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NEW JERSEY TOXICS REDUCTION WORKPLAN

VOLUME I

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SECTION I: INTRODUCTION

STATEMENT OF THE PROBLEM

The New York-New Jersey Harbor estuary system and the New York Bight (see Figure 1-1) are of enormous and interdependent ecological and economic importance. The presence of toxic chemicals in the water and sediments results in reduced water quality, fisheries restrictions/advisories, reproductive impairments in some coastal species, and general adverse impacts to the estuarine and coastal ecosystems. The Port of New York and New Jersey is central to the economy of the region; it is the largest port on the East Coast of the United States. However, in recent years, problems associated with the management of contaminated dredged material, including high costs and the lack of suitable disposal/use alternatives, have impacted the volume of shipping in the harbor.

Continuing discharges of several chemicals, notably metals and polychlorinated biphenyls (PCBs), are contributing to violations of water quality standards, contamination of fish and shellfish, and other ecological impairments. The ecological and/or human health risks of other chemicals are not well defined, however the concentration of a number of these chemicals in the water, sediment, and tissue of fish/shellfish exceed various criteria and standards developed by regulatory agencies to protect biota and human health. Prudent measures must be implemented as soon as possible to eliminate/reduce the discharges of these chemicals to the Harbor/Bight.

The New York-New Jersey Harbor Estuary Program Comprehensive Conservation and Management Plan (HEP CCMP; March 1996) identified at least fifteen chemicals (or classes of chemicals) of concern, including PCBs, dioxins/furans, chlorinated pesticides, polycyclic aromatic hydrocarbons (PAHs), and metals (see Table 1-1; note: this list of chemicals is currently being reviewed and updated by the HEP Toxics Work Group). Historically, much of the toxic chemicals discharged to NY-NJ harbor originated from uncontrolled discharges, particularly from industrial sources. Current sources include atmospheric deposition, municipal and industrial wastewater treatment facilities, combined sewer and stormwater outfalls, and rainfall-induced runoff (non-point sources). In addition, harbor sediments, which preferentially bind various toxic chemicals, can act as a continuing source as they are resuspended and moved throughout the system by both natural and man-made means.

It has been estimated that atmospheric deposition can contribute up to 70% of the loadings of some toxic chemicals to coastal areas. The NY-NJ Harbor estuary system may thus be subject to significant loadings of one or more of the identified chemicals of concern due to atmospheric deposition. However, the magnitude of such loadings to the estuary is largely unknown.

Twelve publicly owned treatment works (POTWs) currently discharge directly to New Jersey surface waters in the NY-NJ Harbor estuary system (see Table III-7). These discharges total approximately 610 million gallons per day (mgd) and account for about 30% of the total wastewater flow discharged by treatment facilities from New Jersey and New York to the Hudson River Basin below Troy Dam. In addition to treating residential and commercial sewage, many of the POTWs treat wastewater originating from a wide variety of industrial operations and processes. A large number of industrial wastewater treatment facilities also discharge directly to the harbor. Limited studies in the past have shown that discharges from municipal and industrial wastewater treatment facilities can contain measurable (and sometimes significant) concentrations of some of the chemicals of concern.

Combined sewerage systems transport both sanitary sewage and stormwater. During wet weather events, the capacity of sewage treatment plants can be insufficient, and the combined flows are diverted from the treatment facilities directly into the harbor. There are approximately 730 combined sewer outfalls (CSOs) in NY-NJ Harbor, including 239 in New Jersey. These CSOs could be significant sources of one or more of the identified chemicals of concern. Likewise, discharges from storm water (only) systems and direct (non-point source) runoff from the land during wet weather events are not treated, and contribute to the problem of toxic chemicals in the harbor and Bight.

Contamination of sediments with the various chemicals of concern interferes with dredging activities, and limits the available dredged material management/disposal alternatives. Sediments throughout the harbor and in some areas of the Bight are toxic to a variety of organisms, or contaminants bioaccumulate to unacceptable levels in laboratory tests required for ocean disposal. In general, sediment contamination is greatest within Newark Bay and its tributaries (including the Passaic and Hackensack Rivers), the Arthur Kill, and the Kill Van Kull. These sediments may also be acting as a continuing source for some of the chemicals of concern.

Although much information is currently available regarding potential sources of the chemicals of concern and the levels of contamination in sediments and biota in NY-NJ Harbor, there are significant gaps in existing data. For example, most current and past monitoring efforts have used analytical procedures with minimum detection limits greater than the concentrations of the contaminants -- thus, they are not routinely detected. However, large volume/very low concentration discharges could be significant sources of some of the chemicals of concern. In addition, trackdown efforts are needed to identify the specific source(s) of the contaminants within the service areas of the discharge points (POTWs, CSOs, and SWOs).

Despite years of abuse and mismanagement, the harbor and Bight are natural resources of unparalleled value, and improvements in water quality and ecosystem health have been observed. To quote from the Final HEP CCMP (page 5):

> *In the two decades since the passage of the Clean Water Act, investments in water pollution control programs have resulted in significantly improved water quality in the region. These improvements have occurred despite an ever-increasing number of people and activities in the Harbor/Bight. Obvious sources of pollution are*

> *now regulated through permit programs ... Industrial Pretreatment Programs have helped reduce discharges of industrial wastes to municipal sewage systems, resulting in substantial reductions in loadings of several toxic chemicals including metals. More recently, agencies have begun to focus on the ecosystem as a whole and on previously inadequately controlled sources, such as combined sewer overflows (CSOs), storm water, and non-point source runoff.*

The New Jersey Toxics Reduction Workplan is another effort, in cooperation with the State of New York, to build upon the successes of the Clean Water Act. The data, information, and analyses to be conducted will focus on the detection of trace amounts (i.e. low concentration discharges) of the chemicals of concern and will improve our understanding of the relative importance of these discharges. This will lead to a prioritization of the various alternative management actions that could be implemented to eliminate/reduce the input of these toxic chemicals to the NY-NJ Harbor and New York Bight.

This workplan will be funded, in part, by a grant of $9.5 million from the Port Authority of New York and New Jersey to the State of New Jersey.

Table I-1: Chemicals of Concern in the NY-NJ Harbor Estuary and Bight

Chemical	Water	Biota	Sediments[a]
METALS			
Nickel[b]	*		
Cadmium		O	
Lead		O	O
Mercury	*	O	O
PCBs (total)	*	*	O
PAHs	*	O	O
DIOXIN		*	O
PESTICIDES			
DDT & metabolites		*	
Chlordane & met.		*	
Dieldrin		O	O
Tetrachlorethylene	*		

Note a: this table was developed by the Toxics Work Group of the New York-New Jersey Harbor Estuary Program. The work group is still evaluating the parameters of concern for sediments.

Note b: only for the Hackensack River.

O = exceedances of unenforceable criteria (i.e. published USEPA criteria or other criteria or screening values such as USEPA fish tissue concentrations), and are recommended for future study, but are not recommended for inclusion in the TMDL process at this time.

* = exceedances of enforceable standards (i.e. state water quality standards, New York State water quality guidance values, USEPA Toxics Rule criteria, and USFDA action levels and state advisory levels for fish tissue), and are recommended for consideration in the TMDL process.

GOALS OF THE HEP CCMP AND JOINT DREDGING PLAN

The overall vision of the NY-NJ Harbor Estuary Program CCMP is "to establish and maintain a healthy and productive Harbor/Bight ecosystem with full beneficial uses". The following general goals of the CCMP are directly related to the problem of contamination of the water and sediments with the identified chemicals of concern:

- Restore and maintain an ecosystem which supports an optimum diversity of living resources on a sustained basis;
- Ensure that fish and shellfish in the Estuary are safe for unrestricted human consumption;
- Actively address emerging issues that impact the Estuary;
- Manage and balance the competing uses of the Estuary to improve environmental quality -- in particular, ensure the continued economic viability of the Port to support safe and efficient waterborne commerce without adversely impacting the ecosystem;
- Manage pollutants within the Estuary so that they do not contribute to use impairments outside the Estuary.

The specific goals and objectives of the HEP CCMP as they relate to the "Management of Toxic Contamination" are reproduced here in Figure I-2a; those related to "Rainfall-Induced Discharges" are reproduced in Figure I-2b. In order to achieve these goals and objectives, the NY-NJ Harbor Estuary Program CCMP includes a number of actions to

(1) reduce continuing discharges of the chemicals of concern to the NY-NJ Harbor estuary and New York Bight systems;

(2) remediate selected contaminated sediments;

(3) minimize human health risks due to the consumption of fish, crustacea, and shellfish;

(4) better understand the problem of toxic contamination and take additional management actions as more is learned.

The Joint Dredging Plan for the Port of New York and New Jersey (October 7, 1996) stresses the economic importance of the port to the regional economy, and the associated need to dredge navigation channels and maintain port facilities. In addition, it recognizes that "the preservation, conservation, and restoration of the harbor's natural resources are critical to the quality of life in the metropolitan region" (page 1). Given these concerns, the Joint Dredging Plan has two major objectives:

- to promote greater certainty and predictability in the dredging project review process, and dredged material management;

- to facilitate effective long-term environmentally sound management strategies for addressing dredging and disposal needs for the region.

As part of the commitments included in the Joint Dredging Plan, the two States agreed to implement the HEP CCMP as it relates to a number of sediment and toxic contamination concerns. Specifically, the following actions included in the Joint Dredging Plan are directly related to the problem of the contamination of the water and sediments with toxic chemicals:

(1) to continue aggressive pursuit of point and non-point source pollution in the harbor;

(2) to fund the track down and clean-up recommendations in the CCMP;

(3) to continue the implementation and enforcement of The Combined Sewer Overflow (CSO) abatement controls of USEPA's national CSO Control Policy;

(4) to develop a workplan for additional studies in areas of highly contaminated sediments;

(5) to conduct Phase I and Phase II sediment Toxicity Identification Evaluations (TIEs) to identify the causes of sediment contamination; and

(6) 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.

In a November 17, 1997 letter to the Department, the Office of Maritime Resources of the New Jersey Department of Commerce and Economic Development provided comments on a draft of the New Jersey Toxics Reduction Workplan. It was recommended that a phased approach be taken to implement the workplan, with the following actions being given immediate attention:

- prioritize sediment hot spots and clean-up projects;
- CSO prioritization and remediation;
- pollutant trackdown, prioritization, and clean-up;
- completion of NJDEP GIS database of pollution sources;
- prioritize non-point source pollution prevention/remediation projects.

Short-term research projects should include (a) TIEs to include a deliverable priority list of contaminants of concern, and (b) tributary loadings quantification and prioritization to include

Figure I-2a: NY-NJ HEP "Management of Toxic Contamination" Goals and Objectives

GOALS	To restore and maintain a healthy and productive Harbor/Bight ecosystem, with no adverse ecological effects due to toxic contamination.
	To ensure fish, crustacea, and shellfish caught in the Harbor/Bight are safe for unrestricted human consumption.

To ensure that dredged sediments in the Harbor are safe for unrestricted ocean disposal.

OBJECTIVES

To reduce continuing inputs of toxic chemicals to the Harbor/Bight system:

T-1 Reduce municipal discharges of chemicals of concern.
T-2 Reduce industrial discharges of chemicals of concern.
T-3 Minimize the discharge of toxic chemicals from CSOs, storm water, and non- point sources.
T-4 Reduce air emissions of chemicals of concern.
T-5 Remediate identified solid and hazardous waste sites.
T-6 Track-down and clean-up other sources of chemicals of concern.
T-7 Improve chemical/oil spill response and prevention.
T-8 Focus pollution prevention activities on chemicals of concern.

To remediate selected contaminated sediments:

T-9 Identify and remediate selected contaminated sediments.

To minimize human health risks due to the consumption of fish, crustacea, and shellfish caught in the Harbor/Bight:

T-10 Establish consistent methodology to assess risks and improve communication of fish advisories.

To better understand the toxic contamination problem and take additional management actions as more is learned:

T-11 Review and develop criteria for copper and other priority chemicals.
T-12 Assess ambient levels, loadings, and effects of chemicals.
T-13 Develop mass balances for metals and organic chemicals.

Figure I-2b: NY-NJ HEP "Rainfall-Induced Discharges" Goals and Objectives

GOALS	To minimize the loads of pollutants entering the Harbor/Bight from combined sewer overflows, storm water discharges, and non-point source runoff.
	To eliminate the adverse environmental effects of combined sewer overflows, storm water discharges, and non-point source runoff on the Harbor/Bight.

OBJECTIVES

CSO-1	Implement the nine minimum measures of the National CSO Control policy.
CSO-2	Implement additional CSO controls to meet water quality standards and restore beneficial uses.
SW-1	Implement measures to control municipal and industrial storm water discharges.
NPS-1	Focus Clean Water Act non-point source programs on Harbor/Bight watersheds.
NPS-2	Develop and implement coastal non-point source management programs under Coastal Zone Act reauthorization Amendments.
NPS-3	Focus the Urban Resources Partnership Initiative on Harbor/Bight watersheds.
NPS-4	Continue and enhance education programs for control of non-point source pollution.

remedial/management actions. Long-term research studies would include sediment transport modeling and human and ecological risk assessments.

Subsequent to the completion and signing of the HEP CCMP and Joint Dredging Plan, the federal government revised its policy for the use of the Mud Dump Site for the ocean disposal of dredged material from NY-NJ Harbor. The site was redesigned as the Historic Area Remediation Site (HARS); only dredged material that is found suitable for unrestricted ocean disposal (i.e. meets the current Category I criteria) may be placed at the HARS. This change in the use of the Mud Dump Site/HARS has resulted in modifications to the short-term priorities of the HEP CCMP and Joint Dredging Plan as they relate to the problem of toxic contamination.

OBJECTIVES OF THE NEW JERSEY TOXICS REDUCTION WORKPLAN

In consideration of the goals and objectives of the NY-NJ Harbor Estuary Program CCMP and the Joint Dredging Plan, the ultimate goals of New Jersey's toxics reduction activities in NY-NJ Harbor are as follows:

- to reduce/eliminate continuing and future inputs of toxic chemicals to the NJ-NY Harbor Estuary and the New York Bight;
- to minimize risks to human health due to the consumption of fish, crustacea, and shellfish caught in the estuary and Bight;
- to undertake studies to better understand problems associated with toxic contaminants, and implement additional management actions as appropriate;
- to identify selected contaminated sediments for future remediation activities.

As a first step in this effort, the New Jersey Toxics Reduction Workplan includes a series of studies designed to provide the Department with the data and information it needs to meet the following primary objectives:

- to identify sources of the chemicals of concern, and to prioritize these sources for appropriate action (management, regulatory, trackdown, clean-up).
- to identify selected contaminated sediments for future remediation and restoration activities.

The studies conducted as part of the New Jersey Toxics Reduction Workplan will be used to develop Draft and Final "Toxics Reduction Implementation Plan[s]". The implementation plans will identify actions that will result in the reduction/elimination of continuing and future inputs of the chemicals of concern. This will also ultimately result in reduced levels of sediment contamination,

allowing the use of a wide variety of dredged material management alternatives, and thus contribute to the continuing economic development of the Port of New York and New Jersey.

The primary/initial objective of this workplan is to identify significant sources of the chemicals of concern; appropriate management actions can then be implemented to eliminate or reduce these discharges. The investigations included in the work plan will provide the following information and assessments:

(1) identify those tributaries to NY-NJ Harbor that are significant sources of the chemicals of concern -- where possible, inputs of the chemicals of concern from sources located in the watershed areas above the head of tide will be distinguished from those located within the tidal reaches of the tributaries;

(2) identify segments within the tidal reaches of the tributaries where the identification and control of sources of the toxic chemicals are most critical;

(3) identify those point discharges (municipal and industrial wastewater treatment facilities, CSOs, storm water outfalls) which are significant sources of the chemicals of concern -- direct trackdown and clean-up activities as appropriate;

(5) evaluate the importance of non-point sources (i.e. direct wet weather runoff), hazardous and solid waste facilities, and existing contaminated sediments as sources for the chemicals of concern;

(4) develop and maintain a GIS-based database management system of the potential sources of the chemicals of concern within the NY-NJ Harbor and New York Bight systems, and use this database to evaluate alternative management actions;

(5) develop a Toxics Reduction Implementation Plan which identifies specific management actions required to eliminate/reduce discharges of the chemicals of concern and develop a long-term monitoring program to asses the effectiveness of these actions.

This workplan incorporates the same generalized approach as that used to develop the NY-NJ Harbor Estuary Program CCMP:

(1) Use existing information to characterize the primary causes of human use and ecosystem health impairments (i.e. the chemicals of concern) and to identify the most significant sources contributing to these impairments.

(2) Act now, based on this information, and building upon existing programs to:

- eliminate/reduce the discharges of chemicals of concern;

- remediate problems due to past discharges;
- minimize the risk to human health and the environment;
- protect and restore ecosystem resources.

(3) Conduct research, monitoring, and modeling studies to better understand the functioning of the ecosystem.

(4) Take additional actions, as needed, based on this research, monitoring, and modeling.

SECTION 2: HEP CCMP AND JOINT DREDGING PLAN ACTIONS THAT NJDEP IS CURRENTLY IMPLEMENTING TO REDUCE OF THE CHEMICALS OF CONCERN

Section 2 of this workplan briefly discusses ongoing Departmental activities which address specific action items included in the NY-NJ Harbor Estuary Program Comprehensive Conservation and Management Plan (HEP CCMP) and the Joint Dredging Plan for the Port of New York and New Jersey. This includes a description of the various "commitments" made by the Department in the HEP CCMP, including funding recommendations, and those actions that require the cooperation/coordination of other agencies in order to be successfully implemented. All of these activities are currently funded through programs within the New Jersey Department of Environmental Protection.

Objectives T-1 through T-5, T-8, and T-11 of the HEP CCMP include a number of "action oriented" regulatory commitments made by the Department, including reducing air emissions and discharges of the chemicals of concern from municipal, industrial, and CSO sources. All of these actions are currently funded by the Department and have been integrated into the Department's overall watershed management program.

HEP CCMP OBJECTIVE T-1: Reduce Municipal Discharges of Chemicals of Concern

- HEP CCMP Action T-1.1: Control Discharges of Metals

Based upon an assessment of historical data, the HEP CCMP identified concerns that point source discharges were resulting in levels of metals in NY-NJ Harbor in exceedance of water quality criteria. Studies conducted under the auspices of HEP (using "clean" trace metal techniques) indicated significantly lower concentrations compared to historical data. Exceedances of water quality criteria were found only for mercury. Subsequently, water quality modeling predicted possible exceedances of chronic water quality criteria for copper, lead, and nickel.

Ten New Jersey sewerage authorities (the New Jersey Harbor Dischargers Group, NJHDG) have been working cooperatively to conduct studies to support and implement a phased Total Maximum Daily Load (TMDL) process. The data collected will be used to develop TMDLs for the water quality-limiting metals, which in turn will provide (1) Waste Load Allocations (WLA) for municipal and industrial point source discharges, and (2) Load Allocations (LA) for nonpoint source discharges.

Under Phase I of the TMDL process, New Jersey Pollutant Discharge Elimination System (NJPDES) permit limits, based upon existing effluent quality limits, were incorporated into draft permits harbor-wide for mercury. The Department will ensure compliance with these Phase I TMDLs by monitoring the Discharge Monitoring Reports (DMRs) submitted by the municipal and industrial dischargers.

The NJHDG has prepared a report entitled "Summary of the Phase I Metal Sampling and Analysis Program for the New Jersey Component of the New York/New Jersey Harbor Estuary Program" (March 1996, with supplement). This report -- for the Hackensack River below Oradel Dam, the Passaic River below Dundee Dam, Newark Bay, Raritan Bay, and the Raritan River below Fieldsville Dam -- indicated the following:

- none of these waterbodies are water quality-limited for copper or lead;
- all of these waterbodies are water quality-limited for mercury;
- the Hackensack and Passaic Rivers are water quality-limited for nickel.

As a result of these findings, the U.S. Environmental Protection Agency (USEPA) withdrew the Phase I copper TMDLs for the above referenced waters. In addition, the NJHDG, the Department, and the USEPA developed a Phase II Metals TMDL Monitoring and Modeling Program which focused on (1) nickel in the Hackensack and Passaic Rivers, and (2) copper and nickel in the Arthur Kill and Kill van Kull. This program was initiated in April 1997, and was completed in August 1998. Based upon ambient data collected in New Jersey waters and a revised modeling effort, it was concluded that the applicable copper criterion would not be exceeded in the Arthur Kill and the Kill Van Kull; thus, there is no need to develop TMDLs for these waterbodies.

Upon completion of this Phase II TMDL program, the Department will draft modifications to NJPDES permits during 1999 as appropriate to address these metals of concern.

- HEP CCMP Action T-1.2: "Track-down and Clean-up" of Significant Discharges of Organic Chemicals of Concern (Dredging Plan: Pollutant trackdown, prioritization, and clean-up)

The initial list of the chemicals of concern was presented in the HEP CCMP, and included PCBs and dioxin. To date, efforts associated with this HEP CCMP Action have targeted the identification of the levels of PCBs (harbor-wide) and dioxin (in Newark Bay) in the discharges from municipal wastewater treatment facilities Sampling for dioxin completed by the NJHDG indicated that the observed concentrations in the discharges were below the study's required reporting level of five parts per trillion (5 ppt).

The NJHDG, in cooperation with the USEPA Edison (New Jersey) Laboratory, initiated a pilot study at the Linden-Roselle facility to track-down source(s) of PCBs in its service area. This study had two main goals: (1) to determine if the trackdown of PCBs is feasible in a municipal sewer system, and (2) to provide the USEPA Edison Laboratory with samples for use in gaining knowledge and experience with analytical protocols for PCBs. However, due to analytical difficulties, this pilot study produced only limited data.

Additional trackdown and source identification studies will be conducted as part of this toxics reduction workplan -- see Section III.

<u>HEP CCMP OBJECTIVE T-2: Reduce Industrial Discharges of Chemicals of Concern</u>

- HEP CCMP Action T-2.1: Continuing Compliance with Controls on Industrial Discharges

The NJPDES permits issued to direct industrial discharges to NY-NJ Harbor contain technology-based limits in order to minimize the discharge of toxic chemicals. These facilities are required to self-monitor effluent discharges so that compliance with the NJPDES permit conditions can be determined; the results of this monitoring are submitted to the Department on DMRs. The Department reviews the DMRs for violations, and then acts on any observed violations, as appropriate. The Department also conducts routine inspections on-site to verify the accuracy of the discharge monitoring reports.

- HEP CCMP Action T-2.2: Pretreatment Program Focus on Significant Industrial Users

The objective of this Action is to ensure that municipalities in NY-NJ Harbor focus their pretreatment programs on all significant industrial users, not just specific categorical industrial users. The facilities located in the harbor are delegated facilities for the pretreatment program. As part of the pretreatment program implementation requirements, the municipalities are required to look at both significant and categorical industrial users. The Department conducts annual reviews of the delegated facilities to ensure compliance with the pretreatment program.

- HEP CCMP Action T-2.3: Additional Requirements for Direct Industrial Discharges

See HEP CCMP Actions T-1.1 and T-1.2, above: direct industrial discharges will be subject to similar requirements. Also see Section 3 of this toxics reduction workplan.

HEP CCMP OBJECTIVE T-3: Minimize the Discharge of Toxic Chemicals from CSOs, Storm Water, and Non-point Sources

Full implementation of the Final National CSO Control Policy and currently planned New Jersey CSO abatement program is expected to reduce discharges of the chemicals of concern. See the discussions under the following HEP CCMP Actions:

- CSO-1.1: Assessment of Steps Necessary to Implement the Nine Minimum Measures
- CSO-1.2: Implementation of the Nine Minimum Measures
- CSO-2.2: New Jersey Long-Term CSO Abatement Program
- SW-1.3: Industry-specific General Permits for Pollution Prevention
- SW-1.5: Storm Water Projects Under the Intermodal Surface Transportation Efficiency Act
- NPS-1.1: New Jersey Focus on Harbor/Bight Watershed
- NPS-1.2: New Jersey Navesink River Project
- NPS-4.0: Ongoing Education Programs

HEP CCMP OBJECTIVE T-4: Reduce Air Emission of Chemicals of Concern

- HEP CCMP Action T-4.0: Implementation of Clean Air Act Requirements

The Department continues to enforce existing regulations that limit the emission of toxic pollutants to the air. In 1999, the Department reviewed and revised the USEPA Air Toxics Inventory for 1996, providing the State with its first comprehensive air toxics inventory. This inventory can be used to set priorities and determine where the Department's air toxic management efforts should be directed. A comparison of 1990 and 1996 emission inventory estimates has shown that emissions overall have decreased substantially.

An electronic emissions reporting system for criteria pollutants and their precursors has been implemented and is used by about seventy-five per cent of the State's industrial sources to transmit emissions monitoring data to the Department. New Jersey's open market emissions trading program has resulted in a reduction in the emissions of nitrogen oxides and volatile organic chemicals. Solid waste incinerators in New Jersey have been targeted for controls and reductions in mercury emissions; an eighty per cent reduction in mercury emissions has been achieved at the State's five mass burn recovery facilities.

HEP CCMP OBJECTIVE T-8: Focus Pollution Prevention Activities on Chemicals of Concern

- HEP CCMP Action T-8.2: Non-regulatory Pollution Prevention (Dredging Plan: Prioritize non-point source pollution prevention/remediation activities)

Pursuant to the New Jersey State Pollution Prevention Act, industrial facilities provide information to the Department in their annual Release and Pollution Prevention Report. The Department continually evaluates this information, looking for trends. In December 1996, the Department discussed the results of this trend analysis in a report entitled "Industrial Pollution Trends in New Jersey". It is anticipated that an updated report will be available in the Fall of 1998.

- HEP CCMP Action T-8.3: Facility-wide Permits

The Department was given permission to issue up to fifteen facility-wide permits statewide. These permits integrate the air, water, and hazardous waste permits for a facility with its pollution prevention plan. The Department has issued several facility-wide permits, and one is under development for a facility located in the NY-NJ Harbor area. As of the present date, the Department has not completed its evaluation of its facility-wide permit pilot project; it is anticipated that this evaluation will be completed by the Summer of 1999.

- HEP CCMP Action T-8.4: NPDES Pollution Prevention

As of the present date, it has not been determined that the state legislature has given the Department the authorization needed to add pollution prevention requirements to NJPDES permits.

- HEP CCMP Action T-8.5: RCRA Permitting and Enforcement

NEED DISCUSSION

<u>HEP CCMP OBJECTIVE T-10: Establish Consistent Methodology to Assess Risks and Improve Communication of Fish Advisories</u>

- HEP CCMP Action T-10.1: Risk Assessment Methodology
- HEP CCMP Action T-10.2: Fish Tissue Criteria

The New Jersey Toxics in Biota Committee, consisting of representatives from the Department, the N. J. Department of Health and Senior Services, and the N. J. Department of Agriculture, meet periodically to review fish advisories for New Jersey waters. Contaminant data for fish and shellfish

tissue and recent developments concerning risks are reviewed. A Risk Assessment Subcommittee evaluates risk methods and makes recommendations to the Toxics in Biota Committee concerning the methodology to use. The Toxics in Biota Committee will also be conducting a consistency review of adjoining States' advisories. This information will be used to assist in developing consistent advisories among these states.

