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# Chesapeake Bay Basinwide Toxics Reduction Strategy

U.S. Environmental Protection Agency  
Region III Information Resource  
Center (3PM52)  
841 Chestnut Street  
Philadelphia, PA 19107

# Chesapeake Bay Program

## Agreement Commitment Report

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December 1988

# **Chesapeake Bay Basinwide Toxics Reduction Strategy**

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**An Agreement Commitment Report from the  
Chesapeake Executive Council**

**U.S. Environmental Protection Agency  
Region III Information Resource  
Center (3PM52)  
841 Chestnut Street  
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**Annapolis, Maryland  
December 1988**

## ADOPTION STATEMENT

We, the undersigned, adopt the **Basinwide Toxics Reduction Strategy**, in fulfillment of Water Quality Commitment Number 3 of the 1987 Chesapeake Bay Agreement:

*"...by December 1988, to develop, adopt and begin implementation of a basinwide strategy to achieve a reduction of toxics consistent with the Water Quality Act of 1987 which will ensure protection of human health and living resources. The strategy will cover both point and nonpoint sources, monitoring protocols, enforcement of pretreatment regulations and methods for dealing with in-place toxic sediments where necessary."*

The Basinwide Toxics Reduction Strategy uses the requirements of the 1987 Clean Water Act as a foundation for the actions that will be needed to reduce toxics in the Bay. In addition, the Strategy contains a number of commitments in the areas of research, monitoring, and toxics management that we agree are necessary to achieve a comprehensive approach to reduce toxics input to the Chesapeake Bay.

The Strategy underscores the importance of including all the various pathways by which toxic substances can pollute the Bay's waters, habitats, and resources. Management programs must address all of the point and nonpoint source inputs of toxics - industrial and municipal wastewater discharges, runoff from agricultural land or urban areas, solid or hazardous waste facilities, and atmospheric deposition.

In recognition that research and monitoring programs will provide new information about the toxics problems within the Bay, a Basinwide Toxics Reduction Strategy progress report will be produced every other year to report on progress and incorporate any necessary refinements to the Strategy.

Date

January 5, 1989

For the Commonwealth of Virginia

Samuel L. Balile

For the State of Maryland

William Douglas Schaefer

For the Commonwealth of Pennsylvania

Robert Plasey

For the United States of America

John H. Jones

For the District of Columbia

Michael E. Barry

For the Chesapeake Bay Commission

W. Taylor Humphreys

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## EXECUTIVE SUMMARY: THE TOXICS COMMITMENT

On December 14, 1987, Governor Casey of Pennsylvania, Governor Schaefer of Maryland, Governor Baliles of Virginia, Mayor Barry of the District of Columbia, EPA Administrator Lee Thomas, and Pennsylvania Representative Kenneth Cole (for the Chesapeake Bay Commission) signed the 1987 Chesapeake Bay Agreement. The Agreement contains statements of goals, objectives, and specific commitments in six major areas, one of which is water quality.

The goal stated for the Bay's water quality is to "Reduce and control point and nonpoint sources of pollution to attain the water quality condition necessary to support the living resources of the Bay". The Agreement adds, "The improvement and maintenance of water quality are the single most critical elements in the overall restoration and protection of the Chesapeake Bay." Consequently, specific commitments are made in the pact to prepare baywide "strategies" for the control and reduction of inputs of nutrients, conventional pollutants, and toxics to the Bay.

Specific to toxics, the 1987 Chesapeake Bay Agreement contains the following commitment:

- o By December 1988, to develop, adopt and begin implementation of a basinwide strategy to achieve a reduction of toxics consistent with the Water Quality Act of 1987 which will ensure protection of human health and living resources. The strategy will cover both point and nonpoint sources, monitoring protocols, enforcement of pretreatment regulations and methods for dealing with in-place toxic sediments where necessary.

This document was prepared by representatives of the signatories to the Bay Agreement, working through a Water Quality Task Group, to fulfill this commitment.

### Toxics Definition

For the purposes of this Strategy the definition of toxics or toxic substances is as follows:

Toxic substance means a substance which can cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological or reproductive malfunctions or physical deformities in any organism or its offspring, or which can become poisonous after concentration in the food chain or in combination with other substances.

This definition refers only to man-made substances and not naturally occurring substances.

### Toxics Goal

*The long term goal of this Strategy is to work towards a toxics free Bay by eliminating the discharge of toxic substances from all controllable sources. By the year 2000 the input of toxic substances from all controllable sources to the Chesapeake Bay will be reduced to levels that result in no toxic or bioaccumulative impacts on the living resources that inhabit the Bay or on human health.*

### Major Commitments

In order to meet this target, the Strategy uses the requirements of the 1987 Clean Water Act as a foundation for action. However, the Strategy also establishes a number of major new commitments on the part of the signatories. These commitments include:

- \* Developing a Toxics Loading Inventory to better establish loadings of toxic substances to the Bay
- \* Creation of a Chesapeake Bay Toxics of Concern list that will provide a basis for assessing and then controlling substances that are toxic to the Bay or human health.
- \* Agreement to have point source Toxics Management Programs include both chemical and biological monitoring, compatible definitions of toxicity, and compatible requirements for initiating toxicity reductions.
- \* Conducting a Baywide pesticide use survey and developing appropriate pesticide programs.
- \* Creating permanent air monitoring stations to measure long term trends in atmospheric deposition of toxics
- \* Promoting hazardous waste minimization programs
- \* Taking a multi-media perspective in developing and implementing this Strategy

The remainder of this document describes in greater detail the specific steps that the signatories believe are necessary to achieve a comprehensive approach to the reduction of toxics.

## Organization of the Strategy

The Strategy has five chapters. They are:

1. Toxics and the Bay
2. Assessing the Toxics Problem
3. Water Quality Standards and Living Resource Requirements
4. Towards a Comprehensive Approach to Toxics Reduction
5. Implementing the Strategy and Measuring Progress

Each of these chapters contains some general discussion of the subject issues followed by a listing of milestones and schedules for specific actions which the signatories to the 1987 Chesapeake Bay Agreement are committing to do under this Strategy.

The Strategy also contains three Appendices. Appendix A describes the requirements under the Clean Water Act for toxics. Appendix B describes, in detail, the individual programs in each state and EPA. As was the case with previous strategy documents for conventional pollutants and nutrients, Pennsylvania, Virginia, Maryland, and the District of Columbia (herein known as the "states") have each developed pollution control programs under varying sets of regulations, laws, and budgetary constraints, to address environmental problems particular to their state waters. As a result, the programs have evolved at different rates and in varying forms. Appendix B provides the opportunity for each state to highlight the unique elements of their toxics control programs.

