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National Estuary Program Guidance

Base Program Analysis

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I. Background

Overview of the National Estuary Program

Estuaries are waterways such as bays and sounds where fresh water drained from the land mixes with salt water from the ocean. This blend of fresh and salt water makes estuaries biologically productive, sustaining many kinds of finfish, shellfish, marshes, underwater grasses, and microscopic marine life. Since estuaries have economic, aesthetic, and recreational value to people, they are attracting a growing number of coastal residents and commercial activities. Aquatic life and scenic values are affected in many ways by these growing populations.

Section 320 of the Clean Water Act established the National Estuary Program (NEP) to identify nationally significant estuaries threatened by pollution, development, or overuse and to promote the preparation of comprehensive management plans to ensure their ecological integrity. The program's goals are protection and improvement of water quality and enhancement of living resources. To reach these goals, the Administrator of the U.S. Environmental Protection Agency (EPA) convenes a Management Conference for each estuary in the NEP to provide a forum for consensus building and problem solving among interested agencies and user groups. The Management Conference studies environmental conditions and trends in the estuary and their likely causes, identifies the most significant problems, and develops an action-oriented Comprehensive Conservation and Management Plan (CCMP) to address high-priority problems.

Purpose of this Document

Section 320 establishes several purposes (see box) for NEP Management Conferences, including a requirement under purposes 1-3 to conduct an objective, technical assessment of the state of the estuary. This assessment, called characterization, is the basis for defining and selecting problems to be addressed in the CCMP. In addition, purpose 5 calls for Management Conferences to develop plans to coordinate implementation of the CCMP by federal, state, and local agencies. Also, purpose 7 requires the Conference to review all federal financial assistance programs and development projects for consistency with the CCMP.

Purposes of the Management Conference

As Defined in Section 320 of the Water Quality Act Amendments of 1987

(1) Assess trends in water quality, natural resources, and uses of the estuary

(2) Collect, characterize, and assess data on toxics, nutrients, and natural resources within the estuarine zone to identify the causes of environmental problems

(3) Develop the relationship between the inplace loads and point and nonpoint loadings of pollutants to the estuarine zone and the potential uses of the zone, water quality, and natural resources

(4) Develop a comprehensive conservation and management plan that recommends priority corrective actions and compliance schedules addressing point and nonpoint sources of pollution to restore and maintain the chemical, physical, and biological integrity of the estuary, ... and assure that the designated uses of the estuary are protected

(5) Develop plans for the coordinated implementation of the plan by states as well as federal and local agencies participating in the conference

(6) Monitor the effectiveness of actions taken pursuant to the plan

(7) Review all federal financial assistance programs and federal development projects ... to determine whether such assistance programs or projects would be consistent with and further the purposes or objectives of the plan prepared under this section.

EPA has interpreted these purposes to call for a two-part characterization process:

- A technical investigation of pollution sources and their impacts on the estuary.
- An analysis of existing federal, state, and local resource management programs.

This document provides guidance for NEPs on conducting a management characterization, or base program analysis. A companion document, *Guidance on Technical Characterization for the National Estuary Program,* provides guidance on characterizing the physical, chemical, and biological processes of the estuary and their relationship to environmental conditions.

Role of Characterization

NEP Management Conferences follow four phases in developing CCMPs:

Phase 1: Convening the Management Conference and establishing a structure of committees and procedures for conducting the group's work.

Phase 2: Characterizing the estuary to determine its health, reasons for its decline, and trends for future conditions; assessing the effectiveness of existing efforts to protect the estuary; and defining the highest priority problems to be addressed in the CCMP.

Phase 3: Specifying action plans in the CCMP to address priority problems identified through characterization and public input. The CCMP should build on existing federal, state, and local programs as much as possible.

Phase 4: Monitoring the implementation of the CCMP, reviewing progress, and redirecting efforts where appropriate.

These phases need not occur sequentially; as the NEP has evolved, EPA has encouraged Management Conferences to proceed with the four phases simultaneously as often as possible. For example, early results of characterization (Phase 2) may indicate obvious management actions prior to completion of the CCMP. In these cases, implementation of management actions should proceed using funds other than those available under Section 320. EPA has found this concurrent approach so effective that the Agency will base the selection of any new estuaries on their ability to streamline the NEP phases, focusing on estuaries where:

- significant problem characterization is complete;
- a management framework analogous to a Management Conference already exists; and
- key state and local agencies have already committed to participate in and support the NEP process.