- HEP CCMP Action T-10.3: Risk Communication Activities

In 1995, the Department conducted a survey of urban anglers in the Newark Bay Complex. This survey was conducted to develop a profile of urban anglers, learn angler's knowledge of and belief in advisories, perception of risk from consumption of contaminated fish and crabs, and consumption patterns. In a998, research was initiated to look at the relationship of culture, social networks, and income on perception of risk from contaminated fish and crabs. This research was conducted to determine if social indicators could be developed that would guide the Department in how to more effectively design and deliver risk information to subpopulations most at risk from contaminants. Year Two of the study will focus on designing and implementing an outreach program based on the indicators developed from Year One.

In 1999, the Division of Science, Research and Technology, in conjunction with the Division of Fish and Wildlife, New Jersey Sea Grant, New Jersey Community Water Watch, the Hackensack Riverkeeper, the Greater Newark Conservancy, and the Partnership for Youth, offered ten watershed education/urban fishing programs in five communities in the Newark Bay Complex. The programs seek to create an understanding of watershed issues in an urban environment and an appreciation of local natural resources. It was developed as part of the Community Outreach to Urban Anglers research conducted by the Department in the early 1990's, and was identified as a need by citizens in the region. The four day program includes lessons on fish consumption advisories, bioaccumulation, nonpoint source pollution, mapping and GIS, water quality monitoring, an ecocruise, and a day of fishing.

HEP CCMP OBJECTIVE T-12: Assess Ambient Levels, Loadings, and Effects of Chemicals

- HEP CCMP Action T-12.7: Modification of Advisories and Restrictions

The Department originally issued fish consumption advisories for the NY-NJ Harbor area in 1983. Based on additional information, these advisories were revised/amended in 1984, 1985, and 1994. The New Jersey Toxics in Biota Committee, which consists of representatives from the Department, the N. J. Department of Health and Senior Services, and the N. J. Department of Agriculture, was reconvened in Spring 2000. This committee will be reviewing new data during the Year 2000 to determine if any advisories need to be updated/revised.

HEP CCMP OBJECTIVE T-13: Develop Mass Balances for Metals and Organic Chemicals

- HEP CCMP Action T-13.1: Monitoring and Modeling for Metals Other than Mercury

See the discussion for HEP CCMP Action T-1.1: Control Discharges of Metals. Upon completion of the referenced Monitoring and Modeling Program, load estimates will be made and then used to develop the TMDLs.

- HEP CCMP Action T-13.4: Whippany River Comparative Mass Balance Study

This project, funded by the USEPA Superfund program, is approximately 20% complete, and will evaluate various modeling approaches to the multimedia fate of environmental toxic chemicals. The objective of this study is to develop a mass balance model that will be appropriate for multiple sources of contaminants in order to predict risk over relatively large areas, such as a watershed.

HEP CCMP OBJECTIVE CSO-1: Implement the Nine Minimum Measures of the National CSO Control Policy

- HEP CCMP Action CSO-1.1: Assessment of Steps Necessary to Implement the Nine Minimum Measures

The Department requires that any person who owns and/or operates any portion of a combined sewer system obtain a NJPDES permit for that portion of the system. To date, all portions of the combined sewer systems and all CSO points are regulated by either an Individual Authorization under the General Permit for Combined Sewer Systems or an Individual NJPDES Permit. Each permit contains the necessary requirements of the National CSO Control Policy, including the nine minimum control measures, as applicable to the type of permitted facility.

There are ten Publicly Owned Treatment Works (POTWs) that receive wastewater from combined sewer systems and that discharge into the NY-NJ Harbor Estuary. The Department and the USEPA have agreed upon language to be used in the NJPDES permits to implement the intent of HEP CCMP Action CSO-1.1. In June 1996, the Department revoked and reissued, or modified, the NJPDES permits for the ten POTWs, so as to include the agreed upon permit language. Each permit action has required that, by January 1, 1997, each permittee submit documentation summarizing the actions taken regarding the permit conditions; this submission of documentation of compliance is consistent with the requirements of the National CSO Control Policy. However, these permit conditions are directives for continuous activities that permitees are obligated to implement beyond January 1, 1997.

- HEP CCMP Action CSO-1.2: Implementation of the Nine Minimum Measures

The purpose of this action is, through the use of enforceable instruments, require dischargers to implement the Nine Minimum Measures of the National CSO Control Policy. This objective has been achieved, and is documented in the various permit files for the dischargers.

HEP CCMP OBJECTIVE CSO-2: Implement Additional CSO Controls to Meet Water Quality Standards and Restore Beneficial Uses

- HEP CCMP Action CSO-2.2: New Jersey Long-Term CSO Abatement Program (Dredging Plan: CSO prioritization and remediation)

The Department's Statewide CSO Program consists of several regulatory efforts that have been unified into a single control strategy.

The New Jersey Sewerage Infrastructure Improvement Act provides, in part, planning and design grants for the development and implementation of Solids/Floatables Controls and Dry Weather Overflow identification and elimination. All CSO points are on enforceable compliance schedules to plan, design, construct, and operate Solids/Floatables Control facilities. Studies have indicated that Dry Weather Overflows are not a chronic problem nor source of toxic contamination in New Jersey. Any identified Dry Weather Overflows have either been eliminated or are on an enforceable compliance schedule for elimination.

The second track of the program is reflected in the General Permit for Combined Sewer Systems, and other similar enforceable commitments (Individual NJPDES Permits and Administrative Consent Orders). Permitees which own and/or operate any portion of a combined sewer system are required to develop and implement technology-based control measures, including the Nine Minimum Control Measures identified in the National CSO Control Policy. These enforceable commitments also initiate the first phase of the planning activities of the National CSO Control Policy Long-term Control Planning (LTCP) Process by the performance of significant land-side monitoring and modeling activities; this results in the development of Land-side Storm Water Management Models (SWMMs) called CSO Discharge Characterization Studies. These studies have proven to be an important tool in understanding the frequency, duration, and nature of pollutants from CSO discharges, including the loadings of toxic chemicals.

The Department intends to complete the remaining elements of the National CSO Control Policy LTCP Process by integrating the regulatory and facility planning obligations of the permitees with New Jersey's Watershed Management Framework planning process. Proposed activities include the development of water quality goals and concerns, identification of areas of non-attainment and other water quality concerns, identification of CSO and non-CSO sources of pollution causing these concerns, development of corrective action plans and/or Total Maximum Daily Loads (TMDLs), and development and implementation of CSO and non-CSO "system-wide" facility controls and performance assessments.

The Department is working with the New Jersey Attorney General's Office to develop enforceable commitments to achieve the goals of New Jersey's CSO abatement program. The Department has also worked with USEPA Region II to develop enforceable commitments from the owners/operators of the POTWs to implement their long-term CSO abatement responsibilities. The Department submitted its proposal to integrate the CSO-LTCP Process into the Statewide Watershed Management Planning Process to the USEPA Region II in September, 1997; as of the present date, the USEPA has neither approved nor commented on the proposed strategy. The Department will continue to meet with the owners/operators of combined sewer systems to develop consensus on long-term control planning approaches.

HEP CCMP OBJECTIVE SW-1: Implement Measures to Control Municipal and Industrial Storm Water Discharges

- HEP CCMP Action SW-1.2: NJDEP Municipal Storm Water Permit(s)

In a phased approach, the Department will negotiate permits with forty-six municipalities that drain to areas of NY-NJ Harbor where metals are water-quality limiting. On January 9, 1998, the USEPA proposed regulations requiring the municipalities to apply, by August 7, 2002, for a permit that contains best management practices to control stormwater runoff. The USEPA expects to make this rule final by the Fall of 1999.

- HEP CCMP Action SW-1.3: Industry-Specific General Permits for Pollution Prevention

In order to regulate storm water discharges associated with industrial activities, the Department has issued storm water general permits associated with industrial sites and construction activities. The Department has issued three general permits for specific industrial activities -- scrap metal processing, automotive dismantling, and concrete manufacturing operations; approximately 100 sites have been authorized under each of these general permits. Two more general permits are currently under development (asphalt and sand/gravel facilities).

HEP CCMP OBJECTIVE NPS-1: Focus Clean Water Act Non-Point Source Programs on Harbor/Bight Watersheds

- HEP CCMP Action NPS-1.1: New Jersey Focus on Harbor/Bight Watershed

Whippany River Watershed

From July 1995 to the present, approximately $575,000 of Section 319(h) funds have been appropriated to reduce non-point source pollution within the Whippany River Watershed. Projects have included low input lawncare, stormwater management, and the dissemination of funds as "mini grants" to local groups within the watershed. One ongoing project -- "Sediment Control Plan for the Whippany River" -- has quantified erosion rates from streambanks, road materials, and land uses. This data will be used in a predictive model; the final report will be available by the end of 1999.

The Whippany River watershed is part of New Jersey Watershed Management Area Number 6. Approximately $585,000 of additional Section 319(h) funds have been expended within the entire watershed management area. Projects have included citizen action programs and detention basin retrofits to minimize non-point source pollution.

Also, see HEP CCMP Action T-13.4: Whippany River Comparative Mass Balance Study.

Barnegat Bay Watershed

Since July 1995, approximately $600,000 of Section 319(h) funds have been appropriated to reduce non-point source pollution within the Barnegat Bay Watershed. Projects have included a home assistance guide for non-point source pollution control, stewardship of soil health, and an Integrated Pest Management education program. An additional $41,000 of Section 319(h) monies have been granted to the U.S. Geological Survey to develop a water quality model to estimate non-point source loads from different land uses.

In addition, Barnegat Bay was added to the National Estuary Program in April 1996, and the studies leading to a Characterization Report and a CCMP are underway for the bay. Drafts of both documents are expected in the Spring of 1999, with final documents in the Spring of 2000. The goals of the National Estuary Program include improving water quality and maintaining overall ecosystem integrity, including the chemical, physical, and biological properties of the ecosystem, as well as its economic, recreational, and aesthetic values.

- HEP CCMP Action NPS-1.2: New Jersey Navesink River Project

The purpose of the "Navesink Non-point Source Pollution Demonstration Project" was to identify simple Best Management Practices (BMPs) that could be implemented on a municipal level with relatively little burden placed upon the implementing agencies and local residents. This project was completed in March 1998 by the Monmouth County Planning Board, and was essentially a public education and outreach program.

HEP CCMP OBJECTIVE NPS-2: Develop and Implement Coastal Non-Point Source Management Programs Under Coastal Zone Act Reauthorization Amendment

- HEP CCMP Action NPS-2.0: Coastal Non-Point Source Programs

New Jersey received conditional approval of its Coastal Non-Point Program from the USEPA and National Oceanographic and Atmospheric Administration in November 1997; the State has three years from this date to comply with all of the conditions. To fulfill one of these conditions, a Memorandum of Agreement (MOA) is being finalized between the Department, the N.J. Department of Agriculture, and the Natural Resource Conservation Service. The MOA will implement part of New Jersey's Coastal Non-Point Source Program by utilizing the voluntary conservation program to encourage and assist implementation of Best Management Practices for non-point source pollution control by farmers. This effort will be backed by the Department's enforcement action authorities for agricultural producers that are jeopardizing the State's water resources.

HEP CCMP OBJECTIVE NPS-4: Continue and Enhance Education Programs for Control of Non-Point Source Pollution

- HEP CCMP Action NPS-4.0: Ongoing Education Programs

The Department continues its non-point source pollution outreach and education programs by offering educational publications and programs, including the Clean Water Rangers program for

elementary school children, the Watershed Focus newsletter, Beneath the Shell Teacher's Guide, and N.J. Water Photography Contest. These programs are currently underway, and are updated and revised on a regular basis.

SECTION III: ACTIONS TO IDENTIFY AND ELIMINATE SOURCES OF THE CHEMICALS OF CONCERN TO THE NY-NJ HARBOR ESTUARY

The overall goal of this workplan is to identify sources of the chemicals of concern discharged into the NY-NJ Harbor Estuary. Appropriate actions will then be developed and incorporated into a "Toxics Reduction Implementation Plan" in order to eliminate (or reduce to the greatest extent practicable) the input of these toxic chemicals to the NY-NJ Harbor Estuary. This will be accomplished, in large part, through the implementation of the NY-NJ Harbor Estuary Program CCMP and the Joint Dredging Plan for the Port of New York and New Jersey. In order to accomplish this goal in the most expeditious and efficient manner, a phased approach to the identification of the sources of toxic chemical has been developed (see Figure III-1). As information is collected and analyzed, significant sources will be identified; resources will then be directed towards implementing those site-specific actions needed to reduce or eliminate them.

Phase One of the work plan includes comprehensive water quality monitoring studies directed towards identifying those tributaries to the harbor estuary within which significant loadings of toxic chemicals originate. Estimates of loadings due to atmospheric deposition will also be made. This will be accompanied by a review of existing data on potential sources of toxic chemicals (including municipal and industrial discharges, solid and hazardous waste facilities, and sediments) and the development of a GIS-based template to display this information. It is estimated that these Phase One Activities will take approximately two years to complete. However, it is also anticipated that the review of existing databases -- in combination with interim results of the tributary monitoring studies -- will enable the Department to preliminarily identify one or more tributaries within which potential significant sources of toxic chemicals originate. The Department will then proceed to implement Phase Two and/or Phase Three Activities on a "fast-track" basis within these tributaries.

Upon the completion of the Phase One Activities, the tributaries to the harbor estuary will then be prioritized for the implementation of Phase Two and/or Phase Three activities on the basis of the relative concentrations of the various chemicals of concern originating within the watershed of each tributary. This prioritization will also consider the "identity" of the specific chemical(s) of concern identified for each tributary and its importance relative to (1) the sediment contamination problem, and (2) seafood consumption and fishery advisories, within the harbor estuary system. Factors to be considered when identifying priority tributaries and/or chemicals of concern include

- the number of contaminants present and their relative concentration/loading;
- the toxicity and/or bioaccumulation potential of the contaminants; and
- the distribution of the contaminants between the dissolved and sediment-bound phases.

Phase Two Activities (if needed) will be conducted within the prioritized tributary systems, and will seek to identify specific municipal wastewater treatment facilities, combined sewer overflows, and stormwater outfalls from which the toxic chemical(s) of interest are discharged. Alternatively, if this monitoring does not identify any such significant point source discharges, the Department will then

investigate other potential point and nonpoint sources for the chemical(s) during Phase Three, including industrial wastewater treatment facilities, and solid and hazardous waste facilities. It is also anticipated that the review of existing databases -- in combination with interim results of the point source discharge monitoring studies -- will enable the Department to identify one or more point sources which potentially discharge significant loadings of toxic chemicals. The Department will then proceed to implement Phase Three Activities on a "fast-track" basis to trackdown the source(s) of the toxic chemical(s) within the service areas of these discharging facilities.

Upon the completion of the Phase One and Two Activities, the point source discharges will then be prioritized for the implementation of Phase Three activities on the basis of the estimated loadings of the various chemicals of concern originating within the watershed of each tributary and the service areas of the discharging facilities. Likewise, the importance of potential nonpoint sources of the various toxic chemicals of concern will be evaluated. This prioritization will also consider the "identity" of the specific chemical(s) of concern and its importance relative to (1) the sediment contamination problem, and (2) seafood consumption and fishery advisories, within the harbor estuary system. A "Draft Toxics Reduction Implementation Plan" will be developed and will include (a) an evaluation of the need for additional/focused studies within the tributaries, (b) plans for the actions required to reduce/eliminate significant discharges from identified point and nonpoint sources of toxic chemicals, and (c) a long-term water quality monitoring plan. A more detailed evaluation of the available data and information will require modeling studies (Phase Four Activities) to better understand the dynamics of the harbor estuary system and how it operates.

Phase Three Activities consist of studies to trackdown potential sources of toxic chemicals originating within the service areas of targeted municipal and industrial treatment facilities, combined sewer overflows, and stormwater outfalls. Additional studies will be conducted as needed to determine the significance of potential discharges from hazardous waste sites and nonpoint sources of pollution. As the data and information from these studies becomes available, the various contributing sources will be prioritized for actions to reduce or eliminate the discharge of toxic chemicals. This prioritization will consider the "identity" of the specific chemical(s) of concern and its importance relative to (1) the sediment contamination problem, and (2) seafood consumption and fishery advisories, within the harbor estuary system. A "Final Toxics Reduction Implementation Plan" will be developed upon the completion of the Phase Three Activities.

Modeling studies, included as Phase Four Activities, will be initiated in 1999-2000 through a Request for Proposal process to be administered by the Hudson River Foundation. Funding will be provided by New Jersey Maritime Resources directly to the foundation. This effort will also be coordinated with the NYSDEC and the NY-NJ HEP Contaminant Assessment and Reduction Program (CARP). A first task to be completed by the modeling contractor will be an evaluation of the data to be collected by the Department and NYSDEC and its adequacy in meeting the various objectives of the modeling activities. The role of the Phase Four modeling studies in meeting the objectives of the New Jersey Toxics Reduction Workplan will be addressed in greater detail in the Draft and Final "Toxics Reduction Implementation Plan [s]". Finally, an evaluation of a "No Further Action" scenario will be undertaken to evaluate the implementation of additional toxic chemical reduction efforts and the associated costs and anticipated benefits of such actions.

Figure III-2 shows an approximate timeline for the initiation and completion of the Phase One through Phase Four Activities and the development of the "Final Toxics Reduction Implementation Plan". Table III-1 is a summary of the investigations and monitoring studies to be undertaken.

The ultimate reduction and elimination of toxic chemical inputs to the Harbor estuary requires the implementation of site-specific source management alternatives. Different types of sources will require different management actions. These efforts could include active remediation of a site or the development and implementation of regulatory and enforcement actions. The integrated nature of this phased approach -- combining an evaluation of existing information with data from the various monitoring studies, continual prioritization and trackdown of potential sources, and ultimately the reduction/elimination of these sources -- will enable the Department to implement actions on a continual basis as new information is gathered and evaluated.

In addition to the Phase One through Four Activities, which directly address and target the elimination/reduction of the sources of toxic chemicals to the NY-NJ Harbor estuary and New York Bight systems, the following efforts will also be undertaken:

- the continuing evaluation of existing fishing/seafood consumption advisories in the NY-NJ Harbor estuary and New York Bight. This will include the development (in coordination with New York State) of a consistent regional method to assess risks to human health due to the consumption of seafood, determinations of appropriate fish tissue criteria, and the subsequent development of appropriate fishing/consumption advisories. [HEP CCMP Action T-10.1: Risk Assessment Methodology and HEP CCMP Action T-10.2: Fish Tissue Criteria]

- the evaluation of potential natural resource damage cases arising from the data collected by the various monitoring studies. This would include a determination of the need for additional human health and ecological risk assessment studies. [Joint Dredging Plan]

- further study and the development/use of ecosystem indicators to better understand the effects of toxic chemicals on the harbor estuary and bight systems. [HEP CCMP Action T-12.1: Quantitative Ecosystem Goals and Biocriteria]

The data and information collected as part of the monitoring component of this Toxics Reduction Workplan will also be used to establish the existing baseline conditions for NY-NJ Harbor estuary system; the effectiveness of measures implemented to eliminate sources of the chemicals of concern will be evaluated by comparison with these baseline conditions. In addition, the data will be used to develop long-term monitoring plans for the harbor estuary.

The implementation of this New Jersey Toxics Reduction Workplan will be managed by the New Jersey Department of Environmental Protection. The Department will establish an internal team to coordinate workplan activities among the various monitoring studies and investigations and to evaluate data and information as it is collected. The principal investigators for the studies will comprise a scientific advisory team to the Department, and together with the NJDEP Workplan Team and additional consultants/advisors, will evaluate the data on a continual basis to (1) identify potential significant sources of chemicals of concerns, (2) prioritize the relative importance of these potential sources, (3) implement/modify the monitoring studies and investigations to target "high priority" areas/sources on a "fast-track" basis, and (4) determine the need to initiate additional monitoring/trackdown studies. The NJDEP will also coordinate directly with New York State (to ensure consistency and compatibility with its toxics reduction workplan) and with the CARP of the

NY-NJ Harbor Estuary Program. The Department will report results of the workplan activities to the public at appropriate intervals and as decision-point milestones are reached.

FIGURE III-1: SCHEMATIC DIAGRAM OF THE NEW JERSEY TOXICS REDUCTION WORKPLAN

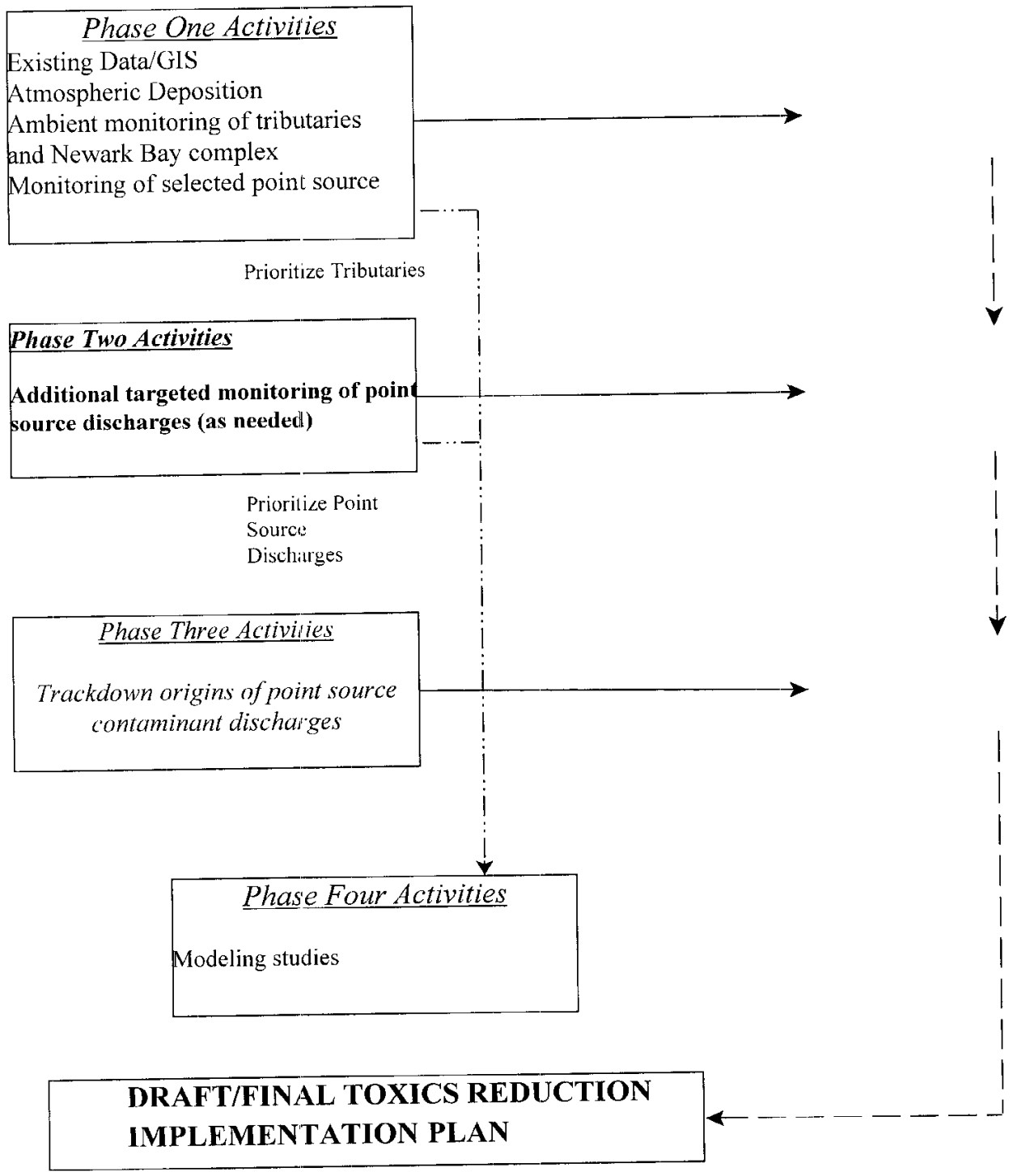
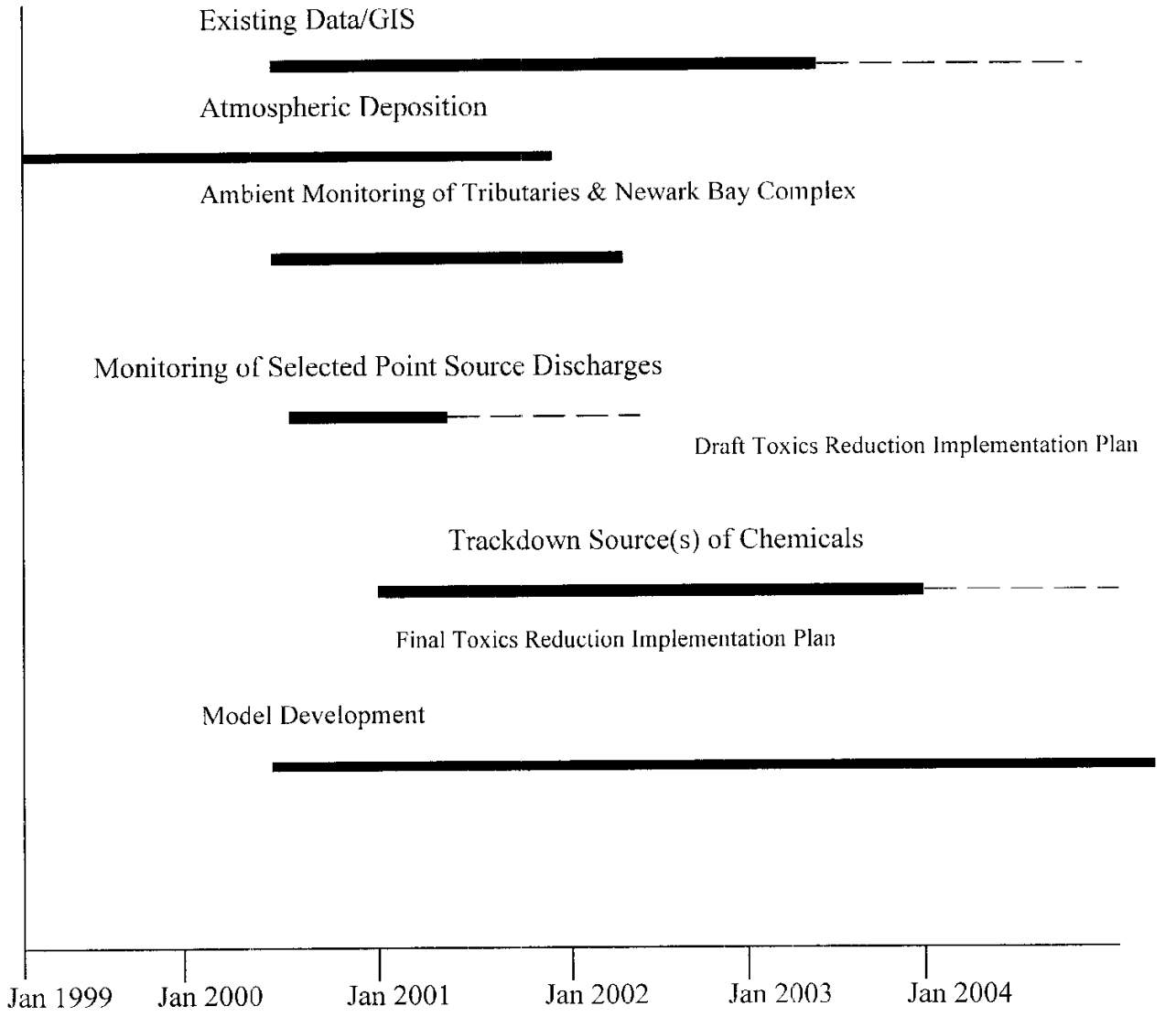


FIGURE III-2: TIMELINE FOR NJ TOXICS REDUCTION WORKPLAN ACTIVITIES



APPROXIMATE DATE

Table III-1: Summary Description of the Investigations and Monitoring Studies to be Undertaken as Part of the New Jersey Toxics Reduction Workplan.

