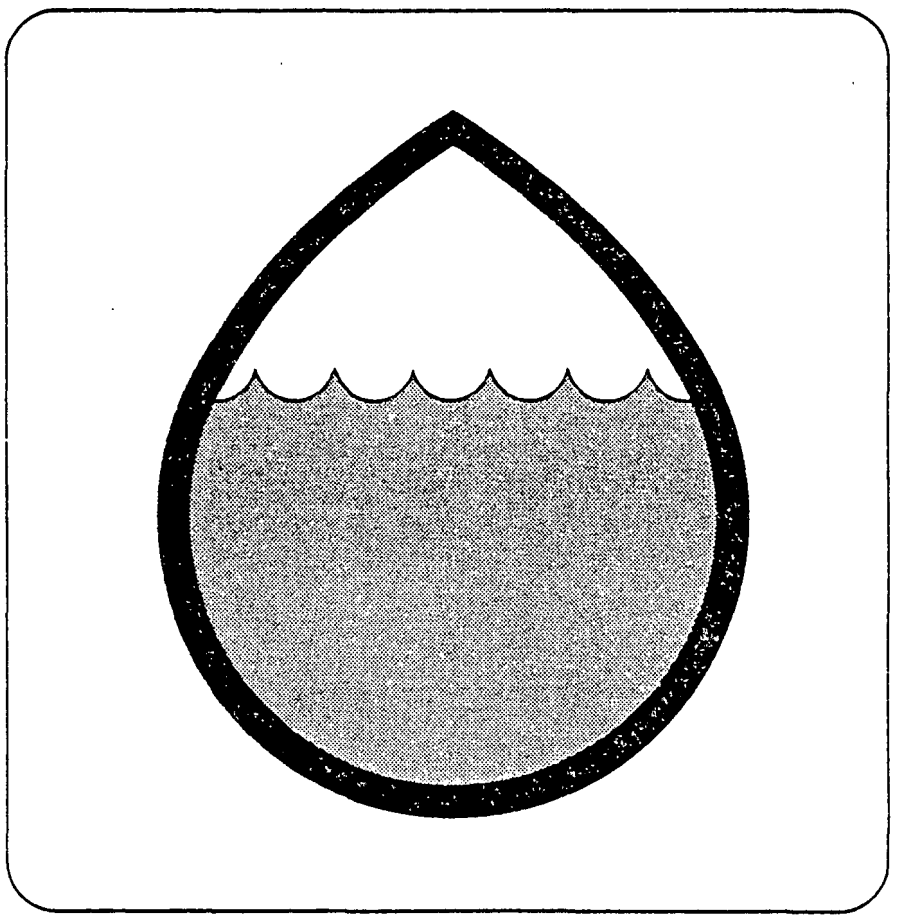
QUARTERLY PROGRESS REPORT



January 1981

Nationwide Urban Runoff Program

Environmental Protection Agency

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Introduction

The purpose of the NURP Quarterly Progress Report is to summarize developments, progress, and findings of the overall NURP program and individual NURP prototype projects. In addition, the Quarterly Progress Reports update project participants on subjects such as EPA staff assignments, new policies, strategy, events, and urban runoff research and publications.

This quarterly report begins by describing new developments at EPA Headquarters, followed by a review of experiences the Tri-County Planning Commission had while implementing their sampling and analysis program. This is followed by a section describing the status of all NURP prototype projects. A section describing proposed NURP Strategy for 1990 follows the status reports. The quarterly report concludes with abstracts and other bibliographic information from research and studies on urban runoff.

Highlights

In this section, a number of events and changes are described including:

- 28 active NURP projects are now distributed among the 10 EPA Regions; the Southern California Association of Governments and the Burlington, Vermont projects were dropped from the program.
- Some Project Officers within EPA Headquarters have been reassigned since Ernest Cobb left the NURP staff.
- A new progress tracking system at EPA Headquarters has been developed and is now being implemented.
- Information on the availability and ordering of Quarterly and Annual Reports.
- Two major conferences are scheduled for 1981. chicago 10/21-23
- A description of a visit to EPA headquarters by representatives from USSR technical agencies.

NURP PROJECTS

There are 28 active NURP projects distributed among the 10 EPA Regions. Over the past several months, two candidate projects were dropped from the program:

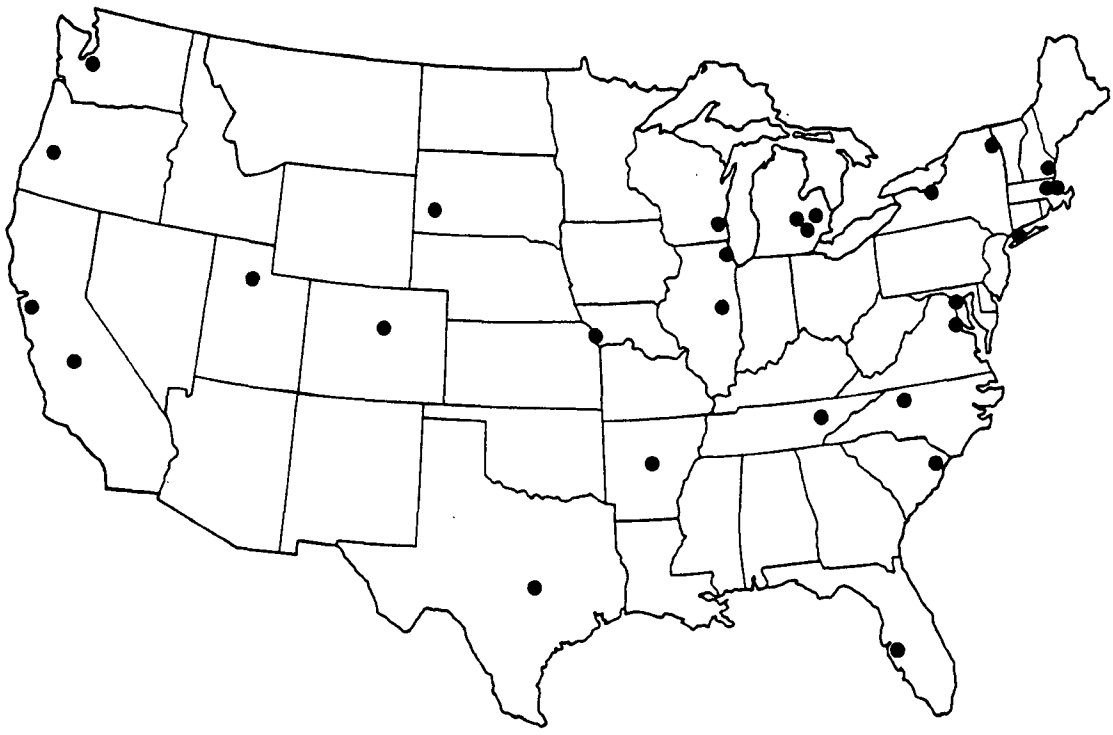
- Southern California Association of Governments (Long Beach, CA)
- State of Vermont (Burlington, VT)

Both candidates moved well into the Work Plan development stage but were not able to progress to the point of completing grant arrangements with the Regions and Headquarters.

The locations of the 28 active NURP projects are shown on the following map. A later section of this report, entitled, "Status of NURP Projects", presents brief descriptions of the projects and their status.

HEADQUARTERS PROJECT OFFICERS

Some Project Officers within the EPA Headquarters have been reassigned. Ernest Cobb, who was on loan from USGS, has left the NURP staff to fill a key USGS post in Reston, VA. His presence is missed day-to-day, but the overall NURP program will still have the benefit of his contributions since his USGS assignment keeps him involved with urban runoff studies.



LOCATION OF ACTIVE NURP PROJECTS

The new assignments of NURP projects to Headquarters Project Officers are as follows:

Patty Bubar - Regions I, IV, VII, and VIII
Stuart Tuller - Regions II, IX, and X
Phillip Graham - Region III
Norman Whalen - Regions V and VI

PROGRESS TRACKING SYSTEM

A new system has been developed to assist EPA Headquarters in keeping track of the NURP projects' progress. For the past year, NURP Headquarters staff have been tracking individual projects by means of charts which display actual accomplishments against the schedules given in the respective final Work Plans. Regional, state and area-wide project officers have provided monthly information updating these tracking charts. The system worked smoothly and was proven effective during the formative phase of NURP. However, now that most projects are operational, timing has become more critical.

The former tracking system was very broad in focus, summarizing overall project activity. During the next year, however, data gathering analysis and data management will be the key tasks. Therefore, Headquarters has developed a more specific tracking format for use during this phase of NURP activity. A copy of the proposed form and instructions for its use were circulated for review and comment. The system was modified in a major way on the basis of comments received, and has been distributed in final form. The first round of reports are undergoing review.

REPORTS AVAILABLE

Quarterly and Annual reports from the individual NURP projects are being received and reviewed at Headquarters. Many of these contain information which could be of use to other NURP Project personnel. As time permits, findings of general importance will be presented in subsequent copies of the Quarterly Progress Report. In the meantime, individual investigators can use the following list to order reports.

