially in small and medium-sized communities.

The ITAC finds that system user ("ratepayer") education on the financial needs and constraints associated with operating and maintaining a community wastewater system is essential to sustaining those systems. Education of the ratepayers is essential to ensure self-supporting systems that can operate in compliance with environmental laws and regulations to protect public health and the environment.

Wastewater systems must plan for appropriate growth. Just as important is the need to replace system components periodically to ensure continued effective treatment and operation. Financial planning for both of these eventualities is critical to effective and

compliant wastewater operations. Education is key to heighten the public's awareness of financial issues in order to gain public acceptance of the need for recurring investment in systems to serve both current and future populations. Training must be available to enhance the financial management skills of managers and decision-makers.

As part of ITAC's ongoing activities, the Committee will look at such issues as systems with a low number of users relative to total project costs, areas with depressed economies or high rates of unemployment, or any project that presents a difficult dilemma for funding reviewers.

Recommendations

The ITAC recommends the following be implemented to effect efficiencies and improvements in locally controlled wastewater systems:

- The creation of regional facilities and consolidation of smaller systems should be encouraged, not necessarily required, to achieve economies of scale in financial and systems management. Financial incentives should be provided to systems that make a concerted effort to reduce operating expenses through these or other cost saving measures such as group purchasing.

- Communities should be encouraged, through financial or other incentives, to conduct periodic cost of service and rate analyses to ensure full cost recovery and adequate funding of reserves.

- Communities should implement rate increases, as needed, based on the results of regularly performed cost of service and rate studies to ensure sustained financial solvency and adequate reserves for the system.

- Communities should be required to participate in financial, managerial, and technical capacity enhancement training, and recognize the requirement to employ qualified operators.

- Local system representatives should be encouraged to participate actively in the county water and sewer planning process, and county representatives should make every effort to obtain local citizen participation.

- The ITAC should evaluate the benefits of creating a panel of public financing experts to review financial assistance applications from communities with "hard to fund" projects.

- The ITAC should examine additional enhancements to the efficiencies of local systems in the longer term once this initial Report is completed. Such enhancements may include:

- Establishing minimum training requirements for non-operational, executive, managerial, and administrative personnel.

- Working with other organizations to strengthen system operator capability and heighten customer knowledge of the need to structure rates to recover all costs of running a wastewater system, including tangible operating costs and soft costs such as reserves for repair and replacement.

- Establishing a statewide financial review committee, similar to the West Virginia Infrastructure Council, to review and make recommendations on applications for project financing and to direct financing to the most needed projects.

- Using the rate studies being compiled pursuant to the 2001 Task Force Report to develop a database of system financial information to track progress of systems in their efforts to improve system capacities and operations.

Public Awareness and Technical Assistance

6.0 PUBLIC AWARENESS AND TECHNICAL ASSISTANCE

6.1 Introduction

One of the most difficult areas to address in the management and operation of water and wastewater systems is the ability to keep the public engaged and interested in the ongoing issues that affect these systems. The public is always concerned when water fails to flow from the tap due to a water main break, or when a large sewage overflow is announced. However, public awareness and knowledge of how water and wastewater systems work, the importance of these systems on a daily basis for protection of public health, and how failures can occur, is a tough message to get across and keep in the forefront of the public.

In addition to the need to educate the general public, it is equally if not more important to ensure adequate technical training for those responsible for the operation of the State's many water and wastewater treatment systems. Federal and State environmental laws and regulations change frequently, and new technologies to achieve better levels of water and wastewater treatment are constantly evolving.

The 2001 Task Force Report raised issues relating to the level of public awareness about sewerage operations and needs. HB 659 (2002) required the ITAC to examine the topics of "Increased Technical Assistance to Small and Medium Sized Communities" and "Public Participation and Education". The ITAC was charged with reviewing the 2001 Report, fulfilling the requirements of HB 659, and making recommendations to the Advisory Council on public participation, education and training/technical assistance.

This Report draws upon the expertise of the members of the Committee, who have extensive experience in the fields of technical assistance and training for water and wastewater operators; hands-on experience in operating facilities; knowledge about the financial aspects of plant operation and maintenance; and an understanding of the viewpoints and concerns of local governments and citizens.

6.2 Findings on Public Participation and Education

The Subcommittee finds there is a strong linkage between the level of citizen awareness regarding proper wastewater operation and compliance, and user rates necessary to maintain proper operation and compliance. The 2004 passage of the Bay Restoration Fund is a good example of this connection. The campaign to protect and restore the Bay exemplifies successful elevation of public awareness.

Similar campaigns are needed to emphasize the importance of addressing compliance-related capital and operational issues at wastewater treatment plants, particularly the small and medium systems with a limited user base. The progressively worsening problems associated with aging wastewater collection systems need more public focus and attention so that ratepayers will be more willing to do what is necessary to raise the funds to address these problems.

The 2001 Report recognized that ratepayers (84% of the State's population or 1.7 million households on community wastewater treatment systems statewide) need to be better informed about human health and the environment. Ratepayers should be educated about the financial issues related to operating and maintaining their sewage systems adequately, and the need for continual re-investment of resources to keep a system in compliance.

Ratepayers are the ultimate users of water and wastewater systems. A concentrated effort needs to be made to inform them about how their rates are set, why there is a need to pay for maintenance of their wastewater system, and how to ensure the facility has the capacity to grow as needs change. The Committee believes that there is a low level of public awareness on these issues currently and that efforts to heighten customer knowledge need improvement.

Aside from a small percentage of community activists who tend to keep abreast of such issues, most wastewater ratepayers have little or no understanding of how their user rates are determined, what costs have to be covered by that revenue or how the money is allocated to the various functions of a system's operations. Likewise, most ratepayers have little grasp of the amount of planning that goes into implementing, maintaining, expanding and sustaining a wastewater treatment and collection system in today's world.

The need to plan for the safe and adequate provision of water and wastewater systems now and for the future is an ongoing exercise. The State has worked to inform the public on issues over the Internet through their Maryland Department of the Environment's Public Information Act Homepage:
http://www.mde.state.md.us/citizensinfocenter/publicinfoact/index.asp. This site has limited information, however, and should be enhanced with more general information about what goes into the construction, operation and maintenance of water and wastewater systems.

More effort and means are necessary to distribute public information regarding the costs related to facility operation and sewer system maintenance, and the effect these costs have on system rates targeted to specific audiences. For example, different audiences can be reached by having this information in different languages. The information can be distributed at different venues such as churches, banks, and eating establishments. Schools should be targeted with age-appropriate materials that help the children relate these services directly to environmental protection, basic public health and civic responsibility.

The Committee believes that there is a continued need for ratepayers to be informed and educated about the consequences of not maintaining their facilities. Such neglect may lead to the lack of economic vitality, fines and penalties that must be paid to the State or EPA, prohibitions on growth, and negative publicity about the quality of life in the community.

Ratepayers should be advised of the increased need for infrastructure upgrades and capital improvements at many facilities. These improvements are required to meet new water quality standards, federal initiatives to drastically reduce combined sewer overflows and sanitary sewer overflows, efforts to restore the Bay, shellfish water protection requirements, and other regulatory programs. The current public education program needs to move beyond the current MDE web site and identify other delivery methods for information. Currently, information available is very general and does not address specific audiences.

6.3 Recommendations for Public Participation and Education

The ITAC recommends that:

- ITAC should develop educational messages to convey the need for adequate funding through user rates to ensure long-term system compliance, environmental improvement to water quality, protection of public health and greater control over local destiny with regard to reasonable economic growth and quality of life issues.

- ITAC should develop targeted messages to ratepayers, State and local elected officials, utility decision makers, and school children. The message should be designed to heighten awareness about the necessity for revenues to keep pace, through periodic and justified rate increases, with long term sustainability issues such as capital improvements, system renewal and replacement, compliance-related improvements, and capacity enhancement to accommodate anticipated growth.

- ITAC should perform a review of current educational materials and the development of new educational materials directed at the various public sectors. Additional work is needed to identify the type of media outlets and enhance the delivery methods needed to drive these messages home to the target audiences. Examples of these outlets include public television, radio, news articles that can be distributed to local newspapers, town meetings, festivals, and other venues where the public assembles.

- MDE should enhance its website to provide educational material for the public on the importance of adequate funding for water and wastewater infrastructure through the user rate process. A primer on water and wastewater processes, as well as some information on typical costs to operate and maintain systems, is needed. The website should be enhanced to include links to the sites of a number of organizations with specific public outreach and educational materials. This could include at a minimum:

- National Environmental Services Center (www.nesc.wvu.edu)
- EPA Office of Water (http://www.epa.gov/ow)
- National Rural Water Association (www.nrwa.org)
- Maryland Rural Water Association (http://www.marylandruralwater.org)
- Maryland Center for Environmental Training (http://www.mcet.org)
- Environmental Finance Center (http://www.efc.umd.edu)
- Maryland Rural Development Corporation (http://www.mrdc.net)
- Rural Maryland Council (http://www.ruralforvm.state.md.us)

6.4 Training and Technical Assistance

6.4.1 Introduction

For purposes of this Report, the Committee considers technical education as a critical component of technical assistance for wastewater treatment/collection systems, as contrasted with general public outreach/education, which is covered in the section above.

The ITAC focused on the wastewater system operators and the facilities they operate, and included the superintendents and operators of industrial wastewater works, wastewater collection systems, and wastewater distribution systems. The Subcommittee identified a growing concern regarding the training received by the operators of small to medium sized wastewater systems.

6.4.2 Findings

The 2001 Task Force Report reached a consensus that many small and medium systems do not have adequately trained personnel on-site to operate and manage the system. While continuing education for operators is one component of resolving this issue, on-site technical assistance is another avenue for 'over-the-shoulder' training. It is important to note that, despite the best operator training, excessively aging or failing infrastructure and lack of adequate funding for capital and operational reinvestment may result in non-compliance, water pollution and a threat to public health. Conversely, a state-of-the-art facility run by an inadequately trained operator may have a similar outcome.

In an effort to assemble information on current education providers and current educational materials, the Committee developed a questionnaire to identify the educational and technical assistance resources available for continuing education to the operators. The purpose of the questionnaire was to establish a baseline of information and identify shortfalls and needs in education, training and technical assistance. The Subcommittee interviewed six of Maryland's main providers of training and technical assistance. This included the Maryland Center for Environmental Training; the Environmental Finance Center for EPA Region III; the Academy for Excellence in Local Government; the Water and Wastewater Operators Association of Maryland, Delaware and D.C; the Chesapeake Water Environment Association; and the U.S. Department of Agriculture Rural Development. The resulting information was used by the Committee

to generate recommendations regarding where and how to target efforts in the three areas of concern.

The following questions were asked about the training and technical assistance provided by the six organizations:

What type of training/technical assistance is given?
Who provides the training/technical assistance?
What qualifications do the trainers/technical assistance providers hold?
Who is the audience receiving training/technical assistance?
What is the average length of a training event/technical assistance outreach?
What does it cost the trainee/recipient of technical assistance?
How is effectiveness monitored?
What type of feedback is received from the trainees/facilities?

Questions were also asked about the overall mission of the organization, the type of outreach given and the funding sources used. Appendix 6 provides copies of the questionnaires and the responses.

6.4.3 Findings from the Questionnaires

Answers to the questionnaire were far-ranging. For instance, answers indicate that funding for training is provided variously by the federal or state governments, private contracts and the trainee. The length of the activity ranges from an hour to several days, depending on the activity's scope. Costs of the training vary from no charge to several hundred dollars. In addition, not all of the organizations contacted provide both training and technical assistance.