Study/Investigation	*Data/Information Collected*	*Objectives of the Study/Investigation*	*Location of Study & Data Collection Methods*
PHASE ONE ACTIVITIES			
I-A Compile and synthesize existing information and data in NJDEP files; develop GIS template to display data.	1. Location of potential point source discharges of chemicals of concern. 2. Sediment and water quality data. 3. Preliminary identification of significant sources.	1. Develop and maintain a database and GIS template of known point sources of toxic chemicals and their status for remediation actions. 2. Determine/prioritize sampling locations for ambient monitoring and trackdown/cleanup studies.	Existing information and data from NJDEP files. All known sites/sources in the watersheds tributary to NY-NJ Harbor estuary: industria and municipal wastewater treatment facilities, CSOs, storm sewers, RCRA, ECRA, Superfund, etc.
I-B Monitoring of the atmospheric deposition of selected toxic chemicals; estimate loading rates of the chemicals.	1. Seasonal patterns and deposition rates of nitrogen and selected trace metals. 2. Atmospheric deposition of hazardous pollutants, including PCBs, pesticides, dioxins/furans, and PAHs.	1. Determine seasonal patterns and atmospheric deposition rates for nitrogen and selected trace metals. 2. Generate total atmospheric deposition rates of target chemicals, and identify the sources of the chemicals. 3. Determine the direction, magnitude, and controls of air-sea fluxes of hazardous pollutants.	An initial sampling site will be established at Sandy Hook, NJ. Additional sampling sites have been established in Jersey City, and other locations as part of the NJ Atmospheric Deposition Network.
I-C Ambient monitoring of the loadings of sediments and chemicals of concern at the head-of-tide of major tributaries to the NY-NJ Harbor estuary.	1. Loadings of suspended sediment and selected toxic chemicals at the head-of-tide of major tributaries 2. TSS, POC, and DOC concentrations as a function of streamflow. 3. Integrated and interval samples during storm events and low flow periods.	1. Determine which NJ tributaries above head-of-tide are important sources of sediment and chemicals of concern. 2. Develop baseline data for monitoring of remediation actions. 3. Provide data for Phase Four modeling activities.	Five permanent stations on the Hackensack, Passaic, Raritan, Rahway, and Elizabeth Rivers at USGS gauging stations near head-of-tide. TOPS and ISCO automatic samplers integrated over events & interval samples.

Study/Investigation	*Data/Information Collected*	*Objectives of the Study/Investigation*	*Location of Study & Data Collection Methods*
I-D Ambient monitoring of the levels of sediments and chemicals of concern from, and within, the tidal reaches of major and minor tributaries to the NY-NJ Harbor estuary.	1. Levels of suspended sediment and selected toxic chemicals within, and discharging from, major and minor tributaries. 2. TSS, POC, and DOC concentrations as a function of streamflow. 3. Integrated and interval samples during storm events and low flow periods.	1. Identify those major and minor tributaries/segments which are significant sources of sediment and chemicals of concern to NY-NJ Harbor. 2. Develop baseline data for monitoring of remediation actions. 3. Provide data for Phase Four modeling activities.	Permanent sites located at the "mouths" of the major tributaries: Hackensack, Passaic, Elizabeth, Raritan, and Rahway Rivers. Additional sites on various segments of these tributaries
I-E Ambient monitoring of sediments and chemicals of concern within the Newark Bay Complex, including the Arthur Kill and the Kill van Kull.	1. Concentrations of suspended sediment and selected toxic chemicals throughout the Newark Bay Complex. 2. TSS, POC, and DOC concentrations as a function of streamflow. 3. Integrated and interval samples during storm events and low flow periods.	1. Provide information on the downstream transport and fate of suspended sediment and contaminants within the Newark Bay Complex. 2 Develop baseline data for monitoring of remediation actions. 3. Provide data for Phase Four modeling activities.	Three permanent stations at Kearny Point (Passaic and Hackensack Rivers), the Bayonne Bridge, and the Goethals Bridge. Transect sampling (along and across navigation channels) within the Newar Bay complex, the Arthur Kill, and Kill Van Kull.
I-F Pilot project: field testing the application and utility of the PISCES sampling devices for ambient monitoring of water quality.	Concentrations of mercury, dioxin, PCBs, PAHs, and pesticides in surface water	To develop, evaluate, and implement a cost-effective approach to the trackdown of sources of toxic chemicals.	Completed: Hackensack River (part). Study area includes the Hackensack and Passaic Rivers and their tributaries, and tidal tributaries to the Arthur Kill.

Study/Investigation	*Data/Information Collected*	*Objectives of the Study/Investigation*	*Location of Study & Data Collection Methods*
I-G Monitoring of loadings of chemicals of concern discharged from selected point sources, including municipal wastewater treatment facilities, CSOs, and storm sewer outfalls.	Current loadings of solids and chemicals of concern from point source discharges.	1. Determine the significance of identified point source discharges of selected chemicals of concern. 2. Provide data for Phase Four modeling activities.	1. Selected municipal wastewater treatment facilities. 2. Selected CSOs and storm sewer outfalls representative of both residential and industrial service areas.
Sampling Method Development Studies: Collection of ambient surface water and municipal wastewater treatment facility effluent samples using TOPS and conventional grab techniques.	Concentrations of selected chemicals of concern in surface waters using different sampling techniques and procedures.	1. Compare the effectiveness of sampling using TOPS vs conventional grab samples. 2. Develop and test sampling protocols for TOPS. 3. Test the feasibility of point sampling vs transects.	1. Hackensack and Passaic Rivers, Newark Bay, Arthur Kill, and PVSC wastewater treatment facility. 2. TOPS automatic samplers and conventional grab sampling techniques.
PHASE TWO ACTIVITIES			
II-A Additional targeted monitoring of loadings of chemicals of concern discharged from selected point sources, including municipal wastewater treatment facilities, CSOs, and storm sewer outfalls (as needed). [Continuation of Study I-G]	Current loadings of solids and chemicals of concern from point source discharges.	1. Based on the results of the Phase One Activities, within the "prioritized" tributaries to the NY-NJ Harbor estuary, determine the significance of identified point source discharges of selected chemicals of concern. 2. Provide data for Phase Four modeling activities.	1. Prioritized selection of municipal wastewater treatment facilities. 2. Prioritized subsamples of CSOs and storm sewer outfalls representative of both residential and industrial service areas.

Study/Investigation	*Data/Information Collected*	*Objectives of the Study/Investigation*	*Location of Study & Data Collection Methods*
PHASE THREE ACTIVITIES			
III-A Trackdown of the sources of chemicals of concern within the service areas of selected point source discharges, including municipal wastewater treatment facilities, CSOs, and storm sewer outfalls.	1. Concentrations of chemicals of concern from specific sources within the service areas of selected point source discharges.	Based on the results of Phase One and Two Activities, within the service areas of the "prioritized" point source discharges, trackdown the source(s) of the chemicals of concern.	1. Within the service areas of prioritized selection of point source discharges: municipal wastewater treatment facilities, CSOs, and storm sewer outfalls. 2. PISCES and grab samples.
III-B Trackdown of the sources of chemicals of concern originating from other point and nonpoint discharges: industrial wastewater treatment facilities, hazardous waste sites, landfills, etc.	1. Concentrations of chemicals of concern in tidal tributaries to NY-NJ Harbor to further identify additional sources.	1. Based on the results of Phase One and Two Activities, within the "prioritized" tributaries to NY-NJ Harbor, determine the significance of other point and nonpoint sources of toxic chemicals. 2. Provide data for the Phase Four modeling activities.	Targeted deployment of PISCES, TOPS and/or grab samplers in the "prioritized" tributaries to further identify sources of chemicals of concern

Study/Investigation	*Data/Information Collected*	*Objectives of the Study/Investigation*	*Location of Study & Data Collection Methods*
PHASE FOUR ACTIVITIES			
IV-A Modeling of surface water and sediment transport within NY-NJ Harbor estuary.	Model transport/flow paths for sediments and chemicals of concern.	1. Develop a tool to provide better understanding of the hydrodynamic functioning of the NY-NJ Harbor estuary. 2. To assess and predict the effects of actions to eliminate sources of toxic chemicals on sediment contamination. 3. To predict the transport and fate of contaminants in NY-NJ Harbor estuary. 4. To help guide the development of long-term monitoring programs.	NY-NJ Harbor estuary, with an emphasis on the Newark Bay Complex, the Arthur Kill, and Kill Van Kull.

DETAILED DESCRIPTIONS OF THE WORKPLAN STUDIES AND INVESTIGATIONS

PHASE ONE ACTIVITIES

There are four major objectives of the Phase One studies and investigations:

(1) to compile existing information and data on potential sources of chemicals of concern within the NY-NJ Harbor estuary region;

(2) to identify and evaluate the significance of point and nonpoint discharges of the chemicals of concern to the tributary systems of the NY-NJ Harbor;

(3) to develop and evaluate the efficacy of the use of PISCES sampling devices for more detailed trackdown studies;

(4) to obtain data on the loadings of the chemicals of concern from selected municipal wastewater treatment facilities, CSOs, and storm water outfalls.

PHASE TWO ACTIVITIES (if needed)

Within the prioritized tributary systems, the major objectives of the Phase Two studies and investigations are:

(1) to obtain additional data on the loadings of the chemicals of concern from selected municipal wastewater treatment facilities, CSOs, and storm water outfalls;

(2) to preliminarily evaluate the importance of nonpoint sources of the chemicals of concern.

****Develop Draft "Toxics Reduction Implementation Plan"****

PHASE THREE ACTIVITIES

There are three major objectives of the Phase Three studies and investigations:

(1) to trackdown the sources of the chemicals of concern originating within the service areas of "significant" point source discharges identified as a result of Phase One Two Activities;

(2) to identify specific industrial wastewater treatment facilities, solid and hazardous waste facilities, and other potential point sources from which the selected chemicals of concern are discharged;

(3) to determine the significance of nonpoint sources of the chemicals of concern.

****Develop Final "Toxics Reduction Implementation Plan"****

PHASE FOUR ACTIVITIES

At the present time, there appear to be four potential objectives for the Phase Four modeling studies and investigations:

(1) to develop a modeling tool which will provide a better understanding of the hydrodynamic functioning of the NY-NJ Harbor estuary;

(2) to assess and predict the effects of actions to eliminate the sources of the chemicals of concern on sediment contamination;

(3) to predict the transport and fate of contaminants in the NY-NJ Harbor estuary;

(4) to help guide the development of long-term monitoring programs.

Study I-A: Develop Database of Existing Information & Develop GIS Template

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

CCMP Action T-5.1: Waste Site Inventory
CCMP Action T-8.1: Identification of Large Emitters of Chemicals of Concern
CCMP Action T-9.2: Identification of Additional Areas (of contaminated sediments)
Dredging Plan: Complete NJDEP database of pollution sources
Dredging Plan: Pollutant trackdown, prioritization, and clean-up

[*Note: as detailed in a November 17, 1997 letter from Frank McDonough, Director, New Jersey Department of Commerce, Office of Maritime Resources to Mary Downes Gastrich, NJDEP.]

The New Jersey Department of Environmental Protection has amassed a substantial body of information and data concerning potential sources of the chemicals of concern within the NY-NJ Harbor estuary region. However, much of this information is dispersed throughout various elements of the Department, and exists in electronic and/or paper databases. This information needs to be compiled into a single database and made available in a useful format. This study has four basic objectives:

(1) to compile all information and data within existing NJDEP files (and from other appropriate sources, where available) which is relevant to the successful implementation of the toxics reduction workplan;

(2) to develop a Geographic Information System (GIS) template to present this data in a user-friendly format;

(3) to preliminarily identify potential significant sources of the chemicals of concern;

(4) to coordinate database/GIS development and management activities with the NY-NJ Harbor Estuary Program Contaminant Assessment and Reduction Project (CARP).

This compilation, synthesis and comprehensive evaluation of existing information will be used in conjunction with the Phase One, Two, and Three monitoring and trackdown efforts -- and the results of studies to be completed as part of the New York State toxics reduction workplan -- to identify potential significant sources of toxic chemicals, target particular chemicals of concern, and further focus and "prioritize" the study areas of these activities towards potential sources. This will result in a more efficient use of limited resources and a more effective process to identify -- and subsequently eliminate/reduce discharges from -- significant sources of the chemicals of concern.

In order to present the compiled information and data in a user-friendly format, a GIS template will be developed, based on the Department's ARC INFO/ARC VIEW system. This will provide access to the information within a geographic framework and the ability to manipulate the various "data maps". The results of the various Phase One, Two and Three monitoring and trackdown studies will also be compiled into databases which can be used with the GIS template.

At a minimum, it is expected that the following types of information and data will be incorporated into the database/GIS system:

- surface and groundwater quality data for the chemicals of concern and other important water quality parameters;
- locations of known point source discharges to surface waters (municipal and industrial wastewater treatment facilities, CSOs, and storm sewer outfalls) and available data on the quantity and quality of these discharges;
- sediment quality data (physical characteristics, bulk sediment chemistry, etc.);
- locations of hazardous waste facilities, solid waste landfills, and contaminated sites that could potentially be the source of discharges to surface and groundwaters in the NY-NJ Harbor estuary region.

Development and management of the database and GIS template will be the primary responsibility of one full-time NJDEP staff (position to be funded through this workplan). This individual will coordinate these activities with the NY-NJ HEP CARP and the New York State Department of Environmental Conservation. The NJDEP Toxics Reduction Workplan Team will assist in this study and ensure that all existing information and data relevant to this project are identified and incorporated into the database and GIS template. In addition, the Workplan Team will use the database/GIS system, along with the results of the Phase One, Two and Three Activities to prioritize additional/focused monitoring and trackdown studies and to identify significant sources of the chemicals of concern.

This study will be initiated in Year One of the implementation of the New Jersey Toxics Reduction Workplan. Development of the database and GIS template are targeted for completion within one year of start-up, with management and updating of these systems continuing indefinitely. Estimated annual costs for this study are $100,000, including salary and benefits, equipment, supplies, travel, and training.

Study I-B: Estimation of Atmospheric Deposition Loadings

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

CCMP Action T-12.11: Atmospheric Loadings Under "Great Waterbodies" Program
Dredging Plan: Pollutant trackdown, prioritization, and clean-up.

It has been estimated that atmospheric deposition can contribute up to 70% of the loadings of some toxic chemicals to coastal areas. The NY-NJ Harbor estuary system may thus be subject to significant loadings of one or more of the identified chemicals of concern due to atmospheric deposition. Any plan to identify and eliminate/reduce potential sources of toxic chemicals to the estuary must consider nonpoint source inputs of these chemicals resulting from atmospheric deposition. However, the magnitude of direct atmospheric deposition to the NY-NJ Harbor estuary system, or indirect loadings *via* deposition to tributary watersheds and subsequent runoff, are largely unknown.

New Jersey Sea Grant currently supports a number of studies of atmospheric deposition by researchers from Rutgers University, including:

- Dr. Steven Eisenreich: *Air-Sea Exchange of PCBs and PAHs in New Jersey Coastal Waters* (Duration: 2 years; Funding: $114,682);
- Dr. Yuan Gao: *Atmospheric Deposition of Nitrogen and Trace Metals to the New York/New Jersey Harbor Estuary* (Duration: 1 year; Funding: $42,000);

New Jersey Sea Grant has requested a two-year extension/expansion of the NY-NJ Harbor Estuary study undertaken by Dr. Yuan Gao (Proposed Budget: $109, 477).

Air-Sea Exchange of PCBs and PAHs: it is hypothesized that atmospheric emissions of hazardous pollutants such as PCBs and PAHs result in enhanced depositional fluxes to coastal water by air-sea exchange. The overall objectives of this study are to determine the direction, magnitude, and controlling factors on the air-sea fluxes of these target chemicals.

Atmospheric Deposition of Nitrogen and Trace Metals to the NY/NJ Harbor Estuary: this is a continuation of the above referenced project, initiated in 1997 with funding provided by New Jersey Sea Grant. The primary objective of this study is to determine the seasonal patterns and rates of the atmospheric deposition of nitrogen and selected trace metals (Pb, Cd, Zn, Cr, Cu, and Hg) to the NY-NJ Harbor estuary system. An air sampling station has been established at Sandy Hook and preliminary data obtained in Year 1; Years 2 and 3 of the study will expand the scale of the investigation. Specific objectives are to:

(1) continue collecting aerosol particulate and precipitation samples to determine the atmospheric concentration of the target chemicals;

(2) initiate the collection of size-differentiated aerosol samples to generate an estimate of the aerosol dry deposition velocity for dry deposition modeling purposes;

(3) generate an estimate of the total atmospheric deposition rates of the target chemicals to the NY-NJ Harbor estuary system through modeling, to identify the sources of these chemicals, and to identify the processes that control the atmospheric deposition of the chemicals.

The two principal investigators closely coordinate these research projects, and will develop a database critical to an understanding of the magnitude of nonpoint sources of the target chemicals to the NY-NJ Harbor estuary. The results of these studies will provide data that can be used to assess the importance of loadings of the target chemicals to the harbor estuary relative to other identified point and nonpoint sources. This information will be used to prioritize and direct the Phase Two and Three monitoring and trackdown activities (for example, to eliminate potential chemicals of concern from consideration in Studies II-A, III-A and III-B if relatively high loadings are due to atmospheric deposition), and to target remediation activities at identified sources.

These studies are currently underway; an additional two year extension of the *Atmospheric Deposition of Nitrogen and Trace Metals to the New York/New Jersey Harbor Estuary* study will be partly funded by the Department (NJDEP Partnering Share: $54,000. The Department will provide an additional $12,500 to New Jersey Sea Grant to coordinate these research efforts with the Department and to host a workshop at which the results of the studies will be presented and discussed (Total NJDEP Match: $66,500). These funds will come from the monies provided by the Port Authority of New York and New Jersey and the studies will be conducted during Years One and Two of the implementation of the New Jersey Toxics Reduction Workplan.

In addition to these studies, the Department and Rutgers University have developed the New Jersey Atmospheric Deposition Network (NJADN). The NJADN has two major objectives: (1) to gain an understanding of the magnitude and potential impacts of air deposition throughout the State, and (2) to assess the relative contribution of various sources of pollutants, including out-of-state sources. The NJADN consists of nine (9) sites (including three in the NY-NJ Harbor region) where atmospheric deposition data (metals, toxic organics, nutrients) will be collected for three years. Atmospheric deposition of toxic chemicals is potentially an important nonpoint source of pollution for surface water bodies and ecosystems.

Phase One Activities I-C, I-D and I-E are monitoring studies of selected ambient water quality and suspended sediment parameters throughout various tributaries to the Newark Bay Complex and the NY-NJ Harbor estuary system. Study I-G consists of the monitoring of discharges from selected municipal wastewater treatment facilities, CSOs, and storm water outfalls (additional monitoring of point sources is discussed under Phase Two Activities). These four studies have been coordinated with each other -- and with various monitoring studies included in the New York State toxics reduction workplan -- in order to provide a synoptic "picture" of conditions in the estuary. The combined objective of these studies is to determine the relative significance of loadings of the chemicals of concern and sediment throughout the harbor estuary: from sources (1) above the head of tide of major tributaries, and (2) within the watersheds of the major and minor tributaries, including the Newark Bay Complex. This information will be used to identify potential sources of the chemicals of concern and to focus additional Phase Two and Three monitoring and trackdown activities.

The sampling/monitoring methods and analytical protocols selected for use will provide data which is directly comparable among the four studies and the work to be completed by New York State. This will enable the Department and the principal investigators to determine the relative significance of potential sources of the chemicals of concern with a greater degree of accuracy. It will also provide data that can be used to develop a better understanding of the hydrodynamic functioning of the NY-NJ Harbor estuary system and for the development of the Phase Four modeling studies. Finally, the data collected will serve as part of the existing "baseline" condition of the NY-NJ Harbor estuary which will used to evaluate the effectiveness of actions implemented to eliminate/reduce discharges of toxic chemicals.

The ambient monitoring studies are to be initiated in Year One of the implementation of the New Jersey Toxics Reduction Workplan, and will continue through Year Two. In order to evaluate the effects of seasonal/climatic conditions on the loading, transport, and fate of the chemicals of concern and sediments, it is presently planned that monitoring of 7 events/periods will be undertaken in each tributary:

- 2 low flow/dry weather events (Summer) -- will provide information on the concentrations and loading of the chemicals of concern due solely to continual point source discharges, relatively independent of precipitation and nonpoint source loadings from runoff;

- 4 high flow/wet weather events (late-Winter/early-Spring);

- 1 "contingent" event, either low flow/dry weather or high flow/wet weather, depending on the results and variability in the data collected during the first 6 events/periods.

However, the actual "timing" and number of monitoring events during the two-year period are dependent on three factors. (1) regional climatic conditions relative to historical norms and trends, (2) geographic variability in precipitation within the various watersheds of the tributaries which discharge to the estuary, and (3) the results of the monitoring studies

themselves, in combination with other Phase One activities, providing information which will enable the Department to preliminarily identify potential significant sources of the chemicals of concern, and thus refocus the monitoring studies and/or implement Phase Two and Three Activities on a "fast-track" basis. In addition, the studies may be extended beyond the initial two-year period (for example if suitable climatic conditions do not occur), and/or revised to focus on particular tributaries, or portions thereof.

The Study I-G monitoring activities will be conducted during Year One of the implementation of this workplan, and will consist of seasonal sampling events for the selected point sources. To the greatest extent possible, these sampling events will be coordinated with the ambient monitoring studies.

The New Jersey office of the United States Geological Survey (USGS; principal investigator for Study I-C) will coordinate initiation of the monitoring activities during a single "event/period". The USGS will be responsible for identifying and selecting the appropriate low flow/dry weather and high flow/wet weather events to be monitored and directing the principal investigators for Studies I-D and I-E (and I-G as appropriate) to implement their investigations.

To the greatest extent possible, each individual study will utilize the same or comparable sampling/monitoring methodologies, analytical protocols and QA/QC procedures; these protocols and methods will also be identical/directly comparable to those to be used by New York State for its toxics reduction workplan. Table III-2 is the initial list of the target chemicals of concern for the four studies; the development of this list has been coordinated with New York State and the NY-NJ Harbor Estuary Program. As the studies progress and potential sources of these chemicals are identified, additional focused monitoring efforts could include analytical testing for only a subset of them (for example, if a tributary was initially observed to only have high levels of chlordane, testing for the other analytes on the target list may not be undertaken). [Note: a similar approach will be used for the Phase Two and Three Activities.]

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

CCMP Action T-6.1: Organic Chemical and Mercury Screening
CCMP Action T-6.2: Tracking and Elimination of Chemicals of Concern
CCMP Objective T-12: Assess Ambient Levels, Loadings, and Effects of Chemicals
CCMP Action T-12.12: Low-Level Detection Methods for Loadings
Dredging Plan: Pollutant trackdown, prioritization, and clean-up.

Dredging Plan: Tributary loadings quantification and prioritization to include remedial/management actions.

`Table III-2: Target Analyte List for Studies I-C, I-D, I-E, and I-G

PCB Congeners

4	5	8	10	11	15	16	17	18	19	22
25	26	27	28	31	33	37	40	42	43	44
45	46	47	48	49	50	52	53	56	59	60
62	63	64	66	70	74	75	77	81	82	84
85	86	87	91	92	95	97	99	101	104	105
110	114	118	119	123	126	128	132	134	135	136
137	138	141	146	149	151	153	154	156	157	158
166	167	168	169	170	171	174	177	178	179	180
183	185	187	189	190	191	194	195	196	198	199
200	203	205	206	207	208	209				

PAHs

Acenaphthene
Acenaphthalylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene

Benzo(e)pyrene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Biphenyl
Chrysene
Dibenz(ah)anthracene
2,6-Dimethlnaphthalene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
1-Methylnaphthalene
2-Methylnaphthalene
1-Mtheylphananthrene
Naphthalene
Perylene
Phenanthrene

Pyrene
2,3,4-Trimethylnaphthalene

Pesticides

Aldrin
alpha-BHC
beta-BHC
gamma -BHC (Lindane)
alpha-Chlordane
gamma-Chlordane

oxy-Chlordane
2, 4'-DDD
4, 4'-DDD
2, 4'-DDE
4, 4'-DDE
2, 4'-DDT
4, 4'-DDT
Heptachlor
Hexachlorobenzene
Mirex
cis-Nonachlor
trans-Nonachlor
alpha-Endosulfan
beta-Endosulfan
Dieldrin
Endosulphan sulphate

Endrin
Endrin aldehyde
Endrin ketone
Heptachlor epoxide
Methoxychlor

Dioxins/Furans

2,3,7,8-TCDD
1,2,3,7,8-PCDD
1,2,3,4,7,8-HCDD
1,2,3,6,7,8-HCDD
1,2 3,7,8,9-HCDD
1,2,3,4,6,7,8-HCDD

O8CDD
2,3,7,8-TCDF
1,2,3,7,8-PCDF
2,3,4,7,8-PCDF
1,2,3,4,7,8-HCDF
1,2,3,6,7,8-HCDF
2,3,4,6,7,8-HCDF
1,2,3,7,8,9-HCDF
1,2,3,4,6,7,8-HCDF
1,2,3,4,7,8,9-HCDF
O8CDF
T4CDD Total
P5CDD Total
H6CDD Total
H7CDD Total
T4CDF Total

P5CDF Total
H6CDF Total
H7CDF Total

Metals

Mercury (dissolved)
Methyl-mercury (dissolved)
Total mercury
Total cadmium
Lead (dissolved)
Total lead

Miscellaneous

Total Suspended Solids
Particulate Organic-C
Dissolved Organic-C

Note: only the suspended solids fraction of most samples will be analyzed for dioxins/furans.