Lake Quinsigamond	- Quarterly Reports for July 1979 through October 1980
Mystic	- Quarterly Reports for July 1979 through October 1980
Durham	- Quarterly Reports for July 1979 through October 1980
Long Island	- Quarterly Reports for July 1979 through March 1980 (10 pages each)
Lake George	- Quarterly Report
Irondequoit Bay	- Quarterly Report
Myrtle Beach	- Data Interpretation and Analysis Report and Final Evaluation of Stormwater Control Alternatives (100 pages each)
Winston-Salem	- Quarterly Reports for September 1979 through September 1980
Tampa	- Quarterly Reports for July 1980 through September 1980
Knoxville	- Quarterly Reports for June 1980 through November 1980
Lansing	- Quarterly Reports
SEMCOG	- Progress Report

Ann Arbor	- Annual Report (147 pages)
IEPA	- Quarterly Reports and Annual Report for first year
NIPC	- Draft Annual Report (127 pages)
Milwaukee	- Quarterly Report for October 1979 through December 1979 (3 pages)
Denver	- Quarterly Reports for June 1979 through September 1980 (50 pages each)
Salt Lake	- Quarterly Reports for September 1979 through August 1980 (5 pages each)
Rapid City	- Quarterly Reports for January 1980 through September 1980
Castro Valley	- Annual Report (56 pages)
Eugene/Springfield	- Quarterly Reports for February 1979 through March 1980 (5 pages each)
Bellevue	- Quarterly Reports for October 1979 through December 1979 (16 pages)

Copies of the above listed reports can be obtained by contacting your Headquarters Project Officer or:

Dennis Athayde, Chief
Urban Nonpoint Sources Section, U.S. EPA (WH-554)
401 M Street SW
Washington, DC 20460

TRAINING PROGRAMS

One of NURP's major objectives is to broaden the understanding of urban runoff mechanisms, problems, and controls. Important elements in this program are workshops, conferences, training programs, and other means of fostering communication and education.

Earlier this year, NURP participants attended three major conferences of this type:

- the technology transfer workshop presented by USGS and EPA in Denver (March 1980)
- the Water Quality Management conference held by EPA in Atlanta (June 1980)
- the toxic pollutant monitoring workshop held by EPA in Springfield (July 1980).

The two major conferences scheduled for 1981 are:

- Baltimore (January 13-15)
  This will be a NURP technology transfer workshop. It will be similar to the one held last year in Denver but will provide significantly more opportunity for project participants to interact and work toward solutions to problems that have arisen (e.g., sampling, analysis, data management). Three major topics will be addressed at this workshop: methods for analyzing the effectiveness of street sweeping; methods for analyzing the effectiveness of detention basins; and methods for assessing the scope of runoff problems in urban areas. It addition, an updated Data Management Manual will be distributed and discussed. Appropriate NURP project personnel are encouraged to attend.
- Chicago (October 21-23)
  This will be the Second Annual Water Quality Management Conference. It will be similar to the one held last summer in Atlanta. Plans are presently underway within the Water Planning Division.

COORDINATION WITH FMAP

For several months, a sense of cooperation has been developing between the Nationwide Urban Runoff Program and the Financial Management Assistance Program (FMAP), which both operate within the Water Planning Division. The need for such cooperation and coordination became evident during numerous discussions at the Water Quality

Management Conference (Atlanta, June 1980). Since then, the staffs and respective consultants of both programs have met several times to establish details of how they will coordinate their efforts.

FMAP was established in 1979 to assist state and local governments in implementing their Water Quality Management plans. In particular, FMAP assistance concentrates on helping resolve the financial, management, institutional, and legal issues which often stand in the way of implementing otherwise technically sound projects. The program offers several types of management assistance to state and areawide agencies for non-point source projects with special emphasis on groundwater, agricultural, and urban runoff programs.

Depending on needs of the particular project, the resources available, and the general applicability of the project, FMAP assistance can take the following forms:

- Major Management Assistance: A limited number of local or state projects in groundwater, urban runoff, and agricultural runoff will receive intensive management assistance (three to four person weeks) from the FMAP team. The team will provide guidance and instruction to project staff in the development of tasks, the identification of financial management issues, and the selection and design of appropriate financial management analysis techniques. Although the FMAP team will not perform the tasks or analysis, they will be available to guide these efforts and review the outputs.

- Short-term Management Assistance. Between 10 and 20 local and state WQM projects will receive short, intensive (three to five person days) management assistance directed toward the solution of a specific financial management problem. FMAP team members will visit the project to provide guidance and information about the application of financial management analysis to project specific problems.

Major and short-term management assistance will be made available to selected NURP and non-NURP WQM agencies during FY 81. Preliminary discussions regarding agency selection and coordination have already begun between the staff of the Urban NPS Section and the members of the FMAP team who will be working in the urban runoff area. These include Don Niehus (EPA/WPD), Larry Scully (Peat, Marwick & Mitchell), and Cathy Spain (Municipal Finance Officers Association).

VISIT BY SOVIET DELEGATES

Several representatives from USSR technical agencies visited EPA Headquarters in November. The purpose of their trip was to continue work being done under the US-USSR Water Protection Joint Working Group. The Soviets were given a tour of the U.S. Environmental Protection Agency's NURP Data Processing Terminal Center and given a demonstration of the computer graphics terminal using the pollutant washoff function.

A tour of selected data collection sites for the Washington COG NURP project also took place. Data were presented showing the expected annual pollutant contribution of urban runoff to the Potomac Estuary. Data was also taken from one of the recently installed monitoring stations in Maryland to show the effectiveness of the three best management practices for control of pollution from urban runoff.

Their Washington, D.C. visit was followed by field trips which included visits to two NURP projects, including the project in Champaign, Illinois. This visit covered data collection of rainfall, run-off, and the management practice of sweeping streets. The Lansing, Michigan NURP project was also visited. Several low cost, simple best management practices were shown. They were a small detention basin, a large detention basin, and an oversized pipe which provides instream storage.

Findings

This newly-instituted section of the report will be used to pass on experiences noted in individual project reports. In this way it will be possible to keep abreast of what is occurring elsewhere. Whenever experiences produce circumstances, solutions, and results that might be applicable to other projects, this forum is available to spread the news. It will be successful if project experiences are shared and the applicability of the experiences to situations at other locations are kept in mind. Submit articles not included in the normal project reports to:

EPA Headquarters,
ATTN: Dennis Athayde,
WH-554,
401 M Street S.W.,
Washington, DC. 20460.

FINDINGS FROM THE TRI-COUNTY REGIONAL PLANNING COMMISSION

The Tri-County Regional Planning Commission has included in their September 30, 1980 quarterly report, experiences encountered in implementing their sampling and analysis program. These experiences might be helpful to others, and so are reported below by Dale Scherger, project officer for ENCOTEC, consultants:

> ". . . .Field blanks have been collected using the procedures outlined in the last quarterly report. The frequency and breadth of the analytical program for these tests have been reduced recently based on the earlier data collected. The field blanks have shown that sampler cleaning, line cleaning, and other maintenance procedures have been effective. The field blank sampling program did indicate one possible problem in that a couple of the field blank samples showed slightly elevated chromium levels. It was suspected that residual chromium from the bottle washing procedures may be the difficulty. A special emphasis on the nitric acid washing and rinsing procedures was instituted and the problem was resolved."

A second problem, and its remedy are described as follows:

> "The redesign of the flow recorders (located) in the manholes, using large dessicant containers, helped reduce flow recorder failure. The solution utilized incorporated removing the internal battery from the flow recorders. External battery holders and batteries were installed at each station. The space in the flow recorder where the internal battery had been located was used to hold the dessicant containers. This design, which minimizes moisture in the unit, has greatly reduced the failure rate."

A third problem encountered, and efforts to resolve it, follow:

> "Due to some marginal and/or negative numbers being generated when calculating the dryfall fallout from the wetfall and bulk fallout, the bulk fallout is not presented in this report. Concern over these numbers makes it necessary to reevaluate the entire wetfall/dryfall collection and analysis procedures.

Under the present procedures a monthly bulk composite represents the monthly fallout due to precipitation. By subtracting the wetfall fallout from the bulk fallout a value for the dryfall fallout should be obtained.

A number of steps are currently under way to resolve this problem of negative and/or marginal dryfall values. These include the following:

1. Review of literature on wetfall/dryfall collection procedures to see if any discrepancies exist in the current collection and analysis procedures.

2. Reevaluation of dust bucket design concerning size, shape, and construction material.

3. Quality assurance check on dust buckets concerning potential for materials being leached out of the buckets into the water. (Results are currently being analyzed).

4. Designing new equipment to collect dryfall information by collecting fallout only during dry weather and closing up during wet weather. (Results of both collection procedures can then be compared for determing dryfall information.)

5. Reevaluate all laboratory results and calculations on existing wetfall bulk fallout data already collected.

Through these measures the current problems encountered while determing dryfall should be resolved."

Further inquiry concerning these problems may be addressed directly to Dale Scherger or Steve Luzkow, (313) 761-1389.

Status of NURP Projects

The following pages are summaries of the current status of each of the 28 active NURP projects.

GRANTEE: Commonwealth of Massachusetts

LOCATION: Worcester and Shrewsbury, MA (Lake Quinsigamond)

GRANTEE CONTACT:	Madeline Snow	(617) 727-7436
PRINCIPAL INVESTIGATOR:	Joe McGinn	(617) 727-6983
EPA REGION:	Roger Duwart	(617) 223-5131
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

Lake Quinsigamond is located in a highly urbanized area. The shoreline is densely developed with homes and some commercial establishments. Two state parks and several private beaches and marinas are also located along the shore. A considerable amount of construction is going on in the basin, with more planned in the near future. Beneficial uses of Lake Quinsigamond are primarily recreational (e.g., fishing, boating, water skiing, swimming).

Because of increased development within the basin, lake quality has degenerated over the past 20 years, causing public concern. Past studies have identified stormwater runoff as the major cause of eutrophication.

The NURP project will attempt to meet the following objectives:

- identify and quantify the pollutant loads generated by stormwater runoff
- determine the relationship between pollutant loads and water quality in order to identify or predict present and future trends
- evaluate possible controls (structural and non-structural) and their effects on water quality
- analyze data for controls in terms of their costs, effectiveness, and the benefits derived from their implementation.