When asked about additional resources available to their audiences, the numerous resources (other than the organizations contacted) mentioned by the organizations include:

Maryland Municipal League (http://www.mdmunicipal.org)
Maryland Association of Counties (http://www.mdcounties.org)
Maryland Department of the Environment (http://www.mde.state.md.us)
US Environmental Protection Agency (http://www.epa.gov)
Local Government Environmental Assistance Network (http://www.lgean.org)
Institute for Government Services (http://www.vprgs.umd.edu/igs)
Maryland Rural Water Association (http://www.marylandruralwater.org)
Maryland Rural Development Corporation (http://www.mrdc.net)
American Water Works Association (http://www.awwa.org)
Association of Metropolitan Sewerage Agencies (http://www.amsa-cleanwater.org)
Local Government Insurance Trust (http://www.lgit.org)
University of Maryland Cooperative Extension Service (http://www.agnr.umd.edu/MCE)
Environmental Finance Center (http://www.efc.umd.edu)
National Small Flows Clearinghouse (http://www.epa.gov/owm/mab/smcomm/nsfc.htm)

National Drinking Water Clearinghouse
(http://www.nesc.wvu.edu/ndwc/ndwc_index.htm)
Delaware Center for Environmental Training
(http://www.dtcc.edu/owens)

6.5 On-site Technical and Compliance Assistance

6.5.1 Introduction

The increasingly complex and stringent environmental requirements placed on wastewater systems result in a human population that is safer from the health effects of ingesting or contacting polluted water. The State and local governments are working hard to implement new standards and limits to improve the quality of our surface and groundwater resources. This means that the persons responsible for the daily operation and maintenance of these wastewater facilities must be prepared to keep up with new technology and be able to run ever more complex systems. Conversely, operators must know how to get the best performance out of older equipment while new facilities may be in planning or design.

The use of on-site, site-specific technical and compliance assistance (T/A) in addition to training and certification can be a successful resolution for a facility with problems. This guidance can be managerial, operational, and/or financial. T/A providers can assist with:

- Process control
- Pollution prevention solutions
- Capital improvement plans
- Rate assessments
- Overall financial management enhancements

Many providers of technical assistance can help identify technical needs of small systems and provide both general and site-specific outreach. In addition, there are many organizations that can work with local officials to identify their needs and to assist them with future planning.

6.5.2 Recommendations on Training and Technical Assistance

The Subcommittee recommends that:

- Funding must be continued to support these training and technical assistance programs in order to ensure that training and on-site facility operation assistance is available.

- Current types and levels of training should be evaluated to determine adequacy of quality and quantity to meet ongoing needs.

    - Priority should be given to maintaining consistent funding through the State and/or EPA to support the programs in place that deliver on-site technical, financial, and managerial assistance to wastewater systems.

- A database should be kept on operator type, location, size of system, and other statistics to determine the technical, financial, and capacity training of the operators and to help identify training and technical assistance gaps

- A mentoring program should be established between larger utility operators and smaller system operators for information exchange and guidance.

Appendices

HOUSE BILL 659

Unofficial Copy 2002 Regular Session
M3 (2lr2078)

ENROLLED BILL

-- Environmental Matters/Education, Health, and Environmental Affairs --

Introduced by **Delegates Morhaim, Redmer, Zirkin, Carlson, Boutin, and Stern**

Read and Examined by Proofreaders:

_____
Proofreader.

_____
Proofreader.

Sealed with the Great Seal and presented to the Governor, for his approval this _____ day of _____ at _____ o'clock, _____M.

_____
Speaker.

CHAPTER_____

AN ACT concerning

Environment - Water Security and Sewerage Systems Advisory Council - Committee on Wastewater Treatment Systems

FOR the purpose of establishing an Advisory Council on Water Security and Sewerage Systems and an Interagency Technical Assistance Committee on Wastewater Treatment Systems in the State; specifying the membership and duties of the Advisory Council and of the Committee; providing for the appointment of the chairman of the Advisory Council and of the Committee; providing for Advisory Council and Committee staff; prohibiting a member of the Advisory Council or the Committee from receiving compensation for serving on the Advisory Council or the Committee; authorizing a member of the Advisory Council and of the Committee to receive reimbursement for specified expenses; providing for the termination of certain provisions of this Act; requiring a certain report; and generally relating to the Advisory Council on Water Security and Sewerage Systems and the Interagency Technical Assistance Committee on Wastewater Treatment Systems in the State.

Preamble

WHEREAS, The Governor's Task Force on Upgrading Sewerage Systems delivered its report in December 2001; and

WHEREAS, That report clearly indicates that the water and sewer pollution will last for decades and will cost millions of dollars to solve; and

WHEREAS, The redesign, modification, repair, and improvement of sewerage systems will challenge architects and engineers; and

WHEREAS, The State, counties, and municipalities will need to address this issue continually; and

WHEREAS, Clean water is essential for all life and human activity; now, therefore,

SECTION 1. BE IT ENACTED BY THE GENERAL ASSEMBLY OF MARYLAND, That the Laws of Maryland read as follows:

(a) There is a State Advisory Council on Water Security and Sewerage Systems.

(b) The Advisory Council shall consist of the following members:

(1) two members of the House of Delegates, appointed by the Speaker of the House;

(2) two members of the Senate of Maryland, appointed by the President of the Senate;

(3) the Secretary of the Environment, or the Secretary's designee;

(4) The Secretary of Planning, or the Secretary's designee;

(5) The Secretary of Health and Mental Hygiene, or the Secretary's designee;

(6) one representative from the Chesapeake Bay Commission, designated by the Chesapeake Bay Commission;

(7) one representative from the Chesapeake Bay Foundation, designated by the Chesapeake Bay Foundation;

(8) two representatives from the environmental community, appointed by the Governor, one of which shall represent Safe Waterways in Maryland (SWIM);

(9) two representatives designated by the Maryland Association of Counties, of which one shall represent a county with a combined sewerage system;

(10) two representatives designated by the Maryland Municipal League, of which one shall represent a municipal corporation with a combined sewerage system;

(11) one representative of the Chesapeake Bay Program Office of the United States Environmental Protection Agency;

(12) one representative of the Johns Hopkins School of Public Health, designated by the Dean;

(13) one engineer with expertise in water and sewage issues;

(14) one representative of the Washington Suburban Sanitary Commission;

(15) one person from a law enforcement or security agency with specific experience in antiterrorism, appointed by the Governor; and

(16) one person from a Maryland educational research institution with specific expertise in water disinfection technologies, appointed by the Governor.

(c) The Governor shall appoint the chairman of the Advisory Council.

(d) The Department of the Environment shall provide staff for the Advisory Council.

(e) A member may not receive compensation for serving on the Advisory Council, but is entitled to reimbursement for expenses under the Standard State Travel Regulations, as provided in the State budget.

(f) The Advisory Council shall:

(1) study new and innovative technologies relating to water security and sewerage systems and compare the costs of new technologies with current practices;

(2) develop a priority funding system for implementing new technology;

(3) develop a plan for regular evaluations at timed intervals;

(4) develop methods for public education;

(5) develop plans to provide technical assistance to small and medium communities;

(6) study user rates;

(7) reevaluate and refine local needs data;

(8) evaluate and review certain water quality regulations and criteria to improve the waters and prevent interim degradation;

(9) review the effectiveness of water and sewer plans;

(10) study and assess the levels, potential health effects, and persistence of chlorination by-products in the water supply as they may affect individuals living and working in Maryland;

(11) assess alternative methods of disinfection of the water supply, and the potential health effects, both risks and benefits, that may accrue from using these alternative methods;

(12) study the environmental and public health issues surrounding the use of chlorine and alternative methods of disinfection in drinking water and wastewater treatment;

(13) perform a risk assessment and cost analysis relating to the use of chlorine and alternative methods of disinfection in drinking water and wastewater treatment; and

(14) examine the security issues surrounding the use and storage of chlorine and alternative methods of disinfection in drinking water and wastewater treatment.

(g) The Advisory Council shall report its findings and recommendations to the General Assembly on or before December 1, 2004, in accordance with § 2-1246 of the State Government Article.

SECTION 2. AND BE IT FURTHER ENACTED, That:

(a) There is an Interagency Technical Assistance Committee on Wastewater Treatment Systems.

(b) The Committee shall consist of at least 12 members, including representatives appointed by each of the following agencies and organizations:

(1) the Department of Housing and Community Development;

(2) the Department of Planning;

(3) the Maryland Environmental Service;

(4) the FORVM for Rural Maryland;

(5) the Maryland Center for Environmental Training;

(6) the Environmental Finance Center;

(7) the U.S. Department of Agriculture Rural Development;

(8) the Maryland Municipal League;

(9) the Maryland Association of Counties;

(10) the Maryland Rural Water Association;

(11) the Chesapeake Bay Foundation; and

(12) Safe Waterways in Maryland (SWIM).

(c) The members shall elect a chairman from among the members of the Committee.

(d) The Department of the Environment shall provide staff for the Committee.

(e) A member may not receive compensation for serving on the Committee, but is entitled to reimbursement for expenses under the Standard State Travel Regulations, as provided in the State budget.

(f) The Committee shall implement a recommendation of the Governor's Task Force on Upgrading Sewerage Systems by advising local jurisdictions on the efficient operation and financial management of wastewater treatment systems.

(g) The Committee shall report to the State Advisory Council on Water Security and Sewerage Systems on or before November 1 of each year.

SECTION~~.~~ 3. AND BE IT FURTHER ENACTED, That this Act shall take effect October 1, 2002. Section 1 of this Act shall remain effective for a period of 3 years and, at the end of September 30, 2005, with no further action required by the General Assembly, Section 1 of this Act shall be abrogated and of no further force and effect.

APPENDIX 2: APPLICABLE DRINKING WATER LAWS AND REGULATIONS

The EPA established the Public Water System Supervision (PWSS) Program under the authority of the 1974 Safe Drinking Water Act (SDWA). Under the SDWA and its 1986 and 1996 Amendments, EPA sets national limits on contaminant levels in drinking water to ensure that the water is safe for human consumption. These limits are known as Maximum Contaminant Levels (MCLs). For some regulations, EPA establishes treatment techniques in lieu of an MCL to control unacceptable levels of contaminants in water. The Agency also regulates how often public water systems (PWSs) monitor their water for contaminants and report the monitoring results to the states or EPA. Generally, the larger the population served by a water system, the more frequent the monitoring and reporting (M/R) requirements. In addition, EPA requires PWSs that serve over 10,000 persons to monitor for unregulated contaminants to provide data for future regulatory development. Finally, EPA requires PWSs to notify the public when they have violated these regulations. Public notification must include a clear and understandable explanation of the nature of the violation, its potential adverse health effects, steps that the PWS are undertaking to correct the violation and the possibility of alternative water supplies during the violation.

The SDWA applies to the 50 states, the District of Columbia, Indian Lands, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and the Republic of Palau.

The SDWA allows states and territories to seek EPA approval to administer their own PWSS Programs. The authority to run a PWSS Program is called “primacy”. For a state to receive primacy, EPA must determine that the state meets certain requirements laid out in the SDWA and the regulations, including the adoption of drinking water regulations that are at least as stringent as the Federal regulations and a demonstration that they can enforce the program requirements. All of the states have primacy with the exception of Wyoming. The EPA Regional Offices report the information for Wyoming, as well as the District of Columbia and all Indian Lands except for the Navaho Nation. EPA Regional offices also report Federal enforcement actions taken. Maryland received primacy for the PWSS program in 1977.