Study I-C: Ambient Monitoring of Loadings to Major Tributaries at the Head of Tide

The primary objective of Study I-C is to determine the loadings of suspended sediment and selected organic and inorganic contaminants (see Table III-2) originating above the head of tide of the major tributaries to the Newark Bay Complex, the Arthur Kill, and Raritan Bay. These discharges represent the loadings of sediment and the chemicals of concern from upstream sources that enter the tidal portions of these major tributaries under low flow/dry weather conditions and as a result of storm events. The monitoring data generated by this study will provide information needed to trackdown and potentially reduce or eliminate sources of the chemicals of concern and will benefit the long-term management of the NY-NJ Harbor estuary system. Specifically, Study I-C will

- provide measurements of the suspended sediment and contaminant loads entering the tidal portions of the estuary at the head of tide;
- provide information that will be used to identify those tributaries that are significant sources of suspended sediments and toxic chemicals;
- characterize how the suspended sediment and contaminant loads vary during low/high (dry/wet weather) flow events and seasonally; and
- provide baseline information which will be used in an evaluation of the effectiveness of actions taken to eliminate upstream sources of the chemicals of concern and long-term monitoring programs.

Study I-C will provide data that can be used to develop an understanding of the relative importance of the loadings of the chemicals of concern associated with the dissolved aqueous phase compared with that bound to suspended sediments. In addition, this study will provide a basic understanding of the relationships between stream flow, stage, and suspended sediment transport dynamics at fixed points in the tributaries. The data and information collected during this study will also be used in the development of the modeling initiatives discussed under Phase Four Activities.

Methods: Study I-C includes the installation of automatic sampling equipment near existing U.S. Geological Survey (USGS) river-stage gauging stations located near the head-of-tide on the Raritan, Passaic, Rahway, Hackensack, and Elizabeth Rivers (see Figure III-3). The sampling devices will collect both event integrated and interval samples during various hydrologic events:

(1) low flow/dry weather conditions,
(2) moderate storm discharges (the discharge that has been exceeded 10% of the time during the period of record), and
(3) extreme storm events.

A wet weather/high flow hydrologic event is defined as a rain storm or snow-melt that causes the river discharge to exceed the 10% exceedance level of flow, as established by the USGS

historic discharge record for the gaging station at the head-of-tide on each tributary. The baseflow (90% exceedance level) and 10% exceedance levels are as follows:

River Tributary	10% Exceedance Level	90% Exceedance Level
Hackensack River	276 cfs	0 cfs
Passaic River	2770 cfs	125 cfs
Rahway River	100 cfs	3.4 cfs
Elizabeth River	51 cfs	5.5 cfs
Raritan River	2620 cfs	170 cfs

It is expected that a wet weather/high flow event will be sampled only if precipitation or snow melt has not occurred within the previous seven (7) day time period and the discharge is relatively steady at approximately the baseflow level.

As implementation of the workplan progresses, this definition of a high flow/wet weather event may have to be changed in order to sample the planned number of events during the study period. For example, because the larger tributaries in the study area are damned (for water supply purposes), the occurrences of large hydrologic events that affect the rivers may be "disturbed" from "normal/expected" conditions unless the upstream reservoirs are near capacity.

The actual "timing" and number of monitoring events during the two-year period are dependent on two factors: (1) regional climatic conditions relative to historical norms and trends, (2) geographic variability in precipitation within the various watersheds of the tributaries which discharge to the estuary. Given this variability, it is doubtful that large-scale/regional wet weather events will occur that simultaneously effect all five tributary watersheds. There are also logistical difficulties in coordinating and implementing Studies I-C, I-D and I-E in a "regionally" synoptic fashion. In practice, therefore, it is expected that, although only seven events will be monitored for each tributary, a total of more than seven events (particularly wet weather/high flow events) will be monitored during the course of this study.

In order to accomplish event-based sampling, the relationship between precipitation and resulting river flow must be understood. In this way, U.S. Weather Bureau predictions on storm occurrences can be used to prepare for sampling an event. The results of an analysis of this relationship generally show that precipitation between 0.5 and 1 inch is needed for the rivers to reach the event threshold criteria during the winter months, while between 1 and 3 inches is needed in the summer. This is approximately equivalent to rainfall intensities of 0.05 inches per hour during the winter, and 0.2 inches per hour in the summer. For a more detailed discussion, see Appendix B.

The sampled weather conditions will span all four seasons over a two-year period, with particular emphasis on storm/wet weather events occurring in late winter/early spring. This will provide data on the loadings of the chemicals of concern and suspended sediments that span a wide range of hydrologic conditions, including the "Spring flush". The sampling/analytical methods will be

consistent with those to be used by the New York State Department of Environmental Conservation (NYSDEC) and New York USGS for similar work on the Hudson River system in the State of New York.

Each monitoring site will be equipped with a Trace Organic Platform Sampler (TOPS) and two ISCO automatic samplers that can collect event integrated or interval samples. The ISCO samplers are standard automatic grab samples that use a peristaltic pump and sample bottles on a rotating platform. The TOPS samplers employ metered peristaltic pumps, a series of glass-fiber filters for collecting suspended sediments, and a standard XAD column for capturing and concentrating organic compounds from filtered water. Two XAD columns are used in series -- the first column collects the organic compounds from the water, and the second provides backup for any compounds that may not be sorbed on the first XAD column, thus preventing potential compound loss by carryover (if it is determined that carryover is not a problem, the number of XAD columns may be reduced). Both types of samplers can be configured to collect samples at discrete time intervals and/or flow conditions. They can also be interfaced with telemetry equipment present in the USGS stage-gauging stations. One TOPS and one ISCO sampler will collect **event-integrated samples** (one sample per station per event) for dissolved and suspended sediment-associated chemicals of concern. The second ISCO sampler will collect **interval samples** during each event (ten samples per station per event) for the analysis of total suspended solids (TSS), particulate organic carbon (POC), and dissolved organic carbon (DOC). These interval samples will represent stream conditions ranging in duration from 2 to 8 hours.

Table III-2 lists the compounds and parameters that will be monitored in this study: the chemicals of concern will be measured in both the dissolved aqueous phase and bound to suspended sediments.

A total of seven events will be sampled at each of the five stations. At each event, integrated samples of water and suspended sediment will be analyzed for the chemical parameters listed in Table III-2, and interval samples will be analyzed only for TSS, POC, and DOC (termed "Chemical Samples" and Sediment Samples", respectively, in Table III-3).

In contrast to traditional sampling methods that produce an "average" sample of water or sediment from the stream cross-section, automatic samplers collect water and suspended sediments from a single point in the stream profile. In order to relate the data from the automatic samplers to results that would be obtained using traditional methods, the "representativeness" of the automatic samplers must be determined. In this study, monitoring for conductivity and TSS will also be conducted concurrently using both sampling methods over a range of flow conditions. The TSS and conductivity data will serve as calibration parameters to provide a relationship between the "average" sample value and the "point" sample (it is assumed that this relationship is "transferable" and valid for all the parameters in Table III-2). Each sampling station will be calibrated using TSS and specific conductance measurements collected in equal width and equal depth profiles; the total number of samples collected will depend upon the width and depth of the tributary.

Monitoring Locations: The monitoring locations are identified in Figure III-3 and Table III-4, which also includes a summary of flow conditions at the sites. These locations are

- the Passaic River at Little Falls, NJ

- the Hackensack River at New Milford, NJ
- the Raritan River at Bound Brook, NJ
- the Elizabeth River near Elizabeth, NJ
- the Rahway River near Rahway, NJ.

The data generated in this study will be tabulated and presented in a manner consistent with the HEP CARP data management plan and will also be incorporated into the NJDEP database/GIS system developed as a part of Study I-A. The principal investigator will submit two interim reports and a final report to the NJDEP, and will serve on the scientific advisory team established by the Department to evaluate the data on a continual basis.

Table III-3: Types and Approximate Numbers of Samples to be Collected in Study I-C

Sample Type	Sample Phase	Parameters Analyzed	Total Number of Samples
CHEMICAL SAMPLES			
XAD Column	Aqueous	Organic Compounds	35[a]
TOPS Filter	Suspended Sediment	Organic Compounds	35
Whole Water Composite	Aqueous	Metals-Total, Metals-Species, PAHs	35
Whole Water Composite	Suspended Sediment	Metals-Total, Metals-Species, PAHs	35
SEDIMENT SAMPLES			
Whole Water	Suspended Sediment & Aqueous	SS DOC,POC	2,135 1,050

All "Chemical Samples" are "event integrated" samples; all "Sediment Samples" are "event interval" samples.

Note a: the total number of samples accounts for each TOPS sampler containing two XAD columns connected in series.

Table III-4: Permanent Monitoring Stations for Study I-C

(1) Passaic River at Little Falls, NJ (01389500) Lat. 40°53'05", Long. 74°13'35"; Passaic County, Hydrologic Unit 02030103, on left bank 0.6 mile downstream from Beatties Dam in Little Falls, and 1.0 mile upstream from Peckman River.

Drainage area is 762 mi^2. Period of Record September 1897 to present. Baseflow is approximately 50 cubic feet per minute (cfm), mean average flow is 1143 cfm, 10% exceeds 2770 cfm.

(2) Hackensack River at New Milford, NJ (01378500) Lat. 40°56'52", Long. 74°01'34"; Bergen County, Hydrologic Unit 02030103, on right bank upstream from two masonry dams and two lift gates at the former pumping plant of United Water New Jersey (formerly Hackensack Water Company), New Milford, 4.0 miles downstream from Pascack Brook, 0.6 miles downstream from Oradell Reservoir Dam, and 21.8 miles upstream from mouth.

Drainage area is 113 mi^2. Period of Record October 1921 to present. Baseflow is approximately 15 cfm, mean average flow is 94.4 cfm, 10% exceeds 277 cfm.

(3) Raritan River at Bound Brook, NJ (0103300) Lat. 40°33'34", Long. 74°31'41"; Somerset County, Hydrologic Unit 02030105, at Queens Bridge on Main Street in Bound Brook, 1.7 miles upstream of Fieldsville Dam.

Drainage area is 804 mi^2. Period of Record 1964 to present (gauge was previously below Calco Dam). Baseflow is approximately 300 cfm, mean average flow is 1202 cfm, 10% exceeds 2600 cfm.

(4) Elizabeth River at Ursino Lake (01393450), Elizabeth, NJ. Lat. 40°40'30", Long. 74°13'20"; Union County, Hydrologic Unit 02030104, on left bank at Ursino Lake Dam in Elizabeth, 75 feet upstream of bridge on Trotters Lane, and 3.8 miles upstream from mouth.

Drainage area is 16.9 mi^2. Period of Record October 1921 to present. Baseflow is approximately 8 cfm, mean average flow is 25.7 cfm, 10% exceeds 51 cfm.

(5) Rahway River (01395000) at Rahway, NJ. Lat. 40°37'05", Long. 74°17'00"; Union County, Hydrologic Unit 02030104, on left bank 100 feet upstream from St. Georges Avenue bridge in Rahway, and 0.9 miles upstream from Robinson Branch.

Drainage area is 40.9 mi^2. Period of Record July 1908 to present. Baseflow is approximately 15 cfm, mean average flow is 48.2 cfm, 10% exceeds 99 cfm.

Study I-D: Ambient Monitoring Within Major and Minor Tributaries

The primary objective of Study I-D is to determine the relative importance of discharges of suspended sediment and selected organic and inorganic contaminants (see Table III-2) originating

within the watersheds of the major and minor tributaries to the Newark Bay Complex, the Arthur Kill, and Raritan Bay. These discharges represent the loadings of sediment and the chemicals of concern from all sources that enter the tidal portions of these tributaries under low flow/dry weather conditions and as a result of storm events. The monitoring data generated by this study will provide information needed to trackdown and eliminate sources of the chemicals of concern and will benefit the long-term management of the NY-NJ Harbor estuary system. Specifically, Study I-D will

- provide estimates of the levels of suspended sediment and contaminants entering the tidal portions of the major and minor tributaries of the estuary system;
- provide information that will be used to identify the watersheds of major and minor tributaries that are significant sources of suspended sediments and toxic chemicals;
- provide information on how the sources of the chemicals of concern and suspended sediment are distributed within the tributaries, which can then be used to focus subsequent monitoring and trackdown activities;
- characterize how the suspended sediment and contaminant levels vary during low/high (dry/wet weather) flow events and seasonally; and
- provide baseline information that will be used in an evaluation of the effectiveness of actions taken to eliminate upstream sources of the chemicals of concern and long-term monitoring programs.

Study I-D will provide data that can be used to develop an understanding of the relative importance of the loadings of the chemicals of concern associated with the dissolved aqueous phase compared with that bound to suspended sediments. The data and information collected during this study will also be used in the development of the modeling initiatives discussed under Phase Four Activities.

Methods: The Study I-D efforts will be coordinated with those undertaken in Studies I-C, I-E, and I-G, and will target the same seven low flow/dry weather and high flow/wet weather events. The five major tributaries have been grouped into two monitoring units: (1) Raritan, Elizabeth, and Rahway Rivers, and (2) Passaic and Hackensack Rivers. In consideration of expected geographic variability in precipitation within the watersheds of these tributaries and logistical difficulties in conducting synoptic sampling, only one of these tributary units will be monitored during a particular high flow/wet weather event. Water and suspended sediment samples will be collected at stations within the selected tributaries. Table III-5a lists the tributaries to be studied and the anticipated number of sampling stations to be used in each waterbody; Table III-5b and Figure III-3 provide preliminary location data for some of these stations. The stations will include locations at the "mouths" of each of the five major New Jersey tributaries to the estuary and at a few additional selected locations in the Hackensack, Passaic, and Raritan Rivers (a total of ten stations) These locations may be altered during subsequent sampling events based on the results of prior sampling, including the presence/absence of any of the chemicals of concern and a preliminary analysis of the significance of the tributaries as sources of contaminants and/or suspended sediments to the estuary system.

In addition, at transects associated with each sampling station, the cross-sectional profile of water velocity will be measured using a towed Acoustic Doppler Current Profiler The cross-sectional distribution of suspended sediment concentration and particle size distribution will be measured using a towed laser-based diffraction profiler. The instrument will continuously measure suspended sediment concentration and size distribution as a function of time and space (width and depth of the tributary). Conductivity and temperature profiles will be obtained using a towed undulating CTD recorder.

Water and suspended sediment samples will be obtained for each station using a combination of a Trace Organic Platform Sampler (TOPS) and grab samples. The TOPS instrument will be configured to allow for continuous, constant-rate pumping during each monitoring event. Grab samples will also be obtained at each monitoring station. The TOPS water and suspended sediment samples will be analyzed for the chemicals of concern listed in Table III-2. The grab samples will only be analyzed for Total Suspended Solids (TSS), Dissolved Organic Carbon (DOC), Particulate Organic Carbon (POC), PAHs, and the metals listed in Table III-2. A total of 70 TOPS and 70 grab samples will be obtained during this study.

The data generated in this study will be tabulated and presented in a manner consistent with the HEP CARP data management plan and will also be incorporated into the NJDEP database/GIS system developed as a part of Study I-A. The principal investigator will submit two interim reports and a final report to the NJDEP, and will serve on the scientific advisory team established by the Department to evaluate the data on a continual basis.

Table III-5a: Major and Minor Tributaries to be Monitored in Study I-D

Major or Minor Tributary	Potential No. of Stations[a]
Hackensack River	3
Sawmill Creek	1
Penhorn Creek	1
Kingsland Creek	1
Cromakill Creek	1
Bellmans Creek	1
Overpeck Creek	1
Berrys Creek	2
Passaic River	3
Second River	1
Raritan River	2
South River	1
Lawrence Brook	1
Washington Canal	1
Red Root Creek	1
Elizabeth River	1
Morses Creek	1
Newark Airport Canal	1
Rahway River	1
Woodbridge Creek	1
Piles Creek	1
Smith Creek	1

Note a: initially, stations will be sampled only within the five major New Jersey tributaries (see Figure III-3) -- the locations of subsequent transects will be determined based on the data collected during the Phase One monitoring studies.

Table III-5b: Preliminary Sampling Locations for Study I-D

Transect ID	Location	Latitude	Longitude
P-1	0.5 mile north of confluence with Newark Bay	40° 44.5' N	74° 07.7' W
P-2	near Route 280 bridge	40° 47.1' N	74° 08.8' W
P-3	south of Avondale Swing Bridge	40° 50.8' N	74° 07.2' W
H-1	0.5 mile north of confluence with Newark Bay	40° 44.1' N	74° 05.7' W
H-2	Buoy 15	40° 47.9' N	74° 04.0' W
H-3	near Turnpike bridge	40° 50.6' N	74° 01.8' W
R-1			
R-2			
RWY-1			
E-1			

Note: "P" denotes Passaic River
"H" denotes Hackensack River
"R" denotes Raritan River
"RWY" denotes Rahway River
"E" denotes Elizabeth River

Study I-E: Ambient Monitoring of the Newark Bay Complex and the Kills

The primary objective of Study I-E is to determine the relative importance of discharges of suspended sediment and selected organic and inorganic contaminants (see Table III-2) originating within the watersheds of the Newark Bay Complex, the Arthur Kill, and the Kill Van Kull. In addition, data will be gathered to characterize the transport patterns of suspended sediments and the chemicals of concern within these waterbodies. Study I-E may also enable the NJDEP and its scientific advisory committee to establish linkages between upstream flows and loadings (monitored in Studies I-C, I-D, and I-G) and downstream suspended sediment and water column contaminant concentrations. The monitoring data generated by this study will provide information needed to trackdown and eliminate sources of the chemicals of concern and will benefit the long-term management of the NY-NJ Harbor estuary system. Specifically, Study I-E will

- provide estimates of the levels of suspended sediment and contaminants entering the Newark Bay Complex, Arthur Kill, and Kill van Kull;
- provide information on how the sources of the chemicals of concern and suspended sediment are distributed within these waterbodies, which can then be used to focus subsequent monitoring and trackdown activities;
- provide data which can be used to characterize and understand the transport and fate of suspended sediments and the chemicals of concern within the Newark Bay Complex, Arthur Kill, and Kill Van Kull;
- characterize how the suspended sediment and contaminant loads vary during low/high (dry/wet weather) flow events and seasonally; and
- provide baseline information that will be used in an evaluation of the effectiveness of actions taken to eliminate upstream sources of the chemicals of concern and long-term monitoring programs.

Study I-E will provide data that can be used to develop an understanding of the relative importance of the loadings of the chemicals of concern associated with the dissolved aqueous phase compared with that bound to suspended sediments. The data and information collected during this study will also be used in the development of the modeling initiatives discussed under Phase Four Activities.

Methods: The Study I-E efforts will be coordinated with those undertaken in Studies I-C, I-D, and I-G, and will target the same seven low flow/dry weather and high flow/wet weather events. However, considering expected geographic variability in precipitation within the watersheds of the five major tributaries to be investigated in Studies I-C and I-D, it is anticipated that a total of nine events will be monitored in Study I-E. The area of investigation for Study I-E is the Newark Bay Complex and environs, defined as the region bounded by the confluence of the Hackensack and Passaic Rivers to the north, Perth Amboy on the Arthur Kill to the south, and Constable Hook on the Kill Van Kull to the east.

Monitoring activities will include three permanent stations at the following locations (see Figure III-3):

- NB1 - the confluence of the Passaic and Hackensack Rivers (Lat. 40.7° N, Long. 74.1° W)
- KVK1 - the Bayonne Bridge (Lat. 40.64° N, Long. 74.12° W)
- AK1 - the Goethals Bridge (Lat. 40.6° N, Long. 74.2° W)

Instrumentation will be installed at each of the three permanent stations approximately two days prior to a sampling event, and will be retrieved approximately two days after completion of the ship-based sampling for the event. The following instrumentation will be placed at each of the three permanent stations:

- an Acoustic Doppler Current Profiler
- a laser-based diffraction profiler for the measurement of suspended sediment concentration and particle size distribution
- a conductivity-temperature sensor

In addition, tide gauges will be deployed at the boundaries of the study area at Perth Amboy and Constable Hook, as well as at the three stations discussed above.

Water and suspended sediment samples will be collected along six transects within the study area. The locations of these transects are listed in Table III-6, and shown in Figure III-3. The transect locations may be altered during subsequent sampling events based on the results of prior sampling. Two vessels will be used in this study, one to collect the water quality data, and the other to collect the hydrodynamic data.

For each transect, the cross-sectional profile of water velocity will be measured using a towed Acoustic Doppler Current Profiler. The cross-sectional distribution of suspended sediment concentration and particle size distribution will be measured using a towed laser-based diffraction profiler. The instrument will continuously measure suspended sediment concentration and size distribution as a function of time and space (width and depth of the tributary). Conductivity and temperature profiles will be obtained using a towed undulating CTD recorder.

Water and suspended sediment samples will be obtained for each transect using a combination of a Trace Organic Platform Sampler (TOPS) and grab samples. The TOPS instrument will be configured on board the vessel to allow for continuous, constant-rate pumping during each transect:

a cross-sectionally averaged sample will be obtained for each of the transects during each of the seven sampling events. Grab samples will be obtained at the centerline of each transect, at mid-depth. The TOPS water and suspended sediment samples will be analyzed for the chemicals of concern listed in Table III-2. The grab samples will only be analyzed for Total Suspended Solids (TSS), Dissolved Organic Carbon (DOC), Particulate Organic Carbon (POC), PAHs and the metals listed in Table III-2. A total of 54 TOPS and 54 grab samples will be obtained during this study.

The data generated in this study will be tabulated and presented in a manner consistent with the HEP CARP data management plan and will also be incorporated into the NJDEP database/GIS system developed as a part of Study I-A. The principal investigator will submit two interim reports and a final report to the NJDEP, and will serve on the scientific advisory team established by the Department to evaluate the data on a continual basis.

Table III-6: Preliminary Locations of Transects in Study I-E

Transect ID	Location	Latitude	Longitude
NB1	Confluence of Passaic & Hackensack Rivers	40.7° N	74.1° W
NB2	North end of Port Newark/Red Buoy 14	40.67° N	74.13° W
NB3	North of Shooters Island/Buoy 16	40.65° N	74.16° W
AK1	Near Goethals Bridge	40.6° N	74.2° W
AK2	Perth Amboy/Red Buoy 60	40.51° N	74.26° W
KVK1	Near Bayonne Bridge	40.64° N	74.12° W

Note: "NB" denotes Newark Bay, "AK" denotes Arthur Kill, and "KVK" denotes Kill Van Kull.

Study I-F: Pilot Project -- Field Testing of PISCES Sampling Device

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

CCMP Action T-6.1: Organic Chemical and Mercury Screening
CCMP Action T-6.2: Tracking and Elimination of Chemicals of Concern

CCMP Action T-12.12: Low-Level Detection Methods for Loadings
Dredging Plan: Pollutant trackdown, prioritization, and clean-up

The NY-NJ Harbor Estuary Program has recommended that the U.S. Environmental Protection Agency (USEPA), the New York State Department of Environmental Conservation (NYSDEC), and the NJDEP conduct screening for ambient levels of the chemicals of concern, in proximity to potential sources, using sensitive monitoring techniques. The objectives of this pilot project are to develop and implement a cost-effective approach to trackdown the sources of the chemicals of concern. Study I-F will include field testing the application and utility of Passive In-Situ Extraction Samplers (PISCES) to monitor for organic chemicals dissolved in surface waters.

This study, also known as the "Hudson River Toxics Trackdown Project", is supported solely by USEPA grant funding. It is described in greater detail in a Quality Assurance Project Plan prepared in 1997. The NJDEP Division of Science, Research and Technology was approved to proceed with this study, effective January 20, 1998. This work is ongoing, and is expected to continue through 2001.

PISCES are innovative passive sampling devices that incorporate a semi-permeable membrane device (SPMD). The samplers are loaded with solvent (hexane) and placed within a waterbody, for up to two weeks, to allow contaminants to concentrate in the solvent. The solvent is later analyzed for the selected chemicals of concern. The ambient monitoring utilizing PISCES in this study will provide concentration data for PCB congeners, PAH compounds, organochlorine pesticides, and dioxins. Sediment samples will also be collected at selected locations to complement the PISCES data.

Preliminary fieldwork to test deployment and recovery procedures for the PISCES equipment was conducted in the Fall of 1997. Analytical data has been collected for the Hackensack River and its tributaries from Marion Reach to Overpeck Creek. Subsequent work focused on the Arthur Kill, and the Rahway and Raritan Rivers. In addition, a pilot trackdown project was conducted on the lower Passaic River, which included the P450-RGS assay for dioxin screening, utilizing the PISCES. Initial results are currently subject to Quality Assurance review and data assessment.

Subsequent activities, based on the initial work, will test the PISCES trackdown methodology on various tributaries highlighted by the initial analytical data. Additional sampling is also planned in 2000 for the Raritan River, Rahway River, and the Newark Bay complex.

Study I-G: Monitoring of Selected Point Source Discharges

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

HEP CCMP Action T-1.2: "Track-down" and "Clean-up" of Significant Discharges of Organic Chemicals of Concern
Dredging Plan: CSO prioritization and remediation
Dredging Plan: Pollutant trackdown, prioritization, and clean-up

Potential major sources of the chemicals of concern include discharges from municipal wastewater treatment facilities (POTWs), combined sewer overflows (CSOs), and stormwater outfalls

(SWOs). A key objective of Study I-G is to determine the loadings of the chemicals of concern discharged from all of the New Jersey POTWs into the NY-NJ Harbor estuary, as well as to estimate the loadings from a selected sample of CSOs and SWOs. If Study I-G does not identify any of these selected discharges to be "significant", Phase Three Activities will then investigate other potential point and nonpoint sources for the chemical(s), including industrial wastewater treatment facilities, and solid and hazardous waste facilities. A second use of the data collected in Study I-G will be to provide the necessary background information to initiate the trackdown efforts that will identify the ultimate sources of the chemicals of concern.

Specifically, Study I-G will

- provide measurements of the contaminant loads (and related water quality parameters) discharged from the New Jersey municipal wastewater treatment facilities discharging to NY-NJ Harbor;

- provide measurements of the levels of contaminants (and related water quality parameters) associated with discharges from selected combined sewer and stormwater systems discharging to NY-NJ Harbor;

- provide the data for POTW, CSO and SWO discharges necessary to initiate trackdown efforts to identify the ultimate sources of the chemicals of concern;

- provide baseline information that will be used in an evaluation of the effectiveness of actions taken to eliminate sources of the chemicals of concern within the service areas of the New Jersey point source discharges;

- provide the basis for a long-term monitoring program of the chemicals of concern in the NY-NJ Harbor system.