PROJECT STATUS:

Nine storm events have been monitored. Available data are being processed and filed on the computer. Samples have been taken to analyze for priority pollutants and sampling is continuing. Interpretive analysis of the new data will be done during the winter months.

GRANTEE: Commonwealth of Massachusetts

LOCATION: Boston, MA (Mystic Lake)

GRANTEE CONTACT:	Madeline Snow	(617) 727-7436
PRINCIPAL INVESTIGATOR:	Bill Pisano	
EPA REGION:	Roger Duwart	(617) 223-5131
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

The study will take place in the Aberjona River -- Upper Mystic Lake area. This area has undergone a tremendous urban expansion. At present, the water quality conditions throughout the Aberjona River system and in the Upper Mystic Lake are generally below the standards assigned by the Massachusetts Division of Water Pollution Controls. The effects of urban runoff on water quality in the study area have not been assessed.

The Upper Mystic Lake is mostly residential, but the water quality conditions in the Mystic Lake have deteriorated to the point where recreational activities have been occasionally restricted and game fish can no longer be supported. Nitrogen, phosphorus, and zinc have been identified as the problem pollutants.

The major objectives of the study are to identify the characteristics of urban runoff and their impacts on receiving water quality in the Aberjona River and Upper Mystic Lake. Another objective is to recommend control strategies and management practices.

PROJECT STATUS:

All sites have been selected and approved. Several storm events were missed during the period of transition between technical consultants. New consultants have been selected and monitoring is scheduled to begin.

GRANTEE: New Hampshire Water Supply and Pollution Control Commission

LOCATION: Durham, NH (Oyster River)

GRANTEE CONTACT:	Paul Hirtzler	(603) 271-3503
PRINCIPAL INVESTIGATOR:	Paul Oakland	(603) 271-3503
EPA REGION:	Roger Duwart	(617) 223-5131
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

The area being studied is projected to have a very high growth rate. Of concern to local and state officials are the impacts that this rapid development will have on the entire coastal area, including water quality resources. Previous Section 208 studies have identified urban runoff as a significant source of pollution.

Baseline monitoring of storm runoff for a year from a downtown parking lot, a small urban stream, and the Oyster River (fresh water above the dam and a tidal water below the dam) will provide the basis for control selection and impact modeling. The project will also provide a basis for establishing controls in the rapidly urbanizing coastal region. Beneficial uses in the area are water supply, recreation and wildlife. Shellfish areas in the estuary are sensitive to toxicants.

PROJECT STATUS:

At least ten storm events have been monitored to date. Data is being processed and stored in the computer. Interpretive analysis of the data will be done this winter.

GRANTEE: Long Island Regional Planning Board

LOCATION: Long Island, NY

GRANTEE CONTACT:	Lee Koppleman	(516) 724-1919
PRINCIPAL INVESTIGATOR:	Sy Robbins	(516) 360-5200
EPA REGION:	John Ulshoefer	(212) 264-8959
EPA HEADQUARTERS:	Stuart Tuller	(202) 755-2114

PROJECT DESCRIPTION:

Stormwater runoff has been identified as a major source of bacterial and nutrient pollutants to surface and marine waters within the Long Island area. As a result, many productive shellfish areas and recreational beaches have been closed or are threatened with closure. Additionally, there is the possibility that groundwater quality is being degraded by aquifer recharge with stormwater runoff. Of primary concern is the possible contamination with organic compounds of aquifers used for potable water supplies.

The overall goals of the Long Island NURP study are to determine the source, type, quantity, and fate of pollutants in stormwater runoff, and to determine the effects of selected management practices on water quality. BMPs to be studied include street sweeping, detention basins, wetlands treatment, retention basins and recharge, and slotted storm sewers for infiltration.

PROJECT STATUS:

Sampling equipment has been received and installed. Sampling has been underway for the last two quarters but due to drought conditions has not kept pace with the sampling plan. The project consultant is currently preparing a plan for intensified monitoring to assure collection of data for the requisite number of storms at each study site and to return the monitoring program to schedule. Input of the data to STORET will begin soon.

A detailed computerized literature search on urban runoff control measures has been conducted by the project technical consultant and will be available in summary form shortly.

A plan to study salmonella instead of viruses, as originally proposed, has been submitted and approved.

GRANTEE: New York Department of Environmental Control

LOCATION: Lake George, NY

GRANTEE CONTACT:	N.G. Kaul	(518) 457-4351
PRINCIPAL INVESTIGATOR:	N.G. Kaul	(518) 457-4351
EPA REGION:	John Ulshoefer	(212) 264-8959
EPA HEADQUARTERS:	Stuart Tuller	(202) 755-2114

PROJECT DESCRIPTION:

Lake George is a long, narrow water body with a relatively small watershed in relation to the lake's surface area. Its primary uses are for recreational activities. Algal growth in the lake has increased exponentially in recent years and is believed to be caused by phosphorus input from urban runoff. Additional problems with coliform pollution and sediments have also occurred.

Although extreme nuisance conditions have not yet occurred, there is growing concern for the water quality of Lake George because of its unique natural characteristics and its recreational value. The objective of the NURP study is to determine whether or not urban runoff is an important cause of Lake George's water quality problems, and if so, what controls and management practices would be most effective in improving water quality.

PROJECT STATUS

Contracts have now been finalized with USGS and the State Health Department.

After initial delays in acquiring equipment, sampling of storm events was begun in September and is now proceeding according to plan. Data from two storm events in each of the months of September and October has been reduced and was submitted as part of a special report to EPA Region II and Headquarters on December 1, 1980.

The public participation effort at Lake George is well underway with the establishment of an advisory group and the scheduling of periodic public information meetings for concerned citizens.

A quality assurance/quality control plan has been prepared and is under review by EPA Region II.

IRONDEQUOIT BAY
(Region II)

GRANTEE: New York Department of Environmental Control

LOCATION: Irondequoit Bay, NY (Rochester)

GRANTEE CONTACT:	N.G. Kaul	(518) 457-4351
PRINCIPAL INVESTIGATOR:	N.G. Kaul	(518) 457-4351
EPA REGION:	John Ulshoefer	(212) 264-8959
EPA HEADQUARTERS:	Stuart Tuller	(202) 755-2114

PROJECT DESCRIPTION:

The immediate watershed surrounding the Irondequoit Bay is highly urbanized. The water quality of the bay is very poor and is characterized by an advanced state of eutrophication caused by long-term input of nutrient compounds. Heavy algal blooms occur frequently, and the bottom sediments consist of a sludge layer. An intensive effort is being made to control point-source input of pollutants by diverting sewage effluents from the bay and reducing combined sewer overflow into the bay. Through these actions it is hoped that water quality will be improved so that Irondequoit Bay may be used for contact recreation and fishing.

The primary objectives of the NURP study are twofold. First, it will assess the magnitude of urban runoff effects on the water quality of Irondequoit Bay. Secondly, it will measure the effectiveness of selected Best Management Practices. A secondary objective of the program is to measure the effectiveness of point source/combined sewer overflow controls currently in use.

PROJECT STATUS:

No findings have been made to date. Instrumentation has been installed in various sub-basins with homogenous/hetrogenous land-use characteristics. Storm event sampling and analysis was begun following two trial runs in July and early August which were used to fine-tune collection procedures and sampling protocol. A USGS core

splitter is being used to split the samples but has necessitated some modifications to analysis procedures.

A biweekly technical meeting is held between representatives of several participating Monroe County Departments, the U.S. Geological Survey, the consulting engineers and the New York State Department of Environmental Conservation and has proven useful in keeping the project on schedule.

GRANTEE: Metropolitan Washington Council of Governments

LOCATION: Washington, DC

GRANTEE CONTACT:	Cameron Wiegand	(202) 223-6800
PRINCIPAL INVESTIGATOR:	Cameron Wiegand	(202) 223-6800
EPA REGION:	Jim Hagan	(215) 597-9131
EPA HEADQUARTERS:	Phillip Graham	(202) 755-2114

PROJECT DESCRIPTION:

The metropolitan Washington area is a rapidly growing urban region located on a major riverine estuary. The principal rivers in this area are the Potomac and Patuxent. Problems in water quality associated with urban runoff are:

- bacterial and dissolved oxygen standards violations
- increased treatment costs for public water supplies
- low diversity of aquatic life in upper Potomac estuary
- decreased nursery potential for anadromous fish
- nuisance algae blooms
- reduction in storage volume in Occoquam Reservoir due to sediments.

PROJECT STATUS:

Eighteen station-storms have been monitored since August 1980 for flow, precipitation, and quality parameters at two urbanized watersheds in Maryland, three urbanized watersheds in Virginia, and four undeveloped control watersheds in Virginia.

Ninety station-storms have been monitored since August 1980 for similar parameters at two wet ponds, two dry ponds, two grassed swales, and two infiltration BMP sites in Virginia and Maryland.

GRANTEE: Baltimore Regional Planning Council

LOCATION: Baltimore, MD

GRANTEE CONTACT:	Sam Martin	(301) 383-5863
PRINCIPAL INVESTIGATOR:	Sam Martin	(301) 383-5863
EPA REGION:	Lee Murphy	(215) 597-9597
EPA HEADQUARTERS:	Phillip Graham	(202) 755-2114

PROJECT DESCRIPTION:

Jones Falls, a major watershed of the Patapsco River Basin, drains the metropolitan Baltimore area and empties into the Baltimore Harbor. The nonurbanized area of the watershed north of Lake Roland is characterized by high water quality and is used for contact recreation and as a spawning ground for trout. The lower third of the watershed is highly urbanized with such characteristic land uses as residential, commerical, industrial, and institutional. The water quality of this reach of Jones Falls and the Baltimore Harbor is highly degraded. State Water Quality Standards are in routine violation for such parameters as: coliforms, nutrients, sediments, heavy metals, and recalcitrant organic compounds (e.g., chlorinated hydrocarbons). As a result of these contaminations beneficial use for contact recreation, fish and wildlife propagation, and aesthetic enjoyment has been impaired.