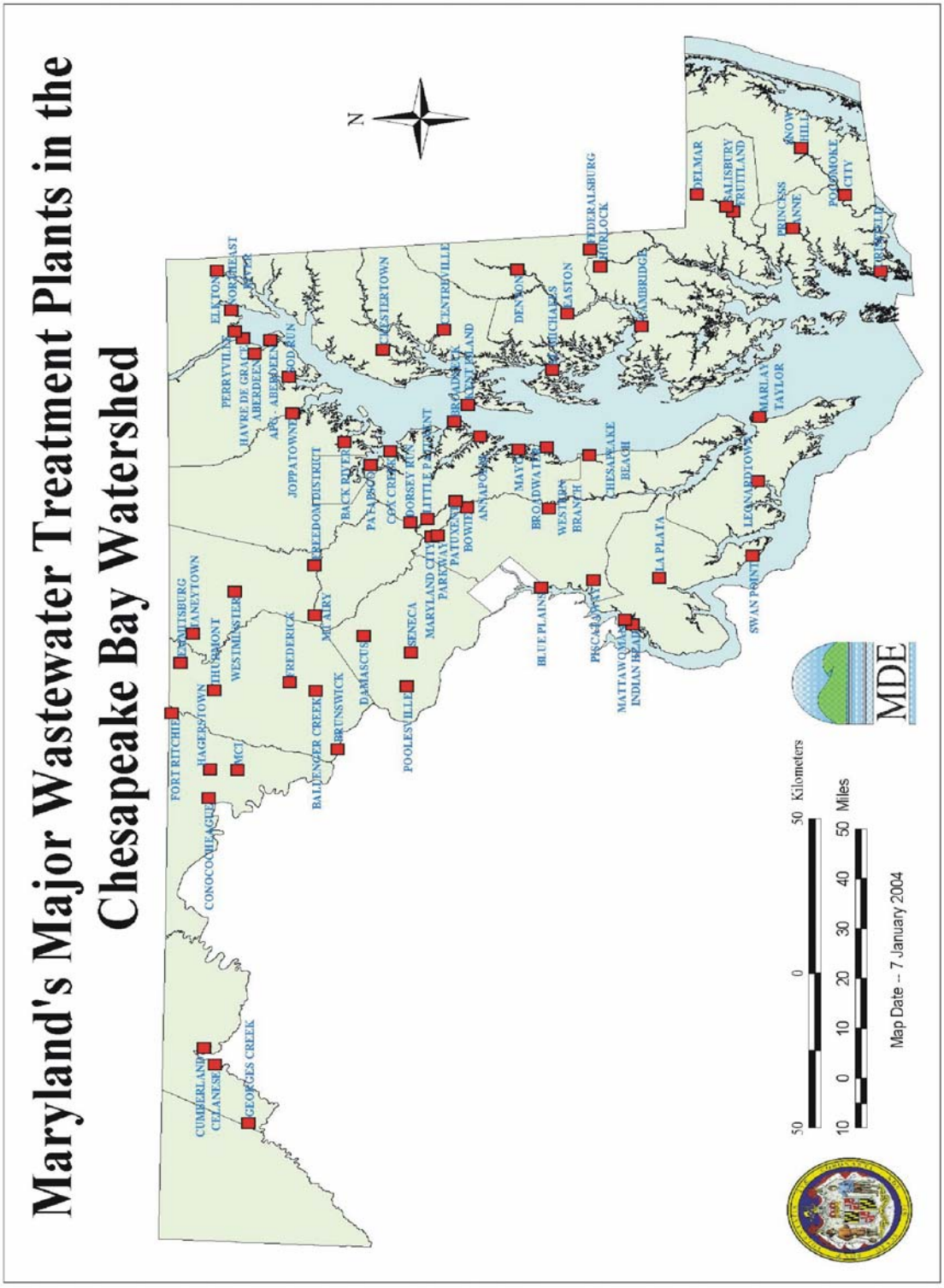
The Maryland Department of the Environment (MDE) is the primary enforcement agency for implementation of the Safe Drinking Water Act (SDWA). The federal Act is adopted in State law as the Annotated Code of Maryland, Title 9, Environment, Section 9-401 to 9-417, which gives the Secretary of the Department of the Environment authority to adopt regulations enforcing the primary drinking water standards. Additional enforcement authority is granted elsewhere in Title 9, including Sections 9-220 through 223, 9-252, and 9-257, which give the Secretary powers to issue orders to correct water supply problems, to examine systems, to approve or disapprove design, and to close sources of water that are dangerous to public health.

APPENDIX 3: APPLICABLE WASTEWATER LAWS AND REGULATIONS

FEDERAL: Clean Water Act and implementing regulations in Code of Federal Regulations, Title 40.

STATE: Environment Article, Title 9, Subtitle 3; COMAR 26.08.01 through 26.08.04 and COMAR 26.08.08.

APPENDIX 4: MAP OF 66 MAJOR WASTEWATER TREATMENT PLANTS



APPENDIX 5: TABLE OF WASTEWATER NEEDS

APPENDIX 6: PUBLIC AWARENESS AND TECHNICAL ASSISTANCE QUESTIONAIRES

Question	Response
Name of Organization Name of Interviewee	Maryland Center for Environmental Training Karen L. Brandt
Overall Mission	The Maryland Center for Environmental Training is celebrating 20 years of providing comprehensive training and technical assistance for environmental compliance and occupational safety and health. Training is offered at sites throughout Maryland and is approved by the State of Maryland for water and wastewater operator certification renewal. MCET also provides on-site technical assistance to Maryland's communities and businesses. MCET helps to ensure that water and wastewater treatment facilities fully comply with the stringent provisions of the Safe Drinking Water Act and the Clean Water Act.
Outreach Type	T/A Training Public Awareness Ed. Other (explain) The Maryland Center for Environmental Training (MCET) is a non-profit educational organization that provides comprehensive training and technical assistance for environmental compliance and occupational safety and health. Environmental training is offered throughout Maryland. Courses for water and wastewater operators are approved by the State of Maryland for certification renewal. MCET also provides on-site compliance assistance to Maryland's communities. MCET's worker health and safety training outreach program offers seminars on regulations and techniques for prevention of work-related illness and injury.
Funding Source	State X Contract X Federal X Trainee X Facility X ALL Other (explain)
Training • What type of training is given? • Is it TRE approved?	Training is offered at sites throughout Maryland and is approved by the State of Maryland for certification renewal requirements. MCET publishes a training schedule to help environmental professionals find out about the classroom training and special events offered by MCET throughout the year. The schedule

• Who does it? • What qualifications do the trainers hold? • Who is the audience receiving training? • What is the average length of a training event? • What does it cost the trainee? • How do you monitor the effectiveness? • What type of feedback do you get from the trainees?	includes information about special programs, publications, and other resources available through MCET for classroom, onsite site specific training, laboratory for water, wastewater, industrial and superintendents Experts, practitioners from the industry Engineer degrees, masters in engineering, water/wastewater certification with CET, other qualifications relative to the industry Maryland's water and wastewater operators, municipalities, local officials, others 1-3 days in classroom $98 per day Testing, feedback, and raised level of awareness shown as increased knowledge put to use in the facility High – excellent evaluations consistently MCET is also the trainer for the Maryland Occupational Safety and Health (MOSH) providing training statewide for employers and employees (not TRE approved)

Technical Assistance • What type/areas of T/A is provided • Who does it? • What qualifications do the TA providers hold? • Who is the audience receiving TA? • How do you monitor the effectiveness? • What is the average time involved with a T/A outreach • Who do you report it to? • Who do you partner with? • What does it cost the recipient? • What type of feedback do you get from the facilities?	MCET provides over-the-shoulder technical assistance for water and wastewater facilities (publicly owned small to medium in size). Assistance is given with operator involvement so they learn by participating. Assistance is long-term in nature and requires facility to work along side T/A provider. T/A is available for: • process control strategies for water and wastewater treatment, especially for Safe Drinking Water Act and Clean Water Act compliance • other regulatory compliance training, particularly for NPDES reporting • sludge management planning • energy audits for water and wastewater utilities systems • laboratory training • plant upgrade and other capital improvement planning • financial management strategies • capacity development • rate analysis • mechanical and electrical equipment troubleshooting • preventive maintenance planning • help in preparing requests for proposals for engineering services • operability and safety reviews of engineering designs • pollution prevention evaluations Engineers, financial specialists, practitioners in the field – most been with MCET more than 10 years Municipalities, small facilities The facility receives the assistance, puts the recommendations into place, the operator learns to use the different approach or upgraded facility MDE, EPA, Facility, Municipality – all involved Worked with MDE, EPA, MRWA, EFC, municipalities, Paid for out of grant funds allocated to MCET Excellent – they continue to contact MCET as help is needed

QUESTIONNAIRE

Question	Response
Name of Organization Name of Interviewee	Environmental Finance Center for Region 3 Jean Holloway, Training Manager
Overall Mission Training Program Mission:	To help strengthen the capacity of governmental and non-governmental organizations to analyze environmental problems, explore new and efficient ways to finance environmental efforts and facilitate the formation of partnerships between various levels of government and private sector organizations; To improve the financial, management and planning capabilities of water and wastewater utilities through training, technical assistance and publications, with an emphasis on sustainable, self-supporting utilities and their relationship to the overall health of the surrounding environment
Outreach Type	T/A - YES Training - YES Public Awareness Ed. – TO SOME EXTENT Other (explain)
Funding Source	State – IN KIND Contract - YES Federal – YES-EPA Trainee Facility Other (explain) -

Technical Assistance • What type/areas of T/A is provided • Who does it? • What qualifications do the TA providers hold? • Who is the audience receiving TA? • How do you monitor the effectiveness? • What is the average time involved with a T/A outreach • who do you report it to? • Who do you partner with? • What does it cost the recipient? • What type of feedback do you get from the facilities?	• TA is in the form of on-site assistance with rate design/rate and cost recovery considerations, typically initiated as a one-on-one training session followed by assistance during the rate setting process; the EFC has also performed a number of charrettes for systems as a problem-solving tool on environmental finance and planning or management issues • TA for rate design is usually done by the Training Manager and charrettes by the other EFC Staff as facilitators with panels of experts assembled applicable to the problem at hand • Recognized as experts in the problem area under discussion • Usually government or private personnel involved in some area of environmental systems management or planning • Case studies are written up and archived, follow ups where necessary • Varies widely depending on the issue being studied, from one working day to several weeks for an on-going involvement • Case Study compilation and successes written up for EPA program representatives; in some cases where a "product" is the objective publication or report is provided to the requesting entity or organization • Partner with other EFC's nationwide when applicable; partner with IGS on an on-going basis beginning Sept. 1, 2004; partner with the requesting party in the case of municipalities or counties, occasionally with a citizens' or advocacy organization, sometimes with a state or interstate committee or commission such as the Chesapeake Blue Ribbon Panel or similar. • Recipient pays nothing at present; there may be a cost for copying/printing when applicable • Feedback is usually in the form of thank you letters, verbal recognition at meetings, or informal feedback during the process itself.
Do you know of other resources available to your audience that they use as well as your organization?	MML, MaCO, IGS, MCET, MRWA, MRDC, WWOA, CWEA, AWWA, AMSA

QUESTIONNAIRE

Question	Response
Name of Organization Name of Interviewee	Academy for Excellence in Local Government IGS – Jeanne Bilanin
Overall Mission	To increase understanding of local government; to promote high ethical standards in public service; to provide an information base for more informed decision making; to develop the capacity of local officials.
Outreach Type	T/A Training – YES Public Awareness Ed. Other (explain)
Funding Source	State Contract Federal Trainee – totally fee supported Facility Other (explain)
Training • What type of training is given? • Is it TRE approved? • Who does it? • What qualifications do the trainers hold? • Who is the audience receiving training? • What is the average length of a training event? • What does it cost the trainee? • How do you monitor the effectiveness? • What type of feedback do you get from the trainees?	• General municipal or county government topics; some general topics that apply to Water & Sewer, such as Capital Improvements, Financial Management, etc. This is a collaborative effort of MML, MaCO, IGS, LGIT and the U of Md. Cooperative Extension Service • Not TRE approved • Trainers with expertise in the specific topic/field • Trainers can be U of Md. faculty, or other recognized expert in the topic at hand • Audience are municipal or county officials, usually those in a decision-making position • Average session is 90 minutes to 2 hours • Cost is 1-time registration fee of $60, plus $10 per CEU credit and/or cost-based fee for meals or room charges whenever applicable • An evaluation questionnaire is completed by each attendee at the conclusion of each session Usually positive; written comments from questionnaires, as well as word of mouth to staff

Technical Assistance • What type/areas of T/A is provided • Who does it? • What qualifications do the TA providers hold? • Who is the audience receiving TA? • How do you monitor the effectiveness? • What is the average time involved with a T/A outreach • who do you report it to? • Who do you partner with? • What does it cost the recipient? • What type of feedback do you get from the facilities?	NOT APPLICABLE TO THIS PROGRAM
Do you know of other resources available to your audience that they use as well as your organization?	Each of the partnering organizations—MML, MaCO, LGIT and CES, as well as Rural Water, EFC and MCET