But to address less obvious or more complex problems, sound characterization of the estuary's environmental and management status is critical for developing action plans in the CCMP. During Phase 2, the Management Conference identifies and fills in information necessary to define priority problems, determine areas for action, and identify appropriate corrective actions. Figure 1 outlines a matrix of the Management Conference's major information needs.

Figure 1

Matrix of Management Conference Information Needs

Types of Information Desired ⇩ / Priority Problems ⇨	Priority Problem 1	Priority Problem 2	Priority Problem 3	Priority Problem 4	Priority Problem n
What activities or pollutants are problems in the estuary?					
Do they produce system-wide impacts?					
Are the impacts significant enough to affect the entire estuary?					
Do they affect potential uses of the estuary?					
Can the causes or sources be identified?					
Do existing programs address problems?					
How effective are they?					
If programs aren't effective, why not?					
What are some potential solutions?					
What institutional or management barriers impede solutions?					
What resources (funding, staff, public support, etc.) are available for addressing probems and their causes?					

PROVIDED BY THE TECHNICAL CHARACTERIZATION

PROVIDED BY THE BASE PROGRAM ANALYSIS

DETERMINED BY THE MANAGEMENT CONFERENCE (with recommendations from the Base Program Analysis)

During characterization and problem definition (Phase 2), the Management Conference assembles information (rows of this matrix) about suspected high-priority estuary problems (columns).

Each cell in this matrix actually represents from one to many pages of information answering the row's question for that priority problem. The Management Conference may decide to drop some priority problems from consideration (shown hatched above) because the technical characterization indicates they are not significant enough to require action in the CCMP.

Though essential, science cannot marshall action alone. Decision makers must also consider whether corrective actions are possible. Some problems, for example, may rate as high priorities for the CCMP because mechanisms to address them are already in place or could be readily implemented. The base program analysis, therefore, serves as a management characterization of the estuary through a process of:

- describing the framework of institutions and programs within which a CCMP will be implemented;
- assessing the effectiveness of that framework in managing and protecting the estuary's resources; and
- recommending, in conjunction with the technical characterization, issues to be addressed in the CCMP based on potential management enhancements or alternatives.

Together, the technical characterization and base program analysis create a receptive audience for program findings and recommendations and help the Management Conference secure effective mechanisms for addressing priority problems and their causes.

Table 1

Typical Sources of Estuary Problems

Point Sources
- Wastewater discharges from POTWs
- Direct wastewater discharges from industrial facilities
- Combined sewer overflows
- Stormwater discharges
- Animal feedlots
- Boat discharges

Other
- Shipping and marinas
- Dredging
- Shoreline development
- Freshwater inflow
- Sea level rise
- Other

Nonpoint Sources
- Agricultural runoff
- Urban and suburban runoff
- Silvicultural runoff
- In-place sediments
- Mining runoff
- Construction site runoff
- Landfill runoff/leachate
- Septic system leaks and overflows
- Atmospheric deposition
- Groundwater pollutant transfer

II. Elements of a Base Program Analysis

Base program analysis offers decision makers a clearer picture of the existing institutional "infrastructure" of the estuary. It examines the likelihood and extent of environmental improvements that could be achieved based on:

- existing institutional capabilities for implementing preventive and corrective actions;
- potential enhancements or opportunities to close gaps and strengthen weaknesses; and
- value of the estuary to the public as reflected in public and private resources directed to it.

To fully consider these factors, the Management Conference:

- develops an institutional inventory to identify programs likely to influence conditions in the estuary;
- analyzes these programs for their current effectiveness; and
- recommends management enhancements or alternatives to improve their ability to carry out recommendations of the CCMP.

Institutional Inventory

An institutional inventory is the first step in both the base program analysis and in developing a process to review federal financial assistance programs and development projects for consistency with the CCMP. In light of both these needs, EPA has identified a number of potentially relevant federal programs. (See bibliography at the end of this document.) These programs are merely starting points, however. NEP inventories are expected to identify an array of available mechanisms to protect the estuary that go beyond basic statutes, codes, and legal authorities. This would include powerful influences on input and behavior such as economic incentives, technical assistance programs, and the impacts of public pressure -- factors not typically considered part of a management infrastructure.

Core elements of the inventory include program authorities, regulatory and resource management programs, finance mechanisms, incentive programs and voluntary initiatives, planning efforts, and public education and technical assistance. Table 2 lists typically

available management tools that should be examined for their relevance to each NEP.

Table 2

Typical Management Framework

Below are programs, authorities, and activities which should be examined for their potential relevance in implementing CCMPs.