Important areas of interest studied in this project are: pollutant sources, problem magnitude, transport mechanisms, receiving water impact assessment, and control effectiveness. Specific goals are:

- determine pollutant load delivered to Baltimore Harbor
- determine pollutant loads and transport mechanisms occurring in individual watersheds with homogenous land uses. Assess the transferability of this data to other urban areas.
- Determine the role and effectiveness of Lake Roland as a management control
- Develop a cost-effective urban runoff management program.

PROJECT STATUS:

No findings have been made at this time. To date, the following conditions exist:

- sampling began in November 1980 at the three receiving water stations
- all major equipment has been received and installed; now awaiting rain. Some equipment was returned.
- all staff have been hired as of September 1980.

GRANTEE: Waccamaw Regional Planning Council

LOCATION: Myrtle Beach, SC (Atlantic Ocean)

GRANTEE CONTACT:	Larry Schwartz	(803) 546-8502
PRINCIPAL INVESTIGATOR:	Newt Colston	(803) 238-0833
EPA REGION:	John Isbell	(404) 881-2913
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

Myrtle Beach's economy is highly dependent upon tourists attracted to the area by the beaches. Because of stormwater runoff from discharge pipes and paved parking lots, major problems in water quality, beach erosion, and beach appearance have occurred which may affect the public health and tourist economy of the area.

The purpose of the Myrtle Beach Stormwater Study has been to obtain specific information concerning water quality-related problems caused by urban runoff. This study defined two main objectives as its goals. First, to determine the seriousness of the water quality problems by using an extensive sampling program. Second, to identify possible solutions which would effectively mitigate the pollution problems caused by stormwater runoff.

PROJECT STATUS:

The data collection phase of this project is essentially completed. A summary report of the findings from this study will be presented in the next quarterly report.

GRANTEE: North Carolina Department of Natural Resources

LOCATION: Winston-Salem, NC (Muddy Creek)

GRANTEE CONTACT:	Ryland Brown	(919) 733-6126
PRINCIPAL INVESTIGATOR:	Del Williams	(919) 727-8060
EPA REGION:	John Isbell	(404) 881-4793
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

The Winston-Salem urban area lies within the Muddy Creek drainage basin. Land use is primarily residential (approximately 80%) with the remaining area evenly distributed among commercial, industrial, and open spaces. Two watersheds with different homogenous land uses and known water-quality problems are being studied:

- the Buena Vista residential development, a well-established, medium density, high-income neighborhood
- the Central Business District, which is characterized by high pollutant loading and high imperviousness (approximately 90%).

Water quality problems associated with urban runoff in Winston-Salem urban streams include extensive degradation of macrobenthic populations, high fecal coliform counts, and high concentrations of lead, zinc, and mercury. Nutrients and dissolved oxygen will also be monitored in this study.

The primary objective of this study will be to determine the effectiveness of street-sweeping and catch basin cleaning. Various combinations of cleaning frequencies and equipment will be assessed. Other BMP's may be used as the project progresses. A secondary objective will be analysis of cost data in order to develop an efficient management program.

PROJECT STATUS:

Water quality data from storms monitored has been put into STORET. Rainfall quality and street solids quality data have been stored on COMNET. Street sweeping effectiveness studies continue. Interpretive analysis of the data will be performed during the winter months.

GRANTEE: Tampa Department of Public Works (through Florida Department of Environmental Regulation)

LOCATION: Tampa, FL (Hillsborough River and Bay)

GRANTEE CONTACT:	R.M. Salmon	(813) 223-8216
PRINCIPAL INVESTIGATOR:	Lydia Moreda	(813) 223-8300
EPA REGION:	Ernesto Perez	(404) 881-4793
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

The receiving waters of interest in the Tampa area are the Hillsborough River and Bay. Both the river and bay suffer from frequent standards violations with the bay occasionally experiencing fish kills. Organic matter, (with an oxygen demand), and coliform bacteria are the contaminants of interest.

The focus of this project is problem assessment. Because there are some point sources of pollutants in the area, the project will be primarily concerned with determining the magnitude of the effects on water quality caused by urban runoff. If urban runoff is found to be a significant water quality problem, the project will be expanded to include analysis of selected BMP's.

PROJECT STATUS:

Phase I is complete: the information available on the Hillsborough River and Bay has been inventoried and summarized. The data was analyzed and a final report for Phase I written. Based on the Phase I results, a decision will be made whether to continue the project.

GRANTEE: Knoxville/Knox County

LOCATION: Knoxville, TN (Second Creek, Tennessee River)

GRANTEE CONTACT:	John Lutz	(615) 521-2500
PRINCIPAL INVESTIGATOR:	Jack Milligan	(615) 755-3167
EPA REGION:	Nancy Redgate	(404) 881-2913
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

Second Creek has been designated by TVA as a "critical" water quality area. Bacterial contamination is so severe that methods to keep people away, rather than attract them, will be required unless remedial action is taken.

The major objectives are to determine the sources of pollutants and to provide preliminary data on BMP effectiveness (at a pilot-scale level). Other objectives are to improve methodologies for the transfer of data and to provide a better understanding of the influence of geological features in the area (Karst terrain, carbonate rock) on urban runoff.

PROJECT STATUS:

A revised work plan has been submitted and approved. Study sites have been tentatively selected. Instrumentation will be provided soon and monitoring will begin in early 1981.

LANSING
(Region V)

GRANTEE: Tri-County Regional Planning Commission

LOCATION: Lansing, MI

GRANTEE CONTACT:	Bob Roller	(517) 393-0342
PRINCIPAL INVESTIGATOR:	Dale Sherger	(313) 761-1389
EPA REGION:	Wayne Elson	(312) 353-2160
EPA HEADQUARTERS:	Norman Whalen	(202) 755-2114

PROJECT DESCRIPTION:

This project is located in the Bogus Swamp Drainage Distric, which discharges into a section of the Grand River. Dryfall, wetfall, and runoff pollutant levels will be evaluated at specific locations within the sub-basins draining into the BMP's and out of the area into the Grand River.

Problem pollutants under investigation include solids, nitrogen and biochemical oxygen demand. Analysis will evaluate the presence and concentrations of many pollutants generally found associated with suspended solids in urban runoff. The office of Research and Development is participating in this project.

BMP's to be evaluated include a wet retention basin, a dry retention basin, and an upsized buried storm drain section.

PROJECT STATUS:

The first year of sampling resulted in up to 13 events sampled, with the sampling occurring at all but two stations. The inlet and outlet of the normally-dry detention basin are ready to be included in the sampling program during the second year, following completion of essential station modifications. Data is being analyzed and coded for entry into STORET.

Preliminary data shows a high degree of removal of various pollutants in the wet retention basin. Lower removal rates were experienced in the two sections of upsized drain pipe operating in series, with removals apparently affected by storm intensity. Sediment removed will be analyzed and results will be included in the next report from TCRPC.

GRANTEE: Southeastern Michigan Council of Governments (SEMCOG)

LOCATION: Oakland County, MI (Troy)

GRANTEE CONTACT:	Dave Morrison	(313) 961-4266, Ext. 313
PRINCIPAL INVESTIGATOR:	Dave Morrison	(313) 961-4266, Ext. 313
EPA REGION:	Wayne Elson	(212) 353-2160
EPA HEADQUARTERS:	Norman Whalen	(202) 755-2114

PROJECT DESCRIPTION:

Surface drainage in Troy is to the Clinton River, and eventually into Lake Erie. Nutrient input from this region has been associated with the eutrophication problems in Lake Erie. Urban runoff is a major source of contaminants, resulting in regional water quality problems.

Specific project objectives include:

- determining pollutant loading in urban runoff and assessing its impact on receiving waters
- evaluating the effectiveness of existing control structures and modifications to develop guidelines for future design and use
- analyzing institutional structure and controls for responsiveness to urban runoff problems, and making recommendations to improve their effectiveness.

PROJECT STATUS:

Sampling has been stopped for the winter and data is being encoded for input to STORET. The three BMP test sites were sampled during three of the ten events which were monitored. The primary reason complete sampling was not accomplished at all sites for all events was malfunctioning sampling equipment. Data obtained is being evaluated with respect to proposed BMP modifications anticipated prior to initiating a new sampling period.

ANN ARBOR
(Region V)

GRANTEE: Southeastern Michigan Council of Governments (SEMCOG)

LOCATION: Ann Arbor, MI

GRANTEE CONTACT:	Dave Morrison	(313) 961-4266, Ext. 313
PRINCIPAL INVESTIGATOR:	Dale Sherger	(313) 761-1389
EPA REGION:	Wayne Elson	(312) 353-2160
EPA HEADQUARTERS:	Norman Whalen	(202) 755-2114

PROJECT DESCRIPTION:

The Ann Arbor urban area is served by separate storm sewers and channels, which empty into the Huron River at five major outfalls. This reach is impounded, causing high residence times, and storm water runoff has substantial effects on water quality. Water quality data, and evaluation of BMP's will be accomplished through a sampling and monitoring program.

Specific goals of the sampling program include:

- monitoring the pollutant inputs from the major storm drain outfalls
- observing water quality indices within the river during and after storm or snowmelt events
- monitoring water quality before and after BMP processes to determine their effectiveness. BMP's include detention/retention basins, wetland treatment, and runoff ordinances.

