

NEW JERSEY MARITIME RESOURCES
An Agency of Prosperity New Jersey
and
The Department Of Commerce And Economic Development

PROCEEDINGS
of the meeting

**THE DREDGING ISSUE:
QUESTIONS TO BE ANSWERED THROUGH
HARBOR SEDIMENT STUDIES**

September 23, 1997

OFFICE OF MARITIME RESOURCES
20 WEST STATE STREET
TRENTON, NEW JERSEY

10:00 AM

On September 23, 1997, the NJ Office of Maritime Resources hosted a meeting for scientists on research needs pertaining to sediment contamination in the Port of New York and New Jersey. The meeting agenda, list of questions that need to be answered by research studies, list of participants, and minutes are included in the attachments to this document.

The meeting was moderated by Dr. Frank Bohlen, from the University of Connecticut. Meeting participants first described the present and planned research initiatives sponsored by the USEPA, the NYS DEC and the NJ DEP. Research efforts of other institutions were also presented. The following summarizes major discussion items from the scientists and organizations represented at the meeting.

Current Research Efforts and Initiatives:

The NY/NJ Harbor Estuary Program (HEP) Comprehensive Conservation and Management Plan has been a cooperative effort between the states of NY and NJ and the USEPA to restore environmental conditions in the Harbor-Estuary and NY Bight. The agreement was signed by the Governors of both states and the USEPA in August, 1997. The plan's goals, with respect to toxic contamination reduction are:

1. To establish and maintain a healthy and productive Harbor/Bight Ecosystem, with no adverse ecological effects due to toxics.
2. To ensure that fish, crustacea and shellfish caught in the Harbor/Bight are safe for unrestricted human consumption.
3. To ensure that dredged sediments in the Harbor are safe for unrestricted ocean disposal.

The priority projects for the NY/NJ HEP are contaminant source reduction, trackdown and cleanup, and CSO abatement. Contaminant source trackdown includes monitoring and data analysis.

Toxics Trackdown component

With respect to HEP CCMP Toxic Source Trackdown, the objective is to identify and eliminate discrete, elevated sources of organic chemicals into the Harbor. The HEP funding for this project is \$5 million for a 5 year program. Point sources, such as POTWs are instituting pilot projects for contaminant source reduction. With respect to harbor tributaries, funding for source trackdown harbor wide recommended funding is from NYSDEC (\$575K) and USEPA (\$412K). A separate initiative is also underway for the Arthur Kill--\$900,000 is being used for source trackdown and reduction. Expanding the toxics trackdown to the other harbor areas will require an additional \$3 million over the next 3 years for source reduction programs.

The HEP CCMP includes a Toxics Monitoring and Modeling component. The purpose is to define a management approach for contaminants in water, biota, and sediments. The modeling issue remains contentious, but a mass balance approach to loadings in the harbor is recommended and appears to have consensus. The Thomann-Farley model is funded at \$339K. HEP further recommends \$10 million for a monitoring program for the Harbor. Rutgers University has proposed to develop a harbor-wide sediment transport model at a cost of \$2.5 million. The meeting participants recommended a model evaluation group be established to coordinate data needs for the model and coordinate data collection and management.

The HEP CCMP includes Sediment Toxicity Identification Evaluation (TIEs) as an important phase of Harbor sediment studies. The objective is to identify the chemicals causing sediment toxicity. WRDA (Phase 1) provides funding for TIEs for marine whole sediment testing. The USEPA is funding TIEs through pore water studies by the Narragansett, RI Lab. The EPA is funding (\$130K) to the Midwest Science Research Center, USGS, to develop marine whole sediment methods for removing organic toxicity. Additional TIE research is being undertaken by SUNY Stony Brook regarding whole sediment TIE methods. Additional TIE research is needed and should be scheduled for priority funding.

The HEP CCMP includes a CSO, combined sewer overflow action component. Each state needs to implement the Final National CSO Control Policy through their respective

permitting systems. Enforcement actions need to be included in NPDES permits. Harbor-wide estimates for CSO abatement runs from \$2 billion - \$6 billion. Each state is working with CSO owners and operators to ensure a coordinated cooperative approach to CSO abatement.

General Recommendations of the Scientist Panel:

*Toxics
tracking
component*

1) Data Management--A common system for data management systems must be developed. The information must be available through the internet and archived in a centralized system. All data must be QA/QC controlled and available to the public. Methodology for data collection must be standardized.

2) A model evaluation group must be established to resolve issues surrounding model development and data needs.

3) A definition of "clean" sediment must be developed; will standards be set based on a chemical definition, biological definition, or a combination?

**
Toxics
tracking
component*

4) Contaminant reduction--What needs to be done short & long term to "clean up" dredged materials. Criteria must be set by USEPA/NJ/NY. Sources must be identified. Baselines must be set so that progress can be assessed, regulatory controls can be implemented and data can be provided for the modeling effort.

5) Contaminants of concern need to be identified. We need to determine bioavailability of PCB, DDT, Hg and Dioxins in harbor sediments. TIE research must be completed by the Spring of 1998 for the modeling efforts.

Summary of information still required to answer questions relating to harbor sediments:

1. Data for model calibration
2. Model development (mass balance vs. harbor wide)
3. Air monitoring--more stations/dioxins
4. TIEs
5. Data management plan
6. Long term monitoring

Meeting Follow up: A follow up meeting for scientists to coordinate research will be held in December.

effects associated with contaminated sediments, establish what the causal factors are, and work out, in a regulatory mode, how to address them. Authority has been given, to USEPA, under the Clean Water Act, to assess chemicals that are causing adverse impacts. Mr. Ausbel asked for some help from the scientists to answer the first question, but the basic comment would be that the point of our monitoring program is to answer those basic questions.

The answer from the group was that chemical contaminants are dynamic, not at steady state.

Dr. Dennis Suszkowski gave a presentation on the Sediment Contaminant Reduction Work Group. Dr. Suszkowski presented the Contamination Assessment and Reduction Project (CARP). The group began with addressing the overall questions, that are listed in the packet, and about 80% of the questions could be combined to this question of the work group: "What contaminant reduction measures should be undertaken to ensure that future dredged sediments are clean enough to meet unrestricted disposal or beneficial use criteria?" and "What action can we yield the quickest results?" The *Goal?* (1) If you reduce contaminants, are you going to see a response in sediments?; and (2) Are your sediments going to be clean, from a criteria standpoint?

You need to understand these questions within the context of the *Bi-State Plan?* The goal was to have a simple mass balance approach. The objectives are to identify and quantify the sources of contaminants of concern, from a dredged material standpoint, and to establish baseline levels of contaminants of concern in water, sediment, and fish tissue. Then to establish a regulatory framework and take action. The plan is a two-pronged attack on reducing contaminants: (1) development of the Harbor-wide assessment on where the contaminants are coming from, and what might happen if we reduce some of them, if not all of them; and (2) programmatic implementation--to track down and cleanup contaminants. Ultimately, the goal is to identify contaminants of concern. To begin with, we had to use with available criteria and results of testing that was based on ocean disposal testing data.

There are two problems with current sediments, from the ocean dumping point of view. There is a problem with bioaccumulation, toxicity, or both. And there has been unacceptable levels of bioaccumulation. Routinely, high levels of DDT, dioxins, PCB's, and some extent some years ago, mercury show up; these were immediately put on our list of contaminants of concern. With respect to TIE's, 70% of the projects being tested in the Harbor show unacceptable toxicity. The obvious management question is what is causing that toxicity? The answer is, we don't know. There are several research projects that are pointing to organic compounds, but the answer to this question needs to be our real focus. If we are going to use a toxicity criteria, then we better know what is causing that toxicity. The hope, from two years ago, is to come up with an assessment of

scenarios that make the most sense to reduce contaminant loads. The largest focus of the Work Group is actually quantifying contaminants from major sources and getting baselines.

Dr. Suszkowski discussed some ongoing monitoring projects, that are funded, and relate directly to our Contaminant Assessment Reduction Project. CARP monitoring of contaminant sources--has received major funding from the Port Authority and the Empire State Development Corp., approximately \$10 million. The track down work, using PICES and NY State coring data, is funded at an additional \$3 million. REMAP II--the Regional Environmental Monitoring and Assessment program of EPA, was carried out in 1993 and 1994. It will be redone over the next two years. The surficial sediment collection coincides well with the HEP program.

Sheldon Lipke asked if these are only NY State programs? What about NJ funding? What will be done in the NJ tributaries, Newark Bay, etc?

Dr. Suszkowski asked someone from NJ to address that question.

Dr. Mary Gastrich clarified that this question will be answered in her presentation later.

Dr. Bohlen indicated that there seems to be a good amount of information available from previous and ongoing projects.

Dr. Suszkowski discussed data management techniques. The US Army Corps of Engineers is now funding (\$500,000) a conceptual plan for data management. The Corps is also working on putting existing data sets into a single database. (Battelle Laboratories has received the contract for this project).

Dr. Suszkowski reviewed information on significance of CSO toxics loadings to the harbor. The preliminary modeling Bob Thomann and Kevin Farley have done, basically models PAHs and the response of sediments given to a variety of chemical loadings.

With respect to research, the Work Group, has been funding research, without waiting for funds from the States. Dr. Suszkowski listed the projects, models, and funding sources. There is more than \$1million dollars in research that is ongoing, which gets to the issues of concern. A list of Projects is attached.

Dr. Suszkowski discussed research needs that are not currently being funded. The following list comes from the Work Group deliberations. 1) There is a desire to have the data collection done that would fit closer into the modeling work. Decisions need to be made on how to get that data and do new model runs of the PCB, PAH, and dioxin. 2) In addition, there is a desire for a full assessment

OVERHEAD SLIDES PRESENTED BY

DR. DENNIS SUSZKOWSKI

HUDSON RIVER FOUNDATION

Work Group Creation

NY/NJ Harbor
Estuary Program

Dredging Forum

Sediment Contamination
Reduction Work Group
(SCRWG)

Sediment Contamination Reduction Plan

Goal: Turn Category II and Category III
dredged material into Category I material



History of Plan

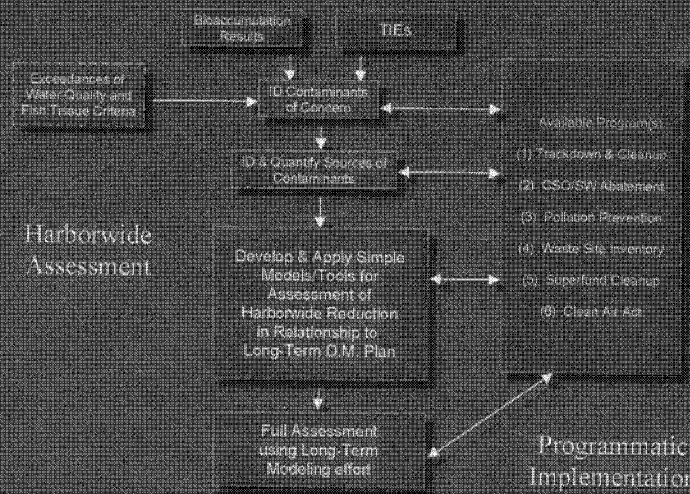
- SCRWG formed in Summer of '94
 - Charged with developing a plan to reduce contaminant loads such that dredged material disposal would not be constrained by the contamination (e.g., only have Cat. I material in the future)

History of Plan (cont.)

Issues given to SCRWG

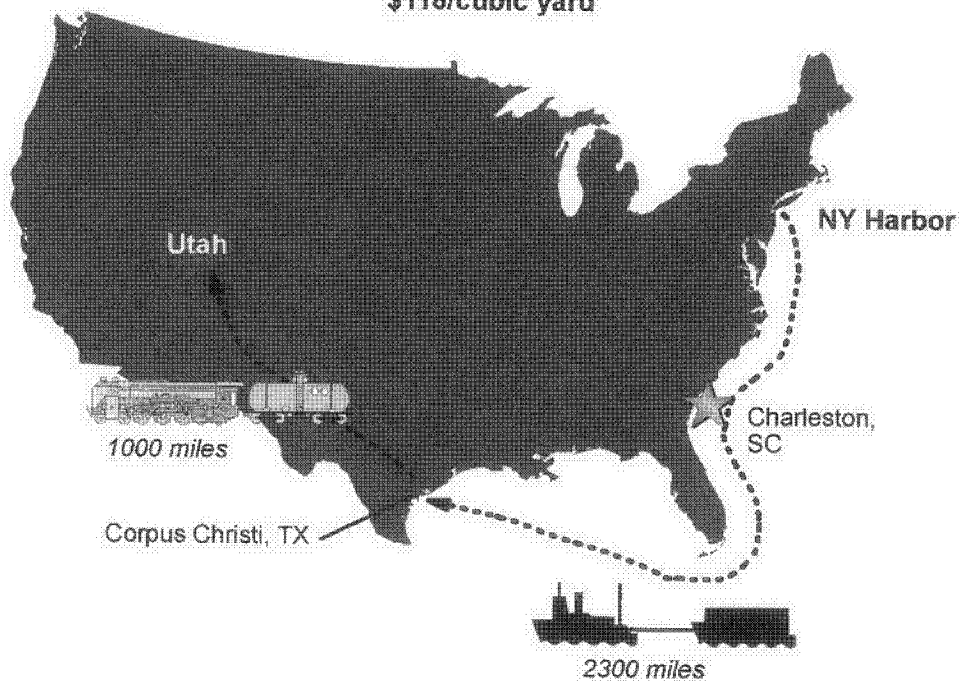
- What are the contaminants of concern?
- Where do they come from?
- In what quantities?
- How can they be reduced or eliminated?
- If sources eliminated, when will DM be clean?
- Does CCMP adequately address these issues?

Sediment Contamination Reduction Plan



Dredging of Howland Hook Terminal - Fall 1995

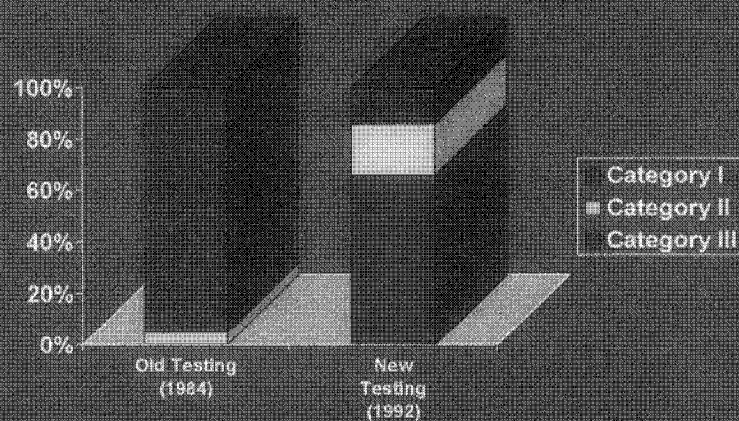
\$118/cubic yard



Dredged Material Categorization

Category	Description	Disposal Options
I	No bioaccumulation No toxicity	Ocean dumping Beneficial uses
II	Bioaccumulation No toxicity	OD w/ capping Small-scale upland Containment facilities Decontamination
III	Toxicity and/or bioaccumulation	Small-scale upland Containment facilities Decontamination

Dredged Material Categorization



Evidence for Chemical-based Toxicity

From TIEs

organics (ionic
& non-ionic),
hydrogen
sulfide

ammonia,
organics

organics (ionic
& non-ionic),
ammonia

from Ho, et al.
(1993)



From Correlations

PAHs*

PCBs, dioxins &
pesticides*

Harborwide
metals* **

PCBs, PAHs,
pesticides**

*Long, et al. (1995)

**Scott, et al. (1990)

Monitoring Plan

- External Sources
- Ambient Conditions
 - Water
 - Sediment
 - Biota
- PCBs
- PAHs
- Dioxins & Furans
- Hg & Cd
- DDT
- Chlordane
- Dieldrin

Hudson River
Foundation

External Sources

- STPs
- CSOs & SWOs
- Direct Industrial Discharges
- Tributaries (Hudson, Mohawk, Passaic, Hackensack, Raritan Rivers & minor tributaries)
- Landfills
- Accidental Spills
- Atmospheric Deposition

Hudson River
Foundation

Ambient Monitoring

Water

- 10 locations
- 4 times per year

Sediment

- at water locations
- Surficial sediments - REMAP coordination
- Additional cores

Hudson River
Foundation

Ambient Monitoring

Biota

Zooplankton

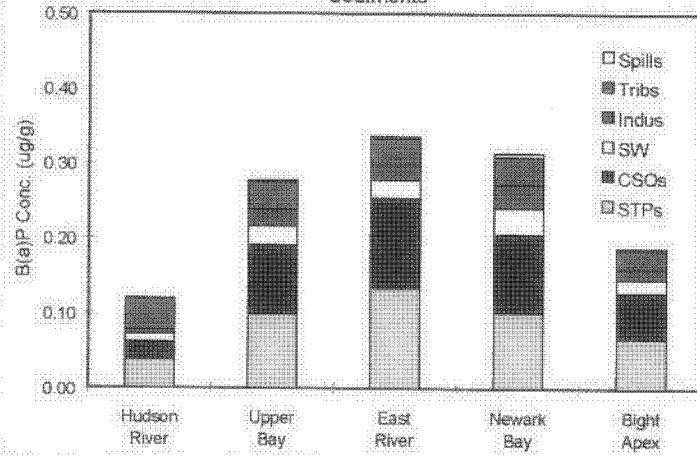
Benthic invertebrates (bivalves, worms & shrimp)

Fish & Crabs (mummichog, white perch, striped bass, American eel, winter flounder & blue crab)

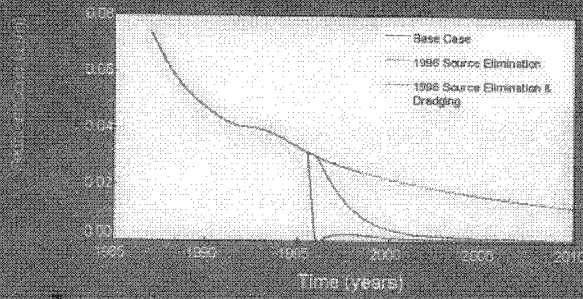
Birds (cormorants)

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Calculated Load Response for Benzo(a)pyrene in Surface Sediments



Concentrations of Tetrachlorobiphenyl
in Newark Bay/Arthur Kill Surface (2.5 cm) Sediments



Hudson River
Foundation

OVERHEAD SLIDES PRESENTED BY

DR. MARY GASTRICH

NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION

INTRODUCTION TO NJ TOXICS TECHNICAL WORKPLAN

CHRONOLOGY
DEVELOPMENT OF NJ TOXICS TECHNICAL WORKPLAN TO IMPLEMENT
THE JOINT DREDGE PLAN

- **1996:** HEP CCMP APPROVAL, GOVERNORS JOINT DREDGE PLAN APPROVAL, AND Performance Partnership Agreements (NEPPs) with NJDEP and EPA; formation of Dept's toxics technical team;
- **January 1997:** Frank McDonough, Asst. Comm. Nagy, Drs. Mary Gastrich and Allan Stern met with the NYSDEC Toxics Technical Team headed by Jeff Sama to discuss implementation of the Joint Dredge Plan;
- **February 1997:** Assistant Commissioner Lew Nagy sent a letter to Mr. Sama formalizing the Dept's toxics technical team, chaired by Dr. Mary Gastrich;
- **March 1997:** The Dept. team members met to discuss implementation and existing efforts underway and/or recommended for NJ waters; Dr. Fred Grassle, co-chair of the HEP STAC committee, and Director of Rutgers Univ's Institute of Marine & Coastal Sciences was asked to coordinate planning and proposals with NJDEP and other NJ institutions that would meet the HEP CCMP (and the Environmental Monitoring Plan developed at a meeting at Rutgers 2 yrs earlier), and Joint Dredge Plan goals;
- **April 1997:** A meeting at NJDEP of HEP committee representatives (EPA, STAC, etc.) and Dept. managers to discuss implementation efforts;
- **May 1997:** A HEP meeting at Hudson River Foundation meeting to discuss HEP toxics implementation; NJ researchers give presentations on proposed work and discuss their objectives; further discussions ensue between the co-chairs of the STAC; Grassle, Bruno, Korfiates and Hazen and others attend; NYSDEC forwards a draft technical workplan and Dr. Simon Litton (NYSDEC) contacts the Dept. on the coordination of the collection of loadings data in the Harbor; NYSDEC indicates that they are considering having the NJ branch of USGS to collect loadings data in NY/NJ;
- **June 1997:** As a result of NYSDEC's proposed planning with USGS, NJDEP meets with USGS to discuss their proposed work with NYSDEC and to coordinate efforts in NJ;
- **July 1997:** Meeting at NJDEP with USGS, Fred Grassle, and Mike Bruno to coordinate NJ's toxics technical proposal; Dr. Korfiates's submits proposal;
- **August 1997:** Drafting of NJ toxics technical workplan
- **September 1997:** Commissioner approval of NJDEP Toxics technical workplan;
- **September 23:** Frank McDonough meeting to identify all work products and costs and discuss NJ Toxics Technical Workplan;
- **October 27:** Meeting in Trenton to finalize comments on workplan
- **November 7:** Written Comments on workplan due; continuing discussions and coordination with HEP and others.

**NEW JERSEY TOXICS TECHNICAL WORKPLAN
TO IMPLEMENT THE JOINT DREDGE PLAN**

PURPOSE:

To provide a technical program for New Jersey that will implement the actions of the NY-NJ Harbor Estuary Program's CCMP.

GEOGRAPHIC AREA:

Watershed Management Areas (WMAs)

- Hudson, Hackensack, Passaic Rivers (WMAs 4, 5)**
- Newark Bay (WMAs 4,5)**
- Arthur Kill (WMA 7)**
- Raritan and Sandy Hook Bays (WMA 12)**

TOTAL COST: \$9,355,289

**OVERALL TOXICS SOURCE REDUCTION GOAL FOR THE
NY-NJ HARBOR ESTUARY WATERSHED**

**RESTORE AND MAINTAIN A HEALTHY A PRODUCTIVE
ECOSYSTEM WITH NO ADVERSE HUMAN HEALTH OR
ECOLOGICAL EFFECTS DUE TO TOXICS (HEP CCMP)**

MANAGEMENT OBJECTIVE 1

ENSURE THAT FISH, CRUSTACEA AND SHELLFISH CAUGHT IN THE HARBOR/BIGHT ARE SAFE FOR UNRESTRICTED HUMAN CONSUMPTION (HEP CCMP).