Legal/Management Infrastructure
- organizational structure
- administrative/decision-making process

Regulatory Programs
- laws/program authorities
- water quality
  - permitting/enforcement
  - standard setting/criteria development
- wetlands protection/dredging/dumping
- remediation/emergency response
- coastal zone management plans
- public health/welfare
  - shellfish sanitation standards
  - septic system standards
  - drinking water protection
- hydropower licensing

Resource Management Programs
- agriculture
- fisheries
- habitat/wildlife
- parks/reserves

Finance Mechanisms
- revenue access
- revenue management
- institutional arrangements

Voluntary Initiatives/Incentive Programs
- public/private efforts

Public Education And Technical Assistance

Planning Efforts
- growth management/corridor plans
- land use controls
- regional agencies

Key steps in developing the institutional inventory include:

- identifying activities or sources of concern for each potential priority problem;
- identifying existing programs, controls, or other tools for managing problem sources and activities;
- identifying standard topics to be included in the inventory;
- reviewing existing programs, activities, or organizations to identify those that should be added to the inventory; and
- describing each program based on interviews, questionnaires, and other background materials.

The information needed for the inventory lends itself easily to a matrix approach. Such an approach, illustrated in Figure 2, has several advantages, particularly for highlighting program operating mechanisms and authorities.

A matrix approach organizes information along lines the Management Conference is likely to find most useful by classifying programs by the tools they provide and by referencing programs to activities or sources of concern. It presents the information consistently among issues, making it easier to update databases and reports, as well as develop public outreach tools such as fact sheets, newsletters, and electronic bulletin boards.

The matrix format is also particularly helpful in highlighting programs' inadvertent or unexpected impacts on each other; for example, large-lot zoning to preserve open space may also result in sprawl, habitat loss, and uncontrolled nonpoint source pollution.

Finally, presenting the institutional inventory in a matrix simplifies the production of summary fact sheets for each program. Figure 3 illustrates a fact sheet based on a matrix. The information in such fact sheets can serve as the basis for further assessment of program effectiveness in protecting the estuary and its resources and can be revised (Figure 6) to accommodate the inclusion of new information from the institutional analysis.

Figure 2

Matrix Approach for the Institutional Inventory

Pollutants or Activities of Concern ⇩ / Management Framework ⇨	Legal/Management Infrastructure	Regulatory Programs	Resource Management	Finance Mechanisms	Voluntary Initiatives/ Incentive Programs	Public Education and Technical Assistance	Planning Efforts
Wastewater discharges from POTWs			■	■			
Direct wastewater discharges from industrial facilities	■	■					
Combined sewer overflows		■					■
Stormwater discharges		■					
Agricultural runoff	■						
Construction site runoff	■						
Mining runoff	■	■					
Silvicultural runoff		■					
Septic tank leaks and overflows		■					
(Continue on additional pages as necessary)							

SAMPLE INVENTORY FACTSHEET

Name of Program:
Priority Problem Addressed:
Implementing Organization:
Program Authorities:
Program Description:
I. Purpose
II. Functions
III. Geographic Jurisdiction
IV. Resource or Activity Managed
V. Funding
VI. Administration

Each blackened cell in the matrix represents the intersection of a management tool with a specific pollutant source or activity of concern. Each cell then serves as the basis for more detailed factsheets that represent standard data on issues of concern to the Management Conference.

Figure 3

Sample Inventory Fact Sheet

Name of Program:

Priority Problem Addressed:

Implementing Organization:

Program Authorities (laws, ordinances, contract):

Program Description:

I. Purpose

II. Functions

A. Regulatory
B. Resource Management
C. Finance Mechanisms
D. Voluntary Initiatives/Economic Incentives
E. Public Education/Technical Assistance
F. Planning

III. Geographic Jurisdiction

IV. Resource or Activity Managed

V. Funding

A. Source of Funding
B. Funding Rationale
C. Allocation of Funding
D. Proposed Budget and Actual Funding
E. Other Resources Available

VI. Administration

A. Organizational Structure
B. Decision-Making Process
C. Linkages to Cooperating Agencies
D. Total Staff

Institutional Analysis

After the institutional inventory has identified the programs most relevant for managing the estuary, those programs are analyzed further to describe their capabilities and effectiveness in relation to problems likely to be addressed in the CCMP. This analysis considers program funding issues as well as management strengths or gaps, and identifies an array of potential management enhancements or alternatives for consideration by the Management Conference. The focus is on how the framework and individual programs or activities within it are able to protect the estuary, *not* on the general effectiveness of the agencies responsible for those activities.