PROJECT STATUS:

Sampling has stopped for the winter months, after obtaining four events for the retention basin and one event for the wetland. Construction is nearly completed on the Traver Creek drain, with only early spring bank stabilization remaining. It is anticipated that the sampling proposed for this basin will commence with spring sampling start-up. Spring snow-melt sampling is planned, given sufficient snow cover by then.

GRANTEE: Illinois Environmental Protection Agency (IEPA)

LOCATION: Champaign, IL

GRANTEE CONTACT:	Bill Rice	(217) 782-3362
PRINCIPAL INVESTIGATOR:	Mike Terstriep	(217) 333-4959
EPA REGION:	John Nagy	(312) 353-2163
EPA HEADQUARTERS:	Norman Whalen	(202) 755-2114

PROJECT DESCRIPTION:

This project at Champaign, IL, will demonstrate the effectiveness of a street sweeping program by application in two paired basins to define accumulation rates, materials composition, and parameters of washoff and transportation functions. The analysis will:

- determine coefficients of functions of solid accumulation in streets
- determine washoff functions
- calibrate QUAL-ILLUDAS and MUNP models to update evaluation and add capability of continuous simulation;
- determine atmospheric contribution
- determine rainfall contribution
- determine significance of deposition and scour in sewers and fraction of runoff from street surfaces.

BMP's being evaluated include streetsweeping, and storage or treatment. Streetsweeping effectiveness will be evaluated related to land use, frequency of sweeping, and other factors.

PROJECT STATUS:

First year sampling effort completed, with discrete sampling obtained for water quality analysis and inputs to computer programs. Second year sampling will obtain composit samples. Flow data will be available upon calibration of monitoring equipment.

Street dirt sampling procedures and schedules are being evaluated for possible modifications, and samples are being analyzed.

GRANTEE: Northeastern Illinois Planning Council (NIPC)

LOCATION: Glen Ellyn, IL

GRANTEE CONTACT:	Philip Peters	(312) 454-0400
PRINCIPAL INVESTIGATOR	Don Hey	(312) 454-0400
EPA REGION:	Mike Phillips	(312) 353-2163
EPA HEADQUARTERS:	Norman Whalen	(202) 755-2114

PROJECT DESCRIPTION:

Glen Ellyn drainage is to the eastern branch of the DuPage River. An important feature of this drainage basin is Lake Ellyn, which is used as a flood control basin, primarily. Lake Ellyn's potential as a control structure for urban runoff pollutants consists of a sampling program to determine sources and transport mechanisms for pollutants of interest (i.e., sediment, BOD, nutrients, and heavy metals), and the evaluation of control practices for effectiveness.

The sampling program will attempt to determine pollutant sources as a function of land use, and consist of:

- atmospheric sampling to determine the importance of dry and wet deposition and its water quality relationship
- examination of soil, vegetation, animals, vehicles, decomposition of impervious surfaces, and chemical use as sources
- water quality and benthic sampling to determine the effects of detention on water quality and bottom material
- detention basin maintenance to evaluate operation practices.

PROJECT STATUS:

Water quality sampling is continuing as scheduled. Storm sewer construction by the city of Glen Ellyn to relieve inadequate drainage conditions has resulted in the necessity of sampling an additional drain flowing into Lake Ellyn. USGS is conducting the sampling program, with the new location being added. During the winter, snow and snowmelt sampling will be added. Street sweeping by the city is curtailed by winter road conditions, but will resume in the spring.

GRANTEE: Wisconsin Department of Natural Resources

LOCATION: Milwaukee, WI

GRANTEE CONTACT:	Roger Bannerman	(608) 266-8805
PRINCIPAL INVESTIGATOR:	Roger Bannerman	(608) 266-8805
EPA REGION:	Gertrud Matuschkovitz	(312) 353-2160
EPA HEADQUARTERS:	Norman Whalen	(202) 755-2114

PROJECT DESCRIPTION:

Water quality data indicated that the areas major rivers, the Menomonee, Milwaukee, and Kinnickinnic, are polluted with heavy metals (lead), sediments, nutrient compounds, and BOD. It is estimated that approximately sixty percent of the pollution load is derived from nonpoint sources. These conditions decrease propagation of fish and wildlife, and recreational usefulness.

The primary goal of this study is to determine the effects of timing and frequency of street sweeping on water quality, and to develop a practical methodology which can be used by municipalities to control nonpoint sources of pollutants. Determining the magnititude of pollutant contribution from roof runoff, atmospheric dry and wet deposition, and winter accumulation are secondary goals.

PROJECT STATUS:

Water quality analyses of first year sampling program is nearly completed, and results will be included in the first annual report, expected to be complete by March, 1981. Samplers are now set to be triggered by snowmelt flows. Only six sampling sites were operational in 1980, but this has been increased to eight for 1981. Two areas (paired) originally selected for street sweeping sampling have been deleted from the project scope, which is currently in the process of a project modification. Dryfall-wetfall samplers have experienced operating problems, with icing causing malfunctions.

AUSTIN
(Region VI)

GRANTEE: City of Austin (Thru Texas Department of Water Resources)

LOCATION: Austin, TX

GRANTEE CONTACT:	Ramon Miguez	(512) 477-6511
PRINCIPAL INVESTIGATOR:	George Chang	(512) 477-6511
EPA REGION:	Sharon Parrish	(214) 767-2662
EPA HEADQUARTERS:	Norman Whalen	(202) 755-2114

PROJECT DESCRIPTION:

Lake Austin, with only limited development within its watershed, is the principal water supply for the City of Austin. Town Lake, the former water supply, is located in the highly urbanized area, and now serves as a supplemental water supply source only, due to urban runoff conditions. Lake Travis, located upstream of Lake Austin, has no urbanization, or non-point source pollution. Lake Austin is also used for recreational activities.

An important objective of this NURP study is to document the effects of urbanization on a relatively pristine water body. This will be done by monitoring the effects of nonpoint sources of pollutants along various stretches of Lake Austin, and by identifying the pollutants and urban runoff sources to Town Lake. Information gathered from this phase of the project will be used to develop a watershed management plan utilizing both nonstructural and structural controls to moderate the impact of future urban development.

PROJECT STATUS:

Samplers have been installed at two BMP sites and two more should be installed within the next week. Lack of rainfall has prevented testing of sampling equipment. As soon after February 1st as this task has been completed, and as weather conditions permit, event sampling will begin. No data has been entered into STORET yet. Sediment sampling of Lake Austin and Town Lake will start within the next couple of months.

GRANTEE: Metroplan

LOCATION: Little Rock, AR

GRANTEE CONTACT:	Andy Covington	(501) 372-3300
PRINCIPAL INVESTIGATOR:	Warren Brainard	(501) 372-3300
EPA REGION:	Ann Hartley	(214) 767-2624
EPA HEADQUARTERS:	Norman Whalen	(202) 755-2114

PROJECT DESCRIPTION:

Fourche Creek and its tributaries drain approximately 90 percent of the metropolitan Little Rock area. Ultimate discharge from this watershed is into the Arkansas River. Water quality problems caused by urban runoff identified by past 208 studies include high concentrations of coliform bacteria, nutrient compounds, and heavy metals. Because of chronic violations of dissolved oxygen, suspended solids, and biochemical oxygen demand standards, Fourche Creek has been designated "water quality limited."

The Little Rock project defined intended objectives as:

- determination of the sources and transport mechanisms for urban runoff pollutants
- analysis of candidate BMP's for effectiveness
- analysis of benefits to the public from BMP implementation, such as improvement of the urban drainage system, use of buffer spaces around waterways, and "green belts" around impervious areas.

PROJECT STATUS:

The University of Arkansas at Little Rock is under contract to METROPLAN to conduct the wet and dry dampling program. They have furnished two sets of background results so far; limited rainfall has

hampered this effort. BMP site selection should allow monitoring and sampling to begin in the spring. A contract with the State for data entry into STORET is under negotiation.

High levels of sediment in background samples appear to result from rapid development in western Little Rock.

GRANTEE: Metropolitan Area Regional Council (MARC)

LOCATION: Kansas City, MO (Indian Creek, Rock Creek, Blue River)

GRANTEE CONTACT:	Dave Garcia	(816) 474-4240
PRINCIPAL INVESTIGATOR:	Frank Browne	(913) 642-5552
EPA REGION:	Cecil Taylor	(816) 374-5420
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

The major participants in this program are Johnson County, Kansas and Independence, Missouri, in conjunction with the Mid-America Regional Council. Water quality problems caused by stormwater runoff are standards violations in Indian and Rock Creeks. Pollutants of interest are nutrients and heavy metals.

The primary objectives of this project are:

- to collect data on land use and pollutant loadings
- to measure the effects of urban runoff on stream quality and benthic organisms
- to evalute detention basins for effectiveness
- to evaluate the applicability of BMP's.

PROJECT STATUS:

All sites have been selected and approved. Monitoring equipment has not yet been received, so complete monitoring has not begun.

Agreements with local participants are finalized.

GRANTEE: Denver Regional Council of Governments (DR COG)

LOCATION: Denver, CO (small creeks, South Platte River)

GRANTEE CONTACT:	Larry Mugler	(303) 455-1000
PRINCIPAL INVESTIGATOR:	Sherman Ellis	(303) 234-4061
EPA REGION:	Bruce Zander	(303) 837-4963
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

Receiving waters in the Denver area are heavily affected by non-point source pollutants such as heavy metals, nutrients, and bacteria. During storm events, the pollution load applied to the receiving waters is of the same order of magnitude as that generated by point sources. The beneficial use of these waters is impaired for recreational and agricultural purposes.