Using the information collected in Study I-G (and Study II-A, if needed), trackdown activities within the service areas of identified "significant" point sources will be pursued in Study III-A. The data and information collected during Study I-G will also be used in the development of the modeling initiatives discussed under Phase Four Activities.

Study I-G will be implemented by the New Jersey Harbor Discharges Group (NJHDG), a coalition of New Jersey municipal wastewater treatment authorities which has jurisdiction over the publicly owned treatment works (POTWs), and some of the CSOs which discharge to the NY-NJ Harbor estuary. The NJHDG also has working relationships with the municipalities who have responsibility for many of the CSO and SWO outfalls. Table III-7 identifies the members of the NJHDG and provides summary information on the discharges from their respective POTWs; Figure III-4 shows the approximate locations of these POTW discharges. Tables III-8 and III-9 provide the preliminary CSO and SWO sampling locations, respectively, to be sampled by Study I-G; these locations are subject to change, based upon the ability to actually collect samples at those locations during storm events. If a sample(s) cannot be obtained at a particular location, an alternate sampling location will be selected.

Methods: Table III-2 lists the contaminants and related parameters that will be monitored in this study.

For the organic chemicals of concern, a 20-liter composite grab sample of effluent will be collected and used in the field to create four 1-gallon subsamples. The existing composite samplers at each POTW will be used to collect the POTW samples. Grab samples of the SWO and CSO discharges will be collected at each location over the duration of the selected discharge events. A 2.5-liter aliquot of each 1-gallon subsample will be filtered, extracted, and analyzed separately for dioxins/furans, PCBs, pesticides, and PAHs. The filters will be extracted using either sonication and mechanical agitation techniques (PAHs), or Soxhlet extraction (dioxins/furans, pesticides, and PCBs). The filtrates (2.5-liter volume) will also be extracted separately using liquid/liquid extraction techniques, and the extracts will be concentrated. The concentrated filter and filtrate extracts for each 2.5-liter aliquot will be combined for analysis (except that for the first set of 12 POTW samples, the extracts will be analyzed separately). This sampling/processing/analytical approach is presented in Figure III-5.

For metals analysis, 500-milliliters of the 20-liter composite grab sample will placed in a separate bottle and analyzed as specified in the QAPP (see Volume II).

Total Suspended Solids, Dissolved Organic Carbon, and Particulate Organic Carbon will also be measured in the collected samples.

The municipal wastewater treatment facilities to be monitored are identified in Table III-7. The discharge from each facility will be sampled either two or four times during this study, depending on the discharge volume from the facility and the relative volume of industrial input to each POTW. The sample collection events will be distributed throughout the year, quarterly for the larger/more complex POTWs, and summer and winter for the smaller/less complex facilities. The POTWs will be sampled during dry weather according to a predetermined schedule. If there is a wet weather event at the time of a scheduled sampling activity, the sampling activity will be rescheduled. Thus, a total of thirty-six samples will be collected from the selected municipal wastewater treatment facilities over a one-year period beginning in the summer of 2000. If the initial sampling and analysis efforts demonstrate that a POTW discharge contains relatively high concentrations of one or more of the chemicals of concern, additional samples may be collected to gain a better perspective on effluent variability.

A total of forty samples will be collected from representative CSO and SWO sites. To the greatest extent possible, the CSO and SWO sampling will be conducted concurrent with the wet weather/high flow events monitored in Studies I-C, I-D, and I-E. The selection of the CSO and SWO monitoring sites was made by evaluating the types of industries and land uses in each of the CSO and SWO service areas, and by using sampling sites that were previously utilized in a nickel/zinc monitoring/modeling study conducted by the NJHDG. Those CSO and SWO sampling locations which are least likely to be responsible for contributing meaningful loads of the contaminants of concern will not be considered in this initial sampling effort (additional CSO and SWO sampling is planned under Study II-A). It was important to consider CSO and SWO sampling sites that are representative of major drainage areas for two reasons: (1) the samples collected should be representative of as large a number of CSO/SWO discharges as possible, and (2) the collection of samples at relatively "downstream" stations and near the actual CSO/SWO discharge locations will be particularly useful for the subsequent trackdown portion of the New Jersey Toxics Reduction Workplan (see Study III-A). As with the POTW sampling, if the initial sampling and analysis efforts demonstrate that a CSO or

SWO discharge contains relatively high concentrations of one or more of the chemicals of concern, additional samples may be collected to gain a better perspective on effluent variability.

The data generated in this study will be tabulated and presented in a manner consistent with the HEP SCRWG-CARP data management plan and will also be incorporated into the NJDEP database/GIS system developed as a part of Study I-A. The principal investigators will submit one interim report and a final report to the NJDEP, and will serve on the scientific advisory team established by the Department to evaluate the data on a continual basis.

As shown in Figure III-1 and III-2, Study I-G is to be conducted in coordination with Studies I-C, I-D, and I-E; to the greatest extent possible, the Study I-G CSP/SWO sampling will be conducted during the same climatic "events" monitored in these three studies. Thus, Study I-G would be initiated during Year One of the implementation of the New Jersey Toxics Reduction Workplan. It is currently planned that the Study I-G monitoring activities will have a duration of approximately twelve months.

Table III-7: Summary Information on the Discharges from POTWs Owned and Operated by the NJHDG

POTW	LOCATION	DISCHARGE RATE[a]	NJPDES Permit No.
Passaic Valley Sewerage Com.[b]	Long. 74° 03' 42" Lat. 40° 39' 16"	283 mgd	NJ0021016
Middlesex County Utility Authority[b]	Long. 74° 15' 12" Lat. 40° 28' 51"	115 mgd	NJ0020141
Bergen County Utility Authority[b]	Long. 74° 01' 57" Lat. 40° 49' 54"	81 mgd	NJ0020028
Joint Meeting of Essex/Union[b]	Long. 74° 11' 51" Lat. 40° 38' 17"	59 mgd	NJ0024741
Rahway Valley Sewerage Authority[b]	Long. 74° 12' 35" Lat. 40° 35' 13"	26 mgd	NJ0024643
North Hudson S.A. (Hoboken/North Hudson/Tri City)[c]	Long. 74° 01' 10" Lat. 40° 45' 11"	21 mgd	NJ0026085
Linden Roselle Sewerage Authority[b]	Long. 74° 12' 23" Lat. 40° 36' 25"	13 mgd	NJ0024953
North Bergen MUA (Central)[c]	Long. 74° 02' 15" Lat. 40° 47' 05"		NJ0034339
North Bergen MUA (Woodcliff)[c]	Long. 73° 59' 59" Lat. 40° 47' 28"		NJ0029084
Edgewater Municipal Utilities Authority[c]	Long. 73° 58' 54" Lat. 40° 49' 15"	3 mgd	NJ0020591
North Hudson S.A. (West New York)[c]	Long. 74° 00' 03" Lat. 40° 47' 16"		NJ0025321
Secaucus Municipal Utility Authority[c]	Long. 74° 02' 54" Lat. 40° 47' 55"	3 mgd	NJ0025038

Note a: taken from "Workplan - Sources and Loadings of Toxics Substance to New York Harbor". NYSDEC, January 28, 1998; mgd = million gallons per day.

Note b: four quarterly samples are scheduled for collection. Additional samples may be collected during Study I-G (see text) and/or in Study II-A.

Note c: two seasonal samples are scheduled for collection. Additional samples may be collected during Study I-G (see text) and/or in Study II-A.

TABLE III-8: Summary Information on the CSOs Initially Selected to be Sampled

CSO NAME/LOCATION (ASSOCIATED WATERBODY AND UTILITIES AUTHORITY)	NUMBER OF SAMPLES
Jersey City Intersection (PVSC)	2
Bayonne Intersection (PVSC)	2
MCUA/Thramboy	2
Joint Meeting/Elizabeth	2
Newark Alkalai	2
Ivy Street (Passaic River, PVSC)	2
Christie Street (Hackensack River, BCUA)	2
Court Street (Hackensack River, BCUA)	2
Livingston and Front Streets (Arthur Kill, Joint Meeting)	2
Worthington Avenue	2
Kearny Street Bridge	2
Elm Street	2
Anderson Street	2
West Side Road	2
TOTAL	28

TABLE III-8, cont.: Summary Information on the CSOs Initially Selected to be Sampled

ALTERNATES: CSO NAME/LOCATION (ASSOCIATED WATERBODY AND UTILITIES AUTHORITY)	NUMBER OF SAMPLES
Campbell Foundry (Passaic River, PVSC)	
Jackson Street (Passaic River, PVSC)	
Johnston Road (Passaic River, PVSC)	
Herbert Place (Passaic River, PVSC)	
91st Street Bellman's Creek (Hackensack River, North Bergen)	
Fourth and Hackensack Streets (Hackensack River, BCUA)	
Overpeck Creek (Hackensack River, BCUA)	
Elizabeth Avenue at Memorial Park (Arthur Kill, Joint Meeting)	
Front Street and Bay Way (Arthur Kill, Joint Meeting)	

TABLE III-9: Summary Information on the SWOs Initially Selected to be Sampled

CANDIDATE SWO NAME/LOCATION (ASSOCIATED WATERBODY AND UTILITIES AUTHORITY	NUMBER OF SAMPLES
Peripheral Ditch /Newark Airport	2
Diamond Alkalai (Blanchard Street, Passaic River)	2
CCI	2
Smith Marina	2
City of Rahway (outfall 003) RUA-SSA	2
Henley Road (Hackensack River, BCUA)	2
TOTAL	12
Alternates	
Anderson Street (Hackensack River, BCUA)	
Elm Street (Hackensack River, BCUA)	
West Side Road/Cromakill Creek (Hackensack River, North Bergen)	
NAPP-GRECO	
Third Street Drainage Ditch (Hackensack River, BCUA)	
East Jersey and Front Streets (Arthur Kill, Joint Meeting	

Study II-A: Monitoring of Additional Targeted Point Source Discharges

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

HEP CCMP Action T-1.2: "Track-down" and "Clean-up" of Significant Discharges of Organic Chemicals of Concern
Dredging Plan: CSO prioritization and remediation
Dredging Plan: Pollutant trackdown, prioritization, and clean-up

The data and information collected in the Phase One studies will be used to identify (1) those tributaries to the NY-NJ Harbor estuary into/from which significant levels of the chemicals of concern are discharged, (2) the specific chemical(s) of concern originating within the watershed of each tributary, and (3) potential sources for these chemicals of concern. Potential major sources of the chemicals of concern include discharges from municipal wastewater treatment facilities, combined sewer overflows (CSOs), and stormwater outfalls (SWOs). Initial monitoring of a number of these point sources will be conducted in Phase One -- see Study I-G, Tables III-7 and III-8; some of these point sources may be monitored again in Study II-A. The objectives of Study II-A are (1) to identify additional point source discharges that may be significant sources of the chemicals of concern (particularly CSOs and SWOs), and (2) to determine the levels of suspended solids and the selected chemical(s) of concern discharged from these point sources. Study II-A is essentially a more focused continuation of Study I-G, targeting specific sewerage systems and/or chemicals of concern. Alternatively, if Study I-G and Study II-A do not identify any of these types of discharges to be "significant", Phase Three Activities will then investigate other potential point and nonpoint sources for the chemical(s), including industrial wastewater treatment facilities, and solid and hazardous waste facilities.

Specifically, Study II-A will

- identify specific point source discharges (or types of point source discharges) within the prioritized tributary systems which are significant discharges of suspended sediment and the chemicals of concern;
- provide measurements of the levels of suspended sediment and contaminants associated with discharges from these point sources;
- provide baseline information that will be used in an evaluation of the effectiveness of actions taken to eliminate sources of the chemicals of concern within the service areas of the point source discharges and long-term monitoring programs.

Using the information collected in Study I-G and Study II-A, trackdown activities within the service areas of identified "significant" point sources will be pursued in Study III-A. The data and information collected during Study II-A will also be used in the development of the modeling initiatives discussed under Phase Four Activities.

Study II-A will be implemented by the New Jersey Harbor Discharges Group (NJHDG), which has jurisdiction over the publicly owned treatment works (POTWs), and some of the CSOs which discharge to the NY-NJ Harbor estuary (see Study I-G).

The first task to be completed as part of Study II-A is to identify those point sources from which potentially significant discharges of the chemicals of concern originate. Using the data and information collected in the Phase One studies (particularly Study I-G), the NJDEP -- in cooperation with the principal investigators from Studies I-A, I-C, I-D, and I-E, the NJHDG, and the NY-NJ Harbor HEP CARP -- will identify these potential point sources. In addition, potential sources not monitored in Study I-G may be targeted in Study II-A. A variety of methods will then be used to further screen and monitor the discharges from these point sources.

Methods: See Study I-G. Table III-2 lists the compounds and parameters that will be monitored in this study; the chemicals of concern will be measured in both the dissolved aqueous phase and bound to suspended sediments. However, within a specific tributary or for a specific POTW, CSO, or SWO system, the results of the Phase One studies may result in the monitoring conducted in Study II-A focusing on only a subset of the chemicals of concern.

This sampling will include an additional subset of the combined sewer and stormwater systems within each tributary. The combined sewer and stormwater systems to be monitored will be selected by evaluating the types of land uses and industries within the service areas of these facilities and identifying those areas most likely to contain sources of the chemicals of concern (see Study I-G). In addition, the data collected from Study I-G will be used in the process to select the systems to be monitored in Study II-A.

The data generated in this study will be tabulated and presented in a manner consistent with the HEP CARP data management plan and will also be incorporated into the NJDEP database/GIS system developed as a part of Study I-A. The principal investigators will submit two interim reports and a final report to the NJDEP, and will serve on the scientific advisory team established by the Department to evaluate the data on a continual basis.

As shown in Figure III-1 and III-2, Phase Two Activities are to be conducted following the completion of the Phase One Activities and the prioritization of the tributaries for additional investigation. Thus, Study II-A would be initiated during Year Two of the implementation of the New Jersey Toxics Reduction Workplan. However, the data and information collected during the Phase One studies will be evaluated on a continual basis, and Study II-A may be implemented within selected tributaries on a "fast-track" basis.

It is currently planned that the Study II-A monitoring activities will have a duration of approximately twelve months. However, Study II-A may be extended and/or phased over a longer period of time, depending on the results of other activities to be implemented as a part of this workplan.

Study III-A: Trackdown of the Chemicals of Concern Within the Service Areas of Identified Point Sources

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

HEP CCMP Action T-1.2: "Track-down" and "Clean-up" of Significant Discharges of Organic Chemicals of Concern
HEP CCMP Objective T-3: Minimize the discharge of toxic chemicals from CSOs, storm water, and non-point sources
HEP CCMP Action T-6.2: Tracking and Elimination of Chemicals of Concern
Dredging Plan: CSO prioritization and remediation
Dredging Plan: Pollutant trackdown, prioritization, and clean-up

The data and information collected in Study I-G and Study II-A will be used to identify significant point source discharges of the chemicals of concern and suspended sediments originating within the service areas of municipal wastewater treatment facilities, CSOs, and storm sewer systems. The primary objective of Study III-A is to trackdown the specific sources of the chemicals of concern within the identified service areas. Once located, actions can be initiated, as appropriate, to eliminate or reduce to the greatest extent practicable these sources. Alternatively, if Study II-A and Study I-G do not identify any of these types of discharges to be "significant" within a particular tributary, Study III-B will investigate other potential point and nonpoint sources for the chemical(s), including industrial wastewater treatment facilities, and solid and hazardous waste facilities.

Specifically, Study III-A will:

- identify the specific source(s) of the chemicals of concern originating within the service areas of municipal wastewater treatment facilities, CSOs, and storm water systems that are significant discharges of these contaminants;

- provide baseline information that will be used in an evaluation of the effectiveness of actions taken to eliminate these specific sources.

The data and information collected during Study III-A will also be used in the development of the modeling initiatives discussed under Phase Four Activities.

Study III-A will be implemented by the New Jersey Harbor Discharges Group (NJHDG), which has jurisdiction over the publicly owned treatment works (POTWs), and some of the CSOs, that discharge to the NY-NJ Harbor estuary. Table III-7 identifies the members of the NJHDG.

Methods: Table III-2 lists the compounds and parameters that will be monitored in this study; the chemicals of concern will be measured in both the dissolved aqueous phase and bound to suspended sediments. However, within the service area of a specific point source discharge, the results of Study I-G and Study II-A may result in the monitoring conducted in Study III-A focusing on only a subset of the chemicals of concern.

The NJHDG, in cooperation with the Department, its scientific advisory team, and the NY-NJ Harbor Estuary Program CARP, will select the POTW, CSO, and SWO systems to be investigated in Study III-A. These selections will be made by evaluating the data collected during the Phase One and Two investigations, and other relevant information. Priority will be given to those systems that most likely contribute meaningful levels of the contaminants of concern to NY-NJ Harbor.

The Study III-A investigators will utilize a variety of procedures, coupled with targeted chemical analyses (based upon the results of Studies I-G and II-A) as they move "upstream" within the service area piping systems. The monitoring sites within the service areas will be selected based on the results of Study I-G and Study II-A, the results of prior Study III-A sampling activities, and relevant information on the service areas and associated land uses (including data and information synthesized in Study I-A).

The data generated in this study will be tabulated and presented in a manner consistent with the HEP CARP data management plan and will also be incorporated into the NJDEP database/GIS system developed as a part of Study I-A. The principal investigators will submit one interim report (for each point source service area) and a final report to the NJDEP, and will serve on the scientific advisory team established by the Department to evaluate the data on a continual basis.

As shown in Figures III-1 and III-2, Phase Three Activities are to be conducted following the completion of the Phase Two Activities and the identification of significant point source discharges of the chemicals of concern for additional investigation. Thus, Study III-A would be initiated during Year Three of the implementation of the New Jersey Toxics Reduction Workplan. However, the data and information collected during Study II-A will be evaluated on a continual basis, and Study III-A may be implemented within selected service areas on a "fast-track" basis. It is currently planned that the Study III-A monitoring activities will have a duration of approximately twenty-four months. However, Study III-A may be extended and/or phased over a longer period of time, depending on the results of other activities to be implemented as a part of this workplan.

Study III-B: Monitoring of Other Point and Nonpoint Source Discharges

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

HEP CCMP Action T-1.2: "Track-down" and "Clean-up" of Significant Discharges of Organic Chemicals of Concern
HEP CCMP Action T-2.3: Additional Requirements for Direct Industrial Dischargers
HEP CCMP Objective T-3: Minimize the discharge of toxic chemicals from CSOs, storm water, and non-point sources
HEP CCMP Action T-5.2: Remediation of Sites Contributing Significant Contamination to the Harbor/Bight
HEP CCMP Action T-6.2: Tracking and Elimination of Chemicals of Concern
HEP CCMP Action T-9.2: Identification of Additional Areas [of contaminated sediments]
Dredging Plan: Pollutant trackdown, prioritization, and clean-up
Dredging Plan: Prioritize non-point source pollution prevention/remediation projects
Dredging Plan: Prioritize sediment hot spots and clean-up projects

The chemicals of concern identified in the New York-New Jersey Harbor Estuary Program CCMP (see Table III-2) can be discharged into the estuary system from a variety of sources. Study I-B investigates the inputs of the chemicals of concern resulting from atmospheric deposition, while Studies I-G, II-A and III-A target a variety of point source discharges. Study III-B will be implemented within selected tributaries as needed to evaluate the significance of additional point and nonpoint source discharges of the chemicals of concern, including:

- industrial wastewater treatment facilities which discharge directly into the harbor estuary system;
- surface and groundwater discharges from hazardous waste facilities (both Superfund/NPL and non-Superfund sites);
- surface and groundwater discharges from solid waste landfills;
- contaminated sediment "hot spots" within the harbor estuary system, including tributaries;
- nonpoint sources resulting from rainfall-induced runoff.

Using the data and information collected from the Phase One and Two Activities, particularly Studies I-A, I-B, I-G and II-A, the significance of these potential additional sources of the chemicals of concern within a specific tributary will be evaluated. Initially, by using the process of elimination, the potential importance of these types of discharges can be determined. The data and information synthesized in Study I-A can then be used to identify specific potential sources of the discharges within the watershed of each tributary; if there are no large point sources present (i.e. industrial wastewater treatment facilities, solid and hazardous waste facilities), the importance of nonpoint sources and contaminated sediment "hot spots" will be investigated further.

The investigations conducted as part of Study III-B will, in part, evaluate the significance of these potential sources in a manner analogous to that used in Studies I-D, I-E, I-G and II-A. The

modeling activities discussed under Phase Four Activities may be needed to identify significant discharges of the chemicals of concern. Finally, trackdown activities similar to those conducted in Study III-A will be used to identify the specific sources of the chemicals of concern within the service area(s) of selected point source discharges.

Specifically, the objectives of Study III-B are to

- identify specific point source discharges from industrial wastewater treatment facilities, solid and hazardous waste facilities, within the prioritized tributary systems which are significant sources of suspended sediment and the chemicals of concern; provide measurements of the suspended sediment and contaminant loads discharged from these point sources;

- evaluate the significance of (and identify) nonpoint sources of the chemicals of concern within the prioritized tributary systems and estimate the loadings of suspended sediment and contaminants from these sources;

- evaluate the significance of known potential "hot spots" of contaminated sediments within the prioritized tributary systems as potential sources of the chemicals of concern;

- provide baseline information that will be used in an evaluation of the effectiveness of actions taken to eliminate these specific sources.

Methods:

Industrial Wastewater Treatment Facilities

The GIS database developed in Study I-A will include all known industrial discharges in the NY-NJ Harbor estuary. Studies I-G and II-A discuss the methods used to sample the discharges from municipal wastewater treatment facilities -- the same methods will be used to monitor direct industrial discharges to the tributaries. Screening evaluations for the chemical(s) of concern may be conducted using PISCES, with grab samples collected for metals analyses. Quantitative measurements of the loadings will then be obtained by monitoring the discharges using TOPS and/or grab samples, as appropriate.

Solid and Hazardous Waste Facilities

Chemicals of concern may be discharged to the tributaries from these potential sources by two routes: direct discharges from a pipe/outfall and/or in a "nonpoint" fashion due to leaching and groundwater discharges. Initially, the Study I-A GIS database and knowledgeable individuals (for example, local public works employees) will be consulted to determine the locations of any known point source discharges (i.e. pipes/outfalls) associated with such facilities: field visits to potential sites

may also be needed. If such discharges are identified, procedures can be implemented as described above for *Industrial Wastewater Treatment Facilities*.

Where specific discharge points can not be identified, the prioritized tributaries can then be further divided into more "segments" (see Study I-D); a targeted sampling program using PISCES (for organic contaminants) and grab samples (for metals) will then be implemented. The objective of this program is to identify those tributary segments into which the chemical(s) of concern are discharged in the largest amount/concentration. This could consist of a series of sampling efforts, continually focusing on smaller segments of the tributary. A search for the leaching/groundwater discharges associated with the "significant" tributary segment(s) will then be implemented.

Nonpoint Source Discharges

Chemicals of concern originating from nonpoint sources would be the result of rainfall-induced discharges from contaminated upland sites. The importance of nonpoint source pollutant inputs would be evaluated by using the process of elimination -- once all the other potential sources (including contaminated sediment "hot spots", see below) have been investigated, it would thus appear that the only remaining possible source(s) would be nonpoint. The GIS database developed in Study I-A would be consulted and all known contaminated sites within the watershed of the tributary (or tributary segment, if such a deduction can be made) which could be the source of the chemical(s) of concern will be identified. Field visits will then be conducted to evaluate the potential for nonpoint source discharges to originate from these sites.

Contaminated Sediment "Hot Spots"

A final potential source of the chemical(s) of concern within a specific prioritized tributary would be existing contaminated sediments deposited on the bottom of the waterbody. Inputs of the chemical(s) of concern from "hot spots" of contaminated sediments could occur in a variety of ways:

- sediment-water fluxes of the chemical(s) of concern;
- disturbance and resuspension of the sediments due to elevated current velocities (resulting from severe weather conditions, boat/vessel traffic, or construction/dredging operations);
- disturbance and resuspension of the sediments due to bioturbation;
- uptake by benthic organisms and subsequent food chain transfer/bioaccumulation and/or excretion into the water column.

The GIS database developed in Study I-A will include all available data on sediment contamination in the NY-NJ Harbor estuary. Initially, this database will be consulted in order to identify any known areas of sediments in the tributary of interest contaminated with high levels of the chemical(s) of concern. If any such areas are identified, more detailed information on the size and degree of contamination of these potential "hot spots" of contaminated sediments will be obtained by implementing an appropriate sampling program. This could consist of both grab and core samples of the sediments and bulk sediment chemistry analyses.

If the presence of a contaminated sediment "hot spot" is verified, additional studies to investigate possible mechanisms which could disperse the contaminants into the water column would be considered and prioritized. This could include an evaluation of the hydrodynamics of the tributary (including a monitoring program as well as modeling activities) and an analysis of the potential impacts of boat/vessel traffic and construction/dredging activities. In addition, a literature search will be implemented to evaluate the potential for direct sediment-water column flux of the chemical(s) of concern, and/or this flux could be measured directly.

Biological mechanisms through which sediment-bound contaminants could be distributed throughout the NY-NJ Harbor estuary will be considered further as part of the Phase Four modeling activities.

The data generated in this study will be tabulated and presented in a manner consistent with the HEP SCRWG-CARP data management plan and will also be incorporated into the NJDEP database/GIS system developed as a part of Study I-A. The principal investigators will submit one interim report for each tributary and a final report to the NJDEP, and will serve on the scientific advisory team established by the Department to evaluate the data on a continual basis.

As shown in Figures III-1 and III-2, Phase Three Activities are to be conducted following the completion of the Phase Two Activities and the identification of significant point source discharges of the chemicals of concern for additional investigation. Study III-B would be initiated on an as needed basis, most likely during Year Four of the implementation of the New Jersey Toxics Reduction

Workplan. However, the data and information collected during Phases One and Two will be evaluated on a continual basis, and Study III-B may be implemented within selected tributaries on a "fast-track" basis. It is currently planned that the Study III-B monitoring activities will have a duration of approximately twenty-four months. However, Study III-B may be extended and/or phased over a longer period of time, depending on the results of other activities to be implemented as a part of this workplan.

Study IV-A: Modeling Studies

NY-NJ HEP CCMP and Joint Dredging Plan* Actions Addressed:

HEP CCMP Action T-13.2: Comprehensive System-wide Model for Mercury and Organic Chemicals
HEP CCMP Action T-13.3: Simple Mass Balance for Mercury and Organic Chemicals
Dredging Plan: Sediment transport modeling.