**SUB-GOAL (HEP CCMP) T-10.1
ESTABLISH A CONSISTENT METHODOLOGY TO ASSESS RISK
AND IMPROVE COMMUNICATION OF FISH ADVISORIES**

APPROACH:

The project will test the hypothesis that individuals and their families who consume locally caught NY-NJ Harbor seafood have higher exposure to persistent contaminants from the NY-NJ Harbor sediments, than the general population in the NY-NJ Harbor region and therefore are at higher risk to a series of adverse health issues such as neurological problems and overall cancer risk

PROJECT COST: \$1,502,657

Management Objective 2:

RESTORE AND MAINTAIN AN ECOSYSTEM WHICH SUPPORTS AN OPTIMUM DIVERSITY OF LIVING RESOURCES ON A SUSTAINED BASIS (HEP CCMP GOAL)

SUB-GOAL:

Develop the capability to evaluate the current status and future trends in ecological health and diversity in the NY-NJ Harbor Estuary.

APPROACH:

Based on the results of the work in other management objectives, and where chemicals of concern are identified in specific media in specific locations, this work will involve the implementation of the HEP CCMP Environmental Monitoring Plan (CCMP Appendix 5).

This work will support an ecological risk assessment in the Newark Bay Complex and New Jersey-specific assessment of ecological quality in the NY-NJ Harbor Estuary.

PROJECT COST: \$285,000

MANAGEMENT OBJECTIVE 3

ENVIRONMENTALLY-BASED RISK ASSESSMENT IN THE HARBOR INCLUDING NEWARK BAY COMPLEX. TO UNDERSTAND THE FATE AND TRANSPORT OF SEDIMENT AND TOXIC POLLUTANTS IN THE HARBOR AND THE NEWARK BAY COMPLEX. (HEP CCMP ACTIONS T-6.1, T-6.2, T-9.2, T-12.12, T-13.2, AND WILL CONTRIBUTE TO T-13.3).

APPROACH

A combined field and data collection coupled to a modeling effort. Development of a coupled hydrodynamic and sediment transport model for use in multimedia environmental modeling of toxics contaminates in the NY-NJ Harbor Estuary. This work will contribute to the framework for sampling and mass balance modeling using the Thomann model. In addition, a characterization of sediment, organic carbon and chemical loadings (including trace metals) at selected tributaries in New Jersey that discharge to the Harbor will be conducted and coordinated with New York.

Project cost:

Hydrodynamic/Sediment transport model: \$2,534,432

TOPS SAMPLING: \$1,168,100

Grand Total: \$3,702,532

MANAGEMENT OBJECTIVE 4

MITIGATION OF UPLAND SOURCES CONTRIBUTING TO THE CONTAMINATION OF THE HARBOR.

APPROACH:

- **Develop a comprehensive database of all major upland sources of contaminated sediments and assess their relative contribution to the pollution to the Harbor;**
- **Conduct feasibility studies and develop plans for mitigating major sources of contaminated sediment;**
- **Develop plans for environmentally acceptable dredging of “hot spots” of contaminated sediment in upland Harbor tributary areas and assess the feasibility of in-situ and ex-situ decontamination technologies to mitigate source areas.**

Project Cost: \$3,000,000

**SUMMARY OF NJDEP PROPOSED PROJECTS
TO IMPLEMENT THE JOINT DREDGE PLAN AND THE HEP CCMP**

9/17/97

Management Objective	HEP CCMP actions	Principal Investigators; Institution	Time Frame	Total Cost
1. Ensure fish, crustacea and shellfish caught in the Harbor/Bight are safe for unrestricted human consumption	H-10.1	NJIT: Spillers Ding, Labib Chan	3 yrs	\$739,224
		Rutgers EOSHI: Lioy		\$763,649
2. Restore and maintain and ecosystem which supports an optimum diversity of living resources on a sustained basis	HEP CCMP EMP Appendix 5	NJDEP: DSR	3 yrs	\$285,000
3. Environmentally-based risk assessment in the Harbor including Newark Bay Complex: To understand the fate and transport and sediment and toxics pollutants in the Harbor and Newark Bay Complex.	T-6.1,6.2, 9.2 12.12, 13.2, 13.2	Rutgers: IMCS Glenn, Haidvogel	3 years	\$2,534,432
		Stevens: Bruno USGS	2 years	\$1,168,100
4. Dredged Material Management A plan to mitigate upland sources contributing to the contamination of the Harbor.	HEP CCMP Dredge	Stevens:Korfiates	5 yrs	\$3,000,000

TOTAL COST: \$9,355,289

SLIDES PRESENTED BY

DR. ROBERT HAZEN

NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHAPTER 1

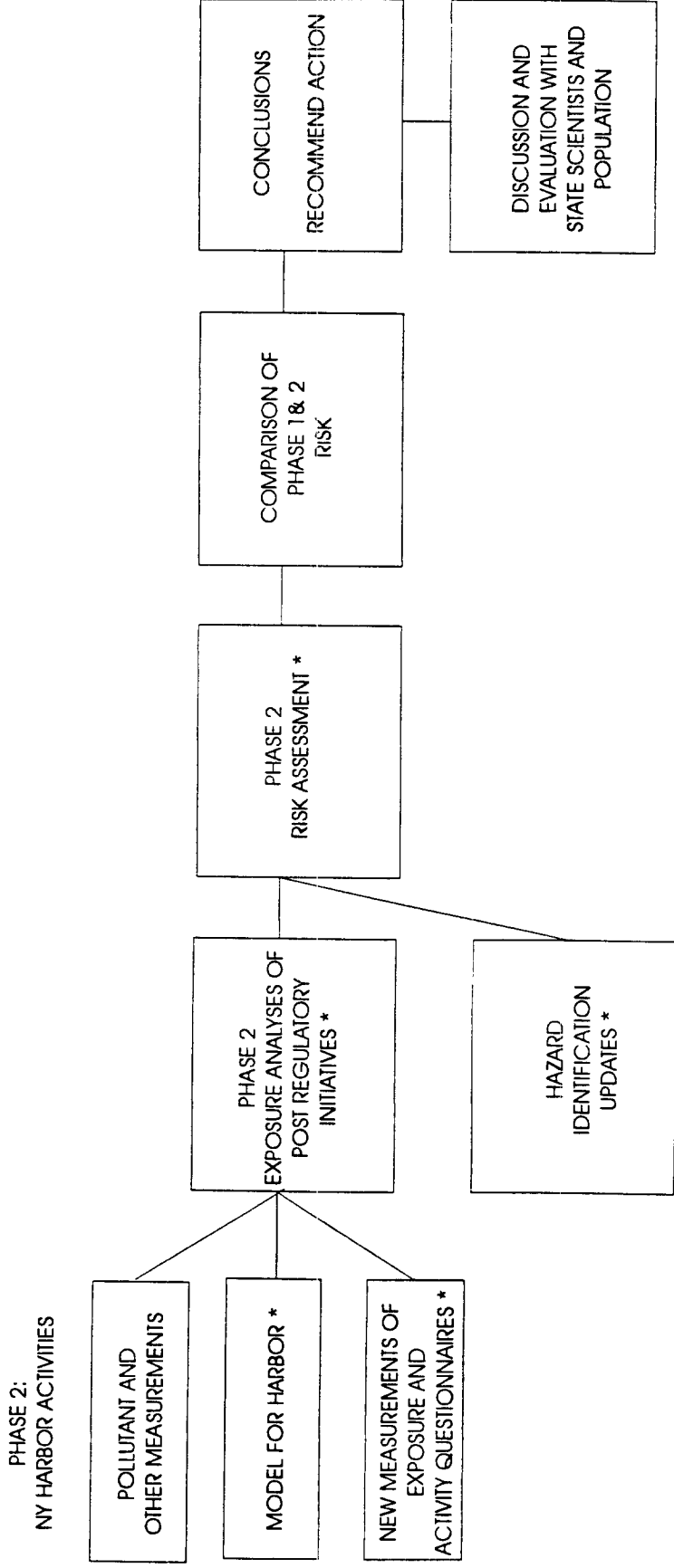
**EXPOSURE AND DOSE TO PERSISTENT
CONTAMINANTS TO HARBOR SEAFOOD
CONSUMERS**

**PAUL J. LLOY (PI) - EOHSI
CLIFFORD P. WEISEL (CO-PI) - EOHSI
MICHAEL GALLO (CO-I) - EOHSI
NATALIE FREEMAN (CO-I) - EOHSI
ROBERT HAZEN - NJDEP
KERRY KIRK PFLUGH - NJDEP**

CONCEPT

- ✓ **Individuals and their families who consume locally caught fish have higher exposure to persistent contaminants from the Harbor sediments than the general population in the NJ/NY region**
- ✓ **therefore evaluation of their health risk based on exposure and body burdens measurements will provide an estimate of the upper end of the risk distribution and**
- ✓ **risk models used to assure protection of the public health associated with release of contaminants within the Raritan/Hudson Estuarine System**

STUDY OF HUMAN EXPOSURE TO CONTAMINANTS IN THE HARBOR (SHECH) : PHASE 2 - RE-MEASURE EXPOSURE AND DETERMINE CHANGES IN RISK POST REGULATORY INITIATIVES



* COMPONENTS WITHIN SHECH

ROLES

PAUL J. LIOY (PI) - EOHSI - oversee implementation of project and evaluation of exposure

CLIFFORD P. WEISEL (CO-PI) - EOHSI - oversee biomarker measurements and analysis of exposure samples

MICHAEL GALLO (CO-I) - EOHSI - oversee the risk analysis to the population

NATALIE FREEMAN (CO-I) - EOHSI - oversee the recruitment and evaluation living/dietary habits of population

ROBERT HAZEN - NJDEP - assure relevance of risk and exposure assessment to overall project & Governmental needs

KERRY KIRK PFLUGH - NJDEP - coordinate interactions with subject population

APPROACH

EXPOSURE ASSESSMENT

- **Identify potential participants based on consumption of seafood caught in harbor and matched controls**
- **Obtain cooperation for sampling a portion of seafood caught, response to questionnaires and biological samples**
 - **Analyze environmental, food and biological samples**
- **Calculate exposure to participants associated with Harbor caught seafood**
- **Project exposure distribution based on NJIT's model prediction**

APPROACH

RISK ASSESSMENT

- **Combine measured exposure with NJIT's modeled distributions of contaminants in bay to obtain a population risk assessment**
- **Evaluate exposure and risk relative to environmental and ecological data being collected throughout the Raritan/Hudson Estuarine System by others**
- **Apply exposure assessment to cancer and non-cancer (neurotoxicity, immunotoxicity, reproductive toxicity and endocrine disruption) risk models to extrapolate potential risk**
 - **Evaluate potential risk associated with predicted contaminant release from NJIT's model to ascertain the level of protection to the public**

DIETARY EVALUATION

- ⇒ Questionnaire response
 - ⇒ Catch evaluation
 - ⇒ Duplicate plate food analysis
 - ⇒ Seasonal and family variations
- ⇒ Determine the species, frequency, amount and preparation techniques of the seafood consumed
- Compare contaminant concentration measured to values in seafood, water and sediments measured by others in the Raritan/Hudson Estuarine

TARGET ANALYTES

**(chosen based on presence, high level of toxicity
and bioaccumulation properties)**

Mercury and methyl mercury

**Selected Polychlorobiphenyls (based on relative
toxicity)**

Chlordane and DDT

EXPOSURE AND BIOLOGICAL SAMPLES

Sediments

Food (raw and prepared)

Hair (mercury)

Blood (serum)

**Breast Milk (PCBs) - if high levels identified in
population**

EXPOSURE PATHWAYS

Need to put exposure from locally caught seafood, which past exposure assessment suggests is a major pathway in perspective relative to other

**Ingestion - Food - Seafood, caught & purchased
Contaminated dust & soil for children**

**Inhalation - Air - windblown contaminated dust/soil
Occupational**

**Dermal - contact with contaminated water, soil &
sediment**

EXPECTED PRODUCTS

- **Risk Assessment for Persistent Chemicals in the Raritan/Hudson Estuarine System**
- **Exposure assessment of maximally exposure population associate with seafood consumption**
- **Interaction with NJIT's model and other participant's measurements of environmental and ecological concentrations to predict distribution of risk and to maximize health benefit from control of sources to the Estuarine system**

**STUDY OF HUMAN EXPOSURE TO
CONTAMINANTS IN THE HARBOR**

William R. Spillers

Professor and Chairman
Department of Civil and Environmental Engineering
New Jersey Institute of Technology

STUDY OF HUMAN EXPOSURE TO CONTAMINANTS IN THE HARBOR

Environmental Management (Risks to State Residents and Their Implications)

Scientific Basis

Fate and Transport Model

(Fugacity Model)

Extend Existing Models

Calibrate Model Using Physical Test Data

Environmental Scenarios

What If?

Calibrate Physical Test Program

Management Issues

Context of Information (NASA Approach)

Permitting Issues, Scenarios, ...

System Accessibility over the Web

Environmental Health of the State

STUDY OF HUMAN EXPOSURE TO CONTAMINANTS IN THE HARBOR

NJIT Project Staff

W. Spillers – Project Director
Management Model

M. Labib – Fugacity Model

Paul Chan –
Computer Model

Yuan Ding -

NJDEP Project Monitor

Robert Hazen

Multimedia Environmental Modeling of the New Harbor

Dr. Mohamed Labib
New Jersey Institute of Technology

Goals of this Modeling Effort

- Predicts fate and transport of contaminants in the environmental compartment
- Provides contaminant distribution in all phases i.e. water, air, sediment etc.
- use contaminant distribution for risk assessment calculation

Model Inputs

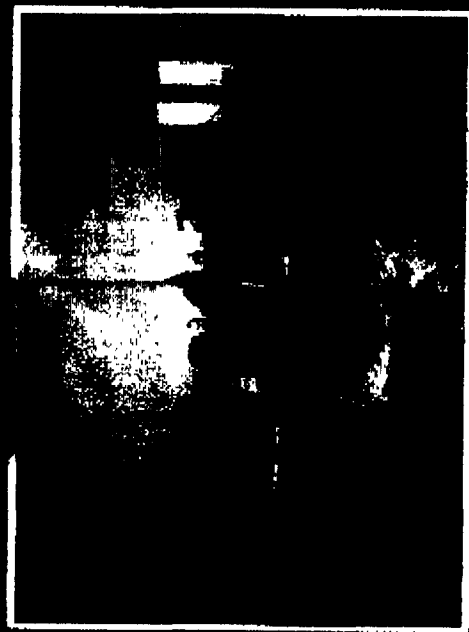
- Characterize the sources
 - From all the phases
 - Source strength: continuous, one time
- Chemical/physical properties of the contaminants: K_{ow} , H, P...
- Characterize the landscape
 - Advective flows
 - Dimensions of the different compartments

Model Outputs

- Distribution of contaminant in all phases
- Concentration in all phases
- Dominant pathways of contaminant transport
- Allows risk assessment calculations for a site
- Prioritization of contaminated sites based on risk assessment
- Distinguishes between local, regional and global sources

SLIDES PRESENTED BY
DR. MICHAEL DELUCA
RUTGERS UNIVERSITY, IMCS
CHAPTER 2

NY - Proposed Modeling Effort Designed to Produce Mass - Balance for Toxics (Thomann Model)



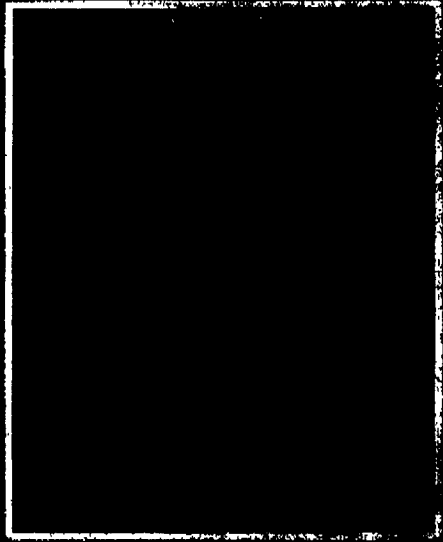
Large-scale

NJ - Fine Scale Hydrodynamics & Sediment Transport Modeling for the Newark Bay System



*Complex geometry (including channels)
Physical oceanography not well understood
Sediment transport mechanisms not well defined*

NJ MODELING EFFORTS FOCUSED TO ADDRESS
THE PRIMARY MANAGEMENT QUESTIONS
ON HARBOR DREDGING



Quantify the problem

Identify sources and deposition sites

Support informed decision-making on specific
mitigation measures

Proceed in a timely manner

Does not duplicate past or proposed efforts

HARBOR ESTUARY FINITE ELEMENT HYDRODYNAMIC and CONTAMINATED SEDIMENT TRANSPORT MODEL-50M GRID

* INPUTS:

- Sources and loadings
- Winds, river flows, tidal forcings
- Conditions for sediment mobilization
- Contaminant concentrations in sediments
- Initial salinity and temperature distribution
- High-resolution geometry and bathymetry

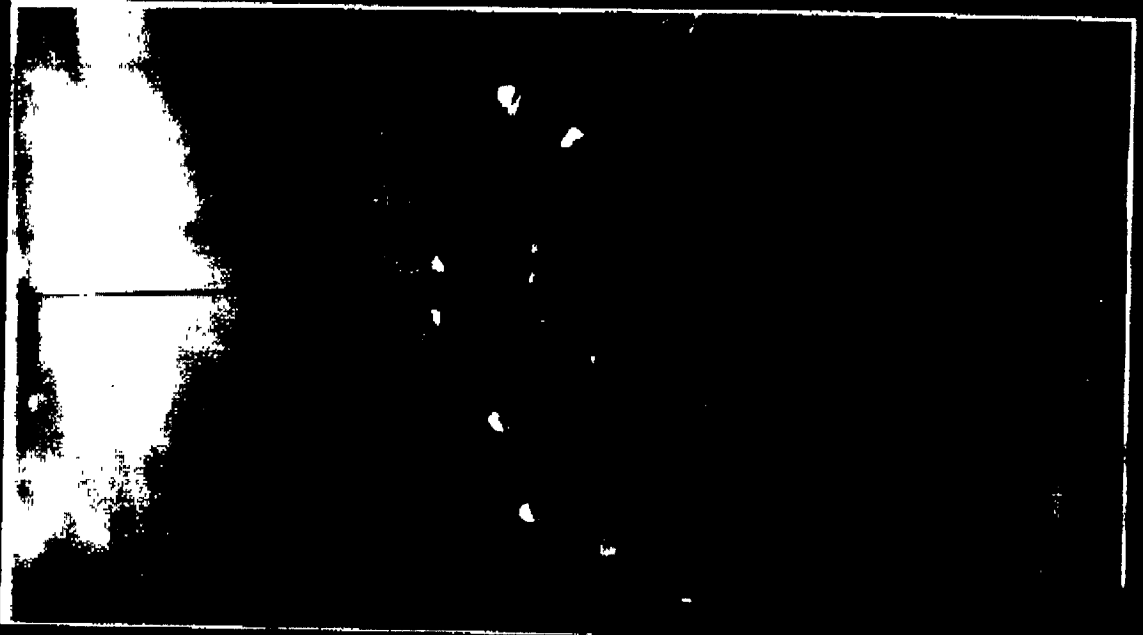
* OUTPUTS:

- Net flow
- Residence time
- Impacted sedimenting channels
- Sedimentation rates



EXPECTED RESULTS

- * Fate and effects of sediments
- * Understanding of relationships and interactions between contaminants, sediments, and sediment contaminants, and their use in assessing ecological health
- * Understand how the Newark Bay system responds to episodic events (high-flow and storm events)
- * Assess effects of various treatment/disposal alternatives on the Newark Bay System
- * Assess effects of human alterations such as channel dredging



* DATA MANAGEMENT:

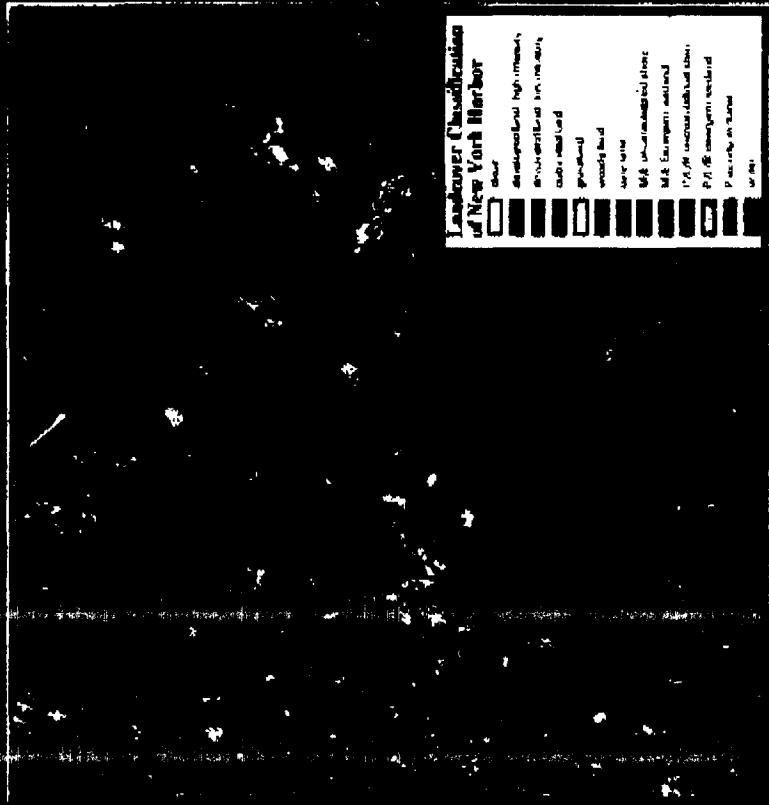
GIS

COAST COMMIT

High-resolution images

User-friendly

Model and data available via the Internet



SLIDES PRESENTED BY
DR. MICHAEL BRUNO
STEVENS INSTITUTE OF TECHNOLOGY
CHAPTER 3

COUPLED MODEL

- The model can be used to address many pressing issues in the Newark Bay Complex :
- *fate and effects of petroleum spills*
- *regulation of industrial discharges*
- *impact of sewage treatment plant outfalls*
- *impact of combined sewer outfalls*
- *impact of Fresh Kills landfill*
- *impact of channel alterations*



OUTSTANDING ISSUES

- *Net flow in the Arthur Kill-Kill Van Kull*
- *Influence of the Newark Bay ship channels*
- *Influence of winds*
- *Cohesive sediments*
- *Residence time of Newark Bay*
- *Circulation/deposition at AK-KVK confluence*
- *Impact of extreme events*



OVERHEAD SLIDES PRESENTED BY

DR. ERIC VOWINKEL

USGS

CHAPTER 3

SAMPLES ANALYZED FOR

BY USGS

- **TOTAL SUSPENDED SEDIMENT (TSS)**
- **DISSOLVED ORGANIC CARBON (DOC)**
- **PARTICULATE ORGANIC CARBON (POC)**

BY CONTRACT LAB

- **POLYCHLORINATED BIPHENOLS (PCBs) AND
NONPOLAR PESTICIDES**
- **POLAR PESTICIDES**
- **POLYCHLORINATED DIBENZO-DIOXINS (PCDDs) AND
POLYCHLORINATED DIBENZO-FURANS (PCDFs)**
- **POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)**
- **METALS--MERCURY AND CADMIUM**

GAGING STATIONS WILL BE UPGRADED WITH

- **CONCRETE OR METAL STRUCTURE TO HOUSE SAMPLING EQUIPMENT**
- **2 ISCO SAMPLERS (1 FOR SUSPENDED SEDIMENT AND SUSPENDED ORGANIC CARBON; 1 FOR METALS)**
- **1 TOPS SAMPLER FOR COLLECTION OF SUSPENDED SYNTHETIC ORGANIC COMPOUNDS**
- **TELECOMMUNICATIONS EQUIPMENT TO REMOTELY ACTIVATE SAMPLERS BASED ON DISCHARGE**

WHAT WILL BE LEARNED FROM THE USGS STUDY

- WHAT ARE THE MASSES AND LEVELS OF CONTAMINATION OF SELECTED METALS AND ORGANICS IN SEDIMENTS FROM MAJOR TRIBUTARIES IN NEW JERSEY ABOVE THE HEAD OF TIDE?
- IS THERE A CONTINUING SOURCE OF CONTAMINANTS FROM THE TRIBUTARIES ABOVE THE HEAD OF TIDE?
- IS THERE A SEASONAL PATTERN TO CONTAMINATION IN THE TRIBUTARIES AND WHEN IS IT THE GREATEST?
- WHAT IS THE FLUX OF CONTAMINANTS IN THE TIDAL PART OF THE ESTUARY AT KEARNY POINT JUST BEFORE ENTERING NEWARK BAY?