The objectives of this study are to assess the nature, causes, and severity of, and to control urban runoff pollution. The following have primary emphasis:

- determine pollution load as a function of land use.
- identify specific areal sources of pollutants.
- determine impact of non-point sources of pollutants on receiving water quality.
- evaluate BMP's and their effects on receiving water quality.
- determine dry weather pollutant accumulation patterns characteristic of semi-arid urban environments.
- evaluate local institutional structures for efficient and effective utilization of BMP's.
- develop an efficient and cost-effective urban runoff management program.

PROJECT STATUS:

A contract is being negotiated with a commercial lab for priority pollutant analysis. Atmospheric deposition samplers are being installed. Data continues to be entered into the WATSTORE and STORET data systems. Coordination has been established with the Clean Lakes grant on Sloans Lake.

GRANTEE: Salt Lake County Council of Governments

LOCATION: Salt Lake County, UT (Jordan River)

GRANTEE CONTACT:	Gerald Kinghorn	(801) 535-7210
PRINCIPAL INVESTIGATOR:	Terry Way	(801) 535-7210
EPA REGION:	Doug Johnson	(303) 837-4963
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

Water quality criteria for designated beneficial uses are being violated in the Jordan River and its major tributaries. This has resulted in their being designated as "Water Quality Limited". Desired beneficial uses include secondary contact recreation, cold and warm water fisheries, aesthetics, and agricultural irrigation. Urban runoff has been identified as a major cause of water quality degradation.

The overall objective of this project is to evaluate and demonstrate the effectiveness of structural and non-structural BMP's and to reduce the effects of urban runoff pollution on surface waters. The project will be accomplished in three phases. The first phase is devoted to problem assessment. Flow and water quality data are being monitored at approximately 40 sites. Both dry and wet weather data are being collected. Data are also being obtained at five control facilities in order to determine their effectiveness and to obtain design criteria. Contribution of pollutants from atmospheric deposition are also being monitored at eight sites. The second phase will be concerned with the design and construction of control facilities. The final phase will evaluate the effectiveness of the controls by monitoring water quality before and after facility processes. Cost data will be applied to determine cost-effectiveness of controls.

The BMP's studied in this project are:

- modification of inlet/outlet structures at existing detention basins
- modification of storm drain catch basins
- use of wetland flow treatment
- use of existing canals as linear detention/percolation basins
- public information/education.

PROJECT STATUS:

The second and third year work plan has been submitted for approval. The scope of work has been cut back to make better use of project funds. The contract with a commercial lab for priority pollutant analysis is being negotiated. Atmospheric deposition samplers have been installed.

RAPID CITY
(Region VIII)

GRANTEE: 6th District Council of Governments

LOCATION: Rapid City, SD (Rapid Creek)

GRANTEE CONTACT:	Mike Strub	(605) 394-2681
PRINCIPAL INVESTIGATOR:	Bruce Zander	(605) 394-2443
EPA REGION:	Roger Dean	(303) 837-2721
EPA HEADQUARTERS:	Patty Bubar	(202) 755-2114

PROJECT DESCRIPTION:

The beneficial uses of Rapid Creek include public water supply and fish and wildlife propagation. Water quality problems associated with this stream are coliform contamination and algae blooms caused by nitrogen and phosphorus input. The stream's use as a supplemental municipal water supply has been impaired by chronic high coliform counts.

The program will be concerned primarily with problem assessment, determination of pollutant sources, and the identification of pollutant loading and land-use relationships. An evaluation of BMP's may be added as the project progresses.

PROJECT STATUS:

All monitoring sites have been selected and approved. Flow monitors are in place and calibrated; sampler installation awaits equipment delivery. Several storms have been manually sampled and analyzed. Data collected to date has been summarized and is reported in this quarterly report. Samples have been collected for priority pollutant analysis.

GRANTEE: Alameda County Flood Control and Water Conservation District

LOCATION: Castro Valley, CA

GRANTEE CONTACT:	Paul Lanferman	(415) 881-6470
PRINCIPAL INVESTIGATOR:	Gary Shawley (Alameda Co. FCWCD)	(415) 881-6485
EPA REGION:	Craig Vassel	(415) 556-5693
EPA HEADQUARTERS:	Stuart Tuller	(202) 755-2114

PROJECT DESCRIPTION:

The Castro Valley watershed is a 5.5 square mile area near the San Francisco Bay. It is primarily residential in nature with less than 10 percent of the land area devoted to commerical development. Castro Valley is considered representative of many suburban neighborhoods in the Bay Area. Important characteristics of the study area include: no municipal or industrial point sources of water borne pollutants; limited, small capacity storm sewers; unchannelized streambeds; residential development along streambeds.

The primary objective of this study is to determine the effectiveness of street sweeping as a Best Management Practice (BMP) in suburban environments such as Castro Valley. This objective is being accomplished in three phases:

- estimation of the pollutant loading from various sources (e.g., roofs, parking lots, streets)
- evaluation of the effectiveness of street sweeping in meeting desired water quality goals
- analysis of the cost-effectiveness of street sweeping compared with other possible control measures.

Important emphasis will be placed on monitoring storm events in order to compare runoff quality with the estimated pollutant loading and to identify the relationship between BMP use and receiving water quality.

PROJECT STATUS:

All data gathering and analysis tasks associated with this project have been completed. The final report is under preparation and due for completion by April 1, 1981.

Selected data summaries and the results of preliminary analyses were incorporated in Castro Valley's last Annual Report. Copies of this report may be obtained from the EPA Headquarters.

GRANTEE: State of California

LOCATION: Fresno, CA

GRANTEE CONTACT:	Gordon Lee Boggs	(916) 322-1587
PRINCIPAL INVESTIGATOR:	Doug Harrison(Fresno Co. FCWCD)	(209) 485-6350
EPA REGION:	Jorita Pajarillo	(415) 556-5078
EPA HEADQUARTERS:	Stuart Tuller	(202) 755-2114

PROJECT DESCRIPTION:

The 166 square-mile project site lies within the Fresno-Clovis metropolitan area located in the San Joaquin Valley of California. This area is semi-arid with much of the yearly rainfall occurring only during a few months in the winter. The watershed under study has no major water courses into which stormwater may flow, thus making the use of retention/recharge basins necessary.

The object of the Fresno NURP study is to determine the effects of urban runoff recharge on a sole source aquifer. Retention/recharge basins currently in use for stormwater disposal will be monitored to determine the following:

- the variables (e.g., land use) which affect the quantity and quality of urban runoff;
- the filtering capacity of the soils, contaminant loading, depth of penetration for various contaminants, and the effects of basin ground cover (e.g., grass, landscaping);
- contaminants which are not removed by soil treatment and their effects on groundwater quality; and
- management practices which will alleviate groundwater degradation caused by urban runoff recharge.

PROJECT STATUS:

Sampling was scheduled to begin early in 1981 but equipment delays coupled with drought conditions have caused a revision of the monitoring schedule. It is likely that full scale sampling will not occur until the winter of 1981-82.

The contract between the State of California, the county of Fresno, and the Flood Control District has been signed and approved.

GRANTEE: City of Bellevue

LOCATION: Bellevue, WA

GRANTEE CONTACT:	Pam Bissonnette	(206) 455-6923
PRINCIPAL INVESTIGATOR:	Pam Bissonnette	(206) 455-6923
EPA REGION:	Al Ewing	(206) 455-7218
EPA HEADQUARTERS:	Stuart Tuller	(202) 755-2114

PROJECT DESCRIPTION:

The water quality of the urban streams within the city of Bellevue has been degraded due to contamination by nutrients, bacteria, heavy metals, BOD, and pesticides. Of particular concern is sediment input from urban runoff which has substantially decreased the nursery potential for salmon propagation and aesthetic enjoyment.

This project will assess the effectiveness of street sweeping and basin cleaning in terms of pollutant load removal and resultant effects on receiving water quality. First-year work has been devoted to street sweeping analysis of various sweeping frequencies and equipment type. The second-year work will be concerned with detention basin analysis using various cleaning frequencies of basins in conjunction with street sweeping. These data will be used to develop a cost-effective strategy for pollutant removal from urban runoff.

PROJECT STATUS:

The USGS is inventorying precipitation and resultant discharge from three urban containments, collecting and analyzing rainfall and dry deposition samples, and collecting discrete runoff samples in order to define pollutant hydrographs for each of the catchments during approximately twelve storms per year. Sampling has been underway since March 1980.

In two of the catchments, street sweeping has been conducted since April 1980 on alternate schedules and with varying frequencies. In the third catchment, stormwater has been sampled without detention in the basins. The detention gates will be reinstalled in the control basins in February of 1981.

Seattle METRO's toxicant inventory is progressing well. Seventeen samples for priority pollutant analysis have been collected and partial results are back from four stormwater runoff samples and two street dirt samples.

GRANTEE: Lane Council of Governments (L-COG)

LOCATION: Eugene/Springfield, OR

GRANTEE CONTACT:	Gerritt Rosenthal	(503) 687-4283
PRINCIPAL INVESTIGATOR:	Gerritt Rosenthal	(503) 687-4283
EPA REGION:	Cecil Ouellette	(503) 221-3250
EPA HEADQUARTERS:	Stuart Tuller	(203) 755-2114

PROJECT DESCRIPTION:

Past studies of surface water quality in the Eugene/Springfield metropolitan area have identified urban stormwater runoff as an important source of contamination. This contamination has been responsible for the creation of potential public health hazards, has interfered with beneficial uses downstream, and has caused regular instream standard violations. Pollutants of specific concern are heavy metals, nutrient compounds, sediments, and pathogenic bacteria.