Appendix C contains the Toxics Research Plan that was prepared by a workgroup of the Chesapeake Bay Program's Scientific and Technical Advisory Committee. The findings of the recommended research activities will support the toxicological hazard and environmental exposure components of a risk assessment framework for defining the impacts of toxics on the Chesapeake Bay system. The resultant risk assessment framework will eventually lead to structured risk reduction decision making through this Reduction Strategy.

## CHAPTER 1 - TOXICS AND THE BAY

Water quality programs have focused for several decades on the control of conventional pollutants, primarily oxygen demanding materials and suspended solids. For example, this effort has been very successful with point sources, since the majority of dischargers achieved final effluent limits (secondary treatment at the minimum, and in some cases more stringent levels) by the July 1988 deadline set in the National Municipal Policy.

Having addressed many of the problems associated with conventional pollutants, attention has shifted to other causes of water quality impairment, including nutrients and toxics. Nutrient enrichment has been identified as a major cause of deteriorating water quality in the Bay. The Baywide Nutrient Reduction Strategy will guide the states toward achieving a 40% reduction in nitrogen and phosphorus loads to the Bay by the year 2000.

A series of reports published by EPA in 1983 detailed the findings of the seven year study of the Bay, jointly conducted by the Bay area states and the federal government, including an assessment of the problems caused by toxics. Researchers found high concentrations of metals and organic compounds in some portions of the Bay, most notably in highly industrialized areas such as the Elizabeth River and the Patapsco River. High levels of metal contamination were discovered in sediments in the upper Potomac, upper James, small sections of the Rappahannock and York Rivers, and the upper mid-Bay area.

Toxic compounds are affecting the Bay's resources in these areas. Research and monitoring have shown a relationship between the levels of toxic compounds found in the sediment and the survival of individual organisms and the resulting health of the system. A better definition of toxics and their impacts is important with initial priorities focusing on protection of the Bay's living resources.

With the exception of these "hot spots", sufficient baseline information is lacking to confirm whether other areas of the Bay are impacted by the concentrations of toxic substances found. As stated in the Appendix C Research Plan, "no critical compendium of scientific information relating to distribution and effects of toxics in the Chesapeake Bay has been formulated. Without such information, developing hypotheses concerning effects of toxic substances on biota in the Chesapeake Bay is difficult if not impossible." The relationship between the concentrations of toxics in the sediment and water column and their impact on living resources outside of these hot spot areas is not clear enough to direct appropriate management actions in many cases. The need for information and further research to acquire the necessary understanding are discussed in Appendix C.



A comprehensive water quality monitoring program has been ongoing since 1984 in the Bay and its major tributaries, with a focus on the dynamics and water quality problems associated with nutrient enrichment. Sediment sampling has been conducted on a much more limited scale for the purpose of assessing toxic contamination in the Bay, but additional work is needed to expand our understanding of the distribution and concentration of toxic substances in the Bay. Limited data exists prior to the 1970s on the levels of toxics in the Bay system. Therefore, the concentrations of toxic substances present in the Bay before that time cannot be documented.

A growing awareness of the potential hazards to Bay organisms and human health from exposure to toxics has prompted the development of this Strategy. We recognize, however, that detecting, understanding, and controlling toxics is an extraordinarily difficult task. For example:

- o There are potentially thousands of toxic substances entering the Bay from point sources and nonpoint sources. Over four million organic compounds are known to exist, with about sixty-five thousand in commercial use today and 1,000 new compounds being developed every year. Federal emphasis on controlling toxics from point sources has been directed towards 126 "priority pollutants", with criteria development focused on only this short list of substances. Recent EPA estimates indicate that of the 65,000 chemicals in commercial use, less than 2% of these have been adequately tested for their effects on human health and the environment.
- o Some toxic pollutants cause toxic effects at extremely low concentrations, even below the level of detection achieved by experienced laboratories. The analytical procedures involved are very complex, making burdensome quality assurance and quality control programs extremely important in ensuring that reliable and accurate data are gathered.
- o Similarly, even low concentrations of toxic chemicals can create unacceptable risks to humans and the Bay's living resources. Assessing such risks is extremely difficult.
- o Chemical analyses for toxics can be very expensive, with costs approaching \$1,500 per sample, depending on the complexity of the sample (number of parameters analyzed), and the detection level required.

- o Although a substance and mixture of substances may exhibit toxic effects in a laboratory test, detecting those effects in the environment may be extremely difficult. Cause and effect relationships are difficult to demonstrate or prove. Extrapolating laboratory results to the "real world" involves many scientific assumptions, and it is impossible to exactly simulate the natural setting in the lab.
- o The most familiar form of water quality monitoring involves testing of ambient water column samples. Because many toxic substances accumulate in sediments, specialized sampling could be required. Sediment work involves more complex sampling gear, and more complicated preparation before analysis. Recent studies also point to high concentrations of toxics in the microlayer at the water surface of the Bay.
- o Toxics problems cross over into a number of media such as surface water, groundwater, air, land, and bottom sediments.

It is clear that dealing with toxics is highly complex and there is a need for a great deal of additional monitoring and research (see Appendix C). However, it is also recognized that aggressive toxics control programs can be pursued for known toxics problems while data is being gathered on those toxics issues which may not be well understood at this time. Implementation of this Strategy recognizes that efforts to control nutrients and sediment transport in the Bay watershed will contribute to the control of toxics in the Bay. The input of some toxics will be reduced due to Best Management Practices aimed at erosion control even though they are installed primarily to reduce nutrients. The long term effects on the Bay's waters, sediments, and resources from toxic pollution makes it imperative that the signatories pursue toxic reduction programs in an expeditious manner, with initial emphasis given to protecting the Bay's living resources and early correction of the known toxics problems.

Environmental legislation of the 1970s and 1980s has resulted in laws, regulations, and programs that have tended to focus on addressing pollution problems in the water, air or on the land separately. The 1987 Amendments to the Clean Water Act, for example, are a basic cornerstone of this Strategy. The Act requires states to do the following:

- \* Develop lists of impaired surface waters due to toxics, identify point sources and amounts of pollutants they

discharge that cause toxic impacts, and develop individual control strategies for each of these point sources.

- \* Adopt standards for certain pollutants listed as toxic. At this time there are 126 priority pollutants listed in the Act.
  