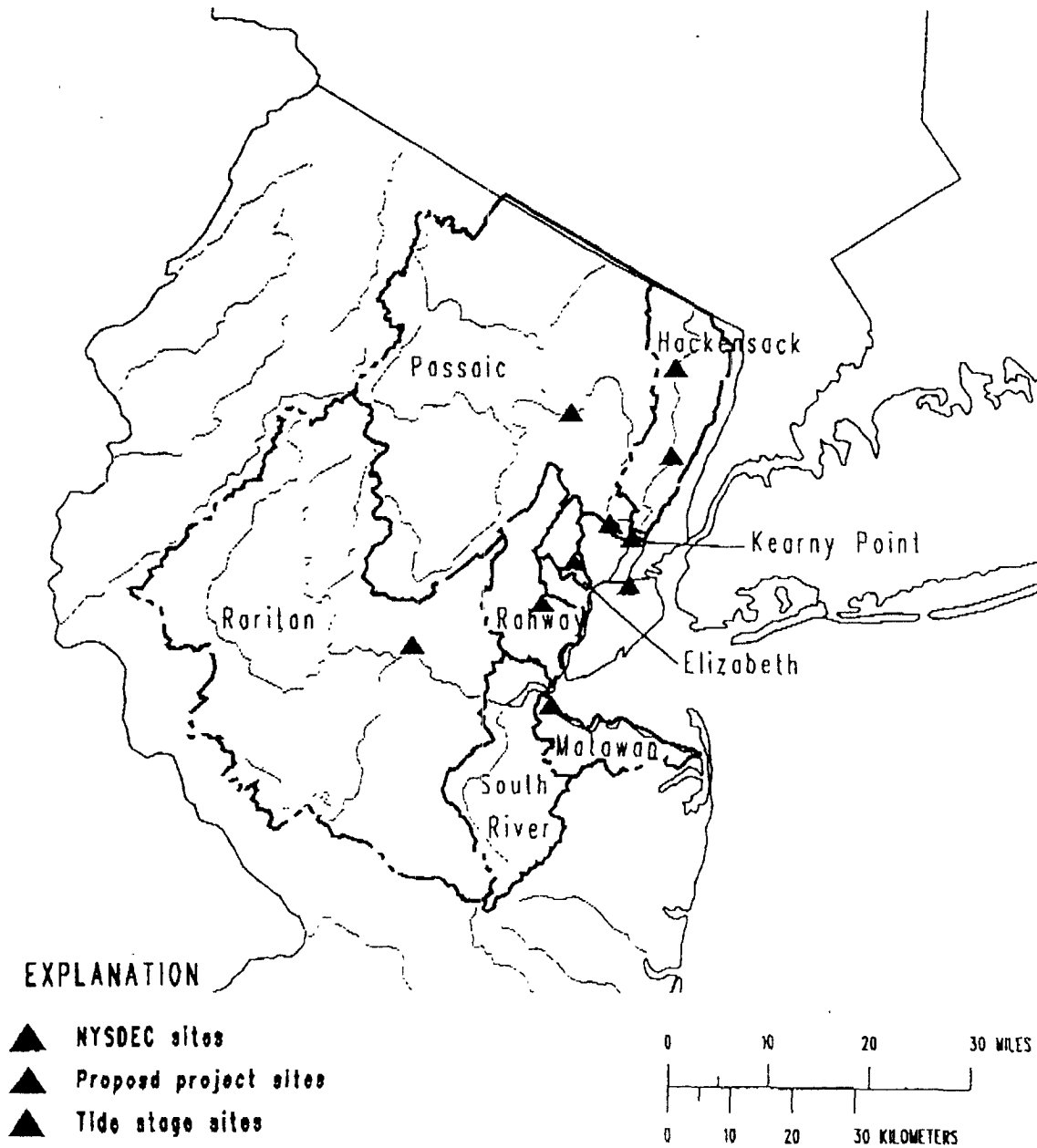


Figure 1. New Jersey basins draining into the Hudson River Estuary Complex

OBJECTIVES

- **TO QUANTIFY THE LOADS OF SUSPENDED SEDIMENTS ABOVE TIDE OF MAJOR TRIBUTARIES IN NEW JERSEY TO THE HUDSON RIVER ESTUARY COMPLEX**
- **TO DETERMINE THE ORGANIC MATTER CONTENT OF THE SUSPENDED SEDIMENTS (DOC, POC)**
- **TO DETERMINE THE CHEMICAL CONSTITUENT LOAD OF SELECTED METALS AND ORGANICS**
- **TO DETERMINE THE RELATION BETWEEN SEDIMENT LOAD AND STREAM DISCHARGE**
- **TO DETERMINE THE SEASONAL VARIABILITY IN LOADS AND RELATION TO STORM EVENTS**

**CHARACTERIZATION OF
SEDIMENT, ORGANIC CARBON,
AND CHEMICAL LOADS AT
SELECTED TRIBUTARIES IN
NEW JERSEY TO THE HUDSON
RIVER ESTUARY COMPLEX**

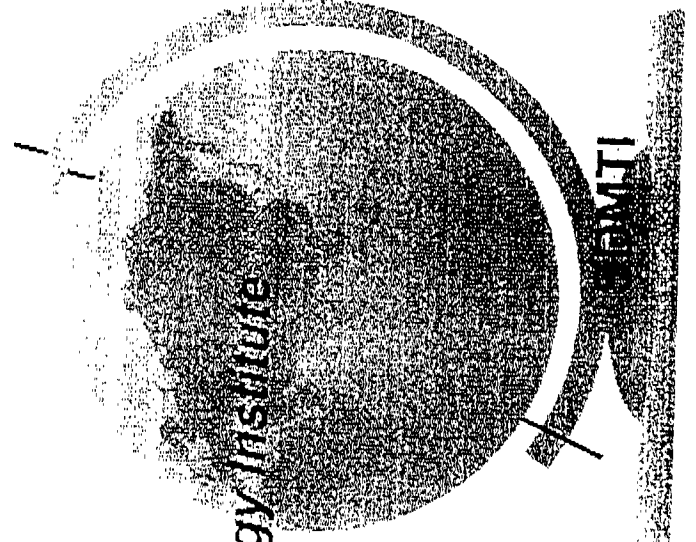
**U.S. GEOLOGICAL SURVEY
WEST TRENTON, NEW JERSEY**

SLIDES PRESENTED BY
DR. GEORGE KORFIATIS
STEVENS INSTITUTE OF TECHNOLOGY
CHAPTER 4

Upland Source Identification and Mitigation Study

George P. Korfiatis
Center for Environmental Engineering
Stevens Institute of Technology
Hoboken, NJ

*Sediment and Dredged Material Technology Institute
Stevens -Rutgers-NJIT*

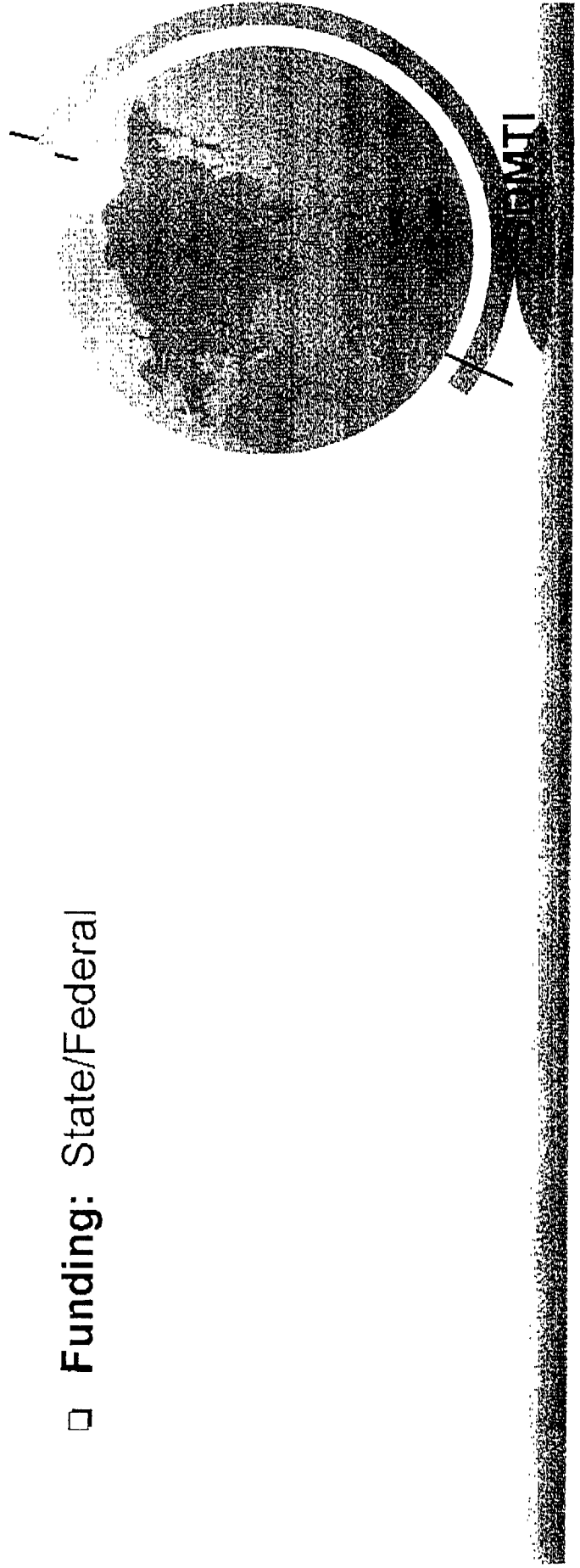


Objectives

- ◆ The objectives of the program are to:
 - Provide the engineering and scientific data and methods for the cost effective and environmentally responsible mitigation of contaminated sediment
 - Develop a comprehensive database of all major upland sources of contaminated sediments and assess their relative contribution to the pollution of the Harbor and environs
 - Utilize computer modeling and monitoring studies to understand the impact of upland contaminated sediment sources on the future dredging and dredged material management needs of the harbor including berths and navigation channels
 - Perform scientifically based feasibility studies and develop plans for mitigating major sources of contaminated sediment which result in minimizing the amount of contamination reaching the harbor and minimizing future dredging needs of the navigable waterways
 - Develop plans for environmentally acceptable dredging of hotspots of contaminated sediment in upland harbor tributary areas and assess the feasibility of in-situ and ex-situ decontamination technologies in these source areas

PROGRAM

- **Partners:** SDMTI, NJDEP in coordination with OMR and HEP
- **Study Area:** From Palisades to Newark Bay, NJ Side
- **Estimated Duration :** Five Years
- **Funding:** State/Federal



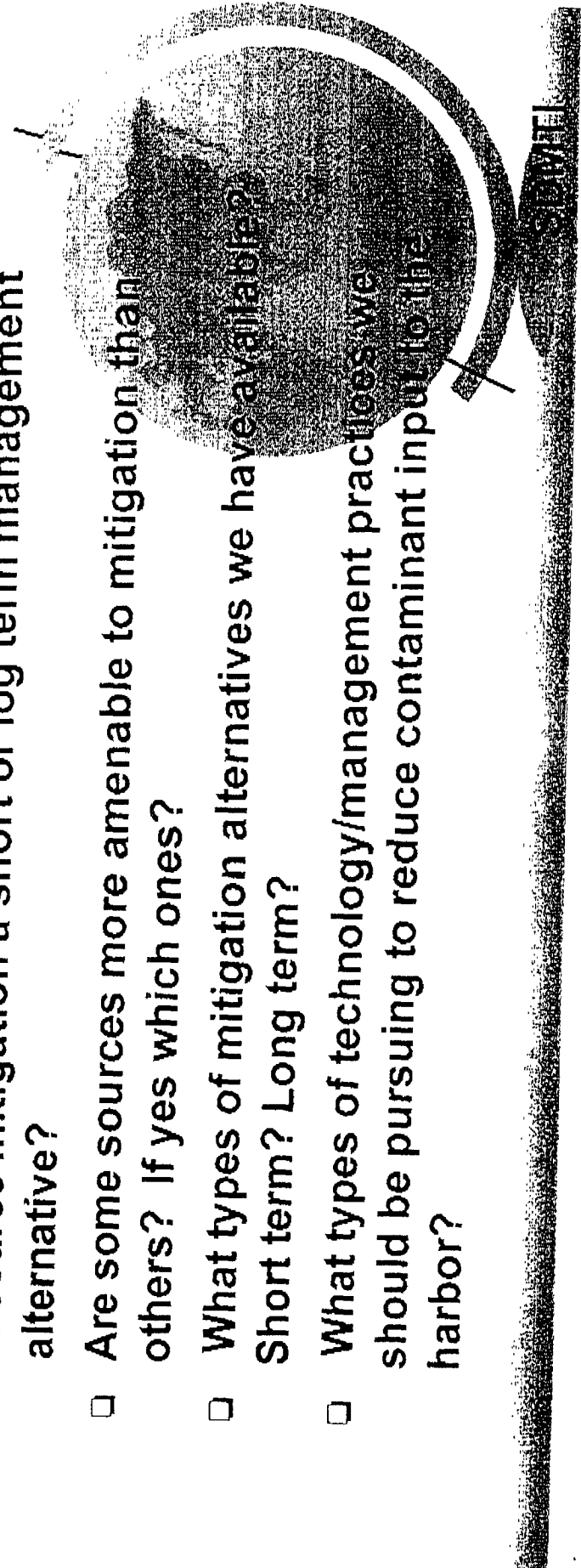
Major Tasks

- Inventory Potential Contaminated Sediment Sources-Upland Discharge Points.
- Inventory Contributing Waste Sites (T-5.1, T-6.1, T-9.2)
- Develop Water/ Sediment Quality Monitoring Program (T-12.9, D-3.7)
- Develop GIS Framework for Sediment Quality Related Data
- Implement Water/Sediment Quality Monitoring Program
- Use Fine Grid Model to Evaluate Impact of Various Sources on Harbor Sediment Quality
- Assess Source Contribution. Quantity/Quality
- Rank and Prioritize Contributing Sources
- Identify Site-Specific Source Management Alternatives
- Evaluate Technology/Management Alternatives for Source Mitigation

FMTI

Major Questions Targeted

- What is the relative contribution of various NJ upland/direct discharge sources to the current and future rate of contaminated sediment deposition in the harbor region?
- What types of contaminants various sources contribute to the Harbor?
- Is source mitigation a short or long term management alternative?
- Are some sources more amenable to mitigation than others? If yes which ones?
- What types of mitigation alternatives we have available? Short term? Long term?
- What types of technology/management practices we should be pursuing to reduce contaminant input to the harbor?



SECRET

**CONTAMINATED SEDIMENT UPLAND SOURCE IDENTIFICATION AND
MITIGATION ASSESSEMENT STUDY**

WORK PLAN

Chapter Four

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

**IMPLEMENTATION OF TOXICS ACTIONS IN THE GOVERNORS'S JOINT DREDGE
PLAN FOR THE NY-NJ HARBOR ESTUARY AND MAJOR NEW JERSEY
TRIBUTARIES**

Prepared by:

George P. Korfiatis Ph.D., Director
Center for Environmental Engineering
Stevens Institute of Technology
Hoboken, N.J. 07030
Tel: 201-216-5348, fax 201-216-8303
Email qkorfiat@stevens-tech.edu

On behalf of the
Sediment and Dredged Material Technology Institute

October 10, 1997

STUDY OBJECTIVES

The overall objectives of this project are:

- Provide the engineering and scientific data and methods for identification, assessment and environmentally responsible mitigation of upland contaminated sediment sources in New Jersey
- Develop a comprehensive database of all major upland sources of contaminated sediments and assess their relative contribution to the pollution of the Harbor and environs
- Utilize computer modeling and monitoring studies to understand the impact of upland contaminated sediment sources on the future dredging and dredged material management needs of the harbor including berths and navigation channels
- Perform feasibility studies and develop plans for mitigating major sources of contaminated sediment which lead to (a) minimizing the amount of contamination reaching the harbor and (b) minimizing future processing of dredged sediment from the navigable waterways
- Develop plans for environmentally acceptable dredging of “hot spots” of contaminated sediment in upland harbor tributary areas and assess the feasibility of using in-situ and ex-situ decontamination technologies to mitigate these source areas

We will target the following questions:

- What is the relative contribution of various NJ upland/direct discharge sources to the current and future rate of contaminated sediment deposition in the harbor region?
- What types of contaminants do various sources contribute to the Harbor?
- Is source mitigation a short or long term management alternative?
- Are some sources more amenable to mitigation than others? If yes which ones?
- What types of mitigation alternatives do we have available? Short term? Long term?
- What types of technology/management practices should we be pursuing to reduce contaminant input to the harbor?

WORK PLAN

This plan includes major tasks and subtasks to be executed by the project team:

Task 1. *Inventory Potential Contaminated Sediment Sources-Upland Discharge Points. Inventory Contributing Waste Sites (Relevant HEP CCMP Tasks T-5.1, T-6.1, T-9.2)*

This task entails the tracking and inventory of potential New Jersey sources of sediment contamination in the NY/NJ harbor. It will include direct discharges to the harbor waterways as well as tributaries and sources located upland. The north-south boundaries of the study region will extend from Palisades (GW Bridge) to Keyport Harbor. The western boundary will be defined at one of the sub-tasks below. This task is divided into six subtasks described below.

Subtask 1-1: Development of a source tracking system: This subtask involves the development of a source tracking methodology which includes source definition, source evaluation criteria and data management aspects. It will be conducted in close collaboration with NJDEP and expand the existing tracking initiative. A set of criteria will be developed that will qualify various sources for consideration as potential contributors to sediment contamination. Such sources will include hazardous waste sites, landfills, wastewater treatment plant outfalls, industrial discharges and others.

Subtask 1-2: Develop study domains: The entire study area will be subdivided into sub-domains on the basis of drainage basin and land use characteristics. The study domains will form the basis of the GIS program.

Subtask 1-3: Identify and inventory potential source inputs and existing sediment/water quality data: Potential contamination sources for each study region will be identified and inventoried. NJDEP databases will serve as the primary reference for this task. Existing water/sediment quality bases will also be reviewed for all tributaries of the study domain. Data that passes QA/QC acceptance screens will be imported into the project database.

Subtask 1-4: Refine study domains: On the basis of the work performed in Subtask 1-3, the study domains will be refined. Some domains may need to be expanded to include new sources and others may need to be reduced.

Subtask 1-5: Perform detailed inventory: A detailed inventory of sources and source characteristics will be conducted. This inventory will include visits and field surveys of major source areas which will supplement available information generated through regulatory required reporting.

Subtask 1-6: Develop source database: . Pertinent information for each source will be input in a source database. An algorithm will be developed to rank the sources in accordance with the criteria developed in Subtask 1-1. A rank number will be assigned and each source will be identified in a GIS format.

Task 2: Develop Water/Sediment Quality Monitoring Program (Relevant HEP CCMP Tasks T-12.9, D-3.7)

This task entails the development of a sediment and water quality monitoring program in the study domain. This phase involves the development of various sampling/analytical plans and procedures, data management and coordination activities with other studies in the harbor.

Subtask 2-1: Develop sampling/monitoring protocols: Sampling protocols and standard operating procedures (SOP's) will be developed for both sediments and water. The monitoring program will entail sampling from both research vessels and from land. The sampling protocols will include information pertaining to collection, transportation preservation and tracking of samples.