In order to better understand the hydrodynamic functioning of the NY-NJ Harbor estuary and to predict the fate and transport of contaminants within it, development of an appropriate model(s) will be needed. This model(s) could also be used to assess and predict the effects of remedial actions taken to eliminate/reduce the discharges of the chemicals of concern from the sources identified in the Phase One, Two, and Three Activities. These modeling studies, included as Phase Four Activities, will be initiated in 2000 through a Request for Proposal process to be administered by the Hudson River Foundation. Funding will be provided directly to the foundation by New Jersey Maritime Resources. This effort will also be coordinated with the NYSDEC and the NY-NJ HEP CARP. A first task to be completed by the modeling contractor will be an evaluation of the data to be collected by the Department and NYSDEC and its adequacy in meeting the various objectives of the modeling activities. The role of the Phase Four modeling studies in meeting the objectives of the New Jersey Toxics Reduction Workplan will be addressed in greater detail in the Draft and Final "Toxics Reduction Implementation Plan [s]".

APPENDIX A

SAMPLING METHOD DEVELOPMENT STUDIES (1998-1999)

(In Preparation)

Preliminary Study of TOPS Methodology (fall 1998)

New Jersey Toxics Reduction Workplan TSS Mass Balance Study
for TOPS - Executive Summary

Introduction

The story of America's urban centers during the second half of the twentieth century too often features decline and disillusionment. While the challenges cities face appeared insurmountable at times, hope remained and a vanguard of elites and everyday citizens never abandoned the goal of reviving the city Through the implementation and study of various renewal methods, some strategies emerged that provide genuine hope for the central city. Among the most popular of these, arts, entertainment and cultural facilities attracted billions of dollars in hundreds of cities.[1] Originally an extension of developmental projects, cultural renewal grew into its own as an unique approach to dealing with problems associated with urban areas. Today, it forms the foundation for many of the most admired, successful and emulated approaches to reversing urban malaise. Yet despite its promise, the academic literature on the subject remains sparse and dated, too often attempting to cram this more recent tact into existing theories of renewal and politics. Further examination into this burgeoning field of urban activity offers answers to vital questions in urban politics. What constitutes culturally derived urban renewal? Does it fit within the existing framework of academic analysis? What problems does it most successfully address? Who initiates and directs, who governs, this process? Placing cultural urban revitalization within a standard, topically appropriate framework, provides the structure necessary to understand the prerequisites for policy success.

For the purposes of this paper, the terms 'arts' and 'culture' shall be used in reference to a wide range of activities. organizations and structures, both public and private, spanning both 'high' and 'low,' or 'popular,' forms of expression. Arts and culture thus include performing, visual and media arts groups; their venues, parks, historic structures, streetscapes. festivals, sports and recreation facilities; artist housing; cultural districts; cultural education groups and activities; and culturally related policy and planning organizations – either non-profit, governmental or corporate. These disparate elements constitute a 'culture

[1] To take just a sampling of these efforts, "Between 1976 and 1986, 250 convention centers, sports arena, community centers, and performing arts halls were constructed or started, at a cost of more than $10 billion, and over the next decade the. the competition continued unabated " This accounting does not include. among other things. art and historic districts, parks. waterfront developments or festivals Judd, Dennis R & Swanstrom, Todd. City Politics: Private Power and Public Policy Addison Wesley Longman New York, 1998 369

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industry' in that they provide the public with 'products' that enhance life, entertain, educate and/or foster community interaction.[2]

An exhaustive study of all major efforts to employ culture as a primary urban renewal method, if it is even possible, lays beyond the scope of this paper. Within a limited study, a useful accounting can be had by synthesizing and then applying the existing, disparate literature on urban renewal in general and the arts in particular, with the experiences of a single city - in this instance Newark, New Jersey. A number of problems have dogged Newark during the past several decades and - as in other cities - it has experimented with various solutions. Though they have received relatively little press, today a number of arts related initiatives seek to lift the city out of its long-standing malaise. These represent a new wave in urban revitalization began in the United States in the early 1980s that increasingly question the traditional, economics driven American approach to renewal.[3] The extent and nature of the city's problems, the variety of solutions now being tried, the relevance of these solutions to those found in other cities and the limited amount of attention they have received thus make Newark a excellent model of modern cultural renewal.

Argument

"...one issue consistently generates consensus among local elite groups and separates them from people who use the city principally as a place to live and work: the issue of growth. For those who count, the city is a growth machine, one that can increase aggregate rents and trap related wealth for those in the right position to benefit. The desire for growth creates consensus among a wide range of elite groups, no matter how split they might be on other issues."[4]

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[2] A collection of articles on the 'culture industry,' with a specific focus on Manchester, UK, argues for the arts being broadly defined. "Importantly we reject the distinctions which regard culture as limited to a definition of art as 'high culture,' which distinguish between commercial and non-commercial consumption and production of cultural provision and products; and which define cultural policy simply as the provision of leisure and arts facilities. We believe that a wider definition is important in order to promote the conceptual leap necessary if the arts are to take their proper place in the new economy upon which successful regeneration strategies need to be based." Derek Wynne ed The Culture Industry: The arts in urban regeneration. Avebury: Brookfield, VT, 1992

[3] "In the US, the practice of city marketing has been linked primarily to local economic development, the promotion of place and the encouragement of public-private partnerships to achieve regeneration." However, there has been increasing tendency to consider the city marketing and arts based urban revitalization as a means and end in themselves, not necessarily bound to growth measurements of success. Newark's approach follows this trend. Ronan Paddison, "City Marketing, Image Reconstruction and Urban Regeneration " *Urban Studies* 1993; vol 30 no 2, 340

[4] Logan, John R & Molotch, Harvey L. Urban Fortunes. University of California Press. Berkeley, 1987 50

While opinions differ as to whether or not the growth agenda benefits cities, there exists a wide consensus that development policies dominate urban politics.[5] The majority of literature on cultural resources and urban renewal tacitly accepts this ideology as the chief motivation for revitalization programs.[6] Economic motivations certainly can and do influence a utility's or a real estate broker's desire for more customers, but the rationale for the inclusions of cultural activities within the growth paradigm are unsatisfactory. Exemplary of this disconnect between reality and theory, an analysis of waterfront development, which often in cities such as New York, Baltimore and Liverpool focuses on the arts, found that:

"In the published literature and political rhetoric, considerable attention is given to the economic purposes of waterfront development. However, the strategy need not be focused so narrowly. There are opportunities for social improvement and regeneration, physical restructuring and fabric refurbishment. Although the terms *regeneration* and *redevelopment* are those used most consistently, the action strategies include revitalization, rehabilitation, and image improvement."[7]

Stating that the culture 'industry' differs from the steel or computer industries may appear unnecessary, until one realizes that according to most theories of urban politics, renewal and policy they should be viewed as of the same mold. The argument that "The growth machine avidly supports whatever cultural institutions can play a role in building locality" does not explain where arts come from, unless one accepts the contention that they exist solely as a means of economic development. More importantly, the fact that growth machines might

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[5] "*Developmental* policies are those local programs which enhance the economic position of a community in its competition with others They strengthen the local economy, enhance the local tax base, and generate additional resources that can be used for the community's welfare." More realistically, policies of growth and development attempt to accomplish these improvements as their primary objectives Peterson, Paul E City Limits University of Chicago Press: Chicago, 1981 41 For a variety of different takes on development, each of which concludes that it a central component of urban policies, see, Logan & Molotch, Urban Fortunes, Peterson City Limits, Michael Porter, "The Competitive Advantage of the Inner City " *Harvard Business Review* May-June 1995; Dahl, Robert A Who Governs? Democracy in an American City Yale University Press New Haven, 1961, Hunter, Floyd, Community Power Structure, A Study of Decision Makers University of North Carolina Press Chapel Hill, 1953 Even much of the critical literature accepts the value of development and concentrates on the methods of achieving it. For examples see: C Michael Henry, "The Porter Model of Competitive Advantage for Innercity Development An Appraisal," and Edward J Blakeley & Leslie Small, "Michael Porter New Gilder of Ghettos," in Boston, Thomas & Ross, Catherine eds. The Inner City. Transaction Books: New Brunswick, 1998. 131-160, 161-183. These theories are not confined to academia but are actively debate and considered in urban areas; Michael Porter even carried his mantra personally to Newark in 1995 Iris Taylor "Inner city economics, Michael Porter Speaking " *The Star Ledger* October 13, 1995, News Section

[6] For example, during an examination of the 'culture industry,' with special emphasis on Manchester, UK, the recommendation is made that "Each local authority (LA) should draw up a strategy for the development of the arts and cultural industries around a key objective to maximize the contribution which the arts and cultural industries can make to the economic and social well-being of the locality and wider region " Derek Wynne ed. The Culture Industry, The arts in urban regeneration For an overview of the arts and the growth machine, see J Allen Whitt, "Mozart in the Metropolis, The Arts Coalition and the Urban Growth Machine " *Urban Affairs Quarterly*, September 1987, vol 23 no. 1, 15-36

[7] Stephen J Craig-Smith and Michael Fagence eds Recreation and Tourism as a Catalyst for Urban Waterfront Redevelopment An International Survey Praeger: Westport, CT, 1995. 137-38

use the arts to facilitate development says nothing of other 'machines' that support cultural institutions towards entirely different ends.[8]

Culture driven revitalization may best be understood in terms of a 'marketing machine' that differs from the growth machine in several important ways; these differences are summarized in the chart below.[9] Most importantly, rather than organizing around growth and development as primary motivating forces, this alternative model coalesces around improving a city's quality of life, morale and image. In essence, this model seeks to market the city both to residents and outsiders by creating material, quality enhancements and, in considering these projects, providing opportunities to reevaluate the situation. While not ignoring economic benefits, the marketing agenda primarily challenges not only the downtown's but also the central city's tarnished and stereotyped reputation. A revival of the city's place in the regional political and social economy follows, progressing through a two tiered process in which cultural projects leverage further cultural renewal.[10]

	GROWTH MACHINE	**MARKETING MACHINE**
Governing Ideology	**Develop & grow jobs, population and tax base**	**Improve & market image, morale & quality of life in city**
Organizing level	Local	Regional
Power grouping	Partnership: Business & Government	Partnership: Non-profits, Business, Philanthropists, Arts Organizations & Government
Nature of leadership	Formal, institutionalized, pluralist	Informal, semi-institutionalized, elite
Business v. Government	Business paramount	Equal weight to public, for-profit & non-profit, government potential leader
City residents	Indirectly involved through vote, constricted by growth	Indirectly involved through consideration, empowered by marketing
Renewal model	Multiplier	Leverage
Primary criticisms	Unrelated to local interests, exclusionary	Lacks legitimacy without structure, indirectly addresses urban crises

[8] Logan & Molotch Urban Fortunes 61 For a description of the 'growth machine' see: Logan & Molotch Urban Fortunes 50-98 For a more positive assessment of the potential of growth see: Porter, "The Competitive Advantage of the Inner City "

[9] The idea of marketing cities is not new, especially in Europe, but its implementation as strategy independent from development and the formulation of a consistent theoretical structure has lagged. For a rare overview of a true marketing machine approach see the analysis of Glasgow in. Paddison, "City Marketing, Image Reconstruction and Urban Regeneration "

[10] The marketing machine's focus on the reputation and viability of the city as a whole, in part addresses the failings of the growth agenda to operate outside the downtown "There is no doubt that the central business districts of most cities have been resuscitated; some had seemed near death In most cases, however, the spillover to other business areas and neighborhoods within the cities has been limited Islands of prosperity have emerged in the cities, but they have generally been surrounded by depressed areas that seem no better off because of the urban renaissance " Judd & Swanstrom, City Politics, Private Power and Public Policy 357 The marketing approach can be used along side (note, not as a tool of) other strategies, a method identified notably with the Dutch that "allies the economic promotion and development of the city with its physical and social planning so as to satisfy the requirements of different users, its citizens, investors and visitors." Paddison, "City Marketing, Image Reconstruction and Urban Regeneration " 340

Stability	Stable	Unstable unless structured & planned

Related to this, the marketing machine approaches cultural renewal from a regional, rather than a local, perspective.[11] This regionalist approach helps create linkages between the urban and the suburban, enhancing the city's image and its viability, a far cry from developmental policies that tend to further isolate central cities from the life of the wider community. Driving this process is an elite partnership that, while in some ways resembling that found in the growth paradigm, tends to be more diverse, more regionally connected, more civically motivated and less formally structured. This type of partnership arises out of the "low pressure" politics – typically found in urban areas where the level of disengagement provides a very low threshold for retaining power – even more so than that which involves local growth policies where "informal channels of communication substitute for formal ones. In these channels the political resources that count are technical expertise, the power of persuasion, and the capacity to reason soundly."[12] While often adhering to project specific plans, master blueprints for the arts and urban renewal often follow initial successes. The lack of rigid structure, the informal nature of leadership and the presence of elitist and outsider forces combine to make the marketing machine potentially less stable than the growth machine due to the susceptibility of cultural renewal to challenges of both its legitimacy and its priorities.

Due to the particular characteristics of cultural activities, arts based urban renewal offers a number of unique insights into urban politics and development. Cultural activities occur mostly in urban settings, with a disproportionate share of venues and artists residing in city centers while serving a regional audience.[13] Ideology, civic mindedness, social interaction and non-profit motivations mark cultural activities and consequently the renewal programs derived from them. This means that while sometimes the arts fall within conventional theories, more often they do not. Most importantly, while arts based renewal addresses many

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[11] For perhaps the most well known argument for a regional, or "federal," approach see: Peterson, City Limits. For a general discussion the subject see: Judd & Swanstrom, City Politics: Private Power and Public Policy. Examinations of regionalism in Minneapolis and Los Angeles, respectively, can be seen in: Orfield, Myron, Metropolitics: A regional Agenda for Community and Stability, R R Donnelley and Sons (Harrisonburg, VA, 1997; Davis, Mike, City of Quartz, Vintage Books, New York, 1990.

[12] Peterson, City Limits, 129.

[13] According to then director of the National Endowment for the Arts' Design Arts Program, Michael Pittas, this structure, along with the ideological and non-profit impulses of the arts leads to a situation where "The one common characteristic...[is] that arts activities tend to concentrate in urban centers. The arts demand centrality because their market is not so vast that they can be spread out, as shopping malls are. That makes for a natural affinity between housing the arts and revitalizing the center city." Cited in George Clark, "Footlight Districts," Kevin W. Green ed. The City as a Stage: Strategies for the Arts in Urban Economics, Partners for Livable Places, Washington, DC, 1983, 12.

social ills, it often does so only indirectly. Acknowledging the limitations and special nature of cultural urban renewal, it nonetheless provides an effective instrument for assailing pervasive urban ailments.

The City of Newark

Overview

In order to understand Newark's experience with the marketing machine one must first review the city's current condition. According to 1996 Census Bureau estimates, 268,510 individuals reside in Newark, the smallest of America's 100 most populous cities in terms of land area. Newark's current population represents a steep decline from a recent peak around 440,000 in the early 1950s. Domestic emigration, the so-called 'white flight' of educated, skilled upwardly mobile citizens of all ethnic backgrounds, led to the loss of Newark's core population to the surrounding suburbs. In Newark today, African-Americans comprise 56% of the population, followed by, Hispanics (26%), European-Americans (16.5%); of the total 19% are foreign born.[14] Unfortunately, although antagonism has eased since the riots of 1967, racial harmony today within this diverse population receives negative ratings from 66% of Newark residents.[15]

Despite the loss of residents, Newark remains the largest city in New Jersey, surrounded by dense, largely wealthy suburbs. Over 4.5 million people live within a 25 mile radius of the city.[16] The Census Bureau's MSA (Metropolitan Statistical Area) that includes Newark contains an estimated population of 1,913,501. The ethnic breakdown of the MSA differs markedly from that of Newark, being approximately 70% European, 23% African American, 10% Hispanic and 3% Asian American.[17] With just 14% of the MSA's population, Newark houses 35% of the area's African-Americans.[18] While not total, there exists a troubling degree of racial and wealth segregation between the city and the surrounding region.

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[14] US Census Bureau *1990 Census* Interestingly, the perceptions of Newark's racial makeup do not fit the reality A recent poll found that Essex County residents believed Newark to be 51% African-American, 20% European-American, 19% Hispanic, 10% Portuguese and 6% Asian-American. Jim Willse ed "Star-Ledger/Eagleton Poll on Perceptions of Newark: results compiled for Newark in the 21st Century " *The Star-Ledger* Newark, November 25, 1997 (unpublished)

[15] Only fair, 44%, poor, 22%. "Star Ledger/Eagleton Poll on Perceptions of Newark: results compiled for Newark in the 21st Century " November 25, 1997 See Newark in the 21st Century Directory of City Assets Newark December 1998 ii-vi (forthcoming)

[16] Glenn Collins, "Architect Picked for Newark Concert Hall " *The New York Times* November 8, 1990, Section C 21

[17] US Census Bureau statistics.

[18] See, Newark Economic Development Corporation (NEDC) & Newark Division of Economic Development 1997 Overall Economic Development Program (OEDP) City of Newark, March, 1998 See Newark in the 21st Century, Directory of City Assets, ii-vi

Poverty, Unemployment, Crime, Education & Infrastructure

Within a half-hour drive of some of the richest communities in the world, Newark struggles with the second highest levels of poverty and public assistance in New Jersey. In 1990, 26.3% of residents lived below the poverty line and 22% of households received some form of assistance, both approximately four times the state average. There exists wide local differentiation within the city; public assistance ranged from 10.1% in the Ironbound (largely Portuguese immigrant) section to 41% in the Central Ward (largely African-American). However, it is important to note that these represent residual but not worsening issues; between 1979 to 1989 median family income, while still below average overall, outpaced that of New Jersey and the United States with a 22% rise.[19]

As is the case in many other cities, Newark's unemployment levels remain above those found in local suburbs and throughout the nation as a whole, thus contributing to regional wealth disparities. During the early 1990s unemployment usually hovered around 13-14%. This largely resulted from the long term decline in private sector jobs, from 195.6 thousand in 1969 to 110.8 thousand in 1991, and from the fact that suburban commuters fill many of these remaining openings. Over time, employment in transportation (largely at Port Newark and Newark International Airport, home of Newark's largest employer Continental Airlines) and especially services increased, but declines in FIRE (Finance, Insurance and Real Estate), wholesale, retail, communications and especially industry, which fell 80% between 1953 and 1996, outweighed areas of growth until recently [20]

As too often occurs in urban America, poverty, unemployment, crime and drug abuse converge in Newark. While crime declined during the past few years, it remains a pressing concern in Newark. Known in the early 1990s as the car jacking and auto theft capital of the United States, the city took steps to curb violent and property crime. Yet despite some improvements, the related concerns of drugs and crime remain foremost in the minds of Newark's citizens with 31% and 27%, respectively, naming them as their primary quality of life problem. The blame for these concerns falls upon the municipal government, with 90% of

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[19] 1997 Overall Economic Development Program (OEDP). See. Newark in the 21st Century Directory of City Assets. ii-vi

[20] 1997 Overall Economic Development Program (OEDP), US Census Bureau statistics; New Jersey Department of Labor statistics. 1963/4 Master Plan for the City of Newark; 1977/8 Master Plan for the City of Newark. See: Newark in the 21st Century Directory of City Assets ii-vi

Newarkers rating drug control efforts as poor (71%) or only fair (19%), and 72% judging police protection as poor (29%) or only fair (43%).[21]

One of the most frequently cited resources for combating a community's problems, human capital develops first and foremost through education. The education of Newark's relatively young population (the average resident is three years younger than the US and five years younger than the state average) occurs in 58 public elementary, 13 junior and senior high, and 10 special schools, 40 private and parochial, 2 charter and 2 vocational schools.[22] Of these, the public schools – currently the subject of a state takeover due to poor performance – enroll the majority of students. In addition there are 5 colleges and universities with approximately 45,000 students, almost all of whom leave Newark after graduation.[23] This evidences itself in Newark's low educational attainment, with 8.5% of adults college and 27.5% high school graduates, as compared to the national averages of 21.3% and 77.6%, respectively. The percentage of Newark adults who did not even complete the ninth grade, 22%, stands more than double the national average, 10%.[24]

Newark stands out among the many central cities that serve as hubs for transportation systems that urban renewal often try to capitalize on as developmental advantages. Seven major highways converge about Newark, as do rail lines used by Amtrak, the PATH and New Jersey Transit; in addition New Jersey Transit's buses, along with those of Greyhound and others carry about 135,000 passengers a day around and from Newark. The main rail station, Pennsylvania Station, also a historic structure, can be seen above.[25] Two million yearly ride the Newark Subway, a partially below ground trolley, and the proposed Newark-Elizabeth light rail, also essentially a trolley, will offer local service to points within and between Newark and neighboring Elizabeth.

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[21] "Star-Ledger/Eagleton Poll on Perceptions of Newark, results compiled for Newark in the 21st Century " November 25, 1997
[22] US Census Bureau statistics, Newark in the 21st Century Directory of City Assets
[23] 1997 Overall Economic Development Program (OEDP). Newark in the 21st Century Directory of City Assets
[24] 1997 Overall Economic Development Program (OEDP), US Census Bureau statistics See Newark in the 21st Century Directory of City Assets ii-vi.
[25] Photograph courtesy Rush Young, www.rushyoung.com/metroview.

Newark International Airport, fifteen minutes from the downtown, saw 30 million passengers in 1997. Port Newark/Elizabeth, one of the nation's largest ports in terms of total tonnage and dollar value of freight, straddles the city line.[26]

With this variety of options, convenience and accessibility understandably rank as the attributes most often cited as Newark's best.[27] However, residents rely more upon public transportation than their suburban counterparts, using cars only half as much. Around one third use public transportation or walk to work, while 45% of those over the age of 18 drove a alone and the rest the rest carpooled. In 1990, 44% of Newark's households did not even possess a car, with African-Americans the least likely to have one.[28] The lack of car ownership, particularly among African-Americans, limits transportation options, in studies of other urban areas this appears to be a major factor behind low wages and high unemployment.[29]

Culture Industry

Besides a place to travel through, Newark also operates as a destination. Newark plays host to an impressive array of arts, humanities, entertainment and cultural resources. The New Jersey Performing Arts Center (NJPAC), the largest venue of its kind to open in the Northeast during the past 30 years, attracted over a half million visitors in its inaugural 1997 season (an enviable 82% of capacity). Even prior to this success, Rand McNally ranked the city as one of America's top ten cultural cities. Newark earns assessment with the breadth and quality of its cultural resources, comprising a 'hospitality and entertainment' industry that employed four thousand – four percent of private sector jobs – in 1995, excluding construction jobs and the then unopened Performing Arts Center.[30]

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[26] 1997 Overall Economic Development Program (OEDP), Newark in the 21st Century Directory of City Assets.
[27] Both were cited by 14% of respondents in: "Star-Ledger/Eagleton Poll on Perceptions of Newark, results compiled for Newark in the 21st Century " November 25, 1997.
[28] US Census Bureau statistics See Newark in the 21st Century Directory of City Assets, II-VI
[29] Referencing a study by labor economists Harry J Holzer, Keith R Ihlandfeldt and David L Sjoquist, William J Wilson wrote: "In addition to finding [lack of] automobile ownership among inner-city blacks contributed significantly to their lower wages and lower rate of employment, these authors also reported that African-Americans "spend more time traveling to work than whites," and "the time cost per mile traveled is...significantly higher for blacks," and that the resulting gains are relatively small. Overall, their results suggest that the amount of time and money spent in commuting, when compared with the actual income that accrues to inner-city blacks in low-skilled jobs in the suburbs, acts to discourage poor people from seeking employment far from their own neighborhoods." Wilson, William J When Work Disappears The World of the New Urban Poor Vintage Books: New York, 1997 41-42 See: Newark in the 21st Century Directory of City Assets II-VI
[30] 1997 Overall Economic Development Program (OEDP) See Newark in the 21st Century, Directory of City Assets II-VI

The New Jersey Performing Arts Center, pictured below, followed a decade long path to fruition.[31] First envisioned by a 1987 state report commissioned for then Governor Tom Kean, state grants and private contributions from corporations and foundations provided for most of its $180 million dollar price tag; NJPAC honored the two largest donors, Prudential Insurance and the Victoria Foundation, by naming its two main theaters after them. Following the conception of the Center by the state, a partnership of local residents and interested parties from outside the city coalesced to form the NJPAC as a non-profit corporation. They combined their knowledge and personal standing in the community to provide the funds, expertise and excitement necessary to move NJPAC along the development process.[32] Opened in 1997 to critical acclaim across the country, NJPAC gained immediate recognition as one of the finest arts centers in the nation, in terms of architecture, ease of access, community involvement and productions hosted.[33]

Three additional marquee institutions make Newark their home: the Newark Public Library, New Jersey's largest with 1.2 million volumes, 100,000 borrowers and 11 branches; the Newark Museum, which welcomes 350,000 visitors a year of whom about 62,000 are students; and the New Jersey Historical Society with its 50,000 items. In addition, Newark owns and operates the historic, acoustically exceptional 2,829 seat Symphony Hall, upon which renewal plans now focus after years of rudderless leadership.[34] Including Symphony Hall, the State and National Registers of Historic Places list 60 buildings in Newark; the James

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[31] Photograph courtesy Rush Young, www.rushyoung.com/metroview

[32] Robin Gaby Fisher, "Designing the dream that became NJPAC," *The Star-Ledger* October 25, 1998, Spotlight Section, 1. Valerie Sudol, "The people behind the PAC," *The Star-Ledger*, October 12, 1997; Spotlight Section, 9

[33] Ronald Smothers, "A Performing Arts Center Takes a Bow," *The New York Times* July 6, 1998, Section B, 1. Charles Strum, "NJPAC Is Almost Too Busy to Celebrate Successes," *The New York Times* September 20, 1998, Section 14NJ, 10., Lawson Taitte, "What can we learn from this? Newark performance center has lessons to teach Dallas," *The Dallas Morning News* December 14, 1997, Arts Section, 1C

[34] Robin Gaby Fisher & George E. Jordan, "While debts mount and officials blame NJPAC or each other, Symphony Hall is going to seed," *The Star-Ledger*, February 22, 1998, News Section, 1, George E. Jordan, "Troubled Symphony Hall boots its director," *The Star-Ledger* October 23, 1998, County Section, 35, Peggy McGlone, "Panel to follow up on arts conference in Newark," *The Star-Ledger* October 31, 1998, Today Section, 35

Street Commons Historic District covers twenty blocks and the Regional Plan Association envisions a 'new' Lincoln Park Historic District near Symphony Hall. In addition, Newark contains the two oldest county parks in the nation, Weequahic and Branch Brook, along with two other county and thirty-five city parks and recreational facilities.