- \* Develop State Nonpoint Source Management Plans that identify statewide management programs designed to quantify, control and limit the effects of nonpoint source pollution on the attainment of water quality goals.

However, the signatories believe that in order to fully protect the Bay, we must go beyond the legal requirements of the Clean Water Act in order to deal more effectively with the full spectrum of toxic compounds, as well as cross-media problems caused by toxics. To do that, we need better information on sources and loads of toxics, effects on biota and human health, and the efficacy of control actions. The remainder of this document lays out specific steps to achieve such a comprehensive approach to the reduction of toxics with recognition of the need to address the most important concerns first.

## CHAPTER 2: ASSESSING THE TOXICS PROBLEM

Toxics monitoring currently conducted by federal and state agencies, localities, and private industry throughout the Chesapeake Bay region provides only a partial picture of the types and amount of toxic inputs to the Bay and the toxics present in the Bay. A major problem facing Bay managers, regulators, and scientists in reducing toxics is the lack of adequate information on sources, loads and effects of toxic chemicals in the Bay. This Strategy seeks to redress these shortcomings by developing a coordinated approach to research and data gathering. It then initiates a process for determining which chemicals, because of the special threats they pose to the Bay, ought to receive priority regulatory attention.

The following sections describe the specific tasks and commitments which the signatories agree to undertake to assess the toxics problems in the Bay.

### A. Research

As stated previously, there remains a great deal that is not understood about the effects of toxics on living resources and their habitat, the fate of toxics in the environment, and the introduction of new, unknown toxic compounds. As these new toxic chemicals present more complex challenges it will be necessary to improve the technical expertise of both the public and private sectors in order to meet these challenges. Development of control strategies for these problems depends on the results of continued monitoring and research initiatives. Although specific control actions are not defined for these areas needing further monitoring and research, our ability to address those problems will grow over time as more information becomes available.

Therefore, concurrent with the development of this Basinwide Strategy a toxics research plan was developed by the Chesapeake Bay Programs's Scientific and Technical Advisory Committee (STAC). The STAC research plan is contained in Appendix C as a complement to the Basinwide Reduction Strategy.

The Research Plan is designed around a risk assessment approach. It is structured to provide for the development and validation of source measurement protocols and designs, modeling of transport and fate processes, and increased understanding of the origin and magnitude of effects. The findings of the recommended research activities will support the toxicological hazard and environmental exposure components of a risk assessment framework for defining the impact of toxics on the Chesapeake Bay system. The resultant risk assessment framework will eventually lead to

structured risk reduction decision making to help prioritize implementation of this Strategy.

In addition to the specific research areas recommended in Appendix C, the following study areas have been identified as needing further study:

- \* A Baywide monitoring project to assess the extent, the levels, and the significance of bioaccumulative compounds that are being discharged in the Bay system.
- \* Additional studies of the microlayer to determine the extent and level of contamination, potential impact on the Bay's resources, and whether special toxics reduction programs are needed to deal with any problems found.
- \* Studies of the effects of toxics on living resources, using indicators more sensitive than standard acute and chronic bioassays, and determination of the potential for use of these indicators in toxic management programs.
- \* Evaluation of methods for determining the effects of toxic discharges on human health (carcinogenicity, mutagenicity, and teratogenicity).
- \* Studies of the processes effecting the release of toxics from sediments into the water column and bioaccumulating in the food chain.
- \* Critical habitat that need to be monitored for toxics.

#### B. Evaluation of Analytical Capabilities for Toxics

In order to properly assess the ambient levels of toxics and to measure the progress towards achieving reductions in toxics loadings and toxicity, the appropriate analytical tools and capabilities must be available. As the Toxics Research Plan points out, "The type and extent of chemical analyses performed on environmental samples to determine the presence and amount of toxic substances is often determined by regulatory statutes or laws rather than by environmental significance. As a result, much of the scientific instrumentation and personnel involved in toxics work in the Bay have been assembled for these "set" or "routine" analyses. The necessary equipment and expertise to perform state-of-the-art chemical analyses in the Bay region are at present only minimally available and are not distributed equally throughout the region."

The signatories agree that a survey of the existing capabilities of state, federal, private and university laboratories within the Bay region is needed to ensure the effective and efficient implementation of the Strategy. The survey will be designed to gauge the strengths and weaknesses of the current analytical capabilities both in the private and public sectors for meeting the needs of the toxics reduction, monitoring, and research programs within the Bay basin. Based on the results of this survey, a report will be developed describing an appropriate plan of action at both the state and federal levels to address the identified needs and issues.

C. Chesapeake Bay Toxics Data Collection, Management and Synthesis

A critical element in an effective Toxics Strategy is an informational data base which is available to support management decisions and actions. Data synthesized into a useful form are essential when attempting to make management and policy decisions in an area where the unknowns often overwhelm the known.

The signatories commit to developing a toxics data base for the Chesapeake Bay Program to provide the support necessary for the toxics reduction, monitoring, and research programs included in this Basinwide Strategy.

D. Toxics Loading Inventory

Existing toxic control programs utilize two primary procedures to identify toxicity problems: (1) bioassay of effluents and environmental samples to detect toxic effects, if any; and (2) chemical analysis to identify agents causing toxicity, or chemicals present in amounts that exceed water quality criteria. These procedures are used to select sites exhibiting impacts from toxics, which are usually confined to an area in close proximity to the source. Thus, toxic control programs have relied upon these procedures and have not placed much attention on the overall loadings of toxics.

A comprehensive baseline for the loadings of toxics to the Bay system from point and nonpoint sources cannot be established at this time due to a lack of monitoring data. The states recognize there will be merit in accounting for the loadings of toxics, especially for the purpose of providing the public a simple way of measuring progress in toxics control programs. The priority need is to obtain loading data on discharges which could have toxic impacts on the living resources of the Bay. In addition, tracking the loading of certain toxic compounds should also provide government officials and the public with an additional tool for program evaluation and setting priorities for toxics control program efforts needed beyond correction of currently known problems.

Therefore, the signatories are committed to initiate the process of developing a Toxics Loading Inventory (TLI) of the Bay for the following major source areas:

- o Point Sources: municipal, industrial, and federal facilities.
- o Nonpoint Sources: agricultural, urban, shipping, groundwater, and atmospheric deposition.