QUESTIONNAIRE

Question	Response
Name of Organization Name of Interviewee	Water and Wastewater Operators Association of Maryland, Delaware and D.C. Earl Ludy, Eastern Section Rep.
Overall Mission	To further knowledge of systems for water supply and distribution, and collection and treatment of wastewaters and solid waste; To inform the public about those systems and the need for highly trained personnel To promote the certification of operators
Outreach Type	T/A Training -YES Public Awareness Ed. – YES Other (explain)
Funding Source	State Contract Federal Trainee – fee based on costs only Facility Other (explain)
Training • What type of training is given? • Is it TRE approved? • Who does it? • What qualifications do the trainers hold? • Who is the audience receiving training? • What is the average length of a training event? • What does it cost the trainee? • How do you monitor the effectiveness? • What type of feedback do you get from the trainees?	• "Exposure" training - 1-2 Annual sessions in each region; at least 2 regionals sponsored by parent organization, usually combined with the regular business meeting, usually offering 2-4 concurrent sessions on different topics; joint sponsor of the Maryland Short Course, also Cal-Tech Sacramento-based training. • TRE approved in all cases • Volunteers- usually consultants, other operators or other industry representatives • Trainers must qualify as "expert" under requirements set by the state in which training is offered or by general recognition in the industry • Water and/or Wastewater operators and superintendents • ½ hour conference sessions; 2-3 hour regional sessions and 4-5 hour sessions from parent body • Cost of meal/room only • Questionnaires may be distributed at the discretion of the individual trainer; otherwise no formal means of evaluation other than members' comments • As a membership organization, members have ample opportunity for feedback at the next meeting to indicate

	satisfaction or dissatisfaction
Technical Assistance • What type/areas of T/A is provided • Who does it? • What qualifications do the TA providers hold? • Who is the audience receiving TA? • How do you monitor the effectiveness? • What is the average time involved with a T/A outreach • Who do you report it to? • Who do you partner with? • What does it cost the recipient? • What type of feedback do you get from the facilities?	Other than opportunity for peers to network and contact each other personally, Tech. Assistance is not a structured part of this program/organization.
Do you know of other resources available to your audience that they use as well as your organization?	Rural Water, CWEA, AWWA, National Small Flows Clearinghouse, National Drinking Water Clearinghouse, MCET, DCET

QUESTIONNAIRE

Question	Response
Name of Organization Name of Interviewee	Chesapeake Water Environment Association Rebecca Kugel
Overall Mission	The Chesapeake Water Environment Association is dedicated to improving water quality and protecting the water environment in Delaware, Maryland, and the District of Columbia. The Association strives to do this through public education, the exchange of technical and scientific information among water quality professionals, the training of wastewater and water treatment plant operators, and by offering technical expertise and advice to the law-making and regulatory processes. The CWEA is a Member Association of the Water Environment Federation.
Outreach Type	T/A Training *Public Awareness Ed. – See final comment* Other (explain) Specialty seminars in the water environment field
Funding Source	State Contract Federal Trainee Facility Other (explain) CWEA receives funding through members' dues paid to the Water Environment Federation, sponsorship of events by vendors, and registration fees for seminars.
Training • What type of training is given? • Is it TRE approved? • Who does it? • What qualifications do the trainers hold? • Who is the audience receiving training? • What is the average length of a training event? • What does it cost the trainee? • How do you monitor the effectiveness? • What type of feedback	 Technical and scientific information is presented and exchanged No Speakers selected by the CWEA committees Expertise in their fields Engineers, wastewater operators, laboratory personnel Usually a day-long event with related tours of facilities $20.00 - $50.00 dependent on whether participant is member of organization n/a

do you get from the trainees?	None
Technical Assistance • What type/areas of T/A is provided • Who does it? • What qualifications do the TA providers hold? • Who is the audience receiving TA? • How do you monitor the effectiveness? • What is the average time involved with a T/A outreach • Who do you report it to? • Who do you partner with? • What does it cost the recipient? • What type of feedback do you get from the facilities?	N/A
Do you know of other resources available to your audience that they use as well as your organization?	Water and Waste Operators' Association of Maryland, Delaware and Washington, DC Maryland Rural Water
Other services	The CWEA Public Education Committee strives to create greater public awareness of the existence, goals, and activities of the Association, and to enhance public understanding of the water environment and its protection. Activities include press releases, articles, publications, providing speakers to elementary and secondary schools and elsewhere, disseminating WEF school curriculum materials and participating in school science fairs.

QUESTIONNAIRE

Question	Response
Name of Organization Name of Interviewee	USDA Rural Development Denise MacLeigh
Overall Mission	To provide financial assistance in the rural areas to support infrastructure improvements essential to community facilities, economic development and business assistance
Outreach Type	T/A Training Public Awareness Ed. Other (explain) Ongoing coordination with local, State, county government
Funding Source	State Contract Federal Trainee Facility Provides federal funding Other (explain)
Training • What type of training is given? • Is it TRE approved? • Who does it? • What qualifications do the trainers hold? • Who is the audience receiving training? • What is the average length of a training event? • What does it cost the trainee? • How do you monitor the effectiveness? • What type of feedback do you get from the trainees?	Training is only provided when new programs are developed to educate potential recipients To new processes or availability of funding

Technical Assistance • What type/areas of T/A is provided • Who does it? • What qualifications do the TA providers hold? • Who is the audience receiving TA? • How do you monitor the effectiveness? • What is the average time involved with a T/A outreach • Who do you report it to? • Who do you partner with? • What does it cost the recipient? • What type of feedback do you get from the facilities?	Provided through national federal grants to local organizations to provide the following: 1. Technical assistance to water and sewer systems for operational needs of the facility (communities less than 10,000) 2. Hands-on technical assistance to communities with a population of 10,000 or less, and low-medium household income to provide pre-application/application processing, assistance with construction process as well as assistance in financial capacity development of the water /swer
Do you know of other resources available to your audience that they use as well as your organization?	Through mutual partnerships with State and local agencies we try to ensure that our targeted audience is aware of all programs of assistance. As a supervisory credit agency we provide hands on assistance to our borrowers.

APPENDIX 7: EXECUTIVE SUMMARY, FINDINGS AND RECOMMENDATIONS FROM 2001 TASK FORCE REPORT

TASK FORCE ON UPGRADING SEWERAGE SYSTEMS

Final Report

December 2001

Governor Parris N. Glendening

Governor Glendening's
Sewerage Task Force

Report of Findings and Recommendations
Table of Contents

SEWERAGE TASK FORCE MEMBERSHIP

In March of 2001, Governor Glendening issued an Executive Order establishing this Task Force, and in doing so, allowed the process of selecting the Task Force members and moving ahead with the mandate in the Executive Order to begin quickly. The selected members represent a variety of statewide and local interests. There are twenty-one (21) members, representing the State's legislative body, local governments, academic institutions, environmental groups and citizen representatives, as well as State agencies with knowledge and experience in sewerage system needs. The Task Force met from July through December to fulfill its mission. The members of the Task Force are:

Robert Perciasepe
Chairman
The IT Group

Katrina R. Riddick
Legg Mason, Inc.

Kellogg Jonathan Schwab, Ph.D.
John Hopkins
Bloomberg School of Public Health
Dept. of Environmental Health Sciences

Elizabeth Hickey
Environmental Finance Center
The University of Maryland

Ingrid I. Rosencrantz
Independent Consultant

Theresa Pierno
Chesapeake Bay Foundation

C. Victoria Woodward, Esquire
Safe Waterways in Maryland

Ms. Lynn R. Pinder
Northeast Environmental Justice Center

Mr. John R. Pick
City of Salisbury

Honorable Jack A. Gullo, Jr.
New Windsor Town Councilman

Mr. Edward F. Dressman
Allegany County Health Dept.

Mr. George Winfield
Director
Baltimore City Department of Public Works

Mr. Andrew M. Fellows
Clean Water Action/Clean Water Fund

Sewerage Task Force
ExOfficio Members

Danna Kauffman
Governor's Legislative Office

Delegate Barbara Frush
Maryland House of Delegates

Delegate Charles R. Boutin
Maryland House of Delegates

Senator Thomas McLain Middleton
Maryland State Senate

Senator Michael J. Collins
Maryland State Senate

Secretary Jane Nishida
Maryland Department of Environment

Secretary Roy W. Kienitz
Maryland Department of Planning

Director James W. Peck
Maryland Environmental Service

Interested Parties/Agency Staff

Merrylin Zaw-Mon
Deputy Secretary
Maryland Department of the Environment

Virginia Kearney
Maryland Department of the Environment

Ron Young
Deputy Secretary
Maryland Department of Planning

Dana Bourland
Maryland Department of Planning

Donna Burke
Maryland Department of the Environment

Marya Levelev
Maryland Department of the Environment

Stella Hajimihalis Jenkins
Maryland Department of the Environment

Debbie Thomas
Maryland Department of the Environment

Janet Hamilton
Maryland Department of the Environment

George Keller
Maryland Department of the Environment

Stephen Kraus
Maryland Department of the Environment

Janice Outen
Maryland Department of the Environment

EXECUTIVE SUMMARY
FINDINGS AND RECOMMENDATIONS

I. Charge from the Governor to the Task Force

On March 19, 2001, Governor Parris N. Glendening established the Task Force on Upgrading Sewerage Systems by signing Executive Order 01.01.2001.03

The mission of the Task Force was to identify the costs, by county and municipality; of upgrading aging sewerage systems and separating combined sewerage systems. The Task Force was asked to identify the costs of installing nutrient removal technology at wastewater treatment plants in the State, and additional nutrient removal technology at plants that already have or are targeted for biological nutrient removal technology. Additionally, the Task Force addressed its mission in relation to the State's Smart Growth policy. Finally, the Task Force was given the mission of establishing methods of seeking funding from the federal government for these sewerage needs. The Executive Order permits the establishment of a pilot program to identify certain sanitary sewerage and combined sewerage systems as priorities for upgrades and seek financial assistance for these upgrades.

II. Problems Addressed

The Task Force looked at capital needs for sewerage systems, including conveyance pipes and pumping stations, correction of combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs), and upgrades at wastewater treatment plants (WWTPs) to maintain compliance, implement advanced treatment (Biological Nutrient Removal or BNR) and provide capacity for existing and projected growth in Priority Funding Areas.

A. Problems in Sewer Lines

Problems in the sewer lines, before the sewage flow reaches the wastewater treatment plant, can be of several types and causes. Combined sewer systems and the overflows that occur during rainfall events in these systems cause the discharge of combined rainfall and raw sewage into the State's rivers and streams where combined systems exist. Separate sanitary sewer lines may be undersized, become blocked by oils and grease or by acts of vandalism, or develop leaks and cracks. Leaks and cracks can allow groundwater, rainfall and surface waters to get into the sewers. This inflow and infiltration (I&I) can cause sewer lines to surcharge, and overflow. Similarly, leaks and cracks can allow sewage to seep out from the sewer line, or exfiltrate, causing public health and water quality concerns.

Sewage spills from combined sewer overflows and leaking or inadequately constructed or maintained separated sanitary sewers present acute and chronic water quality and public health problems. They cause local water quality and public health problems and are of particular concern because of the contribution of pathogenic organisms from these untreated sources. Harmful organisms in raw sewage may affect recreational water use, as well as the consumption of locally caught fish and shellfish. In addition, human enteric pathogens present in untreated human waste can contaminate downstream sources of drinking water. Children and elderly persons with suppressed immune systems are more susceptible to sewage-borne diseases. In addition to public health and water quality problems, inadequate sewer lines may cause basement flooding and damage to structures and personal property.

B. Problems at Wastewater Treatment Plants (WWTPs)

WWTPs may have problems of several types. A WWTP may be undersized for the amount of sewage flow reaching it. One or more of the plant components may be old, inadequately sized, or poorly maintained, thereby causing failures and permit violations. A WWTP may need to be expanded to meet current and future needs. In addition, a WWTP may need additional plant process improvements to meet new discharge permit standards and requirements, or to meet the goals of the Chesapeake Bay Agreement.

III. Needs

The Task Force used information from the Maryland Department of the Environment (MDE) and the Maryland Department of Planning (MDP) to develop the funding needs in each of the categories examined. The total estimated need is $4.3 billion, as follows:

CSO Needs $357,013,000

SSO Needs $1,175,664,000

Secondary Needs $1,176,034,000

BNR Needs $847,010,000

Growth Needs $738,654,000

These needs are distributed throughout the towns, cities and counties in Maryland.