Several annual celebrations take place in Newark including a jazz festival and a cherry blossom festival, along with new events such as a year long 'world festival,' centered on NJPAC.[35] A number of new projects currently underway, including the environmental and physical restoration of the Passaic Riverfront which includes businesses as well as cultural facilities and parks, and a minor league baseball stadium represent a rising tide of activity in the city. Current lobbying for a downtown home for the New Jersey Nets and possibly the Devils looks to extend this trend. Yet despite appearances, large projects do not comprise the total of Newark's arts scene. Smaller groups and organizations work in arts education, the performing and visual arts; some of these also help artists acquire housing and workspace in the city. In addition, fourteen hotels, two in the downtown area with a third under consideration, provide support for cultural activities in the city. Newark's acclaimed ethnic restaurants, featuring Italian, Portuguese, Spanish and Soul Food, round out the picture.[36]

A number of planning and support organizations fill important roles in Newark's cultural life. Many of Newark's arts and cultural resources participate in the Newark Arts Council, an umbrella organization that among other things provides assistance to members and recently began promotional efforts outside the city. The Regional Plan Association (RPA) works to coordinate planning in a 31 county New York/New Jersey/Connecticut area, with the Newark division currently developing plans for the Lincoln Park Historic and Arts District around Symphony Hall and the Newark-Elizabeth light rail terminus. Connection-Newark, a non-profit group, helped initiate a bus service, the Loop, which visits cultural attractions, increased the number and clarity of signage, renovated Military Park near NJPAC and currently participates in ongoing streetscape enhancements. The picture above displays one of the new Loop signs with Washington Park,

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[35] The first world festival featured Portuguese culture, with the next one to focus on "Pan-African influence in the Americas." Tucker, "Report to the Community Inaugural Season 1997-98 " New Jersey Performing Arts Center Newark, 1998, "Singing and Dancing the Praises of Portuguese Culture Around the World." *The New York Times*. March 29, 1998; Section 14NJ, 12, Reginald Roberts, "Youth fund-raiser uses ducks to draw donors " *The Star-Ledger*. August 21, 1998, County News Section, 31

[36] 1997 Overall Economic Development Program (OEDP), Newark in the 21st Century Directory of City Assets See Newark in the 21st Century Directory of City Assets ii-vi.

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which both the Newark Museum and the Public Library front, in the background.[37] Other groups at work include Newark in the 21st Century, a think-tank partnership of community leaders that seeks to articulate a vision for the city's future, and the recently created New Newark Foundation, a non-profit developing land near NJPAC into an artist community.[38]

Emblematic of other urban centers, Newark's current condition defies trite summarization. In the past decade the mayor of Memphis derided it as a national symbol of decay, while the US Conference of Mayor's granted Newark a first-place livable city award, it also gained an All-American City award for its advancements. Rated both the third worst city to raise a child, and one of the best to enjoy the arts, an understanding of renewal efforts in Newark, as elsewhere, derives from an acknowledgement of its dualistic nature. [39]

The Marketing Machine & Newark

Image, Morale & Quality of Life Problems

The marketing machine's impetus derives from the state of the central city, its low standards of living, sense of despair and fearsome reputation. These problems perpetuate a host of other more visible problems such as unemployment and segregation. The marketing machine evolves out of the rejection of the notion that on its own a growth machine can buy a city's way to revival. The marketing approach utilizes arts and culture to address concerns under-served by development models. These cultural resources leverage further gains, initiating a positive cycle of improvement; "place promotion has sought to rebuild and

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[37] Photograph courtesy: Rush Young, www rushyoung com/metroview.
[38] Newark in the 21st Century. Directory of City Assets
[39] "Newark mayor challenges version of city woes by Dixie counterpart " *The Star-Ledger* October 6. 1993, News Section, J Scott Orr. "Report: Newark third-worst city for raising kids." *The Star-Ledger* August 26, 1997; New Jersey Section. 17

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reconstruct the image of the city, allied to which has been a strategy of targeting specific types of activity which both reflect and bolster the image."[40] The importance of such a cycle reflects in the observation that a marketing "campaign can be part of turning around a city's image, but the city has to be truly turning around for it to work."[41] Localities such as varied as Glasgow, San Antonio and Baltimore benefited from similar self-reinforcing systems, where more visitors and venues leveraged further improvements in the city and its image, which began the cycle again. [42] This approach differs markedly from the quantitatively driven growth machine in which individual projects, and the interests of neighborhoods and the city as whole often come into conflict

Newark's modern persona dates to the 'disturbances,' race riots, of 1967 The enmity and damage caused by the civil disorder, the reputation it secured and the flight of jobs and citizenry it accelerated, endured to haunt the city's development based attempts at revival. In 1993 Memphis, Tennessee Mayor W.W. Herenton labeled Newark an "ugly reality," using this history as a warning to local constituents concerning the dangers 'white flight;' his remarks demonstrate the extent of Newark's soiled reputation.[43] In a 1997 survey New Jerseyans essentially agreed with Mayor Herndon's assessment when they chose dump/slum (16%), crime (11%) and unsafe/scary (8%) as the top words to describe Newark. Newark's residents outdid even this, choosing dump/slum (18%), crime (16%), terrible/horrible (16%) and unsafe/scary (15%). (Tellingly, a significant minority, 32%, of Newark residents rated the city excellent, 6%, or good, 26% while only 10% of statewide did the same.) State residents judged Newark by its reputation and their own visits, most of which took place in business settings. Local residents based their assessment on quality of life complaints, leading the list of which were drugs (31%) and crime (27%). Over half of all residents rated the city as only fair or poor in regards to quality of life issues such as raising a family (82% negative), finding a job (68%), cost of living (62%) and attending school (57%).[44] Polling data such as this, along with the

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[40] Paddison, "City Marketing, Image Reconstruction and Urban Regeneration." 340.
[41] Ellen Simon, "Cities use ads to sell new images " *The Star-Ledger*. May 17, 1998. Business Section, 1, "A New Newark?" *The Star Ledger* July 9, 1991 Editorial.
[42] This cyclical approach can be seen in cities such as Glasgow, where "The major contribution of the arts to this regeneration process has been their harnessing to the development of the tourist industry strategy formulated by the GDC [Glasgow District Council] and GGTB [Greater Glasgow Tourist Board] Glasgow's existing "high" tourist assets, such as the Scottish Opera, Ballet and Orchestra, together with the BBC Scottish Symphony and Citizens theatre were marketed in a vigorous campaign and were added to with the opening of the Burrell Collection, and continued development of Mayfest, the annual arts festival." Wynne ed. The Culture Industry The arts in urban regeneration 91; Judd & Swanstrom. City Politics: Private Power and Public Policy 367, John L Kriken. "The Arts and City Livability " American Council for the Arts (ACA) The Arts and City Planning. ACA Publications: New York, 1980. 4-5.
[43] "Newark mayor challenges version of city woes by Dixie counterpart." *The Star-Ledger* October 6, 1993; News Section
[44] "Star-Ledger/Eagleton Poll on Perceptions of Newark results compiled for Newark in the 21st Century " November 25, 1997

'votes' of those tends of thousands of residents and jobs that have left, demonstrates that Newark suffers from a self-feeding cycle of despair typical of many urban areas. The marketing machine addresses these image and quality of life problems as such, rather than as offshoots of underdevelopment as the growth machine does.

Material Improvements

Half of the 'marketing machine' approach rests upon material improvements in a city's quality of life. These lie outside the bounds of traditional development policies because they do not primarily advance business interests, spawn profit or increase the tax base. The $180 million New Jersey Performing Arts Center (NJPAC), first proposed in 1986 and opened in October of 1997 demonstrates the difference between marketing and development policies.

To begin with, the construction of the Center brought physical improvement to the urban landscape, replacing an eyesore with an impressive signature building that serves as the city's ambassador abroad and rallying point at home. The existing James Street Commons Historic District and the proposed Lincoln Park Historic District; the increased marketing of the city's parks, historic sites, cultural amenities and architecturally significant buildings; and the Passaic River Waterfront restoration all speak to the same impulse. Without directly effecting growth, the quality of the urban environment in which people live and work enhances life. The concern for physical change's impact upon society contrasts sharply with developmental policies that place form far behind function.[45]

Existing arts groups go beyond buildings to promote artistic education, especially among the young. In Newark their contribution supplements the efforts of NJPAC, an exceptional $180 million teaching tool.[46] Prior to NJPAC's opening, "a group of educators, performing artists, social service coordinators and community activists [was] assembled to plan the educational and community programming for the arts center;" a similar group's inclusion with a new corporate campus, financial center or highway extension would draw astonishment. Academically termed social capital improvement, in common parlance the arts

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[45] Kunstler, James H. The Geography of Nowhere: The Rise and Decline of America's Man-Made Landscape. Touchstone Books: New York. 1994

[46] Fatima Morais, a bilingual teacher in Newark, who served on the educational planning group said of NJPAC, "It's a great tool. As a teacher, we need something that makes our job easier, not harder." Rudy Larini, "Many city residents see arts center as beacon of hope." *The Star-Ledger* October 24, 1993. News Section, Front

simply materially improve life. In the words of Carolyn Dorfman, the artistic director of her own dance company and a member of the panel, NJPAC seeks to become "a catalyst to reach out into the community and see how we can impact not only ourselves [members of the arts community], but everyone else."[47] The mission of the arts inherently covers mental enlivenment, while in contrast growth policies do not.

Cultural resources provide entertainment and leisure activities that add to the enjoyment of life in ways that an office complex cannot. NJPAC serves to exemplify this tendency towards providing for the public good. Despite its ties to suburban audiences, it offers extensive programs of interest to a wide variety of audiences within the city and the immediate vicinity.[48] Prior to NJPAC's opening, 76% of Essex County residents felt it very or somewhat likely that they would attend a performance. Notably, against claims of 'elitism' the poll found that 92% of the county's African-Americans planned to attend NJPAC and a full 60% of households making under $15,000 a year wanted to make use of the Center.[49] This enthusiasm translated into participation during NJPAC's first season. During 1997-98, 30% of patrons originated in Essex county - 20% of the county's total population. Also, 26% of NJPAC audience members hailed from minority backgrounds, including 17% African-American, which represents a far more diverse audience than is typical for such venues.[50]

Arts jobs also provide material benefits to the quality of life in the city in the form investment and employment. However, the methods and extent of this influence differs markedly from the growth machine. During construction and renovation, arts venues, parks and infrastructure all contribute temporary jobs. Due in part to the importance of image and public approval, to the arts, geographic and ethnic equity draws far more interest from the marketing machine than from the growth machine. For example to address the key issue of minority employment NJPAC hired an affirmative action consultant, Gus Heningburg. His work and the commitment of NJPAC, symbolized in the listing of his name on a plague around the rotunda along with

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[47] *Ibid*
[48] Tucker, "Report to the Community: Inaugural Season 1997-98," Allison Freeman, "New arts center strikes suburban-urban chord " *The Star-Ledger*, June 3, 1997.
[49] "Star-Ledger/Eagleton Poll on Perceptions of Newark' results compiled for Newark in the 21st Century " November 25, 1997
[50] Tucker, "Report to the Community' Inaugural Season 1997-98;"; DiMaggio, Paul & Ostrower, Francie Race, Ethnicity and Participation in the Arts Participation in the Arts: Patterns of Participation by Hispanics, Whites, and African-Americans in Selected Activities from the 1982 and 1985 Surveys of Public Participation in the Arts Seven Lock Press' Washington DC, 1992. Research Division Report #25, National Endowment for the Arts

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"the names of governors [and] million-dollar-plus donors," meant that minorities filled 39% of construction worker hours and 32% of contracts.[51]

The arts already accounted for 4,000 jobs in Newark prior to NJPAC, and on its own the Center adds little although estimates of spill over hiring run potentially into the thousands. More important than even this one venue, cultural employment offers a new, small but stable and energetic foundation. To this end, the New Newark Foundation and the Regional Plan Association aim to create artist communities, with resident artists who need not work only in Newark but might also take advantage of opportunities in nearby New York. Jobs and the money brought into the city by the arts, in part due to the non-profit nature of the industry, only economically aid a few while they psychologically touch all residents. Unemployment cannot be ended with cultural urban renewal, but the cultural agenda does provide the city with a base of active and employed citizens, not just growing 'X' amount of jobs.[52] Burton Eichler, chairman of the New Newark Foundation alluded to the distinctions between traditional development and cultural renewal when he said that: "We want to put this area to the highest and best use, and that's not necessarily the best use for commercial development. Nothing has been finalized. We're going to talk to city officials, community leaders. ...We're prepared to move quite quickly."[53] Besides the obvious, ensuring employment to residents through cultural urban renewal, employment provides the people of the city with a sense of ownership and participation, as opposed to the disconnect felt over the daily workings of a downtown office complex.

Material cultural renewal leverages further improvements in the arts, enhancing a positive feedback loop. A venue such as NJPAC provides a level of recognition and talent upon which local arts groups build. For example, seven of NJPAC's 'ten artistic affiliates' charged to "create commissioned productions, conduct artistic residency programs and participate in arts education projects" hail from New Jersey.[54] The Newark Museum, Symphony Hall, WBGO – a local National Public Radio affiliate – and the world and jazz festivals all offer similar avenues for further cultural gains. Infrastructure and streetscape improvements follow cultural urban renewal because of its leveraging effect. Renovations of Military Park and the parking garage below

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[51] Ronald Smothers, "Where Affirmative Action Ranks in Importance With the Architecture." *The New York Times* October 17, 1997, Section B, 4

[52] 1997 Overall Economic Development Program (OEDP).

[53] George E. Jordan, "New Newark's new look." *The Star-Ledger*. September 17, 1998, News Section, 1

[54] Valerie Sudol , "NJPAC gets major boost of creativity." *The Star-Ledger*. February 25, 1997

it, increased signage in the city and on nearby highways, a new highway off-ramp and the nascent creation of an artists district all came to pass in large part due to NJPAC. The experience of the nearby Gateway complex, which achieved only minor, local changes in the built environment, contrasts with NJPAC; growth policies focus inward upon themselves and their relationship and effect on the city as a whole reflects this. Leverage, not the growth derived multiplier effect, explains NJPAC's success Efforts to replicate and expand upon this process now focus upon Newark's remaining historic infrastructure and Symphony Hall as well as a proposed sports center.

Image & Morale Improvements

Traditional development theory avoids directly addressing the stigma of the inner city. Arts based urban renewal under the marketing machine intentionally and directly improves the city's reputation abroad and the morale of its residents at home. As much as it does anything else, a cultural center defines a positive sense of place; Lawrence Goldman, president and chief executive of NJPAC adheres to this concept: "One primary goal of [NJPAC's] design was to make a statement that cities can be wonderful places - positive, fun, energetic and exciting."[55] A marketing strategy facilitates a turnaround in perception through a variety of means, many of which build upon the material improvements mentioned above.

The arts 'put the city on the map.' NJPAC operates as a landmark for the city and the state, providing an ambassador to the outside world and a positive lens through which others view the city. The distinctive curved brick and glass architecture, inspired by the industrial past of the city and decorated inside with West African inspired designs, together with the intentional use of the Center's picture on marketing material, provides Newark with a signature complex, "a focal point for a sense of citizenship, a participatory public ownership."[56] Lawrence Goldman stated one of the goals of the design was "to give Newark and the state a signature icon, like the Eiffel Tower or the Sydney Opera House. At Newark Airport, you can buy postcards

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[55] Valerie Sudol, "Newark's new arts complex takes Center Stage " *The Star-Ledger* November 10, 1996 Spotlight Section, 1.

[56] Such an institution, updated for the late 20th century as NJPAC has been, also can occupy an important place in the public consciousness "Those municipal buildings and institutions crucial to the creation of a civic identity in the 19th and early 20th century – the museum, the Gallery, the Library, the Orchestra, the imposing town hall – all these established a focal point for a sense of citizenship, a participatory public ownership There is no doubt that social, economic, political and cultural changes have meant that this sense of citizenship needs new forms to express itself and participate within, new foci are necessary." Justin O'Connor, "Local government and cultural policy " Derek Wynne ed. The Culture Industry: The arts in urban regeneration 63

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of the Empire State Building or the Statue of Liberty, but there's nothing like that to identify with New Jersey."[57] Yet unlike the isolated complexes of the 1960s, for example the Kennedy Center, reviewers noted positively the lack of an 'icon' in NJPAC, the structure does not obtrusively stand apart from the rest of the city – its architecture and materials echo, embody and enhance, rather than contrast, the city.[58] In this sense NJPAC mirrors other similar projects recently completed in the United States, such as those featured with it in the exhibition "Building Culture Downtown" at the National Building Museum. The balancing of distinction and accessibility provides the city with a commodity that markets the city and not just itself; failed projects such as St. Louis' Powell Symphony Hall proves through its failure the importance of integration into a host city.[59] Business developments do not focus on creating an identity akin to that present in cultural projects; skylines, while unintended calling cards, speak from a cold distance an arts center such as NJPAC operates at the street level.

The arts provide Newark with an image that anchors the marketing of the city to outsiders. In Baltimore and Glasgow, cultural attractions provided the copy to advertise the story of their rebound. Improved media presence occurs in three ways: through explicitly advertising, through coverage of the arts role in urban renewal and through continuous coverage of events. In its initial efforts, NJPAC spent half a million dollars advertising itself and the city of Newark to residents within a twenty five mile radius. It sent hundreds of thousands of mailings and ran advertisements on radio stations and in newspapers.[60] Media outlets in the region and eventually around the country picked up on the center at first as a curiosity, then as an 'urban interest' story, and finally as a potential model for urban renewal.[61] As time goes on, coverage and reviews of festivals, galas, concerts and performances leads to a steady drumbeat that presents a proud image of the city that is antithetical to the stereotype of the inner city. The marketing machine promotes the advertising of the city as a principal strategy of renewal, a promotion meant "to educate our residents and

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[57] Valerie Sudol, "Newark's new arts complex takes Center Stage ".
[58] Dan Bischoff, "Designers create not a monument to art but a 'standing invitation' to enjoy it." *The Star-Ledger* October 12, 1997
[59] In St Louis, poor planning meant that "symphony-goers didn't really do much for their neighborhood They drove there once, twice, three times a week, parked, went to the concert, got back in their cars and left. They didn't even stay for dinner. The result was a fabulous hall which remained an island In retrospect, what is strange is that we did not better involve the city in safeguarding an investment. Nor did the city have the sense to build on the asset that we had created " Michael Newton, "What Arts Organizations and Artists Can Offer City Planning " The Arts and City Planning 10
[60] Glenn Collings, "Clearing up an urban misperception to attract audiences to a new performing arts center " *The New York Times* October 24, 1997 Section D, 9
[61] Tucker, "Report to the Community Inaugural Season 1997-98 "

neighbors about all the cultural venues and sights of Newark community...[Newark's] citizens need to be educated about the tremendous success stories in our community."[62]

The continuance of positive coverage good coverage depends upon the existence of programs, and ideally user-friendly structures, that bring 'animation' to the city. The presence of visitors in an urban center on the weekend and in the evening provides a critical mass of activity that impresses visitors and residents alike Cultural districts draw people and facilitate their movement and entertainment. Sandra Hillman, then head of Baltimore's Office of Promotion and Tourism, described this process in Harborplace:

"So we began creating animation - creating happenings, turning the city on to itself, using public programming as a means of bringing people back downtown again. We did it initially for one real reason - school spirit. What we wanted Baltimorians to do was begin to feel good about themselves, so that then they would feel good about their city. And we did it in these brand new public spaces."[63]

This animation provides an image and environment that fosters urban revitalization; as famously observed by Frederic Paper, president of the 42nd Street Development Corporation: "We find that actors' walking around the streets, theater activities in general, give off good vibrations; they make an area more renewable. If cement factories did that, we would be putting them in."[64] Institutions such as NJPAC and the Newark Museum, local universities, periodic festivals and sports teams draw in individuals at different times of the day and year and through such complimentary action provide an create a consistent atmosphere of activity Though brief in duration, a festival exercises enormous impact because "while it is happening, a festival is powerful because it animates all the senses - sight, sound, smell, taste, color, and movement. The emotional response that results has a lasting effect on how the participants feel about the places and people of their city;" A festival atmosphere can help draw in more people, leveraging further animation. This occurred in Baltimore where a study found that 54% of visiting shoppers came for festivals or because they conceived of Baltimore

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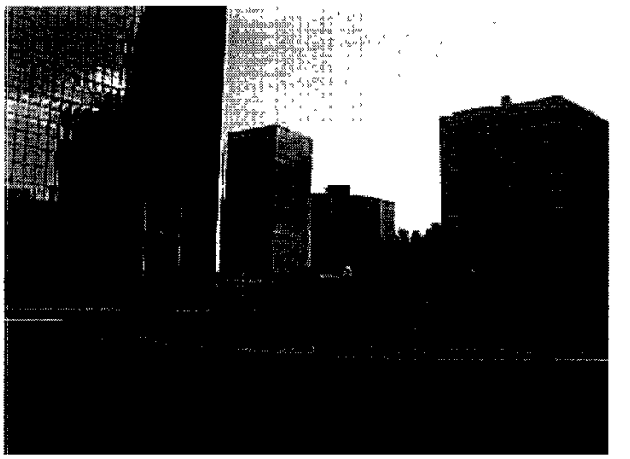
[62] Business Administrator Glenn Grant cited in George E Jordan, "Mayor plans media campaign to improve Newark's image " *The Star-Ledger* January, 14, 1998, New Jersey Section, 23 See also Glenn Collins, "Clearing up an urban misperception to attract audiences to a new performing arts center " *The New York Times* October 24, 1997, Section D, 9:

[63] Sandra Hillman, "Leveraging prosperity in Baltimore." in Green ed The City as a Stage Strategies for the Arts in Urban Economics 98

[64] George Clack, "Footlight Districts." Green ed. The City as a Stage. Strategies for the Arts in Urban Economics 13

as a "festival city" [65] Plans to improve the cityscape of Newark and make it more pedestrian friendly further facilitate this critical enlivenment.[66] Traditional growth policies are little concerned with this kind of visible density, and instead seek to create a captured audience within a downtown mall, convention center or office tower. No better embodiment of this alternate 'ideal' exists than the Gateway complex of office buildings in Newark, featuring self enclosed 'pedestrian skyways' among other things, to prevent interaction with the outside environment. Part of this complex is pictured above, seen in the middle with a similarly unfriendly office building, belonging to the utility company PSE&G, in the foreground at left.[67]



"By moving to separate suburban jurisdictions, wealthy Americans have severed not only the social but the political ties that connect them with the rest of society. Geographical mobility has become a way of opting out of a metropolitan community that forces citizens to recognize reciprocal rights and responsibilities;" the stereotype of the inner city as an alien wasteland of decay reinforces this disconnect through a lack of personal contact or realistic media coverage.[68] Major arts facilities such as NJPAC also substantively challenge the interaction deficit between suburbia and the inner city. Bringing in suburbanites provides a visual display of animation. The presence of suburban visitors provides a counterweight to non-factual myths, and it proves to the value of their home to the community at large. In Newark, NJPAC builds upon the Newark Museum, Ironbound restaurants and area universities that for years drew individuals into the city. As evident below in a photograph of Ferry Street in the Ironbound, Newark varies enormously,

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[65] Sandra Hillman, "Leveraging prosperity in Baltimore," Karin Bacon, "The rhythm of city life " Green ed The City as a Stage: Strategies for the Arts in Urban Economics 104

[66] George E. Jordan, "City council considers surcharge for Newark 'improvement district'." *The Star-Ledger*. September 2, 1998, News Section, 43

[67] Photograph courtesy Rush Young, www rushyoung com/metroview.

[68] Judd & Swanstrom City Politics Private Power and Public Policy 425

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containing some pedestrian friendly neighborhoods that facilitate the interaction.[69] Growth policies fail to provide the visitors they attract with meaningful exposure to life in the city, as they emphasize antisocial spaces and activities.

The existence and creation of a 'happening' public realm presents a needed contrast for a city as beleaguered as Newark. The story and the process of a city's rebirth alters the tone of presentation in the media. The marketing machine also presents outsiders and residents with an alternative vision, one in which the city defines itself rather than allowing external factors to do so for it. Necessity dictates that the arts and cultural districts utilize the 'city as a stage' because their prospects are linked. This differs from growth programs that can isolate themselves from the rest of the city.

Even though an improvement in city standing and quality of life may enhance growth prospects, that is not the primary, proximate objective of the marketing machine A business park, with undisputed growth credentials, might improve local morale or the city's image in outlying areas but that does not negate the centrality of development in the promotion of the project. Similarly, a concert hall might spark local development and encourage people to move themselves and their businesses to the city, but that should not overshadow the marketing machine's influence. Cities already know how to create growth and development – the revival of downtown areas and the luring of convention centers, office towers and white collar workers demonstrates this fact. The growth machine cannot, however, adequately address the stigma of the inner city and the division between suburban and urban.. A different method of approach, cultural renewal, deals with issues pure development policies cannot.

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[69] Photograph courtesy. Rush Young, www.rushyoung com/metroview

Regional Dimension

In addressing issues of power and policy, urban studies literature increasingly considers the dynamic between the city and surrounding areas. Federalist theories of urban politics and anti-sprawl New Urbanists both approach the city with these regional, urban-suburban linkages in mind. Due to its ties to suburban and urban residents, policies and resources, an understanding of the marketing machine must place it within this regional framework.

As mentioned previously, Newark hemorrhaged citizens and jobs over the course of decades, with rates of attrition only leveling off recently. Yet as elsewhere in America's cities, the specter of flight still hangs over the Newark; 58% of residents want to leave the city (72% of European-Americans, 53% of African-Americans and 58% of Hispanic-Americans, a majority of all races).[70] Like many other cities, this has transformed Newark into a disregarded island of despair in a sea of success. In a 1997 poll, only 36% percent of New Jersey residents thought their state had a major city center of commerce and culture, and while 37% of those who did think such a city existed named Newark (the most populous city in the state and as of 1990 the 62nd largest in the country) that represented only 12% of total state residents.[71] The city lost the standing to effect regional developments at the same point when those developments most harmed the city. Development policies seek to grow or at least maintain the economic base of a city as a whole, but wealth and power inequalities between suburbs and cities, commuting and resident employees remain largely unaffected. Cultural urban renewal deals with these regional aspects of the urban malaise by integrating the city – its population, life, leadership and economy – with the suburbs.

The most recent, storied and so far successful of Newark's cultural venues, the New Jersey Performing Arts Center greatly enhanced Newark's position as a regional center Exceptional but not unique, such venues often form the cornerstone of a marketing machine. Visitors and tourists provide the basis for cultural industries. Major art centers depend upon their patronage; even Lincoln Center, a world renowned venue in the nation's largest and most arts friendly city, relies upon commuting arts lovers from outside

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[70] "Star-Ledger/Eagleton Poll on Perceptions of Newark' results compiled for Newark in the 21st Century." November 25, 1997
[71] *Ibid* , US Census Bureau statistics.