Subtask 2-2: Develop Analytical protocols: A comprehensive analytical support system will be developed to accommodate a continuous and long term monitoring program. The first step will be to define needs in terms of number and type of samples anticipated, physical and chemical parameters, required precision and accuracy of the results, method sensitivity (method detection limit), analytical methodologies and reporting formats that will provide data comparability with existing data bases used for Harbor data and that are useful for NJDEP's regulatory management needs. It is anticipated that analyses will be performed for selected compounds of volatile organics, semi-volatile organics, PCB's/Pesticides, Dioxins/Furans (congener specific), metals TOC, sulfides TPHC and grain size. Analytical methods selected will be consistent with "The Management and Regulation of Dredging Material in New Jersey Tidal Waters, March 1996 Draft." This includes methods from EPA, COE, USGS and NJDEP and NOAA.

Following this, the analytical organization selected from within the three SDMTI institutions will prepare their laboratories and equipment for the sampling runs. Dedicated core staff, equipment and laboratory facilities will be used. The overall management, coordination and Quality Assurance function will be centrally managed. The analytical organization will be designed so that the institutions can provide back-up to each other. This will ensure being able to process peak sample loads, protect against down-time and allow for inter-laboratory cross-checking of results.

A Quality Assurance Program will be developed for the laboratories, following NJDEP, EPA Region II and New York District COE Guidelines. Standard Operating Procedures (SOP's) will be developed for all methodology and quality control procedures. All analytical records and documentation will be stored at the SDMTI administrative office.

The analytical methodology and selection of target analytes will be performed in coordination with other harbor studies to ensure compatibility of data.

Subtask 2-3 : Develop Data Analysis Framework: A database management system will be developed to store, manipulate, and analyze the collected data. The constructed system will be able to perform complex data analysis over different dimensions and among hierarchies of these dimensions. Special emphasis will be given on the spatial (i.e. geographic) and time (i.e. temporal) dimensions. Spatial and multi-dimensional query languages will be used for this complex analysis, along with existing and novel data mining techniques. Finally, visualization tools will be utilized to browse the database, analyze query results, and mine interactively the data.

Subtask 2-4: Develop monitoring grid: A monitoring grid will be developed for each study domain. The grid will contain monitoring locations types of samples to be collected and other pertinent information. The monitoring grid will be developed after careful consideration of the types of sources and the source location for each study domain.

Task 3: Develop Data Management Framework and Perform Data Analysis

Subtask 3-1 : DataBase Management System: A commercial DBMS (e.g. Oracle SDE, Illustra, RedBrick, EssBase) will be chosen as the platform for the collected data. The system will be able to support multi-dimensional analysis along with extensible indexing structures in order to perform efficiently spatial queries. These goals can be achieved either by an extended relational database system (e.g. Oracle) that stores data as relations, or a multi-dimensional system (e.g. EssBase) that stores data as multi-dimensional arrays.

Subtask 3-2 : Data Analysis Analytical processing will be supported by general query languages, such as SQL, specific languages for data analysis over space and other dimensions, such as SpatialSQL, datacubes, multi-featureSQL, and data mining tools, such as GeoMiner, to discover association rules, comparison rules, clusters. Visualization tools will browse base data, as well as query results. Finally, basic research will be performed for new data analysis and data mining techniques.

The GIS portion of the data management system will be coordinated closely with NJDEP and USGS.

Task 4: Implement Water/Sediment Quality Monitoring Program

This task entails the implementation of the field monitoring program including sample collection, determination of physical and chemical characteristics and data management.

Subtask 4:1 Perform Coarse Grid Sampling: The two rounds of sampling will be performed on the grid developed in Subtask 2-4. One sampling round will be performed under low flow conditions and the other under high flow conditions. A laser scattering LISST-100 will be used for in-situ measurement of sediment load and grain size distribution. In addition, both sediment and water column grab samples will be collected. We anticipate collecting multiple samples at each monitoring station. The exact number will depend on site-specific conditions. We anticipate that the coarse grid will consist of approximately 100 monitoring stations. Table 1 shows the types of monitoring activities planned for each station:

All sampling will be performed using water and sediment sampling techniques which insure against accidental contamination of the samples. The field crews will be carefully trained and supervised to insure that the sample collection is done following the strictest QA/QC protocols.

TABLE 1: Monitoring Activities and related analyses

Activity	Chemical analysis	Environmental Parameters	Sediment Load/Grain Size	Comment
LISST Transects			YES	
Water Column (grab samples)	YES	YES	YES	Both in the liquid and solid phases
Bottom Sediment (grab samples)	YES		YES	
Tributary Geometry				Cross Section
Tributary Stage				

Subtask 4:2 Refine Monitoring Grid: The coarse monitoring grid will be refined on the basis of the findings of the first two rounds of sampling. The purpose of refining the monitoring grid is to better delineate potential sources and obtain source specific information. We estimate that an additional 100 monitoring points will be created as result of the grid refinement.

Subtask 4:3 Perform fine grid sampling: Three additional sampling events will be performed in accordance with Table 1 at the fine grid monitoring locations. The sampling events will span low, mid and high flow events.

Task 5: Sample Characterization and Analyses

All samples will enter the laboratory at a central point where they will be accepted for custody and inspected for integrity (packaging, holding time, preservation, documentation, etc.). All samples will be tracked through the analytical system and quality control data will be managed, using a data tracking system. Blind quality control samples will also be introduced at this point. Samples will then be immediately transported to the various laboratories where they will undergo a variety of water and sediment analyses for physical, organic and inorganic parameters. All analyses will be performed at the SDMTI facilities with the exception of dioxin/furan analyses which will subcontracted to an outside laboratory. All in-house and contractor laboratory data will be reviewed by the QA function before being approved by the Team Leader and transmitted to the Project Manager.

Task 6: Watershed Modeling

The discharge of contaminants and sediments to the harbor region from upland sources is episodic with major inflows occurring during significant rainfall events. It is essential to know the inflow quantity and quality of water and sediments during these episodic events. During the past two decades there have been substantial advances in the ability to model runoff from drainage basins and to model the transport of contaminants as well. The USEPA supports the Storm Water Management Model,

SWMM and the Hydrological Simulation Program - FORTRAN, HSPF; The U.S. Army Corps of Engineers supports a hierarchy of HEC models, HEC-1, HEC-2 etc. with capability of predicting runoff and water quality parameters. The Corps also supports an urban storm water runoff model, STORM. Each model has its advantages and disadvantages. All require data from the drainage basin. This leads to the first two subtasks listed below:

Subtask 6.1. Evaluate candidate models - A careful review of the available models will be made using two criteria. The first is the suitability of the model output in meeting the overall objectives of this study. The second is the availability of the required input data to run the model successfully.

Subtask 6.2. Inventory required input data - Once suitable candidate models have been selected, the input data requirements will be examined and compared with available data.

Following the completion of these first two subtasks one or two candidate models will be carefully evaluated for two sub-basins; one rural and one urban. These two sub-basins will be selected according to several criteria; e.g., input data availability, precipitation and runoff data availability and, the presence within these basins of highly ranked sources of sediment and contaminants to the harbor. This evaluation will encompass the following subtasks:

Subtask 6.3. Obtain requisite basin data - For both selected sub-basins, the required input data for the model/models will be obtained. These data sets will include basin geometry; e.g., area, and slope, land use, soil type, contaminant sources, estimates of impervious and pervious areas, depression storage, etc.

Subtask 6.4. Model calibration/verification for runoff - The sub-basins to be evaluated will be chosen not only on the basis of available input data but also on the availability of USGS gage data for the discharge of the outlet stream for the basin. Twenty significant rainfall events will be chosen for use in this task. Ten of these will be randomly selected for use in model calibration; the remaining ten will be used for model verification. Model predictions of discharge through the outlet stream will be compared with the USGS discharge data for the storm events. The calibration data set will be used to adjust coefficients in the model. With the calibrated model, the remaining ten rain events will be simulated and the predicted discharge compared with data.

Subtask 6.5. Model calibration/verification for water quality - It is unlikely that the requisite field data will be available for calibration or verification of model predictions for suspended sediment or contaminant discharge from the two test basins. A field study will be made to collect the necessary data for 4 rain events. Two of these data sets will be used for calibration and two for verification. At a minimum suspended sediment concentrations and at least one contaminant concentration will be measured at hourly intervals through the peak discharge in the outlet stream for each rain event.

Once the model has been calibrated and verified it will be used to simulate the discharge, sediment flux and contaminant flux through the outlet streams of both sub-basins for a continuous period of several years.

Task 6.6. Long term continuous simulation - The output data from the multi-year simulation will be evaluated to answer a variety of questions, e.g. What is the magnitude of sediment and contaminant flux during peak storm events compared to baseline conditions? What is the effect of remediation efforts to reduce flux of sediment during these events. For example, if a source of suspended sediment has been identified, the model could be used to determine the effectiveness of a detention pond to reduce the downstream discharge of sediment.

Once these subtasks are completed the model can be applied selectively to other basins to evaluate total loadings to the harbor from the most highly ranked contaminant sources. Thus, subtasks 6.3 through 6.6 would be repeated on an “as needed” basis for these additional basins. It is envisioned that this would be limited to the ten most highly ranked sources.

Task 7: Use Fine Grid Model to Evaluate Impact of Various Sources on Harbor Sediment Quality

The fine grid Harbor Numerical Model developed by the Rutgers/Stevens team will be utilized to assess the contribution of upland sources to the Harbor sediment deposition. Data from both the monitoring program and the watershed modeling will be used as input. The purpose of this effort is to assess how and where sediment originating from upland contaminated sources is deposited in the NY/NJ harbor area. In addition, this effort will provide projections of future dredging needs in certain areas of the harbor.

Task 8: Assess Source Contribution. Rank and Prioritize Contributing Sources

Subtask 8-1: Assess Source Contribution: The contribution of various sources will be assessed on the basis of the monitoring and modeling results. A set of parameters and relative weights will be developed to aid in this assessment. Depending on the outcome of this assessment the decision will be made if additional field studies or modeling will be required to better understand the contribution of specific sources or types of sources to the sediment quality of the harbor. A limited number of such studies may be conducted.

Subtask 8-2: Source ranking: A ranking system will be developed to prioritize the upland sources relative to the degree of contribution to harbor sediment contamination. Criteria including source type, contaminant type, sediment load and overall sediment contamination potential will be used to develop the ranking system and prioritize the sources.

Task 9: Identify Site-Specific Source Management Alternatives

A set of site-specific source management alternatives will be identified for selected top ranked sources on the basis of type of source and its relative contribution to sediment contamination. Such alternatives may include source removal, in-situ or ex-situ remediation of “hot spots” of contamination, specific changes in current management practices among others.

Task 10: Evaluate Technology/Management Alternatives for Source Mitigation

Each management alternative identified in the previous task will be evaluated for mitigation of selected sources. Evaluation criteria will include technical feasibility, overall

beneficial impact to the harbor sediment quality and cost. Recommendations will be made regarding the planning and execution of source remedial/mitigation activities.

PROJECT INTEGRATION:

The project team is fully aware of the importance of integrating this project with past and on-going research efforts in the Harbor both in New Jersey and New York. It will be the responsibility of the project manager to ensure that this integration takes place. The project has been designed to carry out specific tasks included in the DMMP developed by the Harbor Estuary Program. The HEP CCMP therefore will serve as the guiding document for this project. Specific integration efforts include:

- Full participation in harbor wide coordination meetings sponsored by HEP
- Coordination with source tracking and evaluation efforts performed in NY
- Coordination with NY to achieve compatibility in sample characterization and analysis (type of analytes, methods, QA/QC procedures etc.)
- Coordination with NJDEP's source tracking initiative and GIS program
- Coordination with NY on data management and database compatibility
- Coordination with the New Jersey Office of Maritime Resources , and
- Coordination with other projects carried out as part of both the New Jersey and New York Plans. This includes the NJ modeling study and the USGS long term monitoring in NJ tributaries.

PROJECT TEAM

Project Management: Dr. George P. Korfiatis will be the project manager. He will be involved in all aspects of the project and along with the team leaders will be responsible for day-to-day management of the project. Dr. Korfiatis will be responsible for all aspects of the project integration with other harbor sediment related projects in NY and NJ.

Field Monitoring and Modeling Team:

Team Responsibilities: Source tracking, development and execution of field monitoring program, watershed modeling, fine grid modeling, source evaluation.

Richard I. Hires, Ph.D., Professor and Department Head, Civil, Environmental and Ocean Engineering, **Team Leader**

Leslie Brunnel Ph.D, Assistant Professor, Stevens
Michael Bruno, Ph.D., Director Davidson Laboratory, Stevens
Garry Toaghon Ph.D., Associate Professor, IMCS, Rutgers

Sample Characterization and Chemical Analysis Team :

Team Responsibilities: Development and execution of analytical and environmental testing protocols, sample tracking and QA/QC procedures

Gerard McKenna, Associate Director, HSMRC, NJIT, **Team Leader**

Christos Christodoulatos Ph.D., Director Laboratory Operation, J. C. Nicoll Lab, Stevens
Ray. Bahtiar, Assistant Professor, Stevens

X. Meng, Research assistant Professor Stevens

Robert . Sherrell Ph.D., Assistant Professor, IMCS, Rutgers

Clint Brockway, Analytical Lab Director, HSMRC, NJIT

Data Analysis and Management Team:

Team Responsibilities: Development of data bases, GIS program and data manipulation, analysis and presentation

Damianos Chatziantoniou, Assistant Professor, Dept. of Computer Science, Stevens,
Team Leader

Eric Vowinkel Ph.D., Chief Environmental Studies Program, USGS

Source Evaluation and Mitigation Assessment Team:

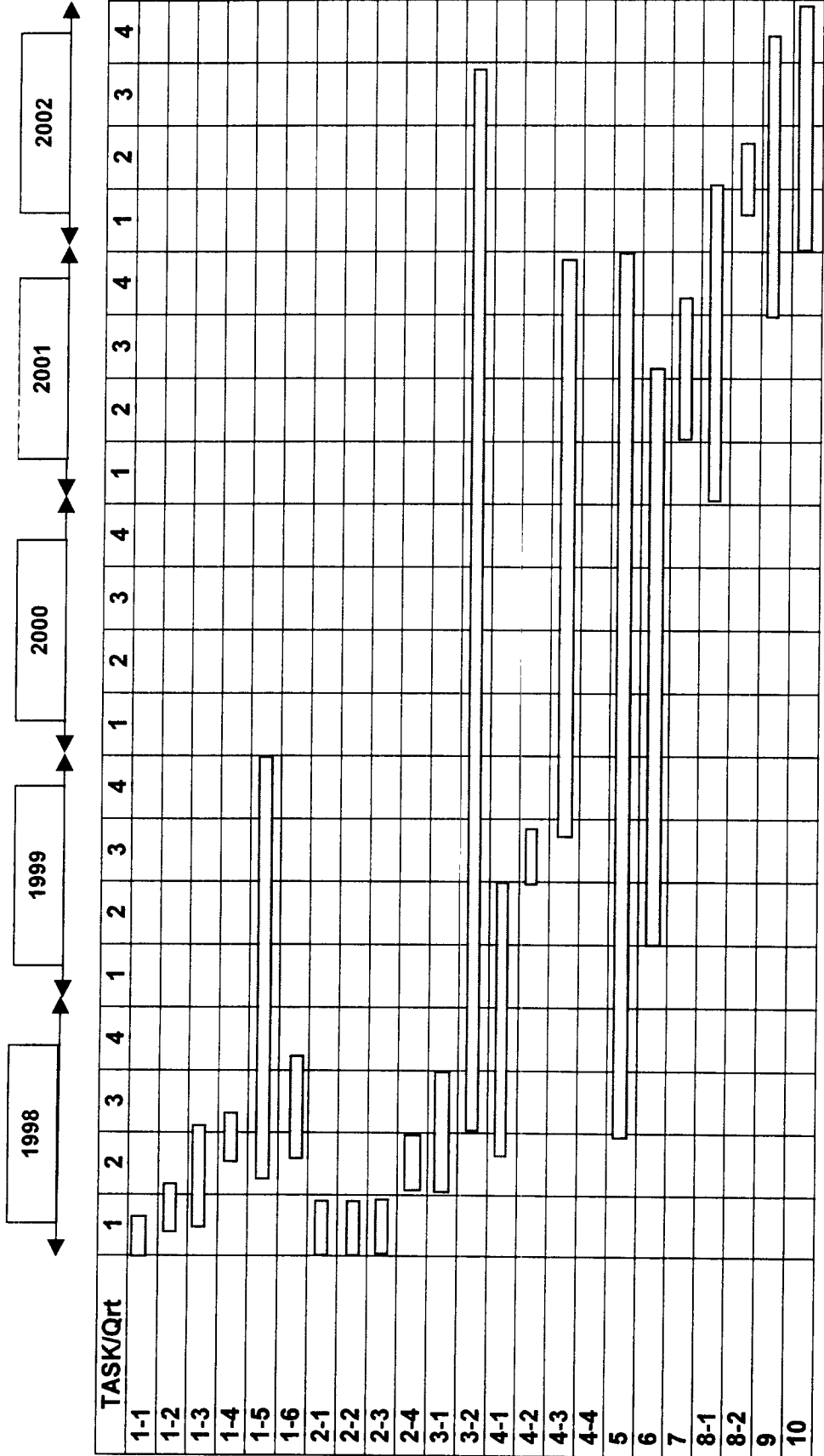
Team Responsibilities: Source evaluation, development of mitigation alternatives and assessment of potential for source mitigation

Christos Christodoulatos Ph.D., Director Laboratory Operation, J. C. Nicoll Lab, Stevens,
Team Leader

Bill Librizzi, Associate Director, HSMRC, NJIT

George Korfiatis, Stevens

ESTIMATED PROJECT TIMELINE



**Estimated Five Year Budget per Task (includes overhead and fringe benefits)
\$K**

TASK	Project Management	Labor	Supplies	Equipment	Maintenance	TOTAL
1	10	145				155
2	10	85				95
3	10	270	30	20	10	340
4	25	750	70	50	40	935
5	20	700	80	75	40	915
6	12	150	8	5		175
7	10	100				110
8	10	100	25		10	145
9	10	50				60
10	10	60				70
TOTAL	127	2410	213	150	100	3000

PRESENTATION BY

STANLEY CACH

NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION

NJ CSO ABATEMENT PROGRAM

NEW JERSEY COMBINED SEWER OVERFLOW CONTROL PROGRAM



DENNIS HART, DIRECTOR
DIVISION OF WATER QUALITY



NICHOLAS G. BINDER, P.E., P.P., ASSISTANT DIRECTOR
MUNICIPAL FINANCE & CONSTRUCTION ELEMENT

STANLEY V. CACH, JR., P.E., P.P., BUREAU CHIEF
BUREAU OF ENGINEERING & CONSTRUCTION PERMITTING-
NORTH
SEPTEMBER 23, 1997

CSO

- WHAT IS IT?
- WHY IS IT A PROBLEM?
- WHAT ARE NEW JERSEY'S MANDATES?
- WHAT HAS BEEN ACCOMPLISHED IN NEW JERSEY?
- CSO PROGRAM IMPLEMENTATION

DEFINITIONS

WHAT IS A COMBINED SEWER SYSTEM (CSS)?

- Combined Sewer System (CSS) collection system designed to collect and transport sanitary sewage AND stormwater runoff.

WHAT IS A COMBINED SEWER OVERFLOW (CSO)?

- When the total wastewater & stormwater flow exceeds the capacity of the system, then the CSS is designed to overflow directly to surface water bodies.

These discharges are called

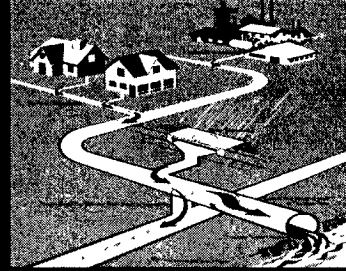
Combined Sewer Overflows.

WHAT ARE DRY WEATHER OVERFLOWS? (DWOs)

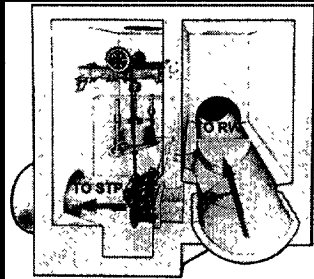
- Are a type of CSO that are not the direct result of the contribution of excess stormwater flows. They are the result of operator error, illegal discharges or connections, or the lack of preventative maintenance.
- Dry Weather Overflows are prohibited.

WHAT ARE SEPARATE SANITARY SEWER OVERFLOWS? (SSOs)

- Are a type of discharge from separate sanitary sewers which are sewer systems designed to convey wastewater only. SSOs generally are the result of inadequate O&M of the system, inadequate sewer system capacity, vandalism or pipeline / facility failure.
- SSOs are prohibited and are not permissible under the CWA.



A TYPICAL COMBINED SEWER SYSTEM



A TYPICAL CSO REGULATOR

WHERE ARE CSSs & CSOs?

Combined Sewer Systems and Combined Sewer Overflows are located in the older urban cities of the State.