The purpose of the L-COG NURP study is to assess the source, magnitude, nature, and controls of pollutants in urban runoff. Possible BMP's to be reviewed in this study are instream sedimentation ponds, wetland treatment, and street sweeping.

PROJECT STATUS:

Rainfall, water quality baseline, and stormwater sample collections are proceeding according to schedule. Data from the analysis of the samples is now being input into STORET with the assistance of EPA Region X.

Full-scale monitoring of the vegetation management site was carried out from June through October. The site was harvested in mid-June; cattail tissues were digested and analyzed for trace metal concentrations.

The sediment control site on the Amazon Channel was cleaned and is now being monitored intensively. It became necessary to abandon

the street sweeping task when equipment was diverted for use in the Mount St. Helens ash zone.

Monitoring has begun at an industrial site to evaluate the effectiveness of straw bales as oil/grease traps.

For nearly 9 months, EPA has been developing a comprehensive strategy to assure achievement of maxiumum water quality improvement from the dollars to be obligated through the wastewater treatment construction grant program over the next decade.

The following proposed strategy for management of urban stormwater runoff was prepared as one element of the overall strategy. Public hearings on the full 1990 Strategy will be conducted across the country during March.

OVERVIEW

Stormwater management is a major problem facing most cities today. It is not yet clear whether urban runoff is actually a water quality problem that must be controlled, or if it is simply a nuisance. Currently, the "red book", Quality Criteria for Water is the principal gauge of a problem's importance. In light of the potential cost and uncertainty associated with hydrologically-induced pollution events, we need to refine our tools of measurement.

The Federal Water Pollution Control Act (PL 92-500) as amended by the Clean Water Act (PL 95-217) views urban drainage as a potential water quality problem, albeit of unknown severity and extent. At the municipal level, however, urban runoff is most often viewed as a quantity problem. In reality, the urban runoff problem is both, but not in equal terms: the quantity problem is greater than the quality problem in most cities. The EPA strategy for urban runoff control recognizes this duality and involves an approach to problem solution wherein funds used to control pollution can be combined with funds being expended on drainage and erosion control.

Sewerage systems have traditionally been classified as one of three types: sanitary, combined, and storm. This traditional classification is based on design and original intent, and is very often misleading in terms of what actually happens during a storm. In

reality, there is a continuum ranging from one intent (pollution control) to the other (drainage control). Where any given system falls within the continuum can be determined only by local examination. The key point here is that urban runoff quantity and quality problems can be associated with all conveyance system types.

The strategy for urban runoff control advocates a holistic approach wherein all sources are considered and the spectrum of control options available are examined in order to select the most workable solution.

A prerequisite step in establishing any control program is to define the nature of the "problem". What is lacking from our previous guidance to date is a clear statement of what constitutes a problem. The Clean Water Act provides an objective... "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Also provided are six goals to help meet the objective. However, translating these goals into target levels of abatement requires clear problem definition in terms of technical, political, social, and financial feasibility, as well as in terms of what harm is being done.

The beneficial uses of a given water body are typically defined in the following terms:

- domestic water supply
- agricultural water supply (e.g., livestock, irrigation)
- industrial water supply (including cooling)
- propagation of aquatic and marine life

- recreation (e.g., contact, noncontact, aesthetics)
- hydroelectric power generation
- navigation
- waste assimilation.

The relative importance of these uses depends upon the specific location. The emerging strategy requires that problems be defined in terms of denial of a designated beneficial use (or the degree of impairment). This must be determined in relation to a specific location. The concept of denying or impairing a designated beneficial use will be considered as the first priority level for problem definition. The second priority level for problem definition will be the failure to meet an established water quality criterion.

This approach breaks water quality standards into two main elements: the beneficial use and the criterion adopted to protect that use. In dealing with urban runoff, criteria based upon dry-weather flows are generally not met during wet-weather events. In many cases where there is a temporary violation of criteria, the beneficial use is not actually denied or impaired to a measurable degree.

The third priority level of problem definition is represented by instances where the public may perceive a water quality problem and forego normal use of the water. An example would be: on a clear sunny day the public views a river which is muddy from a previous day's rain storm and suspends use of the river for recreation. Although the

water's condition may only be caused by natural erosion, it causes concern.

When discussing urban runoff or any hydrologically-related event, several points must be kept in mind:

- it results in an intermittent discharge; the frequency, duration, volume, and areal extent of which are highly variable
- the sources of pollutants are equally variable
- the pollutants themselves are highly variable.

Given the above, it is prudent to move cautiously into the approach of control of hydrologically-related pollution events, especially urban runoff.

Once the problem has been identified and pollutants associated with the impacted beneficial use have been determined, the next step is to determine their source. If, for example, the problem is fish dying from oxygen starvation, how much oxygen-demanding material is coming from urban runoff and how much comes from other contributors (e.g., upstream loads, combined sewer overflow loads, separate storm sewer loads, WWTP effluent loads, industrial loads)?

APPROACH

Two basic approaches can be considered for addressing the control of urban stormwater pollutant loads. One strategy would require the

application of available technology (this would be roughly analagous to prescribing secondary treatment for municipal discharges and BPT or BAT for industrial discharges). The other would be based on determining control needs on the basis of the water quality effects of the urban storm induced load. (This is analagous to the basis for establishing advanced treatment requirements.)

Current plans favor the latter approach. With this approach, any decisions with regard to urban stormwater control would be based on the impact such waste loads would have on beneficial uses of the local receiving waters. The need for control and the level of control required would be determined on a case-by-case basis. This would require an investigation and evaluation of uses of the water body, pollutants which relate to the use or uses in question, and the relative contribution of storm water loads compared with loads from other sources. A determination of the degree to which various levels of reduction in receiving water pollutant concentrations provides additional protection or enhancement of the designated use (i.e., the benefit) would be made. The decision on the level of control to apply to urban runoff sources would be based on a comparison of the costs to achieve the selected improvement in water quality, by applying treatment to each of the significant, controllable sources.

The advantages of such an approach would be as follows:

- Construction and O&M expenditures have the best chance of being cost effective (i.e., based on tradeoffs between point and non-point sources and on effective cost-benefit relationships).

- The approach would be compatible with current EPA efforts to develop PS/NPS tradeoffs for AWT decisions.

- It can help avoid situations where controls arbitrarily selected may not provide enough reduction in load to protect a desired use - or where urban storm water controls have no effect on a water quality problem because these loads are insignificant contributors.

Disadvantages would be as follows:

- The level of technical analysis upfront would be significantly higher than normal past practice for 201s addressing point sources. Additional resources would be required in planning or Step 1 phases of a project.

- Monitoring requirements and associated costs would be higher.

- State and EPA review activities would in most cases require the assignment of additional personnel with appropriate technical background.

- Control requirements and funding would vary from project to project - and would probably not be uniform from one EPA Region or geographic area to another.

- Appropriate guidance, training, and technical support would be required to help ensure that analyses and decisions are technically sound.

In light of the current level of our understanding of urban runoff and the need for its control, the moratorium on the funding of treatment for separate storm sewer discharges should probably be

continued until the mid 80's. This would allow time for the Agency's current work in this area to be completed.

The current funding policy for combined sewer overflows probably does not need to be changed. It recognizes the dual nature of urban runoff and allows for partial funding of multi-purpose projects. However, the strategy does recommend changes in emphasis with respect to the methods for controlling pollution from combined sewers.

The strategy to control urban runoff is based on containment of the runoff, management of the sewer system, and treatment where needed--each overall system tailored so as to meet locally developed and State-recognized priority problems.

- Containment - In order for the nation to avoid playing "catch up" on CSO, runoff in identified problem areas must be contained. Methods to control the rate of runoff and, to some extent, the amount of runoff, have been with us for some time. Detention basins, for example, are currently used widely to attenuate runoff in developing areas. In the majority of older, larger cities, sewer systems are in a deplorable state. Much can be done, expecially with CSOs, by means of sewer system rehabilitation.

- Management - In controlling CSOs, there are many steps that can be taken short of costly treatment. Instream and offstream storage, coupled with flow control devices, proved successful in controlling the problem at a much lower cost than complete separation.

- Treatment - Since much has been written on methods to control and treat CSOs, no further discussion will be provided here. Readers are referred to the 1978 Needs Survey for a good presentation of the alternatives.

IMPLEMENTATION

The following are recommendations based upon consideration of the above issues:

- The moratorium on the funding for treatment of separate storm sewer discharges should be continued. Planning for the control of separate storm sewer discharges should be grant eligible, under section 201, where this control would be part of a cost-effective control package.

- Appropriate changes to the regulation to reflect the legislative amendment need to be made (PRM-61 covers this).

- Six types of activity will be required at the federal level: planning, administration, standards, regulation, funding, and research:

  Planning

  - In the short term, planning should continue with the development of methodologies and the transfer of information from current, ongoing projects to states and local governments.

  - Attention should focus on answering the question of whether urban runoff is a significant contributor to a problem by thoroughly investigating current results of projects.

  - Planning efforts should support other functions with information, data, and analysis (for such functions as research, standards, permits, grants, etc.).

  - Education, training, and technology transfer programs should be developed.

  - Monitoring and inspection programs should be developed to test for results.

  Administration

  - Regulations for states should be changed to emphasize importance of urban runoff and their own role.

- A specialized group dealing with states only on urban runoff needs to be established. Functions would include regulation-writing, grants administration, technical assistance, etc.

- In the short term, 208 grants would be administered; in the long run, 106 grants.

Standards

- We need to work with the standards people--not to develop new criteria--but to develop new methods of using the established criteria (e.g., for wet weather episodes it may be more appropriate to allow for a certain frequency of not meeting the criteria).

- A means for using dilution ratios as a basis for measuring impacts must be worked out.