The Appendix C Research Plan addresses some of the difficulties inherent in determining sources of toxic chemicals: "although detection of toxics is relatively simple for well known compounds emanating from point sources, this is not the case for unidentified or unregulated compounds, or those entering the Bay via atmospheric deposition, groundwater, or urban runoff. For these compounds, chemical analyses must be capable of detecting as many compounds as possible. The problem of sampling is particularly difficult. For these reasons, most of the inventories of toxic loadings to the Bay are less than ideal either because they ignored some routes of entry such as groundwater or atmospheric deposition, or because the chemical analyses of the source materials were minimal and incomplete." For certain sources, such as atmospheric deposition, estimating toxic loads will be extremely difficult and will most likely never be as accurate as point source loading estimates. Initial compilation of the TLI will reflect the availability of information as much as the sources of toxics loadings.

The purpose of the TLI is to provide a meaningful, realistic, and responsible way to measure progress in reducing the amount of toxics discharged. The TLI is not intended to be utilized to provide information for use in developing percent reduction goals, because the nature of any toxics control program is the detection of toxic substances, discharged in toxic amounts. The mere presence of a toxic compound in a source (point or nonpoint) does not establish that toxicity will result in the receiving stream.

The emphasis on load inventories does not obscure the necessity to consider concentrations at any point in time. Occasional discharges of highly toxic substances may contribute little on an annual loading basis, but may be responsible for significant harm to living resources. Management programs need to be flexible enough to respond with different approaches to protect sensitive life stages of the living resources.

The states believe the TLI will be most useful at the river basin, subbasin, or river segment level. Loading information for these smaller geographical areas will be more meaningful to toxics control programs due to the relative near field impacts of toxics.

The commitment and milestones at the end of this chapter describe the workplan and schedule for initiating development of a Toxics Loading Inventory for the Chesapeake Bay watershed beginning with those which could impact the Bay's living resources.

#### E. Chesapeake Bay Toxics of Concern

In addition to the information that will be gathered for the Toxics Loading Inventory, the signatories recognize the need to identify toxics of concern that are causing or potentially may cause problems for the living resources and their habitats within the Bay. As a direct outgrowth from the Toxics Loading Inventory and efforts to develop living resource habitat requirements for toxics, a proposed Chesapeake Bay Toxics of Concern List will be developed by the signatories. The Toxics of Concern will be a listing of toxic pollutants identified as impacting or having the potential to impact the Bay system and targeted for regulatory and management action within the Strategy framework. The accompanying matrix will contain contaminant sources, toxicity, criteria/standard, geographical distribution, analysis and sample matrix information.

The principal objective of the Toxics of Concern List and matrix will be to identify and provide concise, supporting documentation on key toxicants with the potential to impact the Bay system, thereby targeting these contaminants for future research, monitoring, assessment, control and prevention actions. Managers involved in environmental decision making related to toxics are faced with the task of synthesizing and assessing a wide diversity of technical information in order to deal effectively with contaminant issues. The Toxics of Concern List will provide both a Baywide consensus on contaminants to be targeted by various research, monitoring, and management programs and a comprehensive compilation of information to be used as part of decision making processes.

Within the Strategy framework, the Toxics of Concern List is directly connected with the development and continued enhancement of the toxics loading inventory, Baywide toxics monitoring programs, and priority setting for control, reduction, and prevention actions to reach the goals stated within this document.

There will be a continual feedback loop between the toxics loading inventory and the contaminants of concern list. The initial toxics of concern will be used to expand the list of toxic compounds and source terms included in the Toxics Loading Inventory. From that point, as the toxics loading inventory is expanded into other media, additional specific compounds will be identified for possible inclusion on the toxics of concern list.



The individual toxics of concern will be used to reevaluate or develop new lists of parameters to be analyzed as part of ongoing or new toxics monitoring programs. As the matrix will contain information on the medium in which the contaminant may be found, the sources, analytical methods, and geographical distribution within the Bay, the matrix will be instrumental in planning monitoring programs.

Priorities for research, monitoring, regulatory or management actions can be established based on the defined list of toxics of concern. Agencies will be able to set priorities based on individual chemicals or classes of chemicals, as well as focusing attention on specific use patterns or contaminant sources. The states will be able to use the list to schedule the adoption of water quality standards, consistent with the commitments contained with this strategy.

The process will result in: (1) a listing of these toxic compounds and issues along with a review of existing data; (2) identification of additional special toxics monitoring for these compounds for discharges, ambient waters, sediments, or tissue as appropriate to gain required data; and (3) a description of the alternative remedial actions necessary to counter these problems.

#### Commitments and Milestones - Toxics Assessment

1. *The signatories commit to support a program of directed research for toxics in the Chesapeake Bay in order to:*
  - \* *improve current capabilities for detecting, assessing, and managing toxics;*
  - \* *provide a better understanding of the current significance of toxics in the Bay and the potential risks associated with their presence; and,*
  - \* *provide a better understanding of the processes by which toxics may enter the system, move, and become available to the Bay's living resources.*
2. *By July 1991, the signatories commit to completing a basinwide survey of the existing analytical capabilities for toxics, report on the findings, and begin implementing an appropriate plan of action to address the identified analytical needs and issues.*
  - \* *By December 1989, the signatories commit to develop a workplan for undertaking and completing the survey. The*

workplan will describe the overall analytical needs for implementation of the Strategy, the elements of the survey, a listing of laboratories targeted by the survey, the mechanism for undertaking the survey, and the schedule for production of the survey findings report and action plan.

3. The signatories commit to develop a comprehensive listing of data needs for assessment and management of toxics not being addressed through existing monitoring programs and to design and implement the necessary data collection programs to address the identified needs.
  - \* By July 1989, develop and update every two years, a complete set of narrative descriptions of all ongoing toxics monitoring programs within the Chesapeake Bay basin to be published in the Monitoring Subcommittee's Chesapeake Bay Basin Monitoring Program Atlas.
  - \* By December 1989, develop a listing of the identified data needs, evaluate the utility of existing and planned toxic monitoring programs to address those data needs, and outline a schedule for designing and implementing the monitoring programs emphasizing those needs which are important to protecting the Bay's living resources.
4. The signatories commit to develop, support and maintain a basinwide toxics data base accessible through the Chesapeake Bay Program Computer Center and other network data bases where necessary.
  - \* By July 1989, develop a workplan describing the intended structure of the data base, schedule for data submission from ongoing monitoring programs, the schedule for acquisition of historical Bay basin toxics data, and plans for linking the database with the development of the Chesapeake Bay Basin Toxics Loading Inventory.
  - \* By December 1989, the Chesapeake Bay Program Data Management Plans for Water Quality, Biological Data, and Sediment Data will be updated and revised as appropriate to include guidelines for the format and submission of all forms of Bay related toxics data including but not limited to water, microlayer, atmospheric deposition, air quality, sediment, and tissue.
  - \* By July 1990, the toxics database will be made available to all interested users.