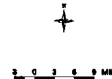
Combined Sewer Overflows Statewide

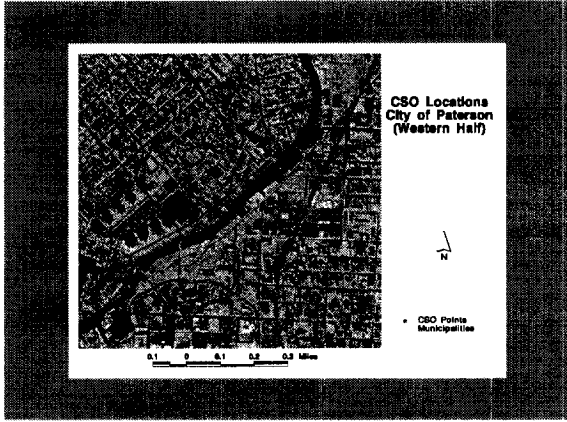
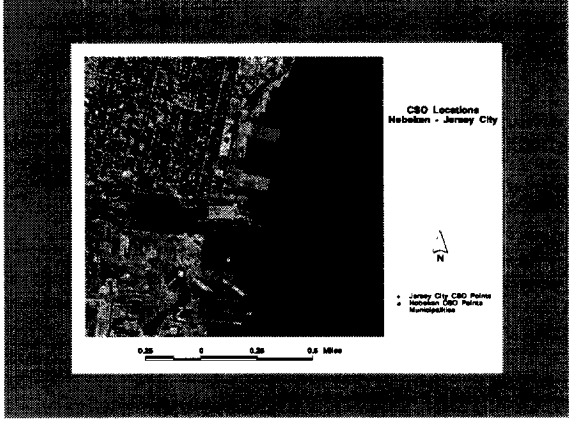
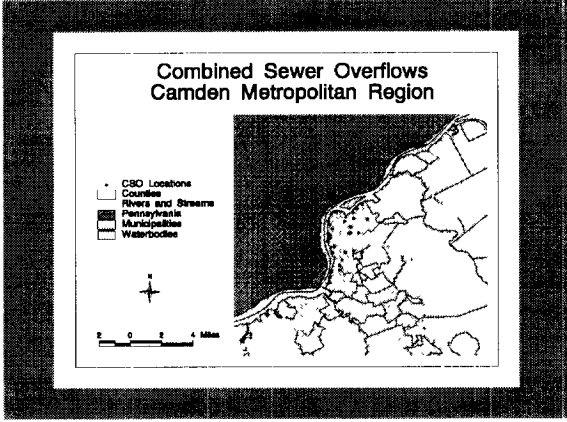
CSO Location
 Counties
 Municipalities



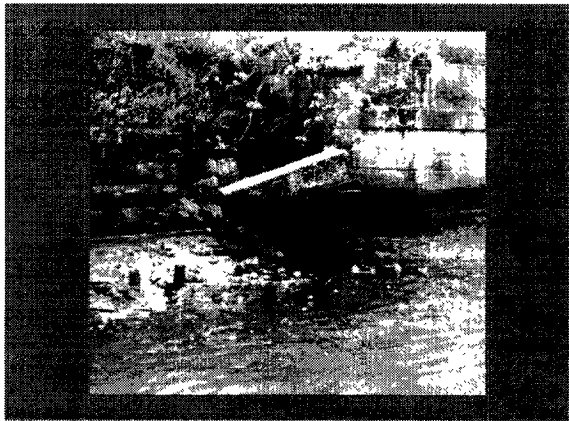
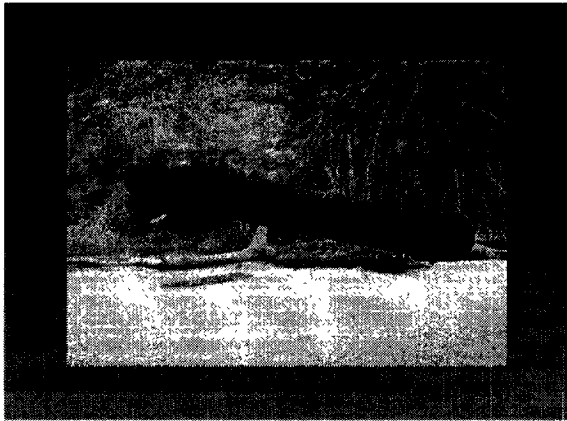
Combined Sewer Overflows Northern New Jersey Metropolitan Region

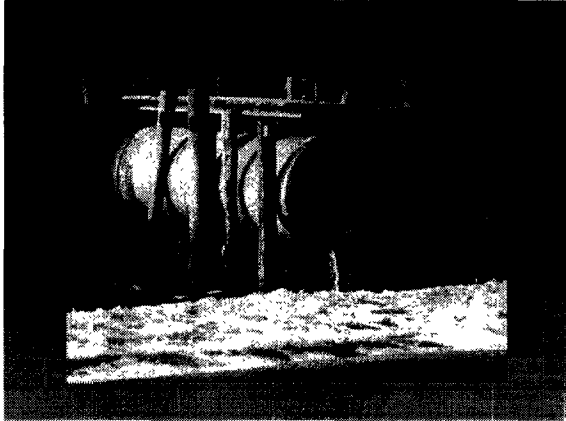
CSO Locations
 Counties
 Rivers and Streams
 Municipalities
 New York
 Waterbodies





WHY ARE CSOs A PROBLEM?





PRESENTLY THERE ARE:

- 280 Individual CSO Discharge Points
- 25 Communities located in 8 Counties
- Impacting 25 Waterbodies of 10 Watersheds.

WATERSHEDS IMPACTED

- Hudson River
- Passaic River
- Second River
- Hackensack River
- Elizabeth River
- Rahway River
- Delaware River
- Arthur Kill
- Raritan River
- Elizabeth Channel

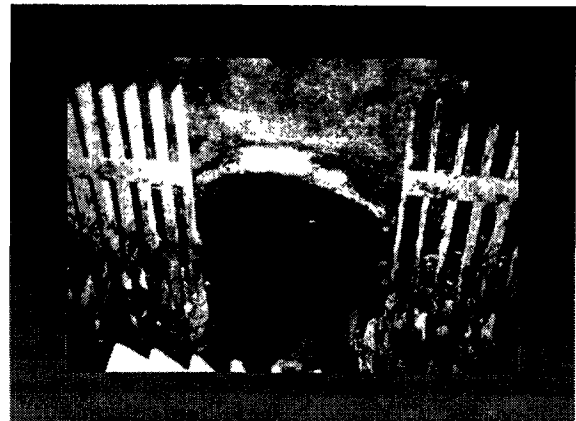
WATERBODIES IMPACTED

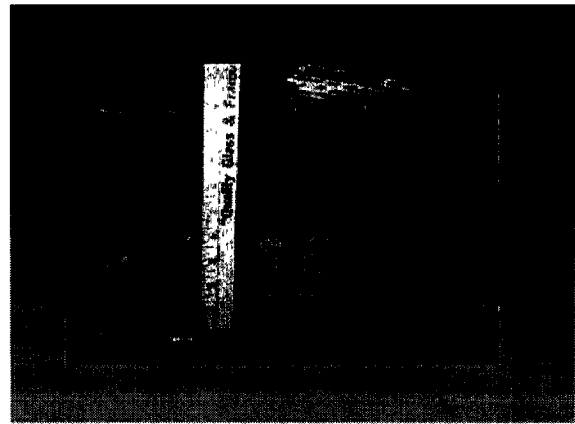
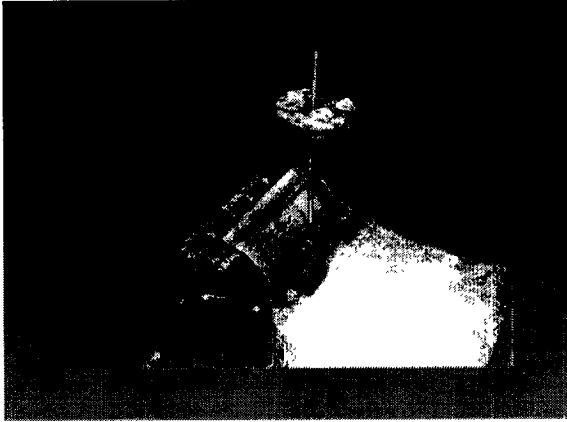
- Newark Bay
- Upper New York Bay
- Raritan Bay
- Atlantic Coastal Waters
- Delaware Bay

CSOs are:

- Dominant sources of pathogens.
- Important contributors of:
 - Floatables,
 - Toxic Metals; and
 - Settleable Solids
- Also contribute:
 - Toxic Organic Chemicals;
 - Nutrients and Organic Contamination; and to the
 - Degradation of Habitat.

*New York-New Jersey Harbor Estuary Program Final Comprehensive Conservation and Management Plan, March 1996, page 224







WHAT ARE NEW JERSEY'S MANDATES?

WHAT ARE NEW JERSEY'S MANDATES?

- New Jersey Sewerage Infrastructure Improvement Act (SIIA);
- National CSO Control Policy;
- New York-New Jersey Harbor Estuary Program Final Comprehensive Conservation and Management Plan; and
- National Environmental Performance Partnership System (NEPPS).

NEW JERSEY SEWERAGE INFRASTRUCTURE IMPROVEMENT of 1988 (SIIA)

Declared CSOs.

- Are a major source of ocean and other surface water pollution
- Contribute to the degradation of the coastal waters of the State.

Directed

All municipalities operating CSSs to provide abatement measures required by the State

The Department to create a fund to provide grants to municipalities for the planning and design of required CSO abatement facilities.

NATIONAL CSO CONTROL POLICY of 1994

PURPOSE:

To coordinate the planning, selection, design and implementation of CSO management practices and controls to meet the requirements of the CWA and involve the public fully during the decision making process.

NATIONAL CSO CONTROL POLICY of 1994

OBJECTIVE:

1. To ensure that if CSOs occur, they are only as a result of wet weather;
2. To bring all wet weather CSO discharge points into compliance with the technology-based and water quality-based requirements of the CWA; and
3. To minimize water quality, aquatic biota, and human health impacts from CSOs.

NATIONAL CSO CONTROL POLICY of 1994

REQUIREMENTS:

As a NPDES delegated state New Jersey must:

- Develop and submit a Statewide CSO Control Strategy
- Implement the National CSO Control Policy

Permittees must develop and implement:

- Nine Minimum Control Measures
- Long-term Control Plans

Time Frames:

- Implement NMCs no later than 1/1/97
- Develop LTCP within 2-years of the inclusion of the requirement in a permit.

NMC and LTCP Characteristics

Nine Minimum Controls (NMC):

- Meet existing technology-based requirements of CWA
- Implement immediate corrective actions

Long-term Control Plan (LTCP):

- Meet water quality-based requirements of the CWA
- Require intensive CSO monitoring and modeling studies
- Will require significant infrastructure improvement activity.

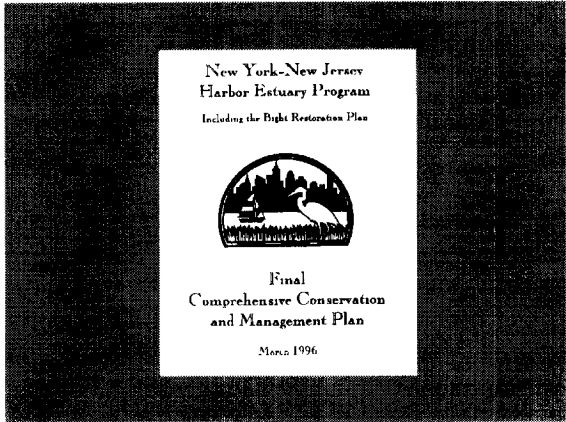
Nine Minimum Control Measures

1. Proper operation and maintenance
2. Maximum use of collection system for storage
3. Review of pretreatment requirements
4. Maximization of flow to POTW for treatment
5. Prohibition of CSOs during dry weather
6. Control of solids and floatables
7. Pollution prevention
8. Public notification
9. Monitoring of CSO impacts and efficacy of controls

NEW YORK - NEW JERSEY HARBOR ESTUARY PROGRAM FINAL COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN (NY-NJ HEP CCMP)

NJDEPs COMMITMENTS:

- Modify NJPDES permits to require implementation of NMCs;
- With USEPA obtain enforceable commitments from STP owners and operators to carry out their Long-term Control abatement responsibilities, and
- Follow up, as necessary, to obtain commitments from the remaining responsible parties.



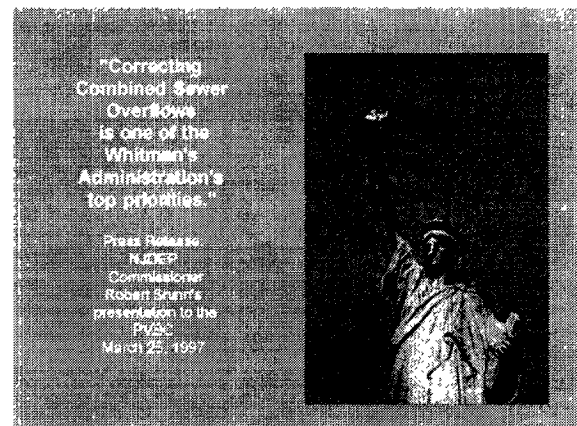
NATIONAL ENVIRONMENTAL
PERFORMANCE PARTNERSHIP SYSTEM
OBJECTIVES: (NEPPS)

To maintain and improve:

- the number and quality of ocean and bay bathing beaches;
- the aesthetic value of lakes and streams in New Jersey; and
- the number and quality of swimmable stream miles in New Jersey.

NATIONAL ENVIRONMENTAL
PERFORMANCE PARTNERSHIP SYSTEM
(NEPPS)

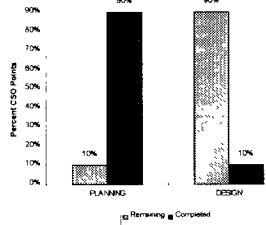
- **Cause Indicator:**
Point source loads of fecal coliform
- **Condition Indicator:**
Status of beach closings at tidal water beaches due to Fecal Coliform, Floatables and Other Causes.
- **Response Indicator:**
Status of infrastructure upgrades of sewage and stormwater systems, including CSO Points with Solids/Floatables Controls.



WHAT HAS BEEN
ACCOMPLISHED IN
NEW JERSEY?

NEW JERSEY SEWERAGE
INFRASTRUCTURE IMPROVEMENT
OF 1988

**STATUS OF SOLIDS/FLOATABLES CONTROL
AND DRY WEATHER OVERFLOW ELIMINATION
PLANNING AND DESIGN STUDIES
MARCH 1997**



NATIONAL CSO CONTROL POLICY

ACHIEVEMENTS:

- Permitting Strategy submitted to and approved by US EPA in 1990
- All CSO Points have been identified and permitted.
 - Individual Permits
 - 7 Permits Issued
 - 10 Permittees
 - 36 CSO Points
 - General Permit Issued January 27, 1995
 - 19 Individual Authorizations Issued (Permittees)
 - 244 CSO Points regulated

**NEW YORK - NEW JERSEY HARBOR
ESTUARY PROGRAM FINAL
COMPREHENSIVE CONSERVATION AND
MANAGEMENT PLAN
(NY-NJ HEP CCMP)**

ACHIEVEMENTS:

- Modified STP (POTW) NJPDES permits to require implementation of NMCs in June 1996.

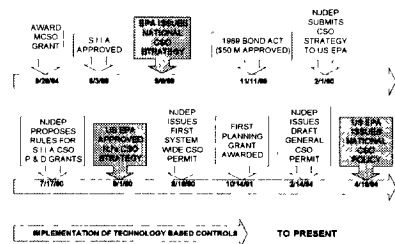
**NATIONAL ENVIRONMENTAL
PERFORMANCE PARTNERSHIP
SYSTEM
(NEPPS)**

USEPA & NJDEP Agreement was signed January 1997.

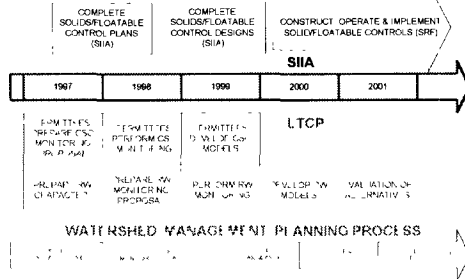
(This is the first year of the partnership participation.)

**IMPLEMENTING
NEW JERSEY'S
CSO
IMPROVEMENT PROGRAM**

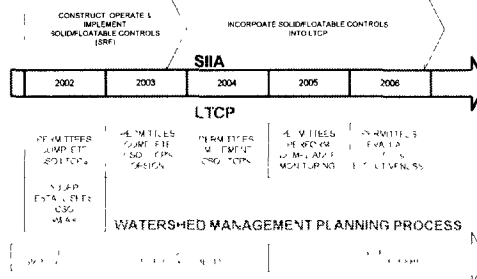
CSO PROGRAM MILESTONES



STATEWIDE CSO CONTROL PROGRAM PROCESS



STATEWIDE CSO CONTROL PROGRAM PROCESS



WATERSHED MANAGEMENT AREAS & CSO COMMUNITIES

WATERSHED MANAGEMENT AREA 4

LOCAL GOVERNMENT UNIT	NUMBER OF CSO POINTS	RECEIVING WATERBODY	POTW
Bayonne, City of (33)	10	Kill van Kill	PVSC-A
Bayonne, City of (33)	19	Newark Bay	PVSC-A
East Newark Borough (1)	1	Passaic River	PVSC
Hackensack, City of (2)	2	Hackensack River	SCUA
Harrison, Town of (7)	7	Passaic River	PVSC
Jersey City Sewerage Authority (27)	9	Hackensack River	PVSC-A
Jersey City Sewerage Authority (27)	2	Newark Bay	PVSC-A
JMESUC	PLANT OUTFALL	Arthur Kill	JMESUC
Keansy, Town of (10)	4	Frank's Creek	PVSC
Keansy, Town of (10)	6	Passaic River	PVSC
Newark, City of (30)	24	Passaic River	PVSC
Newark, City of (30)	6	Pertham Ditch	PVSC
Newark, City of (30)	1	Second River	PVSC
Paterson, City of (31)	31	Passaic River	PVSC
PVSC	PLANT OUTFALL	Newark Bay	PVSC

WATERSHED MANAGEMENT AREA 5

LOCAL GOVERNMENT UNIT	NUMBER OF CSO POINTS	RECEIVING WATERBODY	POTW
Bayonne, City of (33)	4	Upper New York Bay	PVSC-A
Bergen Co. Utility Authority	PLANT OUTFALL	Hackensack River	SCUA
Edgewater, MUA (7)	7	Hudson River	EMUA
EMUA	PLANT OUTFALL	Hudson River	EMUA
Fort Lee Borough (2)	2	Hudson River	SCUA
Octoberburg, Town of (1)	1	Hudson River	NBMUA-W
Jersey City Sewerage Authority (27)	15	Hudson River	PVSC-A
Jersey City Sewerage Authority (27)	1	Pertham Creek	PVSC-A
NBMUA Centre (NBMUA-C)	PLANT OUTFALL	Hackensack River	NBMUA-C
NBMUA Woodcliff (NBMUA-W)	PLANT OUTFALL	Hudson River	NBMUA-W
NHSA Adam St. Plant	PLANT OUTFALL	Hudson River	NHSA-A
NHSA Adam St. Plant	PLANT OUTFALL	Hudson River	NHSA-A
NHSA River Road Plant	PLANT OUTFALL	Hudson River	NHSA-R
NHSA River Road Plant (2)	2	Hudson River	NHSA-R
North Bergen Township (15)	2	Baldwins Creek	NBMUA-C
North Bergen Township (15)	7	Cromack Creek	NBMUA-C
North Bergen Township (15)	3	Hudson River	NBMUA-W
North Bergen Township (15)	1	Passaic Creek	NBMUA-C
North Bergen Township (15)	2	Pertham Creek	NBMUA-C
Rodgers Run, MUA (6)	6	Hackensack River	SCUA

WATERSHED MANAGEMENT AREA 7

LOCAL GOVERNMENT UNIT	NUMBER OF CSO POINTS	RECEIVING WATERBODY	POTW
Elizabeth, City of (33)	3	Arthur Kill	JMESUC
Elizabeth, City of (33)	26	Elizabeth River	JMESUC
Elizabeth, City of (33)	1	Newark Bay	JMESUC
Elizabeth, City of (33)	3	Pertham Ditch	JMESUC
Earth Amboy, City of (18)	7	Arthur Kill (Crane Creek)	MCUA
Earth Amboy, City of (18)	11	Harrison River	MCUA
Rahway, City of (5)	3	Rahway River	RVSA
Rahway, City of (5)	1	Rahway River (Robinson Branch)	RVSA
Rahway, City of (5)	1	South Branch Rahway River	RVSA

WATERSHED MANAGEMENT AREA 9

LOCAL GOVERNMENT UNIT	NUMBER OF CSO POINTS	RECEIVING WATERBODY	POTW
New Brunswick (1)	1	Raritan River	MCUA

WATERSHED MANAGEMENT AREA 18

LOCAL GOVERNMENT UNIT	NUMBER OF CSO POINTS	RECEIVING WATERBODY	POTW
Camden City of (3)	1	Tributary to Newton Creek	CCMUA
Gloucester City (1)	8	Delaware River	CCMUA
Gloucester City (1)	1	Newton Creek	CCMUA

WATERSHED MANAGEMENT AREA 19

LOCAL GOVERNMENT UNIT	NUMBER OF CSO POINTS	RECEIVING WATERBODY	POTW
Camden City of (1)	1	Delaware River	CCMUA
Camden City of (2)	4	Upper Tributary to Delaware River	CCMUA
Camden City of (2)	13	Lower Potomac	CCMUA
Camden City of (2)	10	Delaware River	CCMUA
Camden City of (2)	2	Newton Creek	CCMUA

WATERSHED MANAGEMENT AREA 20

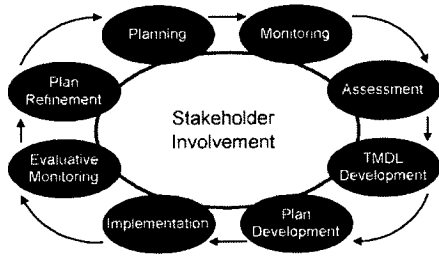
LOCAL GOVERNMENT UNIT	NUMBER OF CSO POINTS	RECEIVING WATERBODY	POTW
Trenton Utility Authority (1)	1	Delaware River	TUA

WATERSHED MANAGEMENT FRAMEWORK IMPLEMENTATION SCHEDULE

WMA #	WATERSHED MANAGEMENT AREA YEAR	IMPLEMENTATION YEAR	IMPLEMENTATION YEAR																	
			01	02	03	04	05	06	07	08	09	10								
9	Raritan River	P	M	A	T															
18	Delaware River	P	M	A	T															
19	Delaware River	P	M	A	T															
20	Delaware River	P	M	A	T															
20	Delaware River	P	M	A	T															
20	Delaware River	P	M	A	T															

P = Planning, M = Monitoring, A = Assessment, T = TMDL Development, D = Plan Development, I = Plan Implementation, E = Evaluate Monitoring, R = Plan Refinement

The Watershed Management Cycle



**CSSs
&
PLANNING / IMPLEMENTATION
AGENCIES**

**BERGEN CO. UA
Planning Entity - BCUA**

CSSs & CSO POINTS

- Fort Lee Boro. (2) WMA5
- Hackensack City (2) WMA4;
- Ridgefield Park (6)WMA5

**Camden County MUA
Planning Entity-CCMUA**

CSSs & CSO POINTS

- CCMUA (1) WMA 19;
- City of Camden (30) WMA 18;
- City of Gloucester (7) WMA 18.