When this cost is spread over twenty years, and an inflation rate of 3% is applied, an estimated annual total cost of $289 million is reached.

IV. Current Funding

A. Grants

There is about $31 million in grants from State and federal agencies. This consists of:

- $15 million per year in State grants for the implementation of the BNR Program;
- $3 million annually in State grants for compliance and special water quality-related projects in lower income communities;
- $1 million from the federal Community Development Block Grant Program
- $6 million annually from the USDA Rural Utilities Service;
- $1 million from the Appalachian Regional Commission;
- $5 million in special federal appropriations.

B. Subsidized Loans

There are low interest loans available annually to local governments in Maryland to address the Task Force issues:

- $60 million from the Maryland Water Quality Revolving Loan Fund
- $6 million in loan from the USDA Rural Utilities Service.

C. Local/Private

The Task Force found it important to recognize the current level of effort made by local governments to finance needed wastewater system improvements. The MDP Infrastructure Needs Survey, conducted biennially pursuant to the Priority Funding Areas law, revealed that, on the whole, local governments are anticipating paying for about 50% of the wastewater infrastructure needs they identified. The Task Force then examined the history of federal grants for wastewater, and current authorizations and appropriations. In most cases where grants are provided, the federal government has an expectation that local governments will pay 45% of project costs, with EPA participation providing a 55% match.

For purposes of this report, the Task Force assumed that local governments will continue to provide on average about 45% of the future funding needs. However, it must be recognized that some local governments can afford to spend less and others much more than 45%. The sources of local funding are numerous. These may include direct tax dollars, fees and fines collected locally, user rates, connection fees, front foot assessments, and a variety of fees paid by private developers wishing to locate homes, businesses and industries in a jurisdiction. The contribution of the private sector is significant and should be

expected to play a large role in funding for sewerage improvements associated with new development.

V. Recommendations

The Task Force realized that in the long term, there is a need for large sums of low cost financing and grants to enable local governments to sustain existing and build future sewerage infrastructure needed to improve and maintain environmental quality, a robust economy and a high quality of life. The Task Force recommends the pursuit of additional funding at the State and federal levels. However, the group also realized that the global, national, State and local economic and political picture is uncertain and that it may be some time before significant funding can be made available.

Because of this uncertainty, the Task Force took an approach that includes a variety of financial and technical tools that can be implemented relatively quickly and that can help to place the State and Maryland's local governments in a better position when federal funding does become available.

A. Funding

The Task Force developed a "menu" of recommendations that includes both short and long term improvements in funding programs, local government expertise, public education and involvement, and the creation of a State level interagency workgroup.

Regarding near term improvement of the funding programs, the Task Force recommends a continuation of existing levels of State grants for sewerage systems. The report suggests that these levels would increase when the status of the State economy would allow. The report has several recommendations regarding the State Water Quality Revolving Loan Fund Program (SRF). These include increasing the amount of funds available to local governments by leveraging the fund through the sale of revenue bonds, as allowed under the current State law. This would increase the availability of very low interest loans from approximately $60 million to $100 million annually. In addition, the report recommends obtaining increased State and federal flexibility to extend the loan term from a maximum of 20 years to 30 years, and allowing for loan forgiveness based on economic need.

In the long term, the Task Force recommends increasing the Maryland Water Quality SRF capacity to $160 million annually, contingent upon the ongoing provision of federal capitalization grants through the year 2020. In combination with the above, obtaining the additional State match that will be required to obtain the increased federal capitalization grant should be pursued.

In the long term, the Task Force recommends seeking a $20 million increase in the federal funding used to capitalize the SRF in Maryland. This would also require finding State funds to provide the 20% State match, or $5 million. This additional funding would be targeted to loan forgiveness. Regarding federal grants, the Task Force recommends aggressive pursuit of funds through several existing bills on Capitol Hill. These include bills to fund CSOs/SSOs, BNR, and other wastewater facility upgrades. Critical to this effort is the coordination of Maryland's pursuit of these funds with other multi-State coalitions. One key entity is the Chesapeake Bay Program's Executive Council, which consists of the Governors of Maryland, Pennsylvania, Virginia, the Mayor of the District of Columbia and the Administrator of the U.S. Environmental Protection Agency. In addition, the Task Force recommends working closely with the: Association of State and Interstate Water Pollution Control Administrators (ASIWPCA); the Association of Metropolitan Sewerage Agencies (AMSA); the Water Infrastructure Network (WIN); and others who are working to increase the national level of funding for the SRF and increase its flexibility, and to seek additional funds from Congress for the replacement of failing sewerage infrastructure.

B. Technical Assistance

The Task Force recommends the creation of a permanent State level interagency committee to act as a "one-stop shop" for local governments seeking assistance with the management and financing of wastewater collection and treatment systems. This recommendation is a focal point of the findings of the Task Force, as it is intended to provide a wide range of services (rate studies, audits, technical training, financing ideas, etc.), to small and medium systems to ensure that they are operated, maintained, and adequately funded for needed capital improvements. This committee will build on the existing resources and expertise in State agencies, such as, Maryland Department of the Environment (MDE), Department of Business and Economic Development (DBED), Maryland Environmental Service (MES), Maryland Center for Education Training (MCET), and Maryland Department of Housing and Community Development (DHCD). The committee will also work closely with federal funding agencies, such as, USDA Rural Utility Service, and with non-profit organizations, such as, the Maryland Rural Development Corporation and the Forvm for Rural Maryland. The committee will be expected to report to the Governor and General Assembly on a biennial basis progress in assisting local governments and in the implementation of recommendations in this Task Force report.

C. Innovative Financing

This category of recommendations addresses the need to be more aggressive with the existing financial tools, to increase federal funding to support the

State's SRF, to modify the federal SRF law to make it work harder for local governments, and to be more innovative in using various funding methods.

The Task Force recommends that the State, through its established Interagency Committee, assemble a team of investment banking and feasibility consultants willing to provide, at a low cost, investment advisory, brokerage, bond underwriting and market study services to municipalities in need of highly qualified expert advice on how to structure the best financing to fund their immediate capital improvement needs utilizing all available sources of revenue.

The Task Force identified many other innovative ways to use existing loans and grants to make projects more affordable to local governments. This includes techniques to decrease interest rates, consolidate sewerage systems to achieve greater efficiencies, and other tools that should be further developed by the interagency workgroup.

D. Additional Recommendations

The Task Force made many other recommendations regarding State funding, targeting of funds, local efficiencies and actions, working with regional and national coalitions, and public participation and education. Among the recommendations was formation of a one time workgroup to evaluate and revise the current "integrated project priority system" used by MDE to select sewerage projects for grant and loan funding. The Task Force recommended numerous actions that should be undertaken by local governments to save energy and water through process revisions and better management, and to adjust user rates to reflect the cost of operating adequate sewerage facilities. The Task Force also recommended the active involvement of interest groups and citizens, to better educate the public about the importance of upgrading and maintaining sewerage systems. The Task Force also identified a pilot study, to work with selected local governments on the characterization and reduction of excess inflow and infiltration into sewer lines.

Finally, the Task Force recommended a comprehensive re-evaluation of the Task Force report in five years to reaffirm the magnitude of the financial needs and to make necessary adjustments in long term strategies to raise capital, meet the environmental needs of Maryland, and to make any other needed course corrections to be responsive to the public health, water quality, and financial needs of the citizens of Maryland.

VIII. FINDINGS

These findings outline the work of the Task Force to determine the sewerage system needs of the State and the costs to implement these needs. The group has attempted to answer the following questions:

- What are the total annual funding needs and how are they distributed in terms of geographical location and category of project need?

- How should priorities be set given limited resources and varying local government financial capabilities?

- What funding methods and approaches can be used at the federal, regional, State, and local levels to best meet these needs?

The Task Force sought information from MDE staff knowledgeable about the various categories of needs, the Chesapeake Bay clean-up efforts, and existing funding programs. The Task Force received presentations from MDE and local financial experts, and from the Governor's Washington, D.C. Office. The members of the Task Force received a variety of papers and articles on the topic of sewerage needs and financing options.

What are the total annual funding needs and how are they distributed in terms of geographical location and category of project need?

A. Determination of Total Needs

For purposes of the Task Force, only those needs relating to publicly owned wastewater systems were considered. The Task Force compared estimated funding needs that were developed through two separate studies and then compared the studies for commonality to reach a consensus.

B. The First Study: EPA National Needs Survey

The Clean Water Act requires that the EPA and the states conduct a National Clean Water Needs Survey ("CWNS"). This survey is used to compile the needs that are eligible to use the Water Quality State Revolving Loan Funds. Congress through EPA provides capitalization grants to states to provide low interest loans to local governments and other entities for water quality capital improvements. The CWNS is used by EPA to justify to Congress the level of funding required for the capitalization grants. The States are required to provide a 20% match to the federal grant. The State and federal funds along with loan repayments are combined into a loan fund and used to provide below market rate loans for a wide variety of water quality capital projects. In Maryland, as in most States, the majority of these funds are targeted to the improvement of wastewater infrastructure owned by local governments.

The MDE conducted the 2000 CWNS to document the needs for sewerage facilities, including sewer and combined sewer overflow abatement/elimination needs, stormwater facilities or nonpoint source pollution controls in Maryland, which existed prior to January 1, 2000. EPA requires that all water pollution control needs of counties and municipalities be properly documented and well represented in the survey. This survey provides EPA with a detailed estimate of the funds needed in Maryland and across the country for activities necessary to comply with the requirements of the Clean Water Act.

Information on needs was collected by MDE from the local governments in Maryland. Departments of Public Works and Sanitary Commissions were contacted. MDE contracted with the Maryland Center for Environmental Training at Charles County Community College to meet with the public works and plant operators in the smaller communities to ensure that their needs were being included in the survey. For each submitted project, MDE was required to justify the need and the cost to satisfy that need. Projects with needs supported by old documentation had to be re-documented.

Basic documentation criteria were required: a description of the water quality or public health problem; the location; the solution; the cost; and the basis of the cost. Approved sources of technical and needs data included: wastewater facility plans; TMDL lists; State biological, chemical and physical water quality data; the State 305 (b) report on state-identified priority water bodies; grant application files; Water Quality State Revolving Loan Fund files; state water quality standards; state discharge monitoring reports, etc. Approved basis of cost provided to EPA included capital improvement plans, engineering plans and reports, State Priority List/Intended Use Plan, and cost of previous comparable construction.

EPA is currently reviewing MDE's data. Upon final approval the 2000 CWNS data will be submitted to Congress, sometime in early 2002. The data that Maryland collected will have a direct impact on the federal dollars that Maryland receives for state and local water pollution control activities over the next four years.

The "unofficial" EPA 2000 National Needs Survey for Maryland (process is not yet completed at the federal level) shows a total need over twenty years of about $4.3 billion for the costs of correcting CSOs, SSOs, maintaining secondary wastewater treatment facilities, implementing nutrient reductions at wastewater treatment plants, and accommodating growth. In order to incorporate new information from the City of Baltimore on the estimate of costs to correct the CSOs and SSOs in the City, the needs were adjusted upward in these categories. Although not yet finally approved by EPA, this

comprehensive, well-documented survey provides a reliable estimate of currently known wastewater needs for the state of Maryland.

C. The Second Study: Maryland Department of Planning Infrastructure Needs Survey

In 1997 the Maryland General Assembly enacted Smart Growth legislation, which included a mandate for the Department of Planning to survey local governments and state agencies to determine their infrastructure needs and their financial capacity to undertake needed projects. This survey is a tool to ascertain whether or not additional infrastructure will be needed in municipalities and county designated growth areas to accommodate projected growth. The survey covers all infrastructure types including solid waste disposal. The survey inventoried the condition of infrastructure in existing neighborhoods and sought funding information to assess whether or not municipalities, counties and state agencies have the fiscal means to fund their identified infrastructure needs.

D. The Comparison of the Two Survey Methods

MDE and MDP staff compared the two surveys, which used different methodologies. After eliminating projects not being considered for analysis by the Task Force, and other adjustments to make the databases comparable, the MDP Needs Survey and the CWNS totals were very close. Consensus was reached by the Task Force members to use the CWNS because of the availability of information on specific project costs. This process lead to a finding of $4.3 billion (in 2000 dollars) in needs for the categories of CSOs, SSOs, BNR, Secondary Treatment and growth. Having the two surveys compare so favorably improves the confidence of the Task Force that this is a reasonable estimate of the Statewide sewerage needs.