5. The signatories commit to develop and maintain a Chesapeake Bay Basin Toxics Loading Inventory, accessible through the Chesapeake Bay Program Computer Center, for all major point sources (municipal, industrial, and federal facilities) and nonpoint sources (agricultural, urban, shipping, groundwater, and atmospheric deposition) of toxics.
- \* By December 1989, the signatories commit to develop a workplan which describes: the inventory structure and its intended focus on the Bay and regional and subbasin scales, where appropriate; signatory roles and responsibilities for developing, maintaining and expanding the Toxics Loading Inventory; plans for identifying additional source data needs; and a schedule for meeting the commitment.
  - \* By December 1990, the initial Toxics Loading Inventory will be made accessible to the Program participants and other interested users. The Toxics Loading Inventory will include point source toxics loads, building upon the Chesapeake Bay Point Source Atlas now accessible through the Chesapeake Bay Program Computer, the point sources identified in accordance with the requirements of Section 304(1) of the Clean Water Act and any other available data. Nonpoint source loading information that is available will also be included.
- Sources of information will be discharge permits and accompanying discharge monitoring reports, existing file information on particular point sources, SARA Title III Inventory data, NURP study data, pesticide use surveys, and other source monitoring program data as appropriate. Source data needs and monitoring programs to collect the necessary loading information will be identified and described for both point and nonpoint sources of toxics.
- \* Every two years the Toxics Loading Inventory will be reviewed, expanded and revised as necessary. This process will include point and nonpoint sources as investigations identify additional discharges, monitoring programs and research studies that refine source estimates, and additional toxics of concerns are identified. Revised and updated versions of the Toxics Loading Inventory will be completed by December of each successive two year period after the initial inventory is developed.
6. The Signatories commit to develop and update a Chesapeake Bay Toxics of Concern list, maintain a matrix of supporting information, and utilize the list and supporting matrix to establish priorities for future standards adoption, monitoring,

assessment, research, and toxic reduction actions as described within this Strategy.

- \* By September 1989, the signatories commit to hold a joint public meeting to invite input from the public on a workplan for developing the Toxics of Concern list. The Water Quality Task Group will use this information in developing the workplan and the initial list.
  - \* By December 1989, the signatories commit to complete a workplan describing the specific selection criteria for toxics to be incorporated into the list; how toxics of Baywide concern will be addressed; description of the supporting matrix elements and corresponding sources of information; plans for surveying existing source and monitoring data to develop the inventory of toxics from which the list will be developed; description of the applications and timetable for using the list; the schedule for future updates of the list and supporting matrix elements and methods for including public involvement in the process.
  - \* By March 1990, an initial Toxics of Concern List will be developed for use by the Chesapeake Bay Program.
  - \* Every two years the Toxics of Concern List will be reviewed and revised as necessary when monitoring programs and research studies identify other toxic compounds meeting the selection criteria. A revised and updated Toxics of Concern List will be completed by March of each successive two year period after the initial list is developed.
7. The signatories commit to support and promote interdisciplinary analysis and reporting of recent findings from toxic monitoring and research programs applicable to management of toxics and ensure wide distribution of the resultant publications.
  8. By July 1989, the signatories agree to convene a scientific workshop to develop consensus protocols for the use of biological indicators to monitor the effects of toxic contaminants in Chesapeake Bay habitats important to living resources.
  9. By December 1989, the signatories commit to develop and begin to implement a plan for Baywide assessment and monitoring of the effects of toxic substances, within natural habitats, on selected commercially, recreationally and ecologically important species of living resources.

### CHAPTER 3. WATER QUALITY STANDARDS AND LIVING RESOURCE REQUIREMENTS

Water quality standards and living resource habitat objectives are important management tools for measuring progress towards the Strategy goals. Because these tools are chemical specific in their approach, they need to be combined with biological assessment techniques to ensure all potential impacts are being identified and addressed. The ultimate measures of success will be the restoration of quality habitat and abundant living resource populations.

Both water quality standards and living resource habitat objectives are useful guides for determining the quality of the aquatic habitat. However, their management application differs when applied within the Strategy framework. Chesapeake Bay water quality standards will serve as means to secure regulatory actions where necessary for a selected set of contaminants; living resource habitat objectives will continue to remain as the goals for restoration of specific habitats for toxics and other controlling habitat requirements.

#### Water Quality Standards

Water quality standards have been the cornerstone of water quality management programs for many years. Standards establish the goals for water quality through narrative statements and numeric criteria. Both EPA and the states have responsibilities in the standards setting process. EPA issues national criteria recommendations under section 304(a) of the Clean Water Act which may form the basis for state standards. The states are charged with the responsibility of adopting water quality standards to protect the designated uses of their state waters. Adopting water quality standards must follow the regulation adoption process within each state. Therefore, under this Strategy the states, by committing to consider standards adoption, do agree to begin the regulatory process for standards adoption, but cannot commit to, nor predict, the final outcome of the process.

The Bay states are currently on different schedules for conducting the triennial reviews of their state water quality standards. However, it may be beneficial for the states to conduct some regulatory processes for standards adoption simultaneously, such as for a chemical appearing on the list of Chesapeake Bay Toxics of Concern. We recognize that for these cases the states have the flexibility of proceeding towards standards adoption at any time and not just during their triennial review period.

The demand for national criteria is already being intensified by the requirements of the 1987 amendments to the Clean Water Act. (Appendix A to this Strategy contains a summary of the requirements.)

The focus of the Act is on the 307(a) toxics, the so called 126 priority pollutants. EPA has published national criteria for 25 pollutants for the protection of aquatic life and 109 for the protection of human health. To enhance the effectiveness of this system, EPA needs to increase the rate at which national water quality criteria recommendations are published during each fiscal year. In addition, the signatories also acknowledge that criteria need to be developed for those chemicals appearing on the list of toxics of concern in the Chesapeake Bay, but which may not be included on Clean Water Act's list of priority pollutants.

EPA has also issued guidance (though not yet final as of early September 1988) to assist the states in complying with the new requirements of the Act. The guidance outlines three options (or combinations thereof) that the states may use. Appendix B contains descriptions of the status within each state for implementing these requirements.