**EDGEWATER MUA
Planning Entities-
EMUA & BCUA**

CSSs & CSO POINTS

- Cliffside Park (0) WMA 5.
- Edgewater Boro. (8) WMA 5

**J.M. of ESSEX & UNION CO.
Planning Entity - JME&UC**

CSSs & CSO POINTS

- City of Elizabeth (41) WMA 7

**MIDDLESEX CO. UA
Planning Entities-
Middlesex Co. Board of Chosen
Freeholders & MCUA**

CSSs & CSO POINTS

- City of New Brunswick (1) WMA 9;
- City of Perth Amboy (18) WMA 7.

**NORTH BERGEN TWP.
(CENTRAL)
Planning Entities -
Hudson Co. Board of Chosen
Freeholders & NBMUA**

CSSs & CSO POINTS

- North Bergen Twp (12) WMA 5.

**NORTH BERGEN TWP.
(Woodcliff)
Planning Entities -
Hudson Co. Board of Chosen
Freeholders & NBMUA**

CSSs & CSO POINTS

- North Bergen Twp. (1) WMA 5;
- Guttenburg (1) WMA 5.

**PASSAIC VALLEY SEWERAGE
COMMISSIONERS
Planning Entity - PVSC**

CSSs & CSO POINTS

- East Newark Borough (1) WMA 4;
- Kearny (12) WMA 4;
- Harrison (7) WMA 4;
- Patterson (31) WMA 4;
- JCSA (27) WMA 5;
- Bayonne (33) WMA 4 & 5;
- City of Newark (30) WMA 4.

**RAHWAY VALLEY SA
Planning Entity - RVSA**

CSSs & CSO POINTS

- Rahway City (5) WMA 7

**TRENTON UTILITIES
Planning Entity - Trenton**

CSSs & CSO POINTS

- City of Trenton (1) WMA 20

**N. HUDSON SA-ADAM ST.
Planning Entities -
Hudson Co. Board of Chosen
Freeholders & N.H.S.A.**

CSSs & CSO POINTS

- N. Hudson SA (10) WMA 5

**N. HUDSON SA-RIVER RD.
Planning Entities -
Hudson Co. Board of Chosen
Freeholders & N.H.S.A.**

CSSs & CSO POINTS

- N. Hudson SA (2) WMA 5

**ENABLING LEGISLATION
AND
REGULATORY AUTHORITY**

**SEWAGE INFRASTRUCTURE
IMPROVEMENT ACT,
N.J.S.A. 58:25-23 et seq.**

- "Any public entity operating a [CSO] shall provide abatement measures approved by the department at any [CSO] point for which a [NJPDES] permit is required..."

**NEW JERSEY WATER POLLUTION
CONTROL ACT, N.J.S.A.
58:10A-1 et seq.**

- Stated purpose of the act is to enable the State to implement the federal wastewater discharge permit program.
- The definitions of discharge, point source, pollutant are consistent with federal statutory and regulatory language.
- USEPA authorization of the State's program in 1981.
- Unlawful for any person to discharge any pollutant, except in conformity with a valid [NJPDES] permit....
- N.J.A.C. 7:14A-1 to 23

**WATER QUALITY PLANNING ACT
N.J.S.A. 58:11A-1 et seq.**

- Areawide waste treatment planning similar to Section 208 of the CWA. Planning areas to the extent practicable should conform to county boundaries.
- Continuing planning process and TMDL provisions similar to Section 303 of the CWA.
- N.J.A.C. 7:15.

**INTERSTATE SANITATION
COMMISSION, N.J.S.A.
32:18-1 et seq.**

- Compact of NJ, NY & CONN. concerning abatement of water pollution in the tidal and coastal waters adjacent to the signatory states.
- NY/NJ Harbor
- N.J.A.C. 7, App. A
- "... no discharge from CSOs unless rainfall in greater than trace amounts or significant melting."

**DELAWARE RIVER BASIN
COMMISSION
N.J.S.A. 32:11D-1 et seq.**

- Compact of NJ, NY, PA, & DE
- Jurisdiction to control future pollution and abate existing pollution in waters of the basin.

**PASSAIC VALLEY SEWERAGE
COMMISSIONERS
N.J.S.A. 58:14-1 et seq.**

- Created for the purpose of relieving the streams and rivers within the District from pollution.
- No discharges into the Passaic River between the Great Falls in Patterson and the mouth of the Passaic River at Newark Bay.

**SEWERAGE AUTHORITIES LAW
N.J.S.A. 40:14A-1 et seq.**

- Policy to foster and promote by all reasonable means the relief of waters in or bordering the State from pollution.
- Authority to acquire, construct, maintain, operate or improve works for the collection, treatment, purification or disposal of sewage.

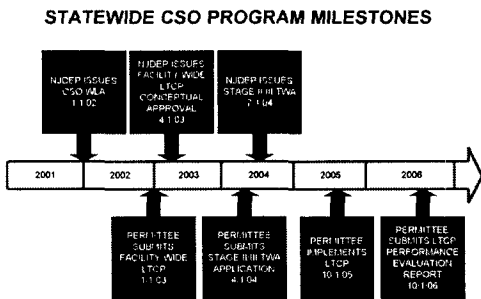
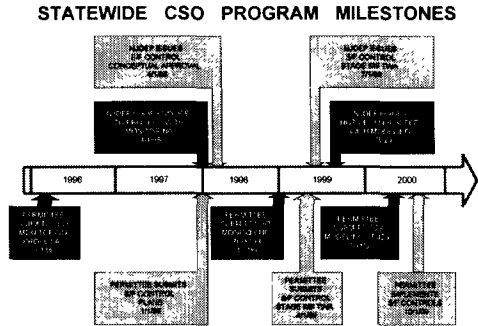
**MUNICIPAL AND COUNTY
UTILITIES AUTHORITIES LAW
N.J.S.A. 40:14B-1 et seq.**

- Foster and promote by all reasonable means the relief of waters in or bordering the State from pollution, from domestic, industrial and other sources.
- Authority to acquire, construct, maintain, operate or improve works for the collection, treatment, purification or disposal of sewage.

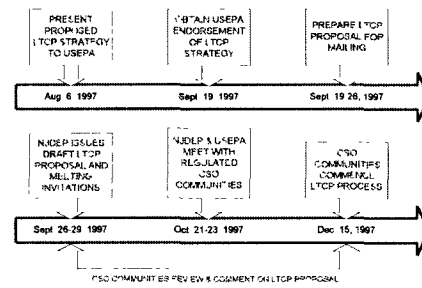
**CSO ABATEMENT
IMPLEMENTATION MECHANISMS**

- NJPDES Permits
 - Individual
 - General
- Administrative Orders
- Section 308 of the CWA

STATEWIDE CSO PROGRAM MILESTONES



LTCP STRATEGY SCHEDULE



VISION

The Dept. of Environmental Protection is committed to providing high quality life for the residents of New Jersey.

MISSION

To assist the residents of New Jersey in preserving, sustaining, protecting and enhancing the environment to ensure the integration of high environmental quality, public health and economic vitality.

JOINT DREDGING PLAN FOR THE PORT OF NEW YORK & NEW JERSEY

OCTOBER 7, 1996

Christine Todd Whitman

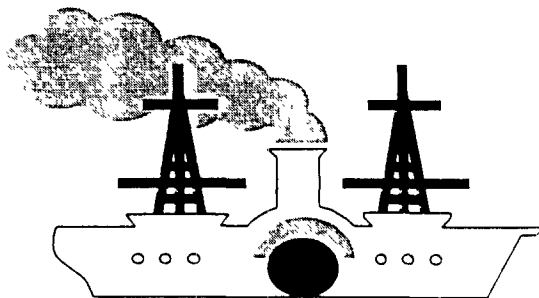
Governor

State of New Jersey

George E. Pataki

Governor

State of New York



Joint Dredging Plan for the Port of New York and New Jersey

PREAMBLE: The continued operation and economic development of the Port facilities and private terminals located in New York Harbor is vital to the regional economy of New York State, New York City, and New Jersey. Additionally, and as importantly, the preservation, conservation, and restoration of the harbor's natural resources are critical to the quality of life in the metropolitan region.

With these overall concerns in mind, the two states, consistent with the parameters developed by the environmental groups and the federal agencies, have developed this plan to accomplish two major objectives vital to the maintenance of our navigational assets. They are:

- To promote greater certainty and predictability in the dredging project review process, and dredged material management; and
- To facilitate effective long-term environmentally sound management strategies for addressing dredging and disposal needs for the region.

The plan consists of three components, a bi-state component representing initiatives common to the two states, and individual components particular to each state's requirements and methodologies.

Introduction and Guidelines for Management of Dredged Materials:

The fundamental principles for dredged material management are as follows:

- Utilize the most economically and ecologically efficient and effective management and disposal options;
- Restore areas historically used for dredged material disposal;
- Reduce volumetric requirements through efficient harbor planning and dredged material reduction techniques and technologies;
- Decontaminate and remediate harbor sediments to the extent possible;
- Improve sediment quality through elimination/reduction of sediment contaminant sources; and
- Develop beneficial uses for dredged material wherever possible.

Categorization of Dredged Material

In the New York District, the Environmental Protection Agency (USEPA) Region II and the U.S. Army Corps of Engineers (ACOE) New York District have established three broad categories of dredged material based upon their suitability for ocean disposal. The ocean disposal criteria for the New York District are as follows:

Category I: Sediments which meet "unrestricted" ocean dumping criteria, test results indicate no unacceptable toxicity or bioaccumulation. No special precautionary measures are required during ocean disposal.

Category II: Sediments which demonstrate no toxicity, but where there is the potential for bioaccumulation. Restricted ocean disposal, capping or some other disposal management practice required.

Category III: Sediments that do not meet ocean dumping criteria. These sediments fail acute toxicity testing or pose a threat of significant bioaccumulation that cannot be addressed through available ocean disposal management practices.

Until 1992, most of the dredged material (95%) from the New York Harbor region was found to be acceptable for ocean disposal. However, the revised testing protocols implemented in 1992, literally reversed the quantities of material in category. It is now estimated that 66% of the material to be dredged over the coming years is Category III, 20% is Category II and only 14% is Category I. These are estimates at best, and the likelihood is that upon further examination, more material will fall into the Category III range.

On July 24, 1996, the Federal administration mandated the closure of the Mud Dump Site by September, 1997. The only material which may be deposited thereafter at the Mud Dump Site will be Category I material, and then only for specific remediation purposes. It is unclear at this time how much Category I material will be required to remediate the site. The USEPA is developing a Supplemental Environmental Impact Statement, which will be completed in January, 1997, in which these requirements will be detailed.

Dredging and disposal of Category I material has continued and a number of initiatives have been undertaken to develop disposal alternatives for the remaining material, but availability of those alternatives is limited at this time. Therefore, it is necessary to utilize all available alternatives in order to maintain our navigation channels.

The following sections outline the options for disposal of dredged materials in the immediate, short and long term, and the initiatives undertaken by the two states to implement this plan.

The Joint Plan

Specific Objectives:

1. To maintain and strengthen the economic vitality of the Port region;
2. To provide for a comprehensive and coordinated approach to the management of dredged material in the region;
3. To identify immediate and short term disposal requirements and initiate development of long term disposal options;
4. To eliminate contaminants at their source; and
5. To remediate contaminated material.

In furtherance of these objectives, the States of New York and New Jersey (the "States") commit to the following actions:

- I. **Immediate Term (through October, 1997):** The States will co-operate with each other, the City of New York, the ACOE, the USEPA, the Port Authority of New York and New Jersey (PANY/NJ) and the private sponsors, where appropriate, to dredge the following high priority projects as expeditiously as possible:
 1. The federally-designated high priority navigational channels indicated in Table I (attached); and
 2. The public and private dredging projects indicated in Table II (attached).

Immediate term dredged material disposal options are as follows:

Category I material: Mud Dump Site. Capacity is sufficient for our needs until September, 1997, at which time only material to be used for remediation purposes as defined by the USEPA may be deposited at the Site.

Category II material: Mud Dump Site, only if no reasonable alternative (as found by the ACOE) is available and the USEPA determines that there is sufficient capacity. A "reasonable alternative site" has been defined as a site which is available on a timely basis, with costs comparable to ocean disposal of Category II materials, as adjusted for cost escalation but not to exceed the current local upland disposal rates. It is estimated by the ACOE and the USEPA that the Mud Dump Site has space for slightly over 1 million cubic yards of Category II material. The following conditions apply to disposal of Category II material at the Mud Dump Site:

- The dredged material comes from fully permitted projects;
- USEPA must establish a maximum time that the mud dump site may remain exposed, without capping, between individual disposal operations;

- The material must be capped with appropriate containment material as determined by the USEPA;
- The USEPA must devise and implement a monitoring plan to assure the complete containment of the contaminated materials deposited at the Mud Dump Site; and
- The Mud Dump site must be closed to all disposal operations by Sept. 1, 1997, and the USEPA restoration plan must be in place on that date.

The Mud Dump is the site of last resort for Category II material, to be used when no other reasonable options are available. As other "reasonable" options become available, they will be brought on line to replace the Mud Dump as the preferred disposal site for Category II material.

Category III material:

- **The ORION Site** is a site located in New Jersey currently being operated as an upland demonstration project for construction fill utilizing dredged materials. Current flow rates for dredged materials are below projections. Therefore, disposal operations associated with the project do not meet current requirements. However, the operator expects to reach a 5,000 to 7,000 cubic yard per day capacity during October, 1996. Capacity is 1.3 million cubic yards.
- **The Newark Bay Borrow Pit(s)** are scheduled to be available for use by June, 1997. The Pits, as well as the ORION site would be limited to New Jersey Category III material, and for New Jersey Category II material to the extent required. The capacity of the pits is currently estimated to be approximately 1.7 million cubic yards.
- Other projects are now in the planning or pre-application phase which will produce additional capacity commencing in June, 1997, as outlined in the individual states' components of this plan.

The sequencing of priority channel dredging and disposal in the immediate term will be conducted by the ACOE, the PANY/NJ and the States of New York and New Jersey. The purpose of this sequencing will be to ensure that the identified projects have the opportunity to be disposed of at the various disposal sites within the projected time frame. Projects will have to be "bundled together" in order to meet both the dredging windows and to ensure maximum capacity utilization.

Additionally, permit advance teams have been created to conduct pre-application meetings with applicants to identify, on a case by case basis, disposal options and testing requirements, in order to provide the most efficient and cost effective options for individual permit applicants. The teams consist of representatives from USEPA, ACOE, New Jersey Department of Environmental Protection (NJDEP) and New York State Department of Environmental Conservation (NYDEC).

II. Short Term (September, 1997 - 2000)

Short Term Dredging requirements - maintenance only

	Category I	Non-Ocean Disposal	Total
New York	3,138,400	4,389,000	7,527,400
NY/NJ	200,000	1,008,000	1,208,000
New Jersey	<u>8,478,000</u>	<u>3,700,600</u>	<u>12,178,600</u>
Total	11,816,400	9,097,600	20,914,000

As noted above, to expedite the permitting process for these projects, each State has set up a dedicated permitting team, with representatives from the ACOE and Environmental Protection Agency. Each team is charged with streamlining the permitting process, developing testing protocols for each project, and working with each applicant to ensure an efficient process.

Initiatives for the disposal of dredged material to be implemented in the short term:

1. The states commit to the development and implementation of dredged material **decontamination technology**. By July, 1997, the states will solicit proposals for the design and construction of a demonstration decontamination facility to treat at least 100,000 cubic yards of Category II/III dredged material. The capacity to treat contaminated material will increase to 500,000 cubic yard (cyd) per year of material by 1999. The states will also:
 - Continue monitoring of the BNL/USEPA/ACOE decontamination technologies project and provide assistance where possible;
 - Provide coordination and assistance to the PANY/NJ in its review of technologies and disposal operations as embodied in its report, Matrix Evaluation of Unsolicited Proposals/Ideas, published on July 31, 1996, providing sites and technical review where practicable; and
 - Work jointly and in cooperation with the appropriate entities, for the evaluation of and funding for additional proposals as warranted.
2. The states commit to the siting, design and construction of **nearshore** and **upland demonstration projects** to take 1,000,000 cubic yards of dredged material per annum in environmentally acceptable, and economically viable sites. Both states have projects under evaluation at this time (see state initiatives.)
3. As part of an integrated, comprehensive disposal plan which includes all viable disposal options, the States commit to the investigation, siting, design and

development of **confined disposal facilities** in environmentally acceptable and economically viable sites. The States will initiate the environmental impact statement process during calendar year 1997.

4. The states commit to continue the investigation of **geotextile bags** and other technologies designed to contain material disposed of in confined disposal facilities.
5. The states commit to the continued development of **beneficial use** projects such as habitat creation, landfill cover/closure, construction material and hazardous site remediation.
6. The processing of dredged material is a critical element in many disposal options, especially upland disposal, beneficial reuse, and decontamination. The states commit to jointly or in cooperation with each other, the development of sufficient **processing facilities** to rehandle dredged materials.
7. The states commit to the use of dredged material suitable for **ocean disposal** to remediate the Mud Dump Site, following the guidelines as determined in the Supplemental Environmental Impact Statement to be published by the USEPA Region II in January, 1997.
8. The states commit to the development of state sponsored **transportation projects** utilizing dredged materials.
9. The States commit to the development of **comprehensive, consistent regulatory policies** between the States with reciprocal acceptance of proposals which meet the other State's criteria. The States will enter into a memorandum of understanding for reciprocal recognition of dredged material management technologies and processes.
10. There are several initiatives underway for the **evaluation and promotion of technologies** for the use of dredged material. The states will continue to foster development of these technologies.
11. The States will work with their **respective Congressional delegations** to insure that the appropriate federal actions are included in authorization and appropriation bills.

III. Long Term (September 2001-2025) Dredging Requirements and Disposal Options

The long term dredging requirements for the harbor, for maintenance dredging, will include approximately 4-5 million cubic yards of material per annum. Depending on the results of the Hub Port Study and the 50' Harbor Deepening study, capital dredging could approach 40 to 60 million cubic yards in addition to the maintenance dredging needs over the long term. These decisions on deepening could also impact the annual maintenance

dredging requirements for the harbor depending on the siting characteristics of the deepened channels.

1. As part of an integrated, comprehensive disposal plan which includes all viable disposal options, the States commit to the investigation, siting, design and development of a long term, large capacity containment facility, utilizing as a base, information solicited and provided by the respective states' Dredged Material Management Teams, the Dredged Material Management Integration Work Group and the data contained in the ACOE Interim Report. Each state's team will make specific recommendations to its respective Governor for environmentally acceptable, and economically viable sites. The States will initiate the environmental impact statement process during calendar year 1997.

Much of the material removed for channel deepening is expected to be "clean" material and may even be suitable for beneficial re-use without the necessity for extensive and expensive re-handling.

2. The States commit to implementation of the Harbor Estuary Plan as it relates to the study of sediment contaminants, the identification and elimination of the sources of contamination of harbor sediment, the remediation of contaminated areas, and the pursuit and sanction of polluting entities. Since 1960, the level of contamination in harbor sediments has been reduced, through a number of initiatives, by half. In order to reduce contaminant levels to produce clean sediments within 30 years, from this date, the states commit to the following actions:
 - To continue the aggressive pursuit of point and non-point source pollution in the harbor;
 - To fund the track down and clean-up recommendations in The Comprehensive Conservation and Management Plan (CCMP);
 - To continue the implementation and enforcement of The Combined Sewer Overflow (CSO) abatement controls of USEPA's national CSO Control Policy;
 - To develop a workplan for additional studies in areas of highly contaminated sediments;
 - To conduct Phase I and Phase II Sediment toxicity identification evaluations to identify the causes of sediment contamination; and

- To aggressively pursue the recovery of damages from the parties responsible for polluting the harbor, with any damage awards to be applied to harbor restoration including clean-up and disposal costs.
3. The States will serve as local sponsors with the PANY/NJ for the Hub Port study being undertaken by the USACE, New York District, in accordance with the Water Resources and Development Act (WRDA) '96 to ensure that the coordinated planning, development and construction necessary to meet the needs of future vessel traffic is carried out. The study should focus on capitalizing on all current assets of the Port and will work toward attaining the most efficient operations possible with the least adverse environmental impact on the harbor, recognizing that increases in cargo and shipping in world trade create an opportunity for all existing (and improved) facilities to benefit if developed appropriately. The reconnaissance study will be completed by early 1997, and the feasibility study will be completed in 1999.
 4. The States will identify and implement technologies and processes designed to reduce the amount of material to be dredged harbor wide.
 5. The States will work together with the USEPA and ACOE to develop accurate and adequate knowledge of the characteristics of sediment to be dredged. This information is necessary in order to make valid scientific and regulatory decisions concerning the contamination of sediments and disposal options for dredged material.

New Jersey's Plan

SECTION I - Introduction

The purpose of this section is to further define the immediate (1996) and short term (1997-2000) management and disposal options identified in the Joint Plan; and to initiate the development of long term facilities and processes to meet New Jersey's dredging disposal requirements. The anticipated availability of management options is contained in Table 3.

SECTION II - Regulatory Initiatives

The two States are committed to development of comprehensive, consistent regulatory policies between the states with some form of reciprocal acceptance of proposals which meet the other State's criteria.

- New Jersey will adopt as regulation its technical guidance document known as The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters, as may be amended in the public comment process.
- New York State will expedite the adoption of policies and procedures for the management of dredged materials, compatible with New Jersey's regulations.
- The two states will enter into a formal memorandum of understanding for reciprocal recognition of technologies and processes, as appropriate.
- All regulatory initiatives will be completed during calendar year 1997.

SECTION III - Technology Development

1. Decontamination Technologies

The two States are committed to the continued development of decontamination technologies with demonstration projects to be conducted in 1997, with the goal of full scale (500,000 cubic yards per annum) production during 1999. New Jersey will, in concert with New York, request proposals for demonstration technologies and, if necessary, assist in site selection and development.

New Jersey will, jointly and in cooperation with New York and the PANY/NJ, assist the New Jersey Dredged Material Sediment and Technology Institute in evaluating and funding additional proposals as warranted.

2. Sediment Control Technologies

New Jersey will commit to the investigation and development, if warranted and feasible, practical sediment control technologies to reduce and/or re-direct sediment transport.