E. Total Needs by Category

The following total needs are shown in 2000 dollars:

CSO Needs $357,013,000

The CWNS data show that the currently known funding need for the correction of CSOs is confined to four local jurisdictions. These include Allegany County (Frostburg, Allegany County, LaVale, Cumberland, and Westernport), Baltimore City, Dorchester County (Cambridge), and Wicomico County (Salisbury and Snow Hill).

SSO Needs $1,175,664,000

According to the CWNS, the largest funding needs to correct SSOs are in Baltimore City, Baltimore County, and Anne Arundel County, followed by Allegany County, Washington County, and Montgomery County.

Secondary Needs $1,176,034,000

According to the CWNS data, the largest needs by cost to address secondary needs are in Montgomery/Prince George's Counties (Maryland's share of the Blue Plains needs), Baltimore City, Anne Arundel County, Frederick County and Howard County.

BNR Needs $847,010,000

The largest CWNS needs by cost in this category include Baltimore City, Montgomery County, and Anne Arundel County, followed by Prince George's County, Washington County and Cecil County. Because this program targets WWTPs of at least 0.5 mgd, the distribution of needs is among those communities with fairly large populations served by the WWTPs. For many of these communities, the costs to implement the first phase of BNR (to achieve 8 mg/l nitrogen effluent concentration) have already been paid or are now being paid. Other communities are just now implementing the first phase of BNR and will face additional costs in the future to "trim" nitrogen discharges.

Growth Needs $738,654,000

All counties identified growth needs, with Baltimore County showing the greatest need by cost, followed by Montgomery County, Anne Arundel County, Cecil County, Frederick County and Harford County.

F. Needs by County and by Municipality

It should be remembered that as the Statewide figures are broken down to the individual municipal level, the degree of confidence and the accuracy of the figures diminishes. This is due to variation in the level of reporting among the local governments.

As this information is reviewed it is imperative to be aware of the following:

- The information is based solely on needs ***reported*** to MDE by the local governments.

- While the absolute numbers from the smaller, more rural jurisdictions are proportionately smaller, these numbers must be compared in a relative manner to size of population and income; it may be erroneous

to conclude that the greatest needs with regard to individual ratepayers are in the largest areas of population.

- The information does not include any needs that have not been quantified in some way by the local government.

- It is believed by the Task Force that the CWNS, although the best available tool, probably underreports actual State sewerage needs.

- Local governments with more sophisticated planning and financing units will typically show needs more accurately, while local governments with fewer resources are more likely to underreport needs.

- Higher needs would most logically be associated with the systems serving larger populations, where there are more miles of sewer line and larger wastewater treatment facilities.

G. Calculation of Annual Needs

For purposes of this Task Force, the total wastewater need of $4.3 billion is spread over twenty years. In "Year One", the total annual need is $215 million. An annual interest rate of 3% was applied to this figure and it was then spread over twenty years. The sum of the twenty years, with interest, or $5.8 billion, was then divided by twenty years, yielding an annual total cost of $289 million.

The twenty-year period was used as a common amortization schedule for loans for these types of capital improvements, and to reflect the fact that many components of a wastewater system have a useful life of about twenty years. Twenty years is a commonly used repayment term for many types of public financing, including the Maryland Water Quality State Revolving Loan Fund (SRF).

H. Steady State Concept of Statewide Needs

The Task Force recognizes that this is an imperfect model. However, in the absence of better forecasting tools, it was agreed that this portrayed a reasonable working model that allowed the Task Force to begin to discuss the order of magnitude of the need, and to address it on an annual funding basis. This working model assumes that the total wastewater needs in Maryland will reach a "steady state" mode, where as new projects and the need for new capital arise, other needs are being met and the associated debt service on those needs is also being retired. The Task Force recognizes that these are needs identified as of 2000. Future distribution of needs by category of need and geographical location may change over time. However, in the aggregate,

the Task Force believes that this "steady state" concept will continue to apply at the Statewide level, with new needs arising that will generally equal "retired" needs.

How should priorities be set given limited resources and varying local government financial capabilities?

I. Establishing Needs and Setting Priorities

The Task Force has identified the State's total sewerage needs by category as well as by County and municipality. The series of charts included in this report illustrate how these needs compare for the correction of CSOs and SSOs, the costs to implement BNR and further nutrient reductions, to upgrade existing wastewater systems, and the costs to accommodate growth for the State into the future.

The Task Force attempted to develop a hierarchy of needs wherein, for example, all CSO projects would be considered for funding before any BNR projects would be considered. However, the Task Force ultimately rejected this as too simplistic an approach to the complex mix of public health, compliance issues and the health of the Chesapeake Bay and of its tributaries. The correction and control of sewer overflows must be achieved to address an acute problem that poses an unacceptable threat to human health and impairs local water quality and aquatic life to an extent that adversely affects the beneficial uses of water bodies.

Equally important, the further reduction of nutrients to the Bay and its tributaries will address a longer term issue of water quality degradation and will ensure that in the future the State can enjoy reasonable growth while continuing to improve and protect water quality. Finally, if the growth needs of existing communities are ignored, development will be forced to occur in areas where public services are not available, leading to sprawl and a proliferation of on-site sewage disposal systems that do not treat the nitrogen compounds in wastewater as effectively as wastewater treatment plants.

The Task Force concluded that a more realistic approach must be taken to balance all of these needs. The Task Force realized that not all projects within a particular category (CSO, SSO, BNR, Secondary or Smart Growth) will be ready to go to design and construction at the same time, and in fact may be phased over many years. Projects required by Compliance Orders may need to be completed within a specified time frame, but the time frame may be as long as 10 or 20 years. Some growth can be accommodated using private funding, so that the demand for public funding is lessened.

J. Integrated Project Priority System

As a first step in determining how finite resources should be divided among these needs, the Task Force considered the existing "Integrated Project Priority System" currently employed by MDE in the selection of capital projects using the Maryland Water Quality State Revolving Loan Fund and State grant funds. This project rating and ranking system is used to evaluate applications for funding from local governments for a wide variety of water pollution control projects, including the correction of CSOs, SSOs, the design and construction of BNR facilities, secondary facilities, and collection and treatment projects to accommodate Smart Growth.

While the IPPS appears to result in the selection of a variety of project types that address the four categories of need (CSO correction, SSO correction, BNR, secondary and Smart Growth) the Task Force believes that the system could be revised to more effectively consider the following principles:

- Projects needed to address imminent public health threats are of the highest priority.

- Projects needed to reverse the decline of the Chesapeake Bay by reducing the delivery of nitrogen and phosphorus to the Bay and its tributaries are also of the highest priority as they have a statewide economic and environmental benefit.

- Projects required to achieve or maintain compliance with water pollution control requirements are equally critical from the standpoint of water quality protection, protecting the public health, and preserving the quality of life in existing communities.

- Projects must be consistent with County Water and Sewerage Plans and with designated priority funding areas consistent with Smart Growth.

- Selection for funding must consider the ability of the community to pay for the needed improvements, and those with the least financial resources should receive the largest share of grant funding.

- Project priority setting should have a component to address environmental equity/justice to ensure that project selection is made without regard to the race, cultural origins, or other factors that could be discriminatory.

- Readiness to proceed must be more carefully evaluated, while taking into account the fact that financially disadvantaged or smaller rural communities may lack the resources to effectively compete in this category.

- Projects must be required to include water and energy conservation wherever possible.

- Wherever possible and environmentally appropriate, regional solutions (which could mean financial/management and/or physical consolidation) to sewerage problems should be considered and encouraged to maximize operational efficiencies, limit the number of discharge points, and serve the largest number of people. The possibility of reducing the impact on individual users is higher as well.

- The State should fund system improvements based on local affordability and need, with emphasis on smaller WWTPs and on projects needed to correct a public health problem, avoid an expansion through correction of inflow and infiltration or through plant modifications and should result in reduction of the discharge of pollutants to impaired waters of the State.

- All wastewater systems must impose rates that will ensure the long-term viability of the wastewater system and that are in keeping with median household income.

- Adequate rate structures should be in place in order to be eligible to receive State financial assistance after adequate time is allowed for these new rate structures to be implemented.

What funding methods and approaches can be used at the federal, regional, State, and local levels to best meet these needs?

K. <u>Current Sources and Levels of Funding</u>

1. State and Federal Sources of Funding

There are low interest loans available annually to local governments in Maryland to address the Task Force issues:

- $60 million from the Maryland Water Quality Revolving Loan Fund
- $6 million in loan from the USDA Rural Utilities Service.

In addition, there is about $31 million in grants from State and federal agencies. This consists of:

- $15 million per year in State grants for the implementation of the BNR Program;

- $3 million annually in State grants for compliance and special water quality-related projects in lower income communities;
- $1 million from the federal Community Development Block Grant Program
- $6 million annually from the USDA Rural Utilities Service;
- $1 million from the Appalachian Regional Commission;
- $5 million in special federal appropriations.

The State and federal governments must recognize the critical importance of providing adequate wastewater infrastructure to the economic and environmental well being of Maryland and the Nation. Because of the large costs associated with these facilities, and the public health benefits to all citizens there must be a recognition that it is appropriate to provide State and federal subsidies to ensure that wastewater systems are kept in good repair and that capacity will exist when appropriate growth and development opportunities arise.

2. Federal Support for Wastewater Infrastructure

The Task Force discussed the need for additional federal assistance in the form of grants, and concluded that the large funding needs facing Maryland's communities will require the infusion of federal funds.

In the 1970s and 1980s, the EPA was providing billions of dollars in grants to local governments for the upgrade of wastewater treatment systems. This infusion of grant funds, usually at a ratio of between 55% and 75% federal cost-share on each project, was driven by Title 2 of the Federal Water Pollution Control Act of 1972 and the Clean Water Act Amendments of 1977. Maryland communities received approximately $2 billion under this federal program. All publicly owned wastewater treatment plants were brought up to secondary treatment or better, failing sewer lines and pumping stations were replaced, and sewer service was provided to unserved areas developed on septic systems that were inadequately designed or poorly constructed.

Since the late 1980's, however, this grant support was abandoned and replaced with the Water Quality State Revolving Loan Fund, created by Title 6 of the Clean Water Act Amendments of 1987. Under this program, the federal government gives the states "capitalization grants" that must be matched 20% by state funds. The combined federal and state funds are used to provide below market-rate loans to publicly owned wastewater treatment plant owners for capital projects

to upgrade and expand these facilities. These federal and state funds may be leveraged in Maryland, through the sale of revenue bonds by the MDE Water Quality Financing Administration, to provide additional loan funds for capital projects.

Nationally, the Water Quality SRF is funded at about $1.35 billion annually. Maryland receives approximately 2.44% of the national allotment. Maryland's most recent allotment was $32.2 million for federal fiscal year 2001. Maryland provided a 20% match to the federal grant, or $6.4 million, for a total of $38.6 million.

While the federal law contemplated an end to the infusion of federal capitalization grants into the State SRF programs, Congress has continued to provide grants to States since the program first began. It is unclear how much longer Congress will continue to do so.

What is clear is that there is ongoing interest on the part of many members of Congress to augment these loan funds with grants to help local governments to address ongoing and extremely costly wastewater improvements. Each year, "special appropriation projects" are added to the EPA operating budget bill. Typically, Maryland communities benefit from this process with about $5 million annually in EPA grants. These are typically federal grants that must be matched by local funds at a level of 45%.

Last year, members of Congress introduced the Wet Weather Water Quality Act, which could provide $450 million nationally for communities trying to address CSO and SSO problems. Earlier in 2001, Maryland Senators Mikulski and Sarbanes, along with their counterparts in Virginia and Pennsylvania, introduced a bill to provide $132 million per year in grants for fiscal years 2003 through 2007 to communities that are pursuing nutrient reductions at their wastewater treatment plants, with an emphasis on the need to restore and protect the Chesapeake Bay and its tributaries.