### Living Resource Habitat Requirements

In addition to the regulatory process of establishing goals for water quality programs, the Chesapeake Bay Program has initiated a process of defining the habitat objectives for the living resources of the Bay. As stated in the report, Habitat Requirements For Chesapeake Bay Living Resources, which was adopted in January 1988 by the principals to the Bay Agreement, "Strategies based primarily upon water quality....cannot necessarily ensure the restoration and protection of living resources. The most tangible signs of widespread environmental problems in the Bay have been shifts in the relative abundance of living resources. Therefore, living resources serve as excellent indicators of the Bay's recovery for Bay managers and the public." The report goes on to state, "...the recovery of species which have declined in Chesapeake Bay and the reestablishment of a balanced ecosystem must be seen as the ultimate measures of success in restoring the quality of Chesapeake Bay. These goals will be unattainable unless certain minimum habitat requirements are achieved." The research needs required to develop criteria and techniques for the measurement and evaluation of the impacts of toxic components on the living resources of the Bay are stated in the attached Research Plan (Appendix C).

As an aid to utilizing the habitat requirements information the Bay Program is developing a use document targeted for management agencies. This process should help to identify needed water quality standards and to allow pollution control programs and natural resource management efforts to take into account the needs of living resources.

The states recognize the importance to the Bay cleanup of working towards consistent goals for water quality and habitat requirements. While each state sets standards under state laws and regulations, the milestones contained below will provide an opportunity for the states to work towards consistent water quality and living resource goals within the Bay.

Commitments and Milestones - Water Quality Standards and Habitat Requirements

1. The states commit to adopting during their triennial review the necessary water quality standards for the 307(a) priority pollutants in accordance with the Clean Water Act and EPA's regulations.
2. EPA commits to increase the rate at which national criteria recommendations are published during each fiscal year by the agency.
3. By July 1989, the states commit to develop and agree to a consistent definition for where to apply national "freshwater" and "marine" criteria and advisories for toxics within the Chesapeake Bay watershed.
4. EPA commits to place priority on developing national water quality criteria and advisories for those toxics of concern specifically identified by the Chesapeake Bay Program.
  - \* By March 1990, and on an annual basis thereafter, the Chesapeake Bay Program will submit to the EPA Office of Water, Criteria and Standards Division, a prioritized list of toxic compounds taken from the Chesapeake Bay Toxics of Concern List, to be considered as priorities for development of water quality criteria, applicable to Chesapeake Bay, for the next federal fiscal year. Accompanying the prioritized list of criteria will be a listing of compounds suggested for development of advisories.
5. The states commit to collectively review the criteria and advisories issued by EPA for toxics of concern in the Chesapeake Bay and consider standards adoption for these toxics during the next triennial review period.
6. By December 1989, EPA commits to issue guidance for the states on ways to enhance water quality standards to better address problems created by nonpoint sources of toxics. The states will pursue incorporation of this guidance into their management programs as appropriate.

7. *The signatories commit to explore means of using more generic approaches to regulating classes of toxic substances and pesticides in lieu of relying upon regulation of individual chemicals. Any generic approach will be incorporated into Strategy workplans as appropriate.*
8. *The signatories commit to use the information contained in the Chesapeake Bay Program report, Habitat Requirements for Chesapeake Bay Living Resources as guidance in toxics management programs for those toxic pollutants not adopted as water quality standards and to update the toxics related habitat requirements contained within the document for listed Toxics of Concern.*



## CHAPTER 4. TOWARDS A COMPREHENSIVE APPROACH TO TOXICS REDUCTION

In order to address the increasing threat of toxic pollution in the Chesapeake Bay, the federal and state partners in the Bay cleanup recognize that a more unified, basinwide approach is needed in the future. Unlike the commitment in the Bay Agreement to reduce the level of nutrients by 40%, the commitment in the Agreement to toxics reduction does not contain any short, simple to understand target. Therefore, as stated in the Executive Summary of this Strategy the signatories agree to the following long-term goal:

*The long term goal of this Strategy is to work towards a toxics free Bay by eliminating the discharge of toxic substances from all controllable sources. By the year 2000 the input of toxic substances from all controllable sources to the Chesapeake Bay will be reduced to levels that result in no toxic or bioaccumulative impacts on the living resources that inhabit the Bay or on human health.*

The signatories have developed a series of milestones in order to work towards the goal of the Strategy. Some of these milestones call for specific tasks to be completed by a specific date. Some are less specific. Some of the milestones deal with actual reductions in the amount of toxics being discharged from point or nonpoint sources. Others only deal with gathering additional data to support future control efforts. The milestones also reflect the intention to address the highest priority toxic problems first.

As outlined in Appendix A the Clean Water Act identifies specific actions the states are to take to control toxics. Individual control strategies are to be developed and implemented to deal with listed toxic "hot spots", especially impacted by toxics appearing on EPA's priority pollutant list. Although much attention will be placed on these requirements in the near future as a first priority, the Strategy is broader in scope to address other point and nonpoint sources of toxics.

Although the costs of implementing the following commitments and milestones cannot be accurately determined, it is evident they will be high. An effective Baywide toxics management strategy will involve monitoring, research, technology development, education, and enforcement, with costs for assessing and controlling toxics pollutants being borne by both the public and private industry. However, the impact of toxic contamination on the Bay's resources is also considerable, as for example in the closing of the James River to fishing following Kepone contamination. The costs of toxics reduction will be high, but the costs to the Bay and its resources of not acting will also be high.

Appendix B to this Strategy contains summaries of the various point source and nonpoint source programs currently being implemented within the Bay states. Many of these programs are similar, reflecting each state's response to the various federal environmental laws such as the Clean Water Act, Clean Air Act, the Resource Conservation and Recovery Act, the Superfund, and pesticide use registration laws. In addition, some programs reflect state laws and initiatives that may be unique to a particular state and its particular problems.

A. Commitments and Milestones - Point Sources

NPDES Permit Program

1. By February 1989, each state will develop and submit to EPA in accordance with Section 304(1) of the Clean Water Act their lists of waters impacted by toxics. Each state will develop and submit to EPA Individual Control Strategies for those discharges appearing on the 304(1) list.
2. By December 1989, each state and EPA commit to have Toxics Management Programs in place that will include the following components:
  - \* A schedule for including appropriate toxics monitoring programs (biological and chemical) in the permits of all priority discharges. Priority discharges will include both major and minor discharges.
  - \* Criteria that are compatible with the other Bay states and consistent with EPA requirements for defining acute toxicity and chronic toxicity.
  - \* Requirements for initiating aquatic life and human health toxicity determinations and reduction evaluations that are compatible with the other Bay states and consistent with EPA requirements.
3. By January 1990 or upon completion of the present studies, EPA commits to provide guidance to the states for including the control of bioaccumulative compounds in toxics management programs. The states will pursue incorporation of this guidance into their management programs as appropriate.
4. By July 1990, the states commit to develop a workplan for conducting a program to "fingerprint" effluent, sediment and tissue samples at selected point source discharges to the Bay. Data from this program will be incorporated into the Toxics Database.