3. Processing Technologies

New Jersey will commit to the development of facilities to rehandle, process and/or decontaminate dredged materials with a capacity of 1.5 to 2.0 million cubic yards per annum. Currently, there are four private proposals which are in the pre-application phase in New Jersey. New Jersey will expedite, in so far as possible, all such applications with the goal of a fully permitted, full production facility, in place by June 1, 1997.

4. Beneficial Reuse Technologies

New Jersey will commit to the continued development of beneficial uses for dredged materials. During the period 1997-2000, the annual average volume of Category II/III projects in New Jersey is 1.82 million cubic yards. To meet those requirements, New Jersey will continue development of the following projects:

- State sponsored transportation projects utilizing dredged materials in an average annual volume of up to 700,000 cubic yards. The New Jersey Department of Transportation has tentatively identified those projects and New Jersey will provide the necessary research and development funds.
- New Jersey will commit to assisting in identification and development of nearshore/upland demonstration projects for construction, habitat development, and restoration projects in the amount of 500,000 cubic yards per annum, providing necessary research and development funds.
- Coordinating with USEPA Region II, New Jersey will provide from its dredging projects as much Category I material as is possible for the restoration of the Ocean Disposal site and such other remediation areas as are available and sanctioned by the appropriate agencies.
- All Categories of materials will be utilized where appropriate for upland beneficial uses such as landfill cover/closure, construction material and hazardous site remediation. New Jersey will aggressively develop a list of local sites which will accommodate the remaining disposal requirements, and will work with dredging permit applicants to schedule development projects to meet identified dredging needs.

5. Harbor Sediment Contaminant Reduction & Remediation

As indicated in the Joint Plan, New Jersey will commit to implementation of the Harbor Estuary Plan particularly as it relates to the sediment studies (source-transport-fate) elimination of pollution sources, remediation, identifying the sources and pursuing polluters. The two states will meet during the first quarter of 1997 to develop work plans, identify funding requirements, and secure commitments to implement those elements of the Harbor Estuary Program identified in the Joint Plan.

6. Funding

A. New Jersey Funding (\$185 Million)

New Jersey, upon successful passage of the Port of New Jersey Revitalization, Dredging, Environmental Cleanup, Lake Restoration, and Delaware Bay Area Economic Development Bond Act of 1996, will develop a dredging priority list and adopt regulations for the implementation of the Bond Act. The Director of Maritime Resources will coordinate with all parties to develop priorities for the annual budget required by the Legislature, and will assist the Commissioner of the Department of Environmental Protection in developing the criteria for the regulations.

Projects eligible for funding under the act include:

- Construction of Disposal Facilities;
- Decontamination Projects; and
- Dredging of Navigation Channels.

B. Project Funding from Committed Port Authority Funds (\$65 Million)

New Jersey will fund, as appropriate, projects from monies allocated by the PANY/NJ to the two states in accordance with the agreement and request of the two Governors. The Director of Maritime Resources will coordinate with all parties to encourage and assist in the development of projects consistent with the goals and objectives of the Joint Plan.

The Director will coordinate with the Commissioner of the Department of Environmental Protection, the Commissioner of the Department of Transportation, and the Executive Director of the Port Authority of New York and New Jersey to implement appropriate projects within the following categories:

- Dredging and Dredged Material Disposal Projects;
- Dredged Material Management Initiatives;
- Harbor Sediment Contaminant Identification/Reduction Studies (local share);
- Harbor Sediment Control Technologies (local share);

- Pollution Prevention Initiatives (local share);
- Beneficial Reuse Technology Development;
- Decontamination Technology Development; and
- The Port of New York and New Jersey Navigation Study (ACOE Hub Port Study), (local share)

THE NEW YORK PLAN

SECTION I - Introduction

This Plan is a critical step in the process of developing a workable solution to the dredging crisis now facing us in the New York Harbor region. The process will include working in partnership with the State of New Jersey, the City of New York, the Port Authority of New York and New Jersey, the Federal Government, local community groups, public interest groups, the maritime industry, and private citizens to ensure that the final plan has support from the broadest possible base. The plan presents a broad array of options for the management of the dredged material, no one of which is sufficient to solve the problem by itself, but when put together, will go a long way towards keeping the Harbor a vibrant port, equipped to compete into the 21st century.

In developing this plan, we recognize the importance of two very basic policies. The first is that the Port is important to the economic well-being of the States of New York and New Jersey, not to mention the entire United States. In order to allow the Port to compete now and in the future, it is essential that dredging and the disposal of the dredged materials take place in a timely and cost-effective manner to keep our navigational channels open. The second all-important policy is that the harbor is a vital natural resource, and the management of the dredged material must include provisions for the preservation and improvement of that resource. These two policies are complementary. To the extent the harbor is a successful economic engine, resources will be generated which can be used to assist in assuring it is a resource which can be enjoyed by all its constituents.

In order to accomplish these goals, the State of New York is committed to the following:

Maintenance Dredged Material Disposal Projects:

- Upland beneficial use (landfill cover);
- Nearshore confined disposal facilities;
- Habitat creation, shoreline protection, wetland creation; and
- RD&D projects.

Dredged Material Management Initiatives:

- Sediment Contaminant source identification and reduction;
- Decontamination technologies; and
- Dredge material Processing Facility Development.

Support Projects:

- Sediment Characterization;
- Regulatory revisions;
- Promotion of technologies for beneficial use;
- Permit Applicant Assistance; and
- Harbor Related Studies.

**New York State Project Funding
\$65 (million)**

	<u>Funding</u>
Maintenance Dredged Material Disposal Projects	40,000,000
Dredged Material Management Initiatives	20,000,000
Other Support Projects	5,000,000
Total	\$65,000,000

SECTION II - Maintenance Dredged Material Disposal Projects

In the short term, from 1997 through 2000, the annual average volume of maintenance dredging projects in New York State is approximately 1.2 million cubic yards of material which is Category II or III. To meet these requirements, we will aggressively develop the following projects:

	<u>Projected Capacity per Year in Cubic Yards</u>
Upland beneficial use: Landfill Cover	500,000
Nearshore Containment Projects	750,000
Habitat Creation, shore protection, wetlands	100,000
RD&D Projects	<u>100,000</u>
Total	1,450,000

In addition to the projects developed for Category II and III material, New York State is committed to the use of Category I material for restoration of the Mud Dump Site in coordination with the EPA Region II, and any other remediation areas available and sanctioned by the appropriate agencies.

SECTION III - Dredged Material Management Initiatives

1. Sediment Contaminant Source Identification and Reduction

New York State is committed to the elimination of the sources of pollution into the Harbor Estuary. **No long term dredged material management strategy is complete without a viable plan to ensure that the dredged material at some time in the future**

will be free of contaminants. To this end, we are committed to implementation of the toxics section of the Comprehensive Conservation and Management Plan (CCMP).

2. Decontamination technologies

Typically, decontamination technologies for dredged materials are intended to make the treated material suitable--as defined by legal and technical criteria--for beneficial use as a product or for less restricted disposal. In the case of the most contaminated sediments, decontamination may be primarily targeted to reducing the actual or potential exposures to hazardous waste, to controlling the spread of contaminants or to modifying the material so that it may be more easily and cheaply managed.

New York State is committed to the continuing development of decontamination technologies. We will work with the State of New Jersey to fulfill the goal of full scale (500,000 cubic yards) production per year by 1999.

3. Dredged Material Processing Facility Development

Processing of dredged material is a critical element in many disposal options, especially upland disposal. Proper processing can cut down significantly on the amount of material which must be disposed of through dewatering and separation of contaminated material from non-contaminated fractions of material. In addition, in many cases the material must be stabilized prior to further handling or disposal. There are several sites in the region which may accommodate this use, both in New York and New Jersey.

The State of New York is committed to working with the State of New Jersey to develop dredged material processing facilities. This is an area where the States of New York and New Jersey can readily share a facility for mutual benefit.

SECTION IV- Support Projects

1. Sediment Characterization

Accurate and adequate knowledge of the characteristics of sediment to be dredged is necessary in order to make valid scientific and regulatory decisions concerning the contamination of sediments and disposal options for dredged material.

The State of New York has committed to a workplan which will compile a complete and reliable database of existing sediment data in the Harbor, support sample collection, analysis and modeling to fill gaps in the database, and enhance the scope, availability and organization of information to characterize sediments over time and space. This will enable predictions of long term disposal capacity needs at different contaminant levels. We will work with other agencies that have data on the Harbor, including the ACOE, USEPA, the City of New York, and PANY/NJ.

2. **Regulatory Revisions**

DEC is currently seeking to expand upland management opportunities through the development of revisions to Part 360 of the state regulations that are designed specifically for upland management of navigational dredged material. DEC is committed to working with the State of New Jersey to formulate consistent policies and procedures for the management of dredged material.

3. **Promote Development of New Technologies for Beneficial Use of Dredge Material**

There are several initiatives underway for the evaluation and promotion of technologies for the use of dredged material. These include construction aggregate and use for transportation projects, among others. New York is committed to the development of these alternatives.

4. **Dedicated Assistance to Dredging Permit Applicants**

DEC, which is responsible for the vast majority of State issued permits for the dredging and disposal of material from the State's waters, has put together an interdisciplinary team of engineers, biologists and technicians led by a project manager to provide dedicated permit services solely to New York Harbor customers. These services include preapplication project evaluation, site evaluations, sampling protocols for data analysis, and environmental assessment, among others. These professionals will work closely with the appropriate Federal agencies, the ACOE, and the USEPA, to ensure clear, consistent guidance and permitting decisions, exclusively for the Port.

5. **Harbor Related Studies**

The State of New York is committed to the efficient development of the Port of New York and New Jersey. We will work with the State of New Jersey, the ACOE, the City of New York, community groups, environmentalists and others to ensure that the economic and environmental interests of the Harbor are best served.

CHAPTER 70

AN ACT authorizing the creation of a debt of the State of New Jersey by issuance of bonds of the State in the aggregate principal amount of \$300,000,000 to provide moneys for the construction of subaqueous pits and a containment facility or facilities for the disposal of dredged material from the New Jersey/New York port region, for the costs of projects related to the decontamination of dredged material; for the dredging of the Kill Van Kull, the Arthur Kill, and other navigational channels located in the port region; for the dredging of navigational waterways not located in the port region; for the remediation of hazardous discharge sites and contaminated water supplies; for the restoration of lakes; and for the construction of economic development sites in the Delaware River and Bay Region; providing the ways and means to pay and discharge the principal and interest thereof, providing for the submission of this act to the people at a general election; and making an appropriation.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. This act shall be known and may be cited as the "Port of New Jersey Revitalization, Dredging, Environmental Cleanup, Lake Restoration, and Delaware Bay Area Economic Development Bond Act of 1996."
2. The Legislature finds and declares that the sand, silt and mud, which naturally accumulate in the navigation channels and ship berths in the port area of northern New Jersey and New York City must be dredged on a regular basis to ensure the continued economic viability of the shipping and trade industry, which creates more than 200,000 direct and indirect jobs, provides more than \$20 billion in regional economic benefits and generates salaries and wages in excess of \$5 billion; that while the economic importance of dredging is significant, it must be recognized that dredged material is often contaminated with harmful and dangerous substances; that in order to enjoy the economic benefits provided by an accessible port, an economically viable and longterm solution to the problem of dredged material disposal must be found; and that it is therefore in the public interest to provide a funding mechanism to finance, in whole or in part, the construction of subaqueous pits and a containment facility or facilities to provide for the safe disposal of dredged materials, projects related to the decontamination of dredged material, and the dredging of the Kill Van Kull, the Arthur Kill and other navigational channels located in the port region. The Legislature further finds and declares that the improper, irresponsible, and sometimes illegal discharge of hazardous substances presents a grave threat to the public health and safety and the environment; that the dangers posed by these discharges can be minimized only by prompt identification, cleanup and removal of these hazardous discharges; that existing funding sources are not adequate to finance these remediation operations; and that it is therefore in the best interests of all citizens of this State to provide a funding mechanism to finance the prompt and efficient remediation of hazardous discharge sites.

The Legislature further finds and declares that navigational channels not located in the port region require dredging to accommodate the commercial fishing industry and recreational boating activities, that the viability of the fishing and tourism industries depends in large part upon the existence of navigable waterways, and that it is in the public interest to provide funding to finance the dredging operations necessary to ensure the continued viability of these important industries.

The Legislature further finds and declares that the lakes of the State are a precious natural resource threatened by nonpoint source pollution, soil erosion, eutrophication, flood damage, illegal solid waste disposal and littering, and uncontrolled vegetative growth; that lakes provide recreation, conservation, water supply, flood control, and other benefits important to the health, safety, and welfare of the citizens of New Jersey, and that in order to protect and preserve these water bodies, it is in the public interest for the State, local government, and private lake associations or similar organizations or persons in conjunction with local government to undertake lake restoration projects.

The Legislature further finds and declares that there are many potential economic development sites in need of financing that would provide jobs and prosperity to the Delaware River and Bay Region of the State; and that it is in the public interest to provide funding to finance the estimated costs of land purchase, building construction, equipment purchase and miscellaneous site improvements of these economic development sites.

3 As used in this act, unless the context indicates a different meaning or intent:

"Bonds" mean the bonds authorized to be issued, or issued, under this act; "Commission" means the New Jersey Commission on Capital Budgeting and Planning; "Commissioner" means the Commissioner of Environmental Protection; "Construction" means, in addition to the usual meaning thereof, acts of construction, reconstruction, improvement, rehabilitation, relocation, demolition, renewal, repair, replacement, extension, betterment, improvement, protection, or consolidation or any combination thereof, of a project; "Containment facility" means an upland or in-water confined disposal facility which shall consist of an artificially constructed island, a diked extension of an existing island, or a diked extension attached to land, and which is used solely for the disposal of dredged materials; "Cost" means the expenses incurred in connection with: the construction of a containment facility or facilities, and subaqueous pits for the disposal of dredged materials from the port region; the decontamination of dredged material; the dredging of the Kill Van Kull, the Arthur Kill and other navigation channels located in the port region; the initiation, continuation, or completion of the remediation of a hazardous discharge site, the acquisition by purchase, lease, or otherwise, and the construction of a water supply facility; the dredging of navigation channels not located in the port region; the restoration of lakes; the purchase of real property, equipment, and any building, construction and miscellaneous site improvements associated with an economic development site; the acquisition by purchase, lease, or otherwise, and the development of any real or personal property for use in connection with a project authorized by this act, including any rights or interests therein, the execution of any agreements and franchises deemed by the department to be necessary or useful and convenient in connection with any project authorized by this act; the procurement of engineering, inspection, planning, legal, financial, or other professional services, including the services of a bond registrar or an authenticating agent; the issuance of bonds, or any interest or discount thereon; the administrative, organizational, operating or other expenses incident to the financing, initiating, continuing, completing, and placing into service of any project authorized by this act, including the expense of salaries, supplies, equipment and materials; the establishment of a reserve fund or funds for working capital, operating, maintenance, or replacement expenses and for the payment or security of principal or interest on bonds, as the Director of the Division of Budget and Accounting in the Department of the Treasury may determine; and reimbursement to any fund of the State of moneys which may have been transferred or advanced therefrom to any fund created by this act, or any moneys which may have been expended therefrom for, or in connection with, any project authorized by this act, "Decontamination" means a process by which contaminants are removed or reduced from dredged materials, or by which dredged materials are otherwise made acceptable for use; "Delaware River and Bay Region" means all the State territory located within the "port district," as defined pursuant to section 1(6) of P L 1951, c.288 (C.32.3-13.23), "Department" means the Department of Environmental Protection, "Discharge" means an intentional or unintentional action or omission resulting in the releasing, spilling, leaking, pumping, pouring, emitting, emptying, or dumping of a hazardous substance onto the land or into the waters of the State; "Dredge" or "dredging" means the removal of sand, silt, mud, and other materials from the bottom of a waterway in order to deepen navigation channels and ship berths, "Dredged material" means material removed by dredging that is, in the determination of the federal Environmental Protection Agency, either unsuitable for ocean disposal or suitable for ocean disposal only with capping, "Economic development site" means land, equipment, buildings, appurtenant infrastructure and miscellaneous site improvements designed to promote economic activity and new jobs in the Delaware River and Bay Region; "Government securities" means any bonds or other obligations which as to principal and interest constitute direct obligations of, or are unconditionally guaranteed by, the United States of America, including obligations of any federal agency, to the extent those obligations are unconditionally guaranteed by the United States of America, and any certificates or any other evidences of an ownership interest in those obligations of, or unconditionally guaranteed by, the United States of

America or in specified portions which may consist of the principal of, or the interest on, those obligations; "Hazardous discharge site" means any location at which hazardous substances have been, are suspected to have been, or potentially could be discharged, and shall include any area to which the hazardous substance contamination has migrated or may migrate; "Hazardous substance" means any hazardous substance as defined pursuant to section 3 of P.L. 1976, c.141 (C.58:10-23.11b), hazardous waste as defined pursuant to section 1 of P.L. 1976, c.99 (C.13:1E-38), or pollutant as defined pursuant to section 3 of P.L. 1977, c.74 (C.58:10A-3); "Lake restoration" or "restoration of lakes" means the removal of sand, silt, mud, sediment, rocks, stumps, vegetation, algae blooms, or other materials from lakes, or the abatement and control of pollution of lakes caused by stormwater runoff, soil erosion, or other types of nonpoint source or point source pollution, to improve, for the purposes of recreation, conservation, water supply, or flood control, the use and overall quality of lake waters or the use or function of any park, natural area, fishing, boating, or swimming area or facility, dam, or flood control facility or structure associated with a lake; "Local government unit" means a county or a municipality, or any agency, authority, board, commission, or other instrumentality thereof, any two or more counties or municipalities operating jointly through a joint meeting or interlocal services agreement permitted by law, or any agency, authority, board, commission, or other instrumentality thereof, or any other local or regional entity created by the Legislature as a political subdivision of the State, or any agency, authority, board, commission, or other instrumentality thereof; "Port region" means the geographic area created by Article II of the Compact of April 30, 1921, creating the bi-state agency, now known as the Port Authority of New York and New Jersey, and which is commonly referred to as the Port of New York District; "Project" means any work relating to the construction of a containment facility or facilities and subaqueous pits for the disposal of dredged material from the port region; the decontamination of dredged material, the dredging of the Kill Van Kull, the Arthur Kill and other navigation channels located in the port region; the remediation of a hazardous discharge site; the construction of water supply facilities to replace potable water supplies contaminated by a discharge, the dredging of navigation channels not located in the port region; the restoration of lakes; or the purchase of real property, equipment, and any building, construction, and miscellaneous site improvements associated with an economic development site; "Remedial action" means those actions taken at a hazardous discharge site, as may be required by the department, including the removal, treatment, containment, transportation, securing, or other engineering or treatment measures, including related operation and maintenance activities, whether of a permanent nature or otherwise, designed to ensure that any discharge at the hazardous discharge site is remediated in compliance with the applicable remediation standards, and the sealing or closure of wells and groundwater supplies contaminated by a discharge; "Remediation" or "remediate" means all necessary actions to investigate and clean up any known, suspected, or threatened discharge of hazardous substances, including, as necessary, identifying areas of concern and determining the presence of hazardous substances, the collection and evaluation of data adequate to determine whether or not discharged hazardous substances exist, determining the nature and extent of any discharged hazardous substance and any problems presented by a discharge, and the performance of a remedial action; "Subaqueous pit" means an excavated area within a water body used for the disposal of dredged material, and "Water supply facilities" means the plants, structures, public or private wells, interconnections between existing water supply systems, machinery, equipment and other property, real, personal, and mixed, constructed or operated, or to be constructed or operated, for the purposes of augmenting the natural water resources of the State and making available a supply of water for all uses, and any and all appurtenances necessary, useful or convenient for making available, collecting, impounding, storing, improving, treating and filtering, or transmitting water.

4 The commissioner shall adopt, pursuant to the "Administrative Procedure Act," P.L.1968, c 410 (C 52:14B-1 et seq), rules and regulations necessary to implement the provisions of this act The commissioner shall review and consider the findings and recommendations of the commission in the administration of the provisions of this act.

5 Bonds of the State of New Jersey are authorized to be issued in the aggregate principal amount of \$185,000,000 for the purposes of financing, in whole or in part, the cost of the construction of subaqueous pits and a containment facility or facilities for the disposal of dredged material from the port region, the

cost of projects related to the decontamination of dredged material, and the cost of dredging the Kill Van Kull, the Arthur Kill and other navigation channels located in the port region, in accordance with all applicable State and federal laws, rules or regulations.

6 Bonds of the State of New Jersey are authorized to be issued in the aggregate principal amount of \$70,000,000 for the purposes of paying or financing costs incurred by the State for the remediation of hazardous discharge sites and for the construction of water supply facilities to replace potable water supplies determined by the department to be contaminated or threatened by a discharge. No moneys authorized pursuant to this section may be expended on any administrative costs of the State or any of its departments, agencies, or authorities.

7. Bonds of the State of New Jersey are authorized to be issued in the aggregate principal amount of \$20,000,000 for the purposes of financing the cost of dredging of navigation channels not located in the port region.

8. Bonds of the State of New Jersey are authorized to be issued in the aggregate principal amount of \$20,000,000 for the purposes of financing the cost of the purchase of real property, equipment, and any building, construction, and miscellaneous site improvements associated with an economic development site.