Most recently, an Economic Stimulus bill was introduced in Congress. This bill would increase federal funding for the national Revolving Loan Fund by $5 billion and $1.5 billion for CSO/SSO correction nationally.

In addition, there is an ongoing effort by several national organizations, such as the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), Association of Metropolitan Sewerage Agencies (AMSA), Water Infrastructure Network (WIN), and others who are working to increase the national level of funding for the SRF and increase its flexibility, as well as to

seek additional funds from Congress for the replacement of failing sewerage infrastructure.

3. State Funding of Sewerage Needs

In prior years, the Maryland General Assembly provided State "match' to the federal grants mentioned above, even though this was not a requirement of the EPA grants program. This match made it more affordable for local governments to fund the non-federal share of sewerage design and construction projects. When the federal program ended, so did the State's provision of funding under this program.

The State continues to provide financial assistance in the form of low interest loans and limited grant funds. These grants are targeted predominantly at rural, lower income towns and counties where the local government demonstrates a financial need. The Legislature should expand the authority of this program should funding become available in the future.

The 50% State share of BNR upgrades has existed since the mid 1980's, and continues to be a strong incentive for local governments to install voluntary upgrades to improve the ability of WWTPs to remove nitrogen and phosphorus from the effluent. The Task Force has recognized the importance of maintaining this program to continue nutrient reductions to the Bay and its tributaries.

4. Local Government Spending

The Task Force found it important to recognize the current level of effort made by local governments to finance needed wastewater system improvements. The MDP Infrastructure Needs Survey, conducted biennially pursuant to the Priority Funding Areas law, revealed that, on the whole, local governments are anticipating paying for about 50% of the wastewater infrastructure needs they identified. The Task Force then examined the history of federal grants for wastewater, and current authorizations and appropriations. In most cases where grants are provided, the federal government has an expectation that local governments will pay 45% of project costs, with EPA participation providing a 55% match.

For purposes of this report, the Task Force assumed that local governments will provide on average about 45% of the future funding needs. It must be recognized that some local governments can afford to spend much more than others.

The Task Force made an assumption that local capital spending accounts for perhaps $120 to $168 million per year. This is based on a very conservative estimate that each County spends $5-7 million per year. Of course, some spend much more and others may spend much less. The sources of local funding are numerous. They may include direct tax dollars, fees and fines collected locally, user rates, connection fees, front foot assessments, and a variety of fees paid by private developers wishing to locate homes, businesses and industries in a jurisdiction. The contribution of the private sector is significant and should be expected to play a large role in funding for sewerage improvements associated with new development.

Another part of the local funding picture consists of subsidized borrowing, such as use of the Maryland Water Quality SRF. In this analysis, the Task Force divided the local share into two categories – "local share" and "subsidized (SRF) local share".

5. Wastewater System User Rates

The Task Force believes that local governments must see their wastewater collection and treatment systems as valuable assets that, if properly managed, can form a solid basis for sound and "Smart" economic growth and a high environmental quality of life for citizens.

Failure to maintain a sewer system, as with any other physical asset, will result in the deterioration and devaluation of the asset over time. In the case of sewerage systems, there is "double jeopardy" since water pollution violations will lead to State and/or federal notices of violations, with an exposure to significant fines and penalties.

The Task Force found that in many instances the fees charged by local governments to support the capital improvements and ongoing costs of operation, maintenance and routine replacement of system parts may be inadequate. Increasing sewer charges is viewed as a tax increase by most citizens, and as a result is generally an unpopular proposition. The Task Force heard from local representatives that the income and age distribution of their citizens prohibited any significant rate increases.

The Maryland Municipal League addressed the Task Force on this issue. This group made recommendations with regard to the analysis of user rates for local governments, and to help local governments put a plan in place to adjust rates in an affordable way. The Task Force was receptive to these ideas.

Given the short time frame of the work of the Task Force, it was found that a comprehensive review and evaluation of the user rates in Maryland was not possible, but is certainly needed. It was also concluded that user rate charges should be considered when grants and loans are offered to a community for system improvements.

6. Training Needs

The Task Force found that adequate training in the financial, managerial and technical aspects of sewerage system management is critical to proper operation and maintenance of these systems. These three areas are crucial to ensure that the system will remain in compliance with its permit requirements, protect public health and the environment, and have the financial resources needed to pay for the ongoing operations, repairs and replacements of system components. In addition, the system must be maintained as a financial asset against which the system owner may borrow as needed to pay for capital equipment replacements and system upgrades.

The adequate training of personnel to manage the wastewater assets of a municipality is therefore extremely important. In the larger municipal and County governments, this may not present a challenge. However, in the smaller cities and towns around the State, local governments often struggle to keep up with new environmental regulations, maintain an accurate tracking and billing system of system

users, train and retain staff to operate and maintain the system, and often lack the budgetary expertise to plan for needed annual and capital expenses.

The Maryland Environmental Service provided the Task Force with some examples of potential WWTP operating savings based on their experience in taking over and operating facilities around the State. Capital equipment can be selected to include savings in manpower and utility costs. Chemical use can be evaluated to determine the optimum type and quantity needed. Other savings can be achieved through: management of staff overtime and assignment of personnel to avoid having too many people on a task; monitoring telephone use; instituting policies for efficient use of fuel and utilities; and other housekeeping items, such as trash disposal, which can be done more cost effectively.

The Task Force considers the following actions to be critical in the development of sustainable sewer systems into the future:

- The provision of intensive training for sewerage system operators in the proper maintenance of systems, including ways to optimize the use of energy and chemicals and to practice water conservation.

- The provision of intensive training for small and medium-sized town managers in the development and management of a viable user rate system.

- The development of shared resources and expertise so that communities can benefit from regional capital equipment and technical experts.

7. Public Outreach and Education

The Task Force discussed the need to provide public education and outreach in order to:

- Inform citizens about the public health and environmental impacts of leaking sewers, failing pumping stations and other conditions that cause the potential for exposure to raw sewage

- Advise the public of the geographical distribution of failing sewerage systems and of the magnitude of capital costs to replace or rehabilitate these systems

- Educate system users of the costs to adequately operate and maintain sewerage systems, including routine maintenance, emergency repairs and major capital investments to upgrade or replace the sewer lines, pump stations, etc. In addition, provide information regarding the legal and financial consequences of allowing systems to fall into disrepair, pollute water bodies, and threaten the public health.

- Gain public support for capital programs, such as the issuance of revenue bonds, needed to provide the capital to implement major system improvement, and for the establishment and adjustment of user rate structures that will adequately support sewerage system needs.

- Keep the public informed about progress in addressing sewerage system issues, such as the correction of CSOs, SSOs, and other system upgrades.

L. Summary of Findings

- The total State sewerage capital improvement need is $4.3 billion (Year 2000 dollars).

- When annualized with a 3% annual inflation rate, this need is $289 million each year.

- The current annual level of federal and State grant funds is $31 million Statewide.

- The Maryland Water Quality State Revolving Loan Program currently provides approximately $60 million annually in low interest (now 2%), 20-year loans to local governments for these needs. This source of funds is called subsidized local funds.

- There is a wide disparity in the ability of the various counties, towns and incorporated municipalities to pay for these needs without additional subsidies from State or federal sources.

- The correction of CSOs and SSOs, implementation of BNR, properly maintaining existing WWTPs, and accommodating projected growth in designated growth areas will benefit all citizens of Maryland by making our waters safe for human contact and recreation and by helping Maryland to restore the Chesapeake Bay while accommodating additional directed growth into the state.

- Failure to assist local governments, especially those with limited ability to incur new debt, in meeting these needs will lead to a decline in water quality, increased risks to the public health, increased compliance actions and citizen suits against local governments, sprawl development and a decreased quality of life for the citizens of Maryland.

IV. RECOMMENDATIONS

The Task Force has learned that the costs to implement needed sewerage improvements are very large, and will require concerted and sustained efforts from the federal, State, local and private sectors. The ability of local governments to shoulder a significant portion of this financial burden varies widely, and in some small towns and disadvantaged counties, the costs of needed improvements will be insurmountable without help from the federal and State governments. The Task Force realizes that the current financial outlook will put a strain on the Nation's and the State's ability to meet the many competing needs for assistance.

Therefore, the recommendations of the Task Force do not identify a single answer to the difficult issues the group faced. Rather, the Task Force has evaluated the types of funding already available and suggested ways in which the use of these funds may be enhanced. The Task Force has also identified specific opportunities to work with the Congressional delegation, national organizations, State and local organizations and with local governments to increase the level of spending for sewerage needs, to make current expenditures more effective and efficient, and to provide greater technical and financial assistance to system owners to better manage existing facilities.

The recommendations of the Task Force fall into eight broad categories:

- Increased technical assistance to small and medium sized communities
- Innovative financing options
- Increased use of subsidized funding through the SRF and increase of State match
- Refinement in targeting of funds
- Local efficiencies and actions
- Active participation with regional and national coalitions seeking increased federal funds and greater flexibility for sewerage needs
- Public Education and Participation
- Five year evaluation

There was an acute awareness on the Task Force of the very real financial constraints on the Local, State, and Federal level. While increased funding is essential to a sound wastewater infrastructure improved use and targeting of existing resources can be improved in the near term. The recommendations here provide near and longer term opportunities for improvement with local

funding through innovative financing and technical assistance, State and federally subsidized funds through more aggressive use and federal grants through sustained multi-State coalition building.

A. Increased Technical Assistance to Small and Medium Sized Communities

The Task Force reached a consensus that many small and medium sized wastewater systems do not have adequately trained personnel in all areas needed to operate and manage a sewerage system in a way that ensures reliable service, compliance with increasingly complex federal and State laws and regulations, and collection of adequate income through user fees to ensure adequate operation and maintenance of the system. To address these shortfalls, the Task Force recommends:

- Establish by Governor's Executive Order a standing committee or work group ("the Committee") comprised of inter-State agencies, and with the voluntary participation of private sector experts to devise and make available to all municipalities a "one stop shopping" approach to the delivery of financial and technical services and assistance. This committee would help local governments with issues related to borrowing of capital funds, accounting, brokerage, investment advise, bond underwriting, system operations, system maintenance, management and staff training and development. This committee will also be the vehicle for the implementation of the recommendations of the Task Force and will report biennially the progress toward achieving the recommendations to the Governor and the General Assembly. This Task Force should be "jump started" with funds from existing State agencies and programs to carry out initial studies and technical assistance.

- Provide State funded or subsidized financial, managerial and processes audits periodically for systems in need in Maryland.

- Require technical, financial and managerial capacity training for appropriate staff in all sewerage systems in Maryland.

- Strongly encourage and participate in the evaluation of innovative technologies and process automation, where appropriate, to save money and other resources.

- Provide State funding and/or technical assistance to local governments for the updating of County Water and Sewerage Plans.

- MDE and MDP, with input from local governments, should cooperatively review the status of the County Water and Sewerage Planning process and take steps to assure that it is functioning effectively. This review should also identify how water and sewerage

facilities are currently funded, and identify measures to assure that future funding is designed in a manner that gives priority to providing adequate facilities capacity in advance of need, and in a manner consistent with Smart Growth principles.

- Evaluate the option of conditioning grant and loan funding to local governments with a provision that the system must have, or will seek to implement, adequate financial, technical and managerial capacity to operate and maintain the wastewater system properly.

- Offer State funding and/or services to perform sewerage system rate studies at the request of local governments. These rate studies should be performed by an independent private sector expert in collaboration with appropriate state agencies, so that each municipality can better determine by how much and how fast their sewer rates must increase in order to meet required federal and State capital improvement needs. The rate study would be used to help set sewer use rates, to aid in establishing local rate stabilization funds and to prepare for capital improvement borrowings. Rate stabilization funds would serve two purposes: 1) to mitigate a municipality's overall need to embark upon a long sustained period of rate increases by investing the funds and generating compounded interest earnings that could be utilized to effectively lessen a municipality's need for continued rate increases overtime; and, 2) to strengthen the creditworthiness of a municipality's tax-exempt capital borrowing by pledging the funds as security for a bond underwriting. By developing the rate study and other related financial incentives for State funding, it could also be used to explain to the general public the need for rate adjustments. Additionally, this information would be helpful to the State to better understand the exact extent of the need throughout the State on a region-by-region basis. This study could serve as a tool for local governments seeking to determine what important community characteristics may affect users' ability to pay (i.e., income levels).