5. By July 1990, the states commit to develop a workplan for conducting a program of toxicity studies at selected point source discharges to the Bay. Data from these toxicity and chemical tests will be incorporated into the Toxics Database.
6. By July 1991, all priority discharges will have chemical and biological toxics monitoring programs included in their permits. Priority discharges will include both major and minor discharges.
7. By June 1992, all discharges identified on the 1989 304(1) list will be in compliance with their Individual Control Strategies for toxics (as required by their permits).
8. By July 1996, all major discharges not included on the 1989 304(1) list will be in compliance with their Toxicity Reduction Evaluations (as required by their permits).
9. The states commit to take timely and appropriate enforcement action, conduct spot checks of self-monitored permittees, and take follow-up actions against non-complying dischargers.
10. The states commit to continue development and implementation of the Permit Compliance System (PCS) for NPDES permits to include archival of data.
11. By December 1989, EPA, in consultation with the states, commits to examine the feasibility of requiring that chemical and biological evaluations be performed, and appropriate remedial measures implemented, before allowing a discharge to the Bay or its tributaries of 1) a significantly changed waste from an existing facility or 2) any discharge from a new facility. By July 1990, the states commit to collectively respond to the conclusions and recommendations of EPA's feasibility study.

#### Pretreatment

1. Delegated states will inspect, and audit as needed, those POTWs with pretreatment programs on an annual basis. For non-delegated states, EPA will conduct these inspections and audits.
2. Delegated states will inspect selected categorical discharges on an annual basis and the remaining significant dischargers at least once during the term of the Publicly Owned Treatment Works (POTW) permit.

3. Delegated states will take appropriate enforcement and follow-up action against non-complying POTWs.
4. New candidate POTWs for pretreatment program development will be investigated and included as necessary.
5. Delegated states will conduct sampling at priority POTWs at least annually, and at the significant dischargers when necessary.

B. Commitments and Milestones - Nonpoint Sources

Urban

1. By December 1989, the states commit to develop consistent methodologies for estimating loads and/or load delivery calculations, for developed urban land uses.
2. By December 1990, the states commit to use the developed methodology to quantify and characterize toxic loads from urban areas into the Bay basin.
3. Following promulgation of stormwater regulations by EPA, the states commit to develop programs to regulate urban stormwater discharges.

Pesticides

1. By December 1989, the signatories commit to summarize and analyze the baseline demonstration watershed data relative to pesticides.
2. By December 1989, the signatories commit to completing a pesticide use survey of the Chesapeake Bay basin through a comprehensive review of existing use information; collection of new data where necessary; incorporation of survey findings in the toxics data base; and utilization of the findings to target Integrated Pest Management programs.
3. By December 1989, the signatories commit to review existing Integrated Pest Management and Sustainable Agriculture Programs and develop alternatives for increasing utilization of these concepts in agricultural production.
4. By December 1990, the signatories commit to implement necessary new and/or expanded monitoring programs for pesticides within the basin.

5. By December 1991, the states commit to identify additional pesticide programs as necessary, for example IPMs for urban areas.
6. EPA commits to review methods for improving coordination between the Toxic Substances Control Act process and the information needs on aquatic toxicity for water quality programs so that more information on the toxicity of chemicals to aquatic life is developed prior to the use of approved chemicals. The signatories commit to explore the development of a Basinwide and national toxics registry of chemicals that are preferred for use due to their more limited potential for causing environmental harm.

#### Air Deposition

1. By December 1989, the signatories commit to ensure that pertinent monitoring data is supplied to the Chesapeake Bay Program Toxics Data Base, and utilize that information to redirect ongoing and future monitoring programs to focus on those cross media toxic pollutants which are present in the Chesapeake Bay system and the ambient air.
2. EPA and other federal agencies commit to continue national research efforts on atmospheric deposition in the Chesapeake Bay basin. EPA commits to develop a national atmospheric pollutant deposition monitoring network and computer model to interpret the data. Results of the work will be supplied to the Chesapeake Bay Program as part of the national strategy to reduce the deposition of airborne toxics.
3. The signatories commit to continue building toxic emissions inventories. When sufficient emissions information exists, it will be possible to generate multi-media dispersion models which predict expected concentrations of pollutants and their impact on the environment of the Bay.
4. The signatories commit to take full advantage of innovative technologies which may become available in the long-term. Such technologies might include satellite measurement of pollutant concentrations or improvements to the minimum detectable levels of analytical equipment.
5. The signatories commit to support long-term research into the mechanisms for pollutant transfer between air and water as it relates to the Chesapeake Bay.f

6. The signatories commit to designate and maintain permanent monitoring stations in the Bay to measure the long term trends in atmospheric deposition of toxic pollutants

#### *Solid and Hazardous Waste*

1. The states commit to promote hazardous waste minimization by conducting information exchange and other public education activities and setting reduction targets where appropriate.
2. The states commit to comply with the Superfund Amendments and Reauthorization Act of 1986 (SARA) 104(k) capacity assurance certification requirements in accordance with schedules promulgated by EPA.
3. By October 1989, the states commit to develop and initiate an inspection program for Resource Conservation and Recovery Act (RCRA) facilities within the Bay watershed.
4. The states commit to comply with SARA 104(k) assurance requirements in accordance with schedules promulgated by EPA.
5. EPA commits to coordinate SARA Title III reporting requirements with the Federal facilities in the basin.
6. EPA and the states commit to prioritize site cleanups for solid and hazardous waste sites where there is evidence or the likelihood of an impact on living resources.

#### *C. Commitments and Milestones - Contaminated Sediments*

1. By December 1989, the signatories commit to design and implement a long-term sediment monitoring program to identify the location and extent of contaminated sediments within the Bay and its tidal tributaries and to track multiple year trends in sediment concentrations of toxics.
2. EPA commits to promote the technology transfer of information on sediment toxicity testing to the scientific and regulatory communities by having the appropriate EPA research laboratories evaluate and modify existing sediment toxicity tests within the Chesapeake Bay basin as part of the process of validating these testing protocols.
3. After reviewing the EPA testing protocols, the states

commit to work with EPA to implement toxicity testing of sediments within the Bay watershed.