Figure 4 shows a checklist of major questions to address in the institutional analysis. The checklist is intended to ensure that the institutional analysis includes as much objective, quantitative information as possible, including data on resources invested and environmental results. This is also an opportunity to update the inventory to include any significant changes in programs, authorities, or resources committed to an existing activity. The checklist also seeks to ensure that a variety of views are represented in the analysis. The credibility of the analysis depends on incorporating the insights of both vested program participants and disinterested observers. In addition to appropriate members of the Management Conference, commenters should include:

- ❑ program staff and mangers;
- ❑ public and private sector individuals who deal with or are subject to the program;
- ❑ key legislative or political figures;
- ❑ persons with a stake in the resource;
- ❑ implementing agencies, particularly at the local government level; and
- ❑ informed members of the public.

The perspectives of these reviewers will provide more detail on each activity's strong points, gaps in authority, and any other factors that may hamper its effectiveness, as well as highlight areas for improvement. Figure 5 is a sample question guide based on the checklist. Figure 6 shows an inventory fact sheet revised to include information from the interview.

Figure 4

Checklist for Institutional Analysis

- ❑ Do existing programs already address priority problems?
  - laws/program authorities
- ❑ How effective are they?
  - enforcement successes
  - sustained budgets and staff
  - environmental results
  - public resistance to budget cuts
- ❑ If programs aren't effective, why not?
  - inadequate enforcement or limited authority to enforce
  - inadvertent or unanticipated impacts
  - inadequate staff or budget support
  - lack of monitoring to document results
  - regulatory gaps
  - lack of technical/scientific bases for decisions
- ❑ What institutional and management barriers impede solutions?
  - unclear program accountability
  - inconsistent or conflicting program missions
  - pressure to address symptoms rather than causes
  - fragmented program responsibilities
  - restricted financing or revenue-raising authorities
  - overlapping or duplicative responsibility
  - lack of coordination mechanisms
- ❑ What are some potential solutions?
  - consistent program accountability
  - cross-program review or coordination
  - increased support for enforcement
  - increased funding and staff allocations
  - technical assistance to improve implementation, particularly for local governments
  - increased monitoring
  - new legislation or enabling authorities
- ❑ What resources (funding, staff, public support, etc.) are available for addressing problems and their causes?
  - dedicated funding or authority to raise or earmark funds
  - complementary activities of other programs
  - lobbying/pressure from public and organized groups
  - leveraged resources from other programs

Figure 5

Question Guide for
Institutional Analysis Interviews

- ❑ Has the program or activity changed since information was gathered for the institutional inventory? Information such as an agency's mandate and goals, position in its government's organization, resource trends, scope of jurisdiction and responsibilities are very important in evaluation.
- ❑ What are the most successful aspects of this program or activity -- things that work well and should be capitalized upon in the future?
- ❑ What innovative programs or approaches could serve as models for future activities?
- ❑ Are there any gaps in existing statutory authority that limit ability to take action on one or more of the priority problems?
- ❑ What kinds of problems has this program experienced, aside from a lack of authority? For example:
  - unclear goals, responsibilities, or procedures?
  - conflicting efforts by other programs?
  - difficulties in coordinating with other organizations?
  - drastically insufficient resources?
- ❑ Do other activities duplicate any of this program's efforts?
- ❑ Are there complementary programs that enhance each other's effectiveness?
- ❑ Are there programs that impede each other's effectiveness?
- ❑ How much support does the program enjoy from the public and the legislature? What is the extent of cooperation with other agencies and the potential for leveraging?
- ❑ What specific actions could improve the effectiveness of the institutional framework?
  - What current activities should be accelerated or expanded?
  - What new efforts should be instituted? Are new authorities or entities required?
  - What obstacles to effectiveness must be overcome?
  - What should be the Management Conference's action priorities?
- ❑ For each action suggested, what are the appropriate tasks, actors, and timing?
- ❑ What are the potential barriers to redirection? How can support be generated?

Figure 6

Sample Base Program Fact Sheet

This fact sheet shows an inventory fact sheet that has been updated. The new Section VII summarizes discussions on the effectiveness of the program and identifies the source of the observations.