- To aid with each municipality's analysis of affordability, the Committee should work with the appropriate State agencies to develop a report that identifies viable, cost efficient alternative approaches to operations and maintenance and to meeting capital improvement requirements. The State agencies which could generate such a report include, but are not limited to, the Maryland Environmental Service (MES), the University of Maryland Environmental Finance Center, Maryland Center for Environmental Training, the MDE Water Quality Financing Administration or any other agency or entity qualified to assist local jurisdictions in understanding the costs to own, maintain and operate the system and, how rates could be structured to meet required financial needs.

- Assist local governments in the development of strategies to ensure that all communities are considered equally in deliberations concerning access to public sewerage systems, the establishment of user rates, and access to all forms of public financial assistance.

B. Potential State Pilot Projects

1. Desk Top I&I Study

Provide State funding for a statewide "review of records" Inflow and Infiltration ("I&I") Study to be performed by MES on every small system. This "desk top" study will determine if there is an I&I problem, and what the magnitude of the problem is. The data will be useful to the owner of the system in making future planning, funding and expansion decisions. It will be useful to MDE in understanding the scope in dollars of the statewide problem. It will also be useful to MDP in determining which systems can handle additional growth, not by expensive plant expansions, but less expensive repairs of the existing system.

2. Comprehensive I&I Study of Selected Representative Systems

Provide State funding for a small number (4-5) of in-depth studies of selected systems that are representative of the I&I problem in order to: 1) provide more complete illustrative data on the actual extent of the I&I problem in Maryland; 2) help those systems involved that have serious I&I problems to actually locate and fix their I&I problems.

C. Innovative Financing Options

This category of recommendations addresses the need to be more aggressive with the existing financial tools, to increase federal funding to support the State's SRF, to modify the federal SRF law to make it work harder for local governments, and to be more innovative in using various funding methods.

- Assemble a team of investment banking and feasibility consultants willing to provide, at a low cost, investment advisory, brokerage, bond underwriting and market study services to municipalities in need of highly qualified expert advice on how to structure the best financing to fund their immediate capital improvement needs utilizing all available sources of revenue. The State's newly established Committee (see supra) could perform this task.

- Immediately increase the Maryland Water Quality SRF capacity from $60 million to $100 million annually through the sale of revenue bonds. For

every $100 million in SRF loans made, the borrowers collectively save $2 million annually in interest compared to the local government borrowing funds. Over a twenty-year loan term, this means a cost savings of $40 million.

- Increase the Maryland Water Quality SRF capacity to $160 million annually, contingent upon the ongoing provision of federal capitalization grants through the year 2020.

- If federal funding of the Maryland SRF is increased by $20 million, matched with the required $5 million in State funds, set aside this $25 million for loan forgiveness, which will not require repayment. The use of loan forgiveness should be restricted to those communities that:

  - demonstrate a true public health or water quality need,
  - cannot afford to finance the project entirely through local funds and/or low interest loans, and
  - agree to accept assistance to improve the technical, financial and managerial capacity of the wastewater system.

- In combination with the above, obtain the additional State match that will be required to obtain the increased federal capitalization grant.

  - Use SRF and other funds innovatively to finance sewerage projects in communities that cannot afford low interest loans.

- Other innovative options using the SRF that should be explored include:

  - State could pay interest on targeted amount of SRF loans determined on a "needs" basis, creating a "repayable grant."

  - State could allocate funds to establish a liquidity backing for sewerage bond issuances, thereby improving the bond issuance rating and reducing interest costs.

  - Consider utilizing a portion of existing grants from several programs as liquidity backing for sewerage bond issuances.

  - Investigate possibility of further securitizing the SRF Loan program loan portfolio to increase liquidity for additional sewerage improvement loans and grants.

  - Consider other structured finance options to optimize liquidity at lowest cost.

- Additional financing tools:

- State works with local governments to allow rate structure to recapture costs of future repair, improvement and replacement of system infrastructure.

- Investigate enhancement of Department of Housing and Community Development Local Government Infrastructure Financing Program.

- Encourage use of Maryland Environmental Service's Service District management capabilities as a management and financing vehicle, especially for smaller systems.

- Through the WQFA, DHCD or other entities, take a more active part in finding lower cost financing alternatives and access to the loan market, through the use of bond pools, loan insurance, and other means, for those communities that lack the financial expertise to manage effective borrowing on their own.

D. <u>State Funding Programs</u>

- Maintain current funding levels for wastewater grants, including the BNR Program and the Supplemental Assistance Program. These grant programs provide about $20 million to Maryland's local governments.

- As the State economic climate allows, increase the level of BNR and Supplemental Assistance grants to local governments to assist in the upgrade of wastewater facilities that are consistent with Smart Growth and that will allow local governments to implement projects that are otherwise beyond the financial means of the community.

- Continue joint funding efforts with the USDA Rural Utilities Service and the Community Development Block Grant Program in the Maryland Department of Housing and Community Development (DHCD).

- Work to develop a grant program for communities that are particularly disenfranchised, perhaps through the development of specific selection criteria used by the existing funding agencies.

E. <u>Refinement in Targeting of Funds</u>

- Evaluate the existing State "Integrated Project Priority System", following the principles outlined in Section VIII J. of this report. This evaluation should be done through the formation of a one-time workgroup consisting of representatives of local government, public financing, public health, water quality, environmental interests and regulatory agencies, and revise

it to more accurately target State and federal subsidies to those communities in need.

- Work with Maryland Municipal League, Forvm for Rural Maryland and other organizations to evaluate the existing distribution of grants and loans

- Enhance coordination with DHCD, USDA Rural Utilities Service and other funding agencies to optimize benefits to individual users in smaller, more rural communities

- Create a Statewide system to track and evaluate the fiscal health of sewerage systems, that would provide information on rate trends, help to identify systems in need of financial or managerial assistance, and help to gauge the need for additional State and/or federal subsidy to maintain and enhance these assets, including:

  - local wastewater user rates
  - sewerage system debt and interest paid on the debt
  - operations and maintenance costs
  - developer fees and contributions
  - connection charges
  - capital needs

F. Local Efficiencies and Actions

The Task Force identified numerous actions that should be undertaken at the local level to optimize operations, improve efficiencies, and strengthen the managerial, financial and technical capabilities of sewerage systems.

- Strongly encourage new energy efficiencies throughout systems in Maryland.

- Implement certain cost-effective process automations.

- Strongly encourage new water conservation practices at home and business.

- Schedule and complete subsidized comprehensive cost of service, periodic audits, and rate studies.

- Implement rate increases as needed, based on rate studies, to ensure eligibility for grant and loan funds and for long-term system viability.

- Participate in required financial, managerial and technical capacity training, and employ qualified system operators.

- Investigate, and where applicable, implement innovative technologies to save money and other resources.

- Participate to fullest extent in State and federal Needs Surveys to ensure representation of Maryland's needs.

- Review of local plumbing codes to identify opportunities to avoid sanitary sewer backups and water conservation practices.

G. <u>Active participation with regional and national coalitions seeking increased federal funds and greater flexibility for sewerage needs</u>

The funding climate in Washington is very difficult, given world affairs. Maryland should work with the Chesapeake Bay region States and Washington, D.C., and with national coalitions on long-term strategies to increase federal funding and increase the flexibility for their use. Some examples are:

- Amend the federal Clean Water Act to allow for the extension of loan terms to 30 years or longer for certain sewerage infrastructure.

- Amend the federal Clean Water Act to allow for loan forgiveness under certain circumstances of community hardship.

- Increase the level of funding appropriated to the State Revolving Loan Funds by 25% nationally.

- The State of Maryland should work with its counterparts in the Nation to urge appropriation for the recently authorized Wet Weather Water Quality Act, which would provide federal grants to correct CSOs and SSOs.

- The State of Maryland should work with its counterparts in the Nation to obtain passage of the recently introduced Economic Stimulus Bill (H.1366).

- The State should also work with its State and federal partners in the Chesapeake Bay restoration efforts to seek passage of S.1044, the Chesapeake Bay Watershed Nutrient Reduction Assistance Act and appropriation of the funds authorized in this bill.

- The State should work with the Regional Office of the USDA Rural Development Program, the Maryland Congressional delegation and its counterpart States in the Chesapeake Bay watershed to obtain a Chesapeake Bay set-aside of funding for wastewater capital projects from the USDA Rural Utilities funding appropriation.

- The State should aggressively pursue the use of other federal fund programs, including TEA-21, FEMA and the Water Resources Development Act administered by the Army Corps of Engineers, for the correction of CSOs and SSOs, and for the implementation of BNR at WWTPs in Maryland.

H. Public Participation and Education

The Task Force believes that the findings and recommendations of this report will require the active involvement of citizens, environmental and community interest groups and other sectors of the general public to be successful. This belief was reinforced during the public meeting held to present the findings of the Task Force. The Task Force recommends the following activities, to be carried out by the appropriate State agencies in concert with the Maryland Association of Counties and the Maryland Municipal League, and other interested parties, to provide education and outreach to the citizens of Maryland.

- Inform citizens about the public health and environmental impacts of leaking sewers, failing pumping stations and other conditions that cause the potential for exposure to raw sewage

- Advise the public of the geographical distribution of failing sewerage systems and of the magnitude of capital costs to replace or rehabilitate these systems

- Educate system users of the costs to adequately operate and maintain sewerage systems, including routine maintenance, emergency repairs and major capital investments to upgrade or replace the sewer lines, pump stations, etc. In addition, provide information regarding the legal and financial consequences of allowing systems to fall into disrepair, pollute water bodies, and threaten the public health.

- Actively seek public support for capital programs, such as the issuance of revenue bonds, needed to provide the capital to implement major system improvement, and for the establishment and adjustment of user rate structures that will adequately support sewerage system needs. This can be accomplished through mass mailings with water and sewer bills, through articles in local newspapers, and public meetings.

- Keep the public informed about progress in addressing sewerage system issues, such as the correction of CSOs, SSOs, and other system upgrades. This can be accomplished through mass mailings with water and sewer bills, through articles in local newspapers, and public meetings.

I. Five-Year Reevaluation

The Task Force has confidence in the needs identified within the next five to six years. Beyond this planning horizon, however, the Task Force has less confidence that the needs will look as they do today. As environmental mandates, economic conditions, political leadership and other factors change, the plans of local governments with regard to infrastructure needs are also likely to change. There will be a new EPA Needs Survey in 2004, and two surveys will have been conducted by the Maryland Department of Planning in conjunction with that agency's Smart Growth duties. Therefore, the Task Force recommends that a work group reconvene in five years to re-evaluate the recommendations of this Task Force and make any "course corrections" needed to continue to be responsive to the public health, water quality and financial needs of the citizens of Maryland.

Correcting CSOs and SSOs, and implementing BNR, represent important facets of reducing the nutrient contribution from wastewater to waters of the State. However, individual wastewater systems must also be addressed to ensure that all of those who generate wastewater contribute their fair share toward meeting nutrient reduction goals.

Individual wastewater systems, primarily septic systems, are a significant source of nitrogen pollution even when well designed and maintained. Because these systems are dispersed over larger areas, and are not centrally managed, they tend to be overlooked. Given Maryland's successful BNR program, septic systems often pollute more per capita than wastewater treatment plants.

Failure to address the nutrient contribution from these systems in an even handed manner along with the community systems, means that the cost of nutrient reduction is unfairly borne by those who are connected to public sewerage systems. In addition, this cost disparity creates an incentive toward low-density development on septic systems, a circumstance counter to Smart Growth. While this report does not address development on septic systems, the Task Force recognized the inequities that can result from nutrient removal targeted to large WWTPs.

J. Recommendations Obtained at Public Meeting

- The State must address urban stormwater management as a significant source of pollution and a contributor to sewer overflows.

- The State must address the significance of onsite sewerage disposal systems as they contribute to non-point source nitrogen pollution, and encourage development patterns that are not consistent with Smart Growth.

- Local governments are limited in the ability to raise funds for needed sewerage system improvements. This limitation contributes to patterns of sprawl development.