9. Bonds of the State of New Jersey are authorized to be issued in the aggregate principal amount of \$5,000,000 for the purposes of financing the cost of lake restoration projects.

a The sum authorized pursuant to this section shall be used to. (1) provide grants to local government units to meet the cost, in whole or in part, of lake restoration projects for lakes owned, leased, or managed by local government units; (2) provide loans to private lake associations or similar organizations or owners of private lakes, as co-applicants with local government units, to meet the cost, in whole or in part, of lake restoration projects undertaken by private lake associations or similar organizations or owners of private lakes, in conjunction with local government units; or (3) meet the cost, in whole or in part, of lake restoration projects undertaken by the State for lakes owned, leased, or managed by the State.

b Loans made to private lake associations or similar organizations or owners of private lakes as co-applicants with local government units from the "1996 Lake Restoration Fund" established pursuant to section 21 of this act shall bear interest of not more than 2% per year, and shall be for a term of not more than 20 years

c Any loan authorized under this section shall be provided under terms and conditions set forth in a written agreement between the Department of Environmental Protection and the entity or person receiving the loan.

d The local government unit that is a co-applicant for a loan made to a private lake association or similar organization or owner of a private lake shall assess the cost of payment of principal and interest for any loan made pursuant to this section upon the real estate benefited thereby in proportion to and not in excess of the benefits conferred. Upon failure to pay an assessment imposed pursuant to this section, the property owner shall pay interest and penalties from the same time and at the same rate as for failure to pay assessments for local improvements in the municipality where imposed, and from the date of confirmation the unpaid assessment shall be a first and paramount lien upon the real estate assessed to the same extent, and be enforced and collected in the same manner, as assessments for local improvements.

e The Department of Environmental Protection shall administer the grant and loan program authorized pursuant to this section. The department shall make available to every local government unit and private lake association or similar organization information concerning the availability of, and the criteria for qualifying and obtaining, grants and loans under the program.

10 The bonds authorized under this act shall be serial bonds, term bonds, or a combination thereof, and shall be known as "Port of New Jersey Revitalization, Dredging, Environmental Cleanup, Lake Restoration, and Delaware Bay Area Economic Development Bonds." These bonds shall be issued from time to time as the issuing officials herein named shall determine and may be issued in coupon form, fully-registered form or book-entry form. The bonds may be subject to redemption prior to maturity and shall mature and be paid not later than 35 years from the respective dates of their issuance

11. The Governor, the State Treasurer and the Director of the Division of Budget and Accounting in the Department of the Treasury, or any two of these officials, herein referred to as "the issuing officials," are authorized to carry out the provisions of this act relating to the issuance of bonds, and shall determine all matters in connection therewith, subject to the provisions of this act. If an issuing official is absent from the State or incapable of acting for any reason, the powers and duties of that issuing official shall be exercised and performed by the person authorized by law to act in an official capacity in the place of that issuing official.

12 Bonds issued in accordance with the provisions of this act shall be direct obligations of the State of New Jersey, and the faith and credit of the State are pledged for the payment of the interest and redemption premium thereon, if any, when due, and for the payment of the principal thereof at maturity or earlier redemption date. The principal of and interest on the bonds shall be exempt from taxation by the State or by any county, municipality or other taxing district of the State.

13 The bonds shall be signed in the name of the State by means of the manual or facsimile signature of the Governor under the Great Seal of the State, which seal may be by facsimile or by way of any other form of reproduction on the bonds, and attested by the manual or facsimile signature of the Secretary of State, or an Assistant Secretary of State, and shall be countersigned by the facsimile signature of the Director of the Division of Budget and Accounting in the Department of the Treasury and may be manually authenticated by an authenticating agent or bond registrar, as the issuing officials shall determine. Interest coupons, if any, attached to the bonds shall be signed by the facsimile signature of the Director of the Division of Budget and Accounting in the Department of the Treasury. The bonds may be issued notwithstanding that an official signing them or whose manual or facsimile signature appears on the bonds or coupons has ceased to hold office at the time of issuance, or at the time of the delivery of the bonds to the purchaser thereof.

14. a The bonds shall recite that they are issued for the purposes set forth in sections 5, 6, 7, 8 and 9 of this act, that they are issued pursuant to this act, that this act was submitted to the people of the State at the general election held in the month of November, 1996, and that this act was approved by a majority of the legally qualified voters of the State voting thereon at the election. This recital shall be conclusive evidence of the authority of the State to issue the bonds and their validity. Any bonds containing this recital shall, in any suit, action or proceeding involving their validity, be conclusively deemed to be fully authorized by this act and to have been issued, sold, executed and delivered in conformity herewith and with all other provisions of law applicable hereto, and shall be incontestable for any cause.

b The bonds shall be issued in those denominations and in the form or forms, whether coupon, fully-registered or book-entry, and with or without provisions for the interchangeability thereof, as may be determined by the issuing officials.

15. When the bonds are issued from time to time, the bonds of each issue shall constitute a separate series to be designated by the issuing officials. Each series of bonds shall bear such rate or rates of interest as may be determined by the issuing officials, which interest shall be payable semiannually; except that the first and last interest periods may be longer or shorter, in order that the intervening semiannual payments may be at convenient dates

16 The bonds shall be issued and sold at the price or prices and under the terms, conditions and regulations as the issuing officials may prescribe, after notice of the sale, published at least once in at least

three newspapers published in this State, and at least once in a publication carrying municipal bond notices and devoted primarily to financial news, published in this State or in the city of New York, the first notice to appear at least five days prior to the day of bidding. The notice of sale may contain a provision to the effect that any bid in pursuance thereof may be rejected. In the event of rejection or failure to receive any acceptable bid, the issuing officials, at any time within 60 days from the date of the advertised sale, may sell the bonds at a private sale at such price or prices and under the terms and conditions as the issuing officials may prescribe. The issuing officials may sell all or part of the bonds of any series as issued to any State fund or to the federal government or any agency thereof, at a private sale, without advertisement.

17. Until permanent bonds are prepared, the issuing officials may issue temporary bonds in a form and with those privileges as to their registration and exchange for permanent bonds as may be determined by the issuing officials.

18. The State Treasurer shall establish a fund to be known as the "1996 Dredging and Containment Facility Fund," and the moneys therein shall be held in those depositories as the State Treasurer may select. The State Treasurer shall deposit into the fund all proceeds from the sale of the bonds issued by the State under this act for the construction of subaqueous pits, the construction of a containment facility or facilities, projects related to the decontamination of dredged material, and dredging projects authorized pursuant to sections 5 and 7 of this act. The moneys in the fund are specifically dedicated and shall be applied to the cost of the purposes authorized pursuant to sections 5 and 7 of this act. Moneys in the fund shall not be expended except in accordance with appropriations from the fund made by law, but bonds may be issued as herein provided, notwithstanding that the Legislature shall not have then adopted an act making a specific appropriation of any of the moneys. Any act appropriating moneys from the "1996 Dredging and Containment Facility Fund" shall identify the projects to be funded by the moneys.

19. The State Treasurer shall establish a fund to be known as the "1996 Environmental Cleanup Fund," and the moneys therein shall be held in those depositories as the State Treasurer may select. The State Treasurer shall deposit into the fund all proceeds from the sale of the bonds issued by the State under this act for the remediation of hazardous discharge sites and the construction of water supply facilities as set forth in section 6 of this act. The moneys in the fund are specifically dedicated and shall be applied to the cost of the purposes set forth in section of this act. Moneys in the fund shall not be expended except in accordance with appropriations from the fund made by law, but bonds may be issued as herein provided, notwithstanding that the Legislature shall not have then adopted an act making a specific appropriation of any of the moneys. Any act appropriating moneys from the "1996 Environmental Cleanup Fund" for the purposes of section 6 of this act need not identify the particular project or projects to be funded by the money. No moneys appropriated pursuant to this section may be expended on any administrative costs of the State or any of its departments, agencies or authorities.

20 The State Treasurer shall establish a fund to be known as the "1996 Economic Development Site Fund," and the moneys therein shall be held in those depositories as the State Treasurer may select. The State Treasurer shall deposit into the fund all proceeds from the sale of the bonds issued by the State under this act for the financing of the purchase of real property, equipment, and any building, construction, and miscellaneous site improvements associated with an economic development site authorized pursuant to section 8 of this act. The moneys in the fund are specifically dedicated and shall be applied to the cost of the purposes set forth in section 8 of this act. Moneys in the fund shall not be expended except in accordance with appropriations from the fund made by law, but bonds may be issued as herein provided, notwithstanding that the Legislature shall not have then adopted an act making a specific appropriation of any of the moneys. Any act appropriating moneys from the "1996 Economic Development Site Fund" shall identify the projects to be funded by the moneys.

21 The State Treasurer shall establish a fund to be known as the "1996 Lake Restoration Fund," and the moneys therein shall be held in those depositories as the State Treasurer may select. The State Treasurer shall deposit into the fund all proceeds from the sale of the bonds issued by the State under this act for the

financing the lake restoration projects authorized pursuant to section 9 of this act. The moneys in the fund are specifically dedicated and shall be applied to the cost of the purposes set forth in section 9 of this act. Moneys in the fund shall not be expended except in accordance with appropriations from the fund made by law, but bonds may be issued as herein provided, notwithstanding that the Legislature shall not have then adopted an act making a specific appropriation of any of the moneys. Any act appropriating moneys from the "1996 Lake Restoration Fund" shall identify the projects to be funded by the moneys and the county and municipality within which each project is located.

22. a. At any time prior to the issuance and sale of bonds under this act, the State Treasurer is authorized to transfer from any available moneys in any fund of the treasury of the State to the credit of the "1996 Dredging and Containment Facility Fund," the "1996 Environmental Cleanup Fund," the "1996 Economic Development Site Fund," or the "1996 Lake Restoration Fund," those sums as the State Treasurer may deem necessary. The sums so transferred shall be returned to the same fund of the treasury of the State by the State Treasurer from the proceeds of the sale of the first issue of bonds.

b. Pending their application to the purposes provided in this act, the moneys in the "1996 Dredging and Containment Facility Fund," the "1996 Environmental Cleanup Fund," the "1996 Economic Development Site Fund," and the "1996 Lake Restoration Fund," may be invested and reinvested as are other trust funds in the custody of the State Treasurer, in the manner provided by law. Net earnings received from the investment or deposit of moneys in these funds shall be redeposited therein and become part of the respective funds.

23. If any coupon bond, coupon or registered bond is lost, mutilated or destroyed, a new bond or coupon shall be executed and delivered of like tenor, in substitution for the lost, mutilated or destroyed bond or coupon, upon the owner furnishing to the issuing officials evidence satisfactory to them of the loss, mutilation or destruction of the bond or coupon, the ownership thereof, and security, indemnity and reimbursement for expenses connected therewith, as the issuing officials may require.

24. The accrued interest, if any, received upon the sale of the bonds shall be applied to the discharge of a like amount of interest upon the bonds when due. Any expense incurred by the issuing officials for advertising, engraving, printing, clerical, authenticating, registering, legal or other services necessary to carry out the duties imposed upon them by the provisions of this act shall be paid from the proceeds of the sale of the bonds by the State Treasurer, upon the warrant of the Director of the Division of Budget and Accounting in the Department of the Treasury, in the same manner as other obligations of the State are paid

25. Bonds of each series issued hereunder shall mature, including any sinking fund redemptions, not later than the 35th year from the date of issue of that series, and in amounts as shall be determined by the issuing officials. The issuing officials may reserve to the State by appropriate provision in the bonds of any series the power to redeem any of the bonds prior to maturity at such price or prices and upon such terms and conditions as may be provided in the bonds.

26. Any bond or bonds issued hereunder, which are subject to refinancing pursuant to the "Refunding Bond Act of 1985," P.L. 1985, c. 74 as amended by P.L. 1992, c. 182 (C.49:2B-1 et seq.), shall no longer be deemed to be outstanding, shall no longer constitute a direct obligation of the State of New Jersey, and the faith and credit of the State shall no longer be pledged to the payment of the principal of, redemption premium, if any, and interest on the bonds, and the bonds shall be secured solely by and payable solely from moneys and government securities deposited in trust with one or more trustees or escrow agents, which trustees and escrow agents shall be trust companies or national or state banks having powers of a trust company, located either within or without the State, as provided herein, whenever there shall be deposited in trust with the trustees or escrow agents, as provided herein, either moneys or government securities, including government securities issued or held in book-entry form on the books of the Department of the Treasury of the United States, the principal of and interest on which when due will provide money which, together with the moneys, if any, deposited with the trustees or escrow agents at

the same time, shall be sufficient to pay when due the principal of, redemption premium, if any, and interest due and to become due on the bonds on or prior to the redemption date or maturity date thereof, as the case may be; provided the government securities shall not be subject to redemption prior to their maturity other than at the option of the holder thereof. The State of New Jersey hereby covenants with the holders of any bonds for which government securities or moneys shall have been deposited in trust with the trustees or escrow agents as provided in this section that, except as otherwise provided in this section, neither the government securities nor moneys so deposited with the trustees or escrow agents shall be withdrawn or used by the State for any purpose other than, and shall be held in trust for, the payment of the principal of, redemption premium, if any, and interest to become due on the bonds; provided that any cash received from the principal or interest payments on the government securities deposited with the trustees or escrow agents, to the extent the cash will not be required at any time for that purpose, shall be paid over to the State, as received by the trustees or escrow agents, free and clear of any trust, lien, pledge or assignment securing the bonds; and to the extent the cash will be required for that purpose at a later date, shall, to the extent practicable and legally permissible, be reinvested in government securities maturing at times and in amounts sufficient to pay when due the principal of, redemption premium, if any, and interest to become due on the bonds on and prior to the redemption date or maturity date thereof, as the case may be, and interest earned from the reinvestments shall be paid over to the State, as received by the trustees or escrow agents, free and clear of any trust, lien or pledge securing the bonds

Notwithstanding anything to the contrary contained herein: a. the trustees or escrow agents shall, if so directed by the issuing officials, apply moneys on deposit with the trustees or escrow agents pursuant to the provisions of this section, and redeem or sell government securities so deposited with the trustees or escrow agents, and apply the proceeds thereof to (1) the purchase of the bonds which were refinanced by the deposit with the trustees or escrow agents of the moneys and government securities and immediately thereafter cancel all bonds so purchased, or (2) the purchase of different government securities, provided however, that the moneys and government securities on deposit with the trustees or escrow agents after the purchase and cancellation of the bonds or the purchase of different government securities shall be sufficient to pay when due the principal of, redemption premium, if any, and interest on all other bonds in respect of which the moneys and government securities were deposited with the trustees or escrow agents on or prior to the redemption date or maturity date thereof, as the case may be; and b. in the event that on any date, as a result of any purchases and cancellations of bonds or any purchases of different government securities, as provided in this sentence, the total amount of moneys and government securities remaining on deposit with the trustees or escrow agents is in excess of the total amount which would have been required to be deposited with the trustees or escrow agents on that date in respect of the remaining bonds for which the deposit was made in order to pay when due the principal of, redemption premium, if any, and interest on the remaining bonds, the trustees or escrow agents shall, if so directed by the issuing officials, pay the amount of the excess to the State, free and clear of any trust, lien, pledge or assignment securing the refunding bonds.

27. Refunding bonds issued pursuant to P.L.1985, c.74 as amended by P.L.1992, c 182 (C.49:2B-1 et seq) may be consolidated with bonds issued pursuant to sections 5, 6, 7, 8 and

9 of this act or with bonds issued pursuant to any other act for purposes of sale.

28 To provide funds to meet the interest and principal payment requirements for the bonds issued under this act and outstanding, there is appropriated in the order following:

a. Revenue derived from the collection of taxes under the "Sales and Use Tax Act," P.L.1966, c 30 (C 54:32B-1 et seq), or so much thereof as may be required; and b. If, at any time, funds necessary to meet the interest, redemption premium, if any, and principal payments on outstanding bonds issued under this act are insufficient or not available, there shall be assessed, levied and collected annually in each of the municipalities of the counties of this State, a tax on the real and personal property upon which municipal taxes are or shall be assessed, levied and collected, sufficient to meet the interest on all outstanding bonds issued hereunder and on the bonds proposed to be issued under this act in the calendar year in which the tax is to be raised and for the payment of bonds falling due in the year following the

year for which the tax is levied. The tax shall be assessed, levied and collected in the same manner and at the same time as other taxes upon real and personal property. The governing body of each municipality shall cause to be paid to the county treasurer of the county in which the municipality is located, on or before December 15 in each year, the amount of tax herein directed to be assessed and levied, and the county treasurer shall pay the amount of the tax to the State Treasurer on or before December 20 in each year.

If on or before December 31 in any year, the issuing officials, by resolution, determine that there are moneys in the General Fund beyond the needs of the State, sufficient to pay the principal of bonds falling due and all interest and redemption premium, if any, payable in the ensuing calendar year, the issuing officials shall file the resolution in the office of the State Treasurer, whereupon the State Treasurer shall transfer the moneys to a separate fund to be designated by the State Treasurer, and shall pay the principal, redemption premium, if any, and interest out of that fund as the same shall become due and payable, and the other sources of payment of the principal, redemption premium, if any, and interest provided for in this section shall not then be available, and the receipts for the year from the tax specified in subsection a

of this section shall be considered and treated as part of the General Fund, available for general purposes

29. Should the State Treasurer, by December 31 of any year, deem it necessary, because of the insufficiency of funds collected from the sources of revenues as provided in this act, to meet the interest and principal payments for the year after the ensuing year, then the State Treasurer shall certify to the Director of the Division of Budget and Accounting in the Department of the Treasury the amount necessary to be raised by taxation for those purposes, the same to be assessed, levied and collected for and in the ensuing calendar year. The director shall, on or before March 1 following, calculate the amount in dollars to be assessed, levied and collected in each county as herein set forth. This calculation shall be based upon the corrected assessed valuation of each county for the year preceding the year in which the tax is to be assessed, but the tax shall be assessed, levied and collected upon the assessed valuation of the year in which the tax is assessed and levied. The director shall certify the amount to the county board of taxation and the treasurer of each county. The county board of taxation shall include the proper amount in the current tax levy of the several taxing districts of the county in proportion to the ratables as ascertained for the current year.

30. For the purpose of complying with the provisions of the State Constitution, this act shall be submitted to the people at the general election to be held in the month of November, 1996.

To inform the people of the contents of this act, it shall be the duty of the Secretary of State, after this section takes effect, and at least 60 days prior to the election, to cause this act to be published at least once in one or more newspapers of each county, if any newspapers be published therein and to notify the clerk of each county of this State of the passage of this act; and the clerks respectively, in accordance with the instructions of the Secretary of State, shall have printed on each of the ballots the following:

If you approve of the act entitled below, make a cross (X), plus (+), or check (o) mark in the square opposite the word "Yes." If you disapprove of the act entitled below, make a cross (X), plus (+) or check (o) mark in the square opposite the word "No." If voting machines are used, a vote of "Yes" or "No" shall be equivalent to these markings respectively.

PORT OF NEW JERSEY REVITALIZATION, DREDGING, ENVIRONMENTAL CLEANUP, LAKE RESTORATION, AND DELAWARE BAY AREA ECONOMIC DEVELOPMENT BOND ACT OF 1996

YES

Shall the "Port of New Jersey Revitalization, Dredging, Environmental Cleanup, Lake Restoration, and Delaware Bay Area Economic Development Bond Act of 1996," which authorizes the State to issue bonds

in the amount of \$300,000,000 for the purposes of financing, in whole or in part, the costs of constructing subaqueous pits and a containment facility or facilities for the disposal of materials dredged from the Kill Van Kull, Arthur Kill and other navigation channels located in the New Jersey/New York port region; projects related to the decontamination of Arthur Kill and other navigation channels located in the New Jersey/New York port region; dredging navigation channels not located in the New Jersey/New York port region; remediating hazardous discharge sites; and constructing water supply facilities to replace contaminated water supplies; the restoration of lakes; and economic development sites in the Delaware River and Bay Region; and which provides the ways and means to pay the interest on the debt and also to pay and discharge the principal thereof, be approved?

INTERPRETIVE STATEMENT

If approved, this bond act would authorize the State to issue \$300 million in State general obligation bonds. The proceeds from these bonds would be used to fund the following projects: \$185 million would be used to construct underwater pits and a containment facility or facilities for the safe disposal of harmful dredged material from the New Jersey/New York port region, to finance projects related to the decontamination of these dredged materials, and to dredge the Kill Van Kull, the

in the New Jersey/New York port region; \$20 million would be used for the dredging of navigation channels not located in the New Jersey/New York port region; \$70 million would be used to clean up hazardous discharge sites and contaminated water supplies; \$5 million would be used for the restoration of lakes in New Jersey; and \$20 million would be used for financing economic development sites in the Delaware River and Bay Region.

The fact and date of the approval or passage of this act, as the case may be, may be inserted in the appropriate place after the title in the ballot. No other requirements of law of any kind or character as to notice or procedure, except as herein provided, need be adhered to.

The votes cast for and against the approval of this act, by ballot or voting machine, shall be counted and the result thereof returned by the election officer, and a canvass of the election had in the same manner as is provided for by law in the case of the election of a Governor, and the approval or disapproval of this act so determined shall be declared in the same manner as the result of an election for a Governor, and if there is a majority of all votes cast for and against it at the election in favor of the approval of this act, then all the provisions of this act not made effective theretofore shall take effect forthwith.

31 There is appropriated the sum of \$5,000 to the Department of State for expenses in connection with the publication of notice pursuant to section 30 of this act

32. The commissioner shall submit to the State Treasurer and the commission with the department's annual budget request a plan for the expenditure of funds from the "1996 Dredging and Containment Facility Fund," the "1996 Environmental Cleanup Fund," the "1996 Economic Development Site Fund," and the "1996 Lake Restoration Fund," for the upcoming fiscal year. The plan shall include the following information: a performance evaluation of the expenditures made from the fund to date; a description of programs planned during the upcoming fiscal year; a copy of the regulations in force governing the operation of programs that are financed, in part or in whole, by funds from the "1996 Dredging and Containment Facility Fund," the "1996 Environmental Cleanup Fund," the "1996 Economic Development Site Fund," and the "1996 Lake Restoration Fund"; and an estimate of expenditures for the upcoming fiscal year.

33 Immediately following the submission to the Legislature of the Governor's annual budget message, the commissioner shall submit to the relevant standing committees of the Legislature, as designated by the President of the Senate and the Speaker of the General Assembly, and to the Joint Budget Oversight Committee, or its successor, a copy of the plan called for under section 32 of this act, together with such changes therein as may have been required by the Governor's budget message

34 Not less than 30 days prior to entering into any contract, lease, obligation, or agreement to effectuate the purposes of this act, the commissioner shall report to and consult with the Joint Budget Oversight Committee, or its successor. Except as otherwise provided by this act, all appropriations from the bond funds established by this act shall be by specific allocation for each project, and any transfer of any funds so appropriated shall require the approval by the Joint Budget Oversight Committee or its successor.

35. This section and sections 30 and 31 of this act shall take effect immediately and the remainder of this act shall take effect as and when provided in section 30.

Approved July 17, 1996