Name of Program:

Priority Problem Addressed:

Implementing Organization:

Program Authorities (laws, ordinances, contract):

Program Description:

I. Purpose

II. Functions

- A. Regulatory
- B. Resource Management
- C. Finance Mechanisms
- D. Voluntary Initiatives/Economic Incentives
- E. Public Education/Technical Assistance
- F. Planning

III. Geographic Jurisdiction

IV. Resource or Activity Managed

V. Funding

- A. Source of Funding
- B. Funding Rationale
- C. Allocation of Funding
- D. Proposed Budget and Actual Funding
- E. Other Resources Available

VI. Administration

- A. Organizational Structure
- B. Decision-Making Process
- C. Linkages to Cooperating Agencies
- D. Total Staff

VII. Report

Interviewee:
Perceived Strengths:
Perceived Weaknesses:
Effects From or On Other Activities:
Suggested Improvements:

Base Program Analysis Report

The final base program analysis presents findings on the overall management framework for the estuary based on a synthesis of the institutional analysis and consideration of crosscutting issues. These findings form the basis of recommended management changes, including suggestions for financing mechanisms. They further suggest issues that should be addressed as priorities in the CCMP because of the feasibility of corrective actions.

Figure 7 suggests an outline for the base program analysis report based on the information needs first identified by the Management Conference. In this format, the report first briefly describes the nature and extent of each priority problem, summarizing the conclusions of the technical characterization. Then, it integrates and condenses the relevant inventory and assessment fact sheets pertaining to the priority problems. Finally, the report discusses gaps and management needs documented in the institutional analysis.

This discussion is the heart of the base program analysis and identifies resource and management changes that must occur if priority problems are to be successfully addressed in the CCMP. The intent is to provide clear, objectively documented conclusions that provide the Management Conference with a number of options for formulating the CCMP.

A useful approach to developing management options is to examine case studies in areas of particular concern to the Management Conference, such as the framework for managing development, or the process of issuing permits. By comparing initial program goals with final administrative and environmental outcomes, case studies can be especially helpful in reviewing such complex issues as the adequacy of scientific and technical support for decisions, the standards used in decisionmaking, the consistency of decisions, and the unavoidable political considerations affecting decisionmaking.

Case studies are also an opportunity to provide real world information on the costs of pollution controls and to review financial mechanisms available for implementing them. Identifying sources of funding in advance is critical to the success of the CCMP. EPA has studied a number of approaches for financing resource management (See bibliography at the end of this document), including pollution prevention and economic and market incentives. Economic incentives include tax subsidies or credits, grants, and awards, while economic disincentives usually include effluent or emission fees and fines. Another financing option is to establish special-purpose governments -- such as regional authorities, districts, compacts, or commissions -- to assist in regional projects or projects with a limited group of

Figure 7

Sample Outline for the
Base Program Analysis Report

Base Program Analysis Report For Moonlight Bay

I. Executive Summary

II. The Estuary and Its Problems
(brief overview of technical characterization findings)

A. Priority Problem #1
(a problem the Management Conference has decided to address in the CCMP)

1. The Existing Framework for Managing the Problem
(from inventory fact sheets)

2. Strengths and Weaknesses of Existing Programs
(from assessment fact sheets)

3. Synergism or Conflicts Among Existing Programs
(from assessment fact sheets)

4. Gaps in the Institutional Framework
(from interviews and other sources)

5. Recommended Improvement Actions
(from assessment fact sheets and other sources)

B. Priority Problem #2

(repeat section headings from Priority Problem #1)

N. Priority Problem #n

(repeat section headings from Priority Problem #1)

III. Cross-Cutting Findings and Recommendations

IV. Case Studies

V. Alternative Management Options

VI. Appendix — Inventory and Assessment Fact Sheets
(optional)

beneficiaries or purposes. Although limited, special-purpose governments typically have powers to raise and manage money to finance operation, construction, and upkeep of physical plants; many have authority to levy *ad valorem* taxes or to issue their own bonds. A case study examining the effectiveness of organizations such as the Cape Cod Commission or the Puget Sound Water Quality Authority offers a chance to apply the lessons of their experience and avoid mistakes or lost opportunities.

Despite the availability of such models, however, the universe of financing options can be limited. Local governments in particular often are restricted by state constitutions from raising revenue for certain purposes. The base program analysis, thus serves as an important catalyst to build financing capacity for environmental quality in general, as well as for specific CCMP action plans.

Public Report

Although components of the technical characterization and base program analysis may be too lengthy and complex for broad public distribution, the public will be extremely interested in the results of these studies. To facilitate the dissemination of this information, the Management Conference may wish to publish a *State of the Estuary Report* aimed at audiences with no scientific or regulatory background in environmental protection or natural resources management. This report can summarize clearly the key findings of both characterizations, describing the priority problems, the existing management framework, and potential avenues for improvement. All estuary programs can benefit from a professionally written and visually attractive *State of the Estuary Report* that highlights the main findings and conclusions for the general public.

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