Manhattan for most of its audience. Yet, depending upon non-urban areas, major cultural venues still only survive in cities:

"...most art institutions are economically viable only in places where the local arts audience is big enough to support them, and basically that means in cities or metropolitan areas that are sufficiently large. ...Painters, composers, and playwrights may live anywhere they like, but the economics of live performance as well as gallery and museum display dictate that their output will be seen for the most part in cities."[72]

NJPAC officials stated that one of the key measures of success would be ticket-purchases by suburban resident; this recognized both the dual need to cultivate a suburban audience in order to fill seats as well as overcome the urban-suburban socialization divide.[73] During the first season, NJPAC experienced great success in attracting suburban residents into a city that many previously avoided.[74] This both improved the city's image and created a link of experiences between urban and suburban residents. Through the frequenting of NJPAC individuals share experiences previously undertaken in separate communities. Growth policies attract daytime workers who labor mostly together, in an isolated world largely devoid of community building activities.

Regional Infrastructure

Besides encouraging a regional community interest, cultural activities precipitate infrastructure links between the city and outlying areas. The existence of NJPAC, and other cultural venues such as the Newark Museum, the universities and the Ironbound District, argues for improved physical links with the suburbs. In addition to encouraging the increased utilization of existing links, cultural resources leverage new improvements, some previously planned, others not, that facilitate a two-way link between city and

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[72] Heilburn, James & Gray, Charles M The economics of art and culture: An American perspective Cambridge University Press New York, 1993 302

[73] Valerie Sudol, "Suburbanites, city-dwellers sign up for NJPAC debut season." *The Star-Ledger* June 8, 1997

[74] "NJPAC attracted more than 500,000 patrons, approximately 82% of capacity and 8 points above projections Audiences are coming from throughout New Jersey and the metropolitan area, with significant numbers from 13 of New Jersey's 21 counties Essex County, 29 9%, Union County, 12 7%, Bergen County, 10 8%; Morris County, 10 7%; Middlesex County, 6 7%, Hudson County, 5 3%, Passaic County, 4 5%, Somerset County, 4.4%, Monmouth County, 3.9%, Mercer County, 1 3%, Hunterdon County, 1 3%, Sussex County, 1 1%; Warren County, 0 5%, Other Locations/Out of State, 6.1%." Tucker, "Report to the Community: Inaugural Season 1997-98 "

surrounding areas.[75] Commonly transportation construction attempts to ease movement into and within the city. In Newark's case, lobbyists used NJPAC to justify placing Newark back on New Jersey highway and interstate signs, and to build a new, easier on-off ramp placed into the downtown area. These both boosted the city's image while enticing visitors with greater convenience [76]A non-profit group, Connection-Newark, worked with NJPAC and other bodies to improve street signage within the city, adding bright purple signs listing key attractions. The group also created the Loop cultural bus. Other projects, such as rail construction, that exist outside the arts benefit from the increased attention.

While developmental policies also increase infrastructure use and creation, there are some subtle differences that should be noted. Movement around the city and into the downtown may be made relatively easy by growth policies alone. However, connections within the city, outside the downtown, and the convenience of those links for novice visitors tend to come up lacking. Cultural renewal promotes projects that improve travel of non-commuting suburban residents into and out of Newark. These improvements also make Newark a more attractive place to live by building upon the accessibility and convenience that residents already cite as the best aspect of the city.[77] Moreover, physical infrastructure links increase the ability of residents to take advantages of employment opportunities available in the suburbs. As discussed earlier, Newark suffers from a problem not uncommon in other inner cities, especially among African-Americans. In a private transportation, car centered world, Newark residents remained dependent upon a mixture of public and private transportation. This negatively impacts Newarkers' quality of life, job opportunities and status as full citizens of the region. The increased awareness and availability of public transportation – buses, light rail and rail – and the regional growth of services to suburban stations allows for more two-directional, although by no means yet equal, movement between the urban and the suburban.

The leadership behind many cultural renewal projects, like the money that finances them, tends to represent a regional alliance of interests. The importance of state level officials in the formation of NJPAC

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[75] The most common reason cited by New Jersey residents for visiting Newark was for business related activities. "Star-Ledger/Eagleton Poll on Perceptions of Newark: results compiled for Newark in the 21st Century." November 25, 1997

[76] The difficulty of navigating one's way by car into Newark's downtown is legendary, as captured in an editorial praising the state's decision to increase the number of and improve the clarity of signs on major roads. Kenneth Lobb. "Sign problems make driving in Jersey a lost cause." *The Star-Ledger* December 5, 1997, Editorial, 28

[77] Chosen by 14% each: "Star-Ledger/Eagleton Poll on Perceptions of Newark: results compiled for Newark in the 21st Century." November 25, 1997

first demonstrated the regional pattern of leadership; Governor Thomas Kean (R) originated the drive for the New Jersey Performing Arts Center in 1987, Governor James Florio (D) moved it along despite steep budget cuts in the arts, and current Governor Christine Whitman (R) saw it to fruition.[78] Newark Mayor Sharpe James (D) serves as a local booster, providing support for arts projects, but arguably in this marketing machine, the involvement of the governors overrode in importance any decisions the mayor made.

In addition to public officials, a small group of business figures, non-profit heads and philanthropists with suburban ties provide cultural renewal with linchpin direction. The composition of this elite group includes a broader array of backgrounds and residencies than that found in development coalitions. Those who with ties both to Newark and the suburbs populate a number of important positions.[79] Individuals serving in various formal and informal capacities bring a regional perspective to cultural development in Newark. Perhaps the most exemplary, but certainly not the only, of these, a businessman turned philanthropist named Raymond Chambers founded the Amelior Foundation which invests in Newark, serves as co-chairman of NJPAC, backed the study group Renaissance Newark; bankrolled the New Newark Foundation plans for an arts district near NJPAC and co-purchased the NBA New Jersey Nets with the stated intention of relocating the team to the city. Chambers grew up in Newark, settled in nearby suburban Morris County, became a multimillionaire, then retired and subsequently devoted himself to helping his former hometown and its citizens.[80] His experience, while unique in degree, generally mirror that of other individuals involved in Newark's cultural development; he works out of a love for and familiarity with the city from the position of a regional citizen.[81] His motivations would seem nonsensical from a developmental perspective, as his efforts have undoubtedly 'cost' him money. Consequently they fit perfectly within the marketing machine.

As is too often the case, Newark's problems devolve from regional, largely urban-suburban, disparities. This disconnect between the city and the suburbs also embodies a political divide, with the

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[78] For a brief overview of the people behind NJPAC and its relatively non-partisan backing see. Valerie Sudol. "The people behind the PAC." *The Star-Ledger* October 12, 1997; Spotlight Section, 9.
[79] For example see: Newark in the 21st Century, "Newark in the 21st Century Task Force Members " Newark, September 1998 (unpublished), Tucker, "Report to the Community: Inaugural Season 1997-98 "
[80] Judith Miller, "Raymond G Chambers A self-made man takes on Newark," *The New York Times* October 14, 1997, Section B, 1
[81] Judith Miller, "A Self-Made Man Takes On Newark, Shy Philanthropist Gives His Time And Money to New Arts Center " *The New York Times* October 14, 1997 Section B, Front

resources needed to address urban areas lie frequently beyond their reach.[82] The regional nature of the marketing machine addresses these issues from two different, mutually reinforcing angles. First, using partnerships, it draws upon resources unavailable to growth machine politicians because they lie outside their political purview and interest. Second, the regional scope of the marketing machine facilitates greater interaction between the urban and the suburban; this increases the relative importance and standing of the city in surrounding areas, making future interaction, investment and cooperation easier.

Questions of Legitimacy & Priorities

Academics ask 'who governs?,' 'who leads?,' and 'for what?' as much to ascertain democratic legitimacy as to understand urban power structures. With cultural renewal, a small group of 'movers and shakers' lead the way and make key decisions. The evidence suggests that this leadership group, despite its elitist appearances, does not fit within the growth paradigm of self-interest. Rather, because of its broader experience, background and differences in motivation this leadership operates with civic, not personal benefit as its primary motivation. However, no matter how altruistic, the 'right' of an elite group to exercise influence and the accuracy of its judgement both naturally come into question. A lack of formal leadership also creates at least the image of a power vacuum, with some figures leading individual programs but the totality of the process still appearing beyond any direct control. This arrangement differs from a growth machine in which policies and projects tend to be linked with specific business and city interests, and formal structures of government such as a Chamber of Commerce or a Department of Development institutionalize policy implementation. Institutionalizing cultural renewal involves a strategic planning process that includes "an involvement with the people in order to insure the plurality of expression so crucial to making the arts of the people."[83] Without such structure, no "plurality of expression" forms. The basis of renewal itself, cultural activities, becomes the fodder for caricatures by critics as elitist – beneficial more to wealthy suburbanites and unrelated to pressing urban issues. However, in response it appears that as time goes on cultural renewal does

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[82] This is especially though not uniquely true in tiny Newark, which by occupying the smallest amount of land of America's 100 most populous cities has seen independent outlying communities flourish that in other cities would have been incorporated as productive boroughs or wards. See Jackson, Kenneth T. Crabgrass Frontier: The Suburbanization of the United States. Oxford University Press: New York, 1985. Chapter 8.

[83] R. Gene Brooks, "Arts Amenities in Comprehensive Plans," The Arts and City Planning, 41.

tend to right itself, becoming increasingly centrally planned, democratically responsible and aware of its own limits. While the growth regime remains static and stable over time, the marketing regime faces challenges to its viability and evolves over time.

Leadership figures in the marketing machine tend to fall within three broad groupings. Government officials comprise the first of these. Elected representatives, particularly mayors, potentially direct cultural urban renewal. The experience of cities such as Baltimore demonstrates this, and the absence of a formal role for Newark's mayor in part explains the lack of a unified approach there. Under the marketing machine bureaucrats possesses far fewer opportunities to positively influence policy than under the growth machine, though they can negatively influence cultural renewal by not accommodating its needs. The second group consists of those with corporate experience, either past or present; this includes among others regionally focused full time philanthropists and heads of arts organizations who rose through the business world. While similar individuals operate under the growth machine, motivations and means of interaction determine that their actions differ under the marketing regime. In Newark as elsewhere, these individuals live largely outside the core area and generally experience the city through work or past residency. They might contribute through non-profit board membership, by partnering (contributing) business resources with cultural venues or by using their personal connections to initiate and sustain a marketing machine alliance. Heads of non-profit, planning and cultural organizations with largely public sector, non-profit and/or arts affiliated experience make up the third group of marketing machine leaders. These individuals reside closer to, although not necessarily within, the core area, than the second group. This group in particular has no real equivalent in the growth machine, as its non-materialistic, civic driven actions fall outside its purview. If anything, these figures might tend to challenge growth programs.

Successful cultural urban renewal projects typically follow from broad partnerships between the three leaderships groups discussed above.[84] Experiences in a variety of other cities, as well as with projects in

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[84] The Governor's Task force on Private Sector Initiatives in Massachusetts provides a useful summary of what generally constitutes a partnership "Public-private partnership is collaboration between business, non-profit organizations (including foundations), and government agencies in which risks, resources, and skills are shared in projects which benefit both the partners and the broader community; in essence, partnership is a mechanism through which two or more organizations can each bring to bear their unique skills and resources in the planning or pursuit of a goal of mutual and public interest. Each partner contributes the knowledge and expertise of individuals, facilities, equipment, and funds not normally available to the other partner but essential to the achievement of the common goal " Commonwealth of Massachusetts *Governor s Task force on Private Sector Initiatives in Massachusetts* 1983, cited in Carol W Lewis and Morton I. Tenzer, "Community Collaboration Public-Private Partnerships in Connecticut " Richard C. Hula ed. Market-Based Public Policy St Martin's Press: New York, 1988 102

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Newark demonstrate that in order to overcome obstacles, projects depend upon the capabilities of a capable and determined leadership team.[85] No single group or individual has the expertise, resources and wherewithal to carry out a multi-faceted arts project. A marketing machine project draws upon more disparate talents than would a similar development project; while an office complex might involve businesses, real estate developers and local officials, an arts center depends upon these along with the arts community, non-profit groups and suburban boosters to name a few. Boston's example offers a comparative perspective; "It is doubtful whether [its]unified cultural zone, and sufficiently concentrated critical mass, could have been developed without: the integrated planning activities of the city council; the determination to adopt the planning legislation develop; the support obtained from both the public and arts associations involved."[86] Comparison between projects within Newark also illustrates the importance of such a leadership team. In a decade NJPAC, which had a comprehensive, phased master plan, a corporate structure with government support and a clear, publicly stated agenda went from proposal to reality while, lacking supporters and under rudderless municipal control, Symphony Hall languished.[87] This recently began to change, precisely because the Regional Plan Association took up its cause and the city government began to exercise greater oversight, notably firing its manager.

Legitimacy

The experience of cities such as Baltimore where "the linkage between the promotion and planning of a cultural district concept and its later success and community-wide acceptance," spells out the importance of planned partnerships in renewal:

"when you get inside the machinery of government and banking, and if you have people in the private sector who know the game and are on your side (for whatever reason – because of political contacts or because they happen to be interested in what you're doing), you can achieve unexpected and astounding results by using unfamiliar, private-sector strategies for the purpose of helping a cultural institution."[88]

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[85] For a summary of the people behind NJPAC see: Valerie Sudol, "The people behind the PAC."
[86] Derek Wynne, "Urban regeneration and the arts." Derek Wynne ed. The Culture Industry: The arts in urban regeneration. 89
[87] Glenn Collins, "Planners' Vision of Newark Arts Center." *The New York Times* February 7, 1991, Section C, 19.
[88] Michael Newton, "What Arts Organizations and Artists Can Offer City Planning." The Arts and City Planning. 100, Richard C. Weinstein, "Creative financing." Wynne ed. The Culture Industry: The arts in urban regeneration. 43

Unlike other urban areas that pursued the arts as a basis for revitalization – for example, Buffalo, Cleveland, Columbus OH, Winston-Salem and Boston – Newark lacks a central coordinating body.[89] The Arts Council exercises little formal authority, the Regional Business Partnership (essentially the Chamber of Commerce) does little with the arts, and neither the public Newark Economic Development Corporation, nor the Department of Economic Development, the zoning ordinances, nor the Master Plan currently enumerates an overall arts strategy. Ongoing, comprehensive revisions of both the Master Plan and the zoning ordinances do not remedy this situation as neither focuses strategically upon cultural renewal [90] While individual actors and partnerships posses direction, the lack of a clear overall statement about the city's future opens up the appearance of a power vacuum. This power vacuum, a challenge to the stability of the marketing machine, presents a challenge not evident in growth machines. Because of the pervasiveness of growth ideology, the institutionalization of development into government and the wide acceptance market forces – by both the well off and the destitute – a questioning similar to that of the marketing machine remains unthinkable.[91]

Newark's successes thus far have come from those partnerships with vision delineated in a project or program specific master plan. A study of Buffalo, Cleveland, Columbus OH, Winston-Salem and Boston found partnerships similar to these, hallmarked by a high level of overall formalized structure and planning, as well as the involvement of the "well-connected in the community" whose connections in essence created the partnerships.[92] However, as mentioned these cities also benefited from more clearly formulated visions, at the public and quasi-public level, than Newark does. Newark's failing in this area rears itself in areas such

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[89] Wynne, "Urban regeneration and the arts " Derek Wynne ed. The Culture Industry. The arts in urban regeneration 89-93, Harvard Business School, "Cultural revitalization in six cities." Green ed The City as a Stage: Strategies for the Arts in Urban Economics.

[90] Kathlene Kelly, Department of Development official in charge of the Master Plan stated that currently there are no requirements or plans to include arts based development in the new version currently being drafted See also Jesse Drucker, "Newark awaits zoning blueprint " *The Star-Ledger* October 4, 1998, Essex Section, 33

[91] While arts and culture are subject to criticism from both Left and Right, adherence to the free market ideology that undergirds the growth machine remains pervasive. An analysis of those for whom the system has arguably failed the most, found that. "Despite the overwhelming poverty, black residents in inner-city ghetto neighborhoods verbally reinforce, rather than undermine, the basic American values pertaining to individual initiative ...[In a study less] than 3 percent of the black respondents from ghetto poverty census tracts denied the importance of plain hard work for getting ahead in society, and 66 percent expressed the view that it is very important." Wilson When Work Disappears: The World of the New Urban Poor 67

[92] A survey of 300 company presidents by Development Counselors International, a marketing group for cities and states, found that the No 1 factor that influenced their decisions where to locate was personal contact. Ellen Simon, "Cities use ads to sell new images " *The Star-Ledger* May 17, 1998, Business Section, 1 Also, in the cities mentioned it was found that. "The projects were simply too large to succeed without the support of all major groups social, corporate, and political. Finally, putting forth a well-coordinated effort in which all major parties are communicating provides an important advantage in soliciting non-local funds and media attention .the organizational structure, the active involvement of both an effective coordinator and a person well-connected in the community, and the commitment of a number of key organizations were all necessary to successfully launch the project Another important element is the presence of a local (major) benefactor " Harvard Business School, "Cultural revitalization in six cities " Green ed The City as a Stage. Strategies for the Arts in Urban Economics 26-27

as the James Street Commons Historic District, which has seen historic structures demolished for lack of oversight mechanisms.[93]

Yet even in its exceptionalism, Newark follows the example of other marketing machine cities. It began with informal organization and over times has moved towards more open and formal leadership arrangements. Similarly, in Baltimore democratic involvement and oversight came only gradually after initial successes made it clear that the marketing machine approach was to be that city's chosen path for renewal into the future.[94] Government involvement creates legitimacy through association with democratic processes, and although "rarely is planning for cultural development incorporated into the day-to-day functioning of the city government.... the success or failure of new arts facilities depends on whether the community and arts organizations involved have asked themselves some hard questions" that require the input of the citizenry to be answered.[95]

The importance of private interests in cultural partnerships and the absence of formalized public input through democratic organization can, in the long term, harm the legitimacy of the arts agenda. Appearances of elite control over the future of a city make easy targets, especially when that control appears to originate in the suburbs. Exacerbated by the nature of the arts and the marketing machine, political costs mount over the strong identification between culture and the wealthy when long suffering citizens feel they must make way for upper-class newcomers.[96] This is not to say the cultural renewal must, or even usually does follow this pattern. Rather, without a clear agenda that states the objectives, management style and limitations of the process, questions of priority can be expected; in the words of the International City Management Association, "Implementing partnerships calls for a clearly defined program, with the roles and commitments of each party spelled out beforehand."[97] The alternative is clear, "Without their [arts organizations] coming together with a combined voice...it is impossible to attract enough attention to generate the kind of public and

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[93] Reginald Roberts, "The uncommon Commons." *The Star-Ledger*. February 12, 1998, Newark This Week Section, 1
[94] Judd, & Swanstrom City Politics: Private Power and Public Policy 367-369.
[95] Phyllis Lehmann, "Where will all the dancers dance?" Green ed The City as a Stage Strategies for the Arts in Urban Economics 16
[96] Regarding historic preservation, it has been said that "The argument for historic preservation conceals the fact with gentrification that almost nothing is preserved. The original households are replaced, and the meaning of the structure is redefined from a working-class use value to an aestheticized symbolic value." Gordon Clark, Andrew Goudie & Ceri Peach eds. The New Middle Class and the Remaking of the Central City Oxford University Press New York, 1996.
[97] Cited in Hula ed. Market-Based Public Policy 103

private support these projects need."[98] Because image, morale and quality of life form the criteria for a marketing machine's success, average citizens indirectly determine the approach's long term success via their actions and opinions; "You've got to win acceptance in the community for your concept, and you've got to market a vision and create anticipation, so that when the project comes on stream the community is ready for it and excited about it," otherwise the program fails.[99] Despite their checkered track record, growth projects do not face similar challenges because of wide agreement on the benefits of the market and growth in general, the capability for individual projects to succeed on their own and the nature of the judgement criteria which have far less to do with providing civic goods.

Priorities

Concern over the placing of urban priorities also follows the marketing machine. In a city such as Newark, where the general population's focus upon drugs and crime as their foremost concerns, the allotment of money and manpower to the arts may appear little removed from fiddling while the city burns. One upset citizen made exactly this allusion after the mayor's 1994 State of the City, comparing him to Nero and writing, in a letter to the *Star-Ledger* that "In the midst of hunting season in Newark for our leather jackets and cars, **Mayor** James plays Nero, delivering happy talk about new movie theaters and arts centers while residents are losing a life-and-death battle in streets far removed from any "renaissance.""[100]

As with legitimacy, a clear, well thought out structure of renewal best provides for the input and information needed to properly account for the city's priorities. Paul Peterson argues that:

"In any policy context one cannot easily assert that one "knows" what is in the interest of cities, whether or not the residents of the city agree. But city residents do know the kind of evidence that must be advanced and the kinds of reasons that must be produced in order to build a persuasive case that a policy is in the interest of cities. And so do community leaders, mayors, and administrative elites."[101]

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[98] James, Cloar, president of the Dallas Central Business District Association cited in Clark. "Footlight Districts." Green ed. The City as a Stage: Strategies for the Arts in Urban Economics. 14

[99] David Cwi, "Baltimore's Promotion." Green ed. The City as a Stage. Strategies for the Arts in Urban Economics. 102.

[100] Keith Royster, Newark. "Feedback on James' State of City Address." *The Star-Ledger*. February 14. 1994. News Section

[101] Peterson. City Limits. 22

Since neither marketing machine leaders nor everyday citizens absolutely represent the city as a whole, institutional structures in major policy areas must provide the basis for a consensus that the arts represent a viable and appropriate vehicle for city revivification. Without this, over time opponents can caricature the arts as serving outsiders interests before the city's – a charge that depends upon growth machine assumptions that a renewal project offers mainly material or economic benefits. This kind of challenge tends not to be brought against the growth machine, because of the pervasiveness of the market ideology and because of development's greater tendency towards quantifiable results – rises in tax revenues, new job openings – that even if illusional provide the appearance of success.

Criticisms harm the progress and legitimacy of the marketing machine approach to urban problems, running directly counter to its aim of increasing unity, spirit, image and reality. But they should not be rejected out of hand, as they arise from identifiable failures in the structure of cultural renewal. In Newark, some criticism already exists over the makeup of cultural leadership, the lack of democratic influence and the allotment of priorities. In response, those involved in the city and the arts attempt to synthesize an agenda for the city's future. Groups such as Newark in the 21st Century, a think-tank partnership, bring together leaders from different fields in order to articulate an overall vision for the city. A recent conference on "Arts Transforming the Urban Environment" at Rutgers University and community meetings held by the Regional Plan Association both represent attempts to formulate a similar, cultural vision. The city's recent movement to create a quasi-public "special improvement district," focusing on improving the streetscape and pedestrian environment, offers hope that Newark will regulate and manage the outer limits of the marketing regime.[102] While moving in the right direction, more progress must be made because the marketing machine "poses...questions as to the future directions to be taken by the city – how it is to be represented through marketing campaigns; the types of investment which are to be targeted – issues which involve choices, and which have distributional implications, and hence are political."[103] So long as the marketing approach lacks formal citizen participation, it risks fatal missteps and a crisis of legitimacy.

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[102] George E. Jordan, "City council considers surcharge for Newark 'improvement district' " *The Star-Ledger* September 2, 1998, News Section, 43

[103] Paddison, "City Marketing, Image Reconstruction and Urban Regeneration "

The experience of Newark, especially compared with other cities, demonstrates that effective partnerships led by a small elite provide the wherewithal for the marketing machine. While relatively easy to create, structural flaws challenge the regime's legitimacy and stability. In order to overcome them, vision and democratic involvement need to be formalized. Cultural urban renewal faces challenges different from those of developmental renewal, far more often having to clarify issues of leadership, vision and civic responsibility. Though not completed yet in Newark, as elsewhere, from Baltimore to Glasgow, there appears a countervailing tendency for cultural renewal to gradually 'right itself,' responding to criticisms to reflect community interests in both means and ends. Yet while in part an evolutionary process where the marketing machine matures into a more unified whole, actions must be taken to ensure the completion of the process before criticism cripples it.[104]

Summary

Arts based urban renewal, both from a theoretical and a case study perspective, represents a kind of "city marketing" that:

> "is aimed at a series of different, but related, objectives - raising the competitive position of the city, attracting inward investment, improving its image and the well-being of its population - rather than single overriding objectives, as is true for profit for the private firm. Typically, city marketing focuses around services rather than goods, so that the measurement of effectiveness outcomes may be that much more problematic."[105]

Differing markedly from the growth machine, the marketing machine focuses upon improving the city's quality of life, image and morale; its economic fallout, for example "raising the competitive position of the city, attracting inward investment," occurs only as a secondary outcome. Commitment to its aesthetically grounded goals binds an informal partnership of elite, regionally based, civicly motivated interests. These groups, hailing from a diversity of backgrounds, works to implement the marketing machine. Cultural renewal projects derived from this process improve the reality and also market the reality, so forming a positive feedback cycle. These projects also create linkages between the urban and suburban that renew the city

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[104] For Baltimore and Glasgow respectively, see: Judd & Swanstrom City Politics: Private Power and Public Policy.; Paddison, "City Marketing, Image Reconstruction and Urban Regeneration "
[105] Paddison, "City Marketing, Image Reconstruction and Urban Regeneration " 341

center's role as a place to live and enjoy and empower the city within the region and to leverage similar continuing programs. However, because of the nature of the arts and the marketing machine's leadership, without proper planning and democratization, arts based urban renewal becomes unstable, facing questions of legitimacy and priority.

Conclusion

After examining culturally derived urban renewal efforts in Newark and comparing them to other case studies as well as general theoretical literature, a clear case can be made that it differs substantially from other forms of revitalization. This is not to say that it is completely unrelated. This form of revitalization may prove a necessary prerequisite for successful efforts elsewhere, such as business development, the lowering of entrenched poverty and elimination of racial segregation. Rather, its unique characteristics call for a new framework of analysis. Without acknowledging the particular bent of cultural renewal and the marketing machine, it will fail in the same way that many downtown office developments have failed – by creating an isolated suburban enclave in an urban environment. But when well thought out and followed through, cultural urban renewal tremendously and positively effects a city's prospects and people. In addition, when paced over time the arts can serve to leverage additional related improvements in the surrounding area, perpetuating a positive feedback cycle that builds upon its own successes. Such a process offers real hope to urban areas plagued by the all too common negative feedback cycle of decline. Most importantly, the marketing machine effects psychological and qualitative factors, often neglected in materialistic assessments of development, that significantly contribute to the inner city's disenfranchisement and disillusionment. Through addressing these root problems it serves to level the playing field and provide the city with a fighting chance against external and internal forces. No one approach can hope to on its own 'save' any city – least of all Newark. Yet so far as one can offer a solution to the downward spiral, and above all provide that unscientific quality of hope, culture and the arts may be the ticket.

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