4. Following recommendations by the EPA Science Advisory Board on the scientific validity of methodologies to estimate sediment toxicity and biological impacts of in-place contaminated sediments, EPA will work with the states and other federal agencies in using the above methodologies to develop a Chesapeake Bay specific sediment quality evaluation protocol by December 1991.
5. The states commit to pursue incorporating appropriate sediment protocols into their toxics management programs.
6. By December 1990, EPA commits to complete a study of the feasibility of developing a Superfund type program for contaminated sediments.

## CHAPTER 5: IMPLEMENTING THE STRATEGY AND MEASURING PROGRESS

The milestones listed in Chapters 2, 3, and 4 address key areas in toxics control and toxics monitoring that directly support control programs. However, a great deal lies ahead in implementing and refining the Strategy. This chapter describes several ways of helping to ensure that these all important steps will not be overlooked.

### Implementing the Strategy

The signatories believe that this Strategy would benefit from a structured process to guide how it will be implemented. Therefore, a special panel of managers, researchers, and other individuals will be established. The purpose of this panel will be to consider and recommend proposals for implementing the Strategy. It is expected that this panel will complete its work in about six months. Professional facilitators outside of the Bay Program will be used to assist the panel in arriving at a consensus on the approaches that should be used.

The commitments and milestones contained in this Strategy will require a great deal of financial resources to implement on the part of the federal and state regulatory and management agencies as well as local governments and industry. At this time the total costs are not known, nor who will pay these costs. One of the tasks of the ad hoc panel mentioned above will be to explore alternative funding sources from state, federal, and private sectors. It is the intent of the signatories to address budgetary and funding needs and priorities in any report or workplan developed pursuant to this Strategy.

Management programs for toxics may also benefit from improvements in water quality modeling. The 3-D model currently being developed will aid in the 1991 reevaluation of the Basinwide Nutrient Reduction Strategy. Nutrient enrichment within the Bay watershed results in water quality problems far removed from the sources of nutrients. Therefore, a water quality model should provide managers with an important tool linking the changes in nutrient input with changes in water quality in the Bay. The same Baywide modeling approach may not be as critical in dealing with more localized toxics problems, but refinements can be made to use models to assist management decisions in more localized, targeted areas. It will be important for the signatories to identify how the 3-D model of the Bay can be used to aid the toxics management programs.



## Public Education and Involvement

Several drafts of this Strategy were circulated for review and comment by numerous federal and state officials, environmental groups, industry, and private citizens. The Alliance for the Chesapeake Bay sponsored a two day conference in October 1988 to provide several hundred persons the opportunity to discuss the toxics issues of the Bay and to provide comment on the draft Strategy. The Water Quality Task Group believes this extensive public review process greatly strengthened the final Strategy document.

The complexity of toxic pollution in the Bay requires public education programs that present in understandable terms the seriousness of the problems caused by toxics, but in a balanced way that do not overstate the threat of these chemicals. The signatories will be working to ensure that the public education strategy developed in response to the 1987 Bay Agreement incorporates appropriate toxics education programs.

It is also important that individuals and groups both in the public and private sectors are informed of this Strategy and how they may be impacted by its commitments and programs. Therefore, the signatories will use all available means to disseminate information about the Strategy, such as newsletters, public meetings, news media, and circulation of summaries of the Strategy.

The signatories agree that implementation of this Strategy will be aided by active involvement from the public. Therefore, appropriate means will be used to ensure that public input is provided through public meetings, involvement with strategy workgroups, and solicitation of public review and comment on workplans, programs, and other components implementing this Strategy.

## Progress Reports and Reevaluation

As more information from research and monitoring becomes available, the signatories recognize that refinements to the Basinwide Strategy will be necessary. Therefore, a Basinwide Toxics Reduction Strategy Progress Report will be produced on a biennial basis.

During the development of the Basinwide Nutrient Reduction Strategy the signatories recognized the need, not only for annual progress reports, but also for a complete reevaluation of that Strategy in December 1991. A similar approach for the Toxics Strategy is appropriate.

### Commitments and Milestones - Implementing The Strategy

1. By January 1989, the Principals' Staff Committee will establish an ad hoc panel of managers, researchers, and other appropriate individuals that will: 1) help design an action plan to coordinate implementation of this Strategy; 2) identify the available toxics baseline data; 3) determine what baseline data is needed; and, 4) how to implement short-term and long-term monitoring and research to collect the data to meet managerial needs. The panel will coordinate their activities with the other Chesapeake Bay Program committees.
2. By July 1989, the signatories commit to the development of an action plan, including appropriate means for public involvement, to implement this Basinwide Toxics Reduction Strategy.
3. By December 1989, the signatories commit to develop and begin implementing a plan of action to increase coordination of programs and agencies so that cross-media impacts from toxics are properly addressed.
4. EPA commits to coordinate toxics reduction initiatives with Federal Facilities in the basin and with Federal agencies participating in the Chesapeake Bay Program.
  - \* Through the Federal Agencies Committee, EPA will ensure the revisions to the Federal Agency Workplan reflect the Federal agencies plans for achieving the goals and commitments outlined in this Strategy.
5. By December 1989, the signatories commit to completing the design of a system for measuring progress under the Basinwide Toxics Reduction Strategy.

For point sources these measurements may include the following:

- \* An accounting of the number of point source dischargers operating under a Toxics Monitoring Program or Toxicity Reduction Evaluation Program.
- \* The volume of wastewater flow that is considered acutely or chronically toxic, as demonstrated through biological monitoring, and the volume no longer exhibiting toxic effects due to reduction programs (including degree of toxicity).
- \* An accounting of the reduced toxic loads discharged

due to toxics control programs using the TLI and discharge monitoring data. The accounting should include the quantity and the relative toxicity of the compounds.

For nonpoint sources these measurements may include the following:

- \* Conduct "before and after" investigations on the effectiveness of BMPs (urban and agricultural) in removing toxic materials
  - \* An accounting of pesticide use reductions, such as pounds of pesticides used annually, based upon the efforts of selected Integrated Pest Management Programs.
  - \* The estimated volume reduction of urban nonpoint toxic loadings achieved through implemented control programs.
6. The signatories commit to producing a Basinwide Toxics Reduction Strategy Progress Report every other year.
  7. By December 1992, the signatories commit to a complete reevaluation of the Basinwide Toxics Reduction Strategy.