- The concept of stream categories (i.e., urban feeder vs. urban tributary) needs to be developed.

Regulation

- New concepts of regulation need to be developed for hydrologically-related pollutant discharges.

- In the long term, general permits will need to be issued.

Funding

- In the short term, funding will be withheld until the need for funding can be established.

- Should there be a need, a small-scale funding program, (e.g., Rural Clean Water Program) may be appropriate for separate storm sewer discharges.

- A small-scale Urban Clean Water Program may be all that is required to focus on controlling well-defined problems.

- Needs Survey work must consider new approaches in defining needs. Current ongoing work must be funneled into the next surveys.

Research

- In the short term, ORD should continue current work.

- The primary focus must switch to evaluating the impacts on receiving waters.

- The data base being developed by current EPA and USGS work must be used. Much work will remain to be done in the long term to gain a good understanding of cause and effect.

- The 80's should see a closer working together of the agency and the states through the use of state-EPA agreements and a restructuring of the administrative infrastructure of the agency. The real burden of implementation will fall upon the states to:

  - determine and develop priorities for problem areas

  - develop a control framework

  - develop priority lists

  - develop educational programs

  - develop monitoring programs

  - develop regulatory programs.

  It is at the local level that implementation of control will actually occur. It is at this level that problems will be defined, beneficial usage defined, and the need for control defined. Local agencies will have to:

  - define problems based on denial of beneficial usage

  - develop administrative infrastructure

  - develop educational programs

  - develop operational programs & ordenance

  - develop local monitoring programs.

Recent Urban Runoff Studies and Publications

Beginning with this Quarterly Progress Report, we will be presenting abstracts and other bibliographic information on urban runoff studies.

The following list of descriptions of urban runoff research and abstracts notes were obtained from the NTIS data base.

TITLE	Settleability of Urban Runoff Pollution
TITLE NOTE	Partial completion rept.
AUTHORS	Whipple, William Jr; Hunter, Joseph V.
ORGANIZATIONAL SOURCE	Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst. *Office of Water Research and Technology, Washington, DC.
PAGINATION/DATE	April 80; 25p
ISSUE	U8017
NTIS PRICES	NTIS Prices: PC A02/MF A01 W80-04807, /OWRT-A-058-NJ(1)
CONTACT/GRANT NOS.	DI-14-34-0001-0132
PROJECT NOS.	OWRT-A-058-NJ
CATEGORY CODES	8H; 68D; 48G; 91A
INDEX TERMS	*Runoff; Water pollution control; *Urban areas; Settling; Reservoirs; Lagoons (Ponds); Coliform bacteria; Effectiveness; Biochemical oxygen demand; Removal; Copper; Zinc; Sediments; Feasibility
SUPPLEMENTARY TERMS	*Storm water runoff; Heavy metals; Nonpoint sources; Urban hydrology; NTISDIOWRT
ABSTRACT	Because of the growing interest in stormwater management, and particularly of the possibility of using detention basins for removing particulate pollution, it is important to determine the effectiveness of such basins for removal of various polluting substances. In the study reported upon samples of urban runoff were allowed to settle in a large tube, and the quantity of each pollutant settling in a given time period determined. There was more variability in rate of settlement of specific pollutants than for total supspended solids. Lead and hydrocarbons settled out 60-65 percent in 32 hours, only slightly slower

than total suspended solids. BOD and copper were removed at somewhat lower rates, and zinc even lower. Coliform counts were reduced by an order of magnitude. These results indicate the probable effectiveness of retention of stormwaters in removing particulate pollutants.

TITLE	Characteristics of Nonpoint Source Urban Runoff and Its Effects on Stream Ecosystems
TITLE NOTE	Final rept.
AUTHORS	Porcella, Donald B.; Sorensen, Darwin L.
ORGANIZATIONAL SOURCE	Utah Water Research Lab., Logan. *Corvallis Environmental Research Lab., OR.
PAGINATION/DATE	Feb 80; 112p
ISSUE	U8016
NTIS PRICES	NTIS Prices: PC A06/MF A01 EPA-600/3-80-032; 8H; 6F; 68D; 48G; 57H; 91A
INDEX TERMS	*Runoff; *Water pollution; *Streams; *Urban areas; *Ecology; Ecology; Environmental impacts; Invertebrates; Primary biological productivity; Respiration; Carbon cycle
SUPPLEMENTARY TERMS	Stormwater runoff; *Nonpoint sources; Water pollution effects (Animals); NTISEPARORD
ABSTRACT	Literature on urban nonpoint source runoff was surveyed to determine the magnitude of the effects of that source of contaminants to stream ecosystems. Ecological literature provided a basis for evaluating such impacts based on benthic invertebrate biomass and diversity, measurement of community primary production and respiration, carbon cycling, and variables related to the contaminant concentrations in the stream.

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TITLE	Effects of Land Use and Urbanization on Water Resources and Water Quality. 1977-April, 1980 (Citations from the NTIS Data Base)
TITLE NOTE	Rept. for 1977
AUTHORS	Brown, Robena J.
ORGANIZATIONAL SOURCE	National Technical Information Service, Springfield, VA
PAGINATION/DATE	Apr 80; 146p*
ISSUE	U8014
NTIS PRICES	(Supersedes NTIS)PS-79/0448 and
NOTES	NTIS/PS-78/0488. See also 1971-1976, NTIS/PS-78/0487.
CATEGORY CODES	13B; 48B*; 68D*; 91A; 91H; 86W *Bibliographies; *Land development; *Water resources; *Urbanization; *Land use; Regional planning; Urban planning; Benefit cost analysis; Surface water runoff; Recreation; Water supply; Flood control; Water pollution; Water quality management; Government policies
SUPPLEMENTARY TERMS	NTISNTISN
ABSTRACT	General studies on the effects of land use and urbanization on water supply and water quality are presented. Reports on specific localities are included. If they may be applied to other areas. These citations not only include local, state, and national government policies and planning affecting land development, but also basic research on the relationship between land use and water quality management. (This updated bibliography contains 139 abstracts, 23 of which are new entires to the previous edition.)

TITLE	Sediment-Pollutant Relationships in Runoff from Selected Agricultural, Suburban, and Urban Watersheds. A Statistical Correlation Study
TITLE NOTE	Final rept. Sep 77-Sep 78
AUTHORS	Zison, Stanley W.
ORGANIZATIONAL SOURCE	Tetra Tech. Inc., Lafayette, CA. *Environmental Research Lab., Athens, Ga.
PAGINATION/DATE	Jan 80; 150p
ISSUE	U8013
NTIS PRICES	NTIS Prices: PC A07/MF A01 EPA-600/3-80-022; EPA-68-03-2611
CATGEGORY CODES	8H; 68D; 48G
INDEX TERMS	*Runoff; *Water pollution; Simulation; Statistical analysis; Sediment transport; Particles; Corelation techniques; Variability; Estimating
SUPPLEMENTARY TERMS	*Nonpoint sources; Suspended solids; Stormwater runoff; Agricultural watersheds; NTISEPAORD
ABSTRACT	Data from agricultural, subruban, and urban watersheds were subjected to statistical correlation analysis to estimate potency factors. These factors are coefficients that, when multiplied by sediment mass emission rates (transported in runoff), provide estimates of mass emission rates for other pollutants. The potency factors are required input for such lumped-parameter runoff models as the Nonpoint Source (NPS) Model and the Stormwater Management Model (SWMM). The data were also subjected to multiple regression analysis to examine the effect of storm parameters on runoff water quality and the interrelationship among runoff water quality constituent concentrations themselves (other than sediment load).

TITLE	The Influence of Urbanization on the Transport of Heavy Metals in New Jersey Streams
TITLE NOTE	Technical completion rept. (Final)
AUTHORS	Wilber, William G.; Hunter, Joseph V.
ORGANIZATIONAL SOURCE	Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research and Technology, Washington, DC.
PAGNATION/DATE	Feb 80; 128p
ISSUE	U8012
NTIS PRICES	NTIS Prices: PC A07/MF A01 W80-03774, /OWRT-A-050-NJ(5)
CONTRACT/GRANT NOS.	DI-14-34-0001-8032
PROJECT NOS.	OWRT-A-050-NJ
CATEGORY CODES	13B; 68D; 91A
INDEX TERMS	*Metals; *Water pollution; *Saddle River; *Urban areas; Sampling; Runoff; Precipitation (Meteorology); Sediments; Industrial wastes; Concentration (Composition); Lead (Metal); Copper; Zinc; Nickel; Tables (Data); New Jersy
SUPPLEMENTARY TERMS	Heavy metals; Lodi (New Jersey); NTISDIOWRT
ABSTRACT	A study of the transport of heavy metals was performed on a higly developed 4.6-mile stretch of the Saddle River near Lodi, New Jersey. Heavy metal concentrations in stormwater runoff entering the study area varied significantly throughout runoff events and from storm to storm. Lead, zinc and copper contributed from 90 to 98 percent of the total metals measured. Distribution of metals in precipitation samples collected in the study was similar to that in runoff samples, with lead and zinc predominating, although concentrations of metals in rainfall were much lower than those in runoff. Base flow metal concentrations in tributaries to the Saddle River were variable, with highest levels occurring during wet weather.

The following list of descriptions of urban runoff research notes and abstracts were obtained from the SSIE database.

TITLE	DEVELOPMENT OF METHODS TO DEFINE WATER QUALITY EFFECTS OF URBAN RUNOFF
INVESTIGATOR	Mancini, JL; DiToro, DM
ORGANIZATIONAL SOURCE	Manhattan College, School of Engineering, Dept. of Environmental Engineering & Science, 4513 Manhattan College Pkwy., Bronx, New York 10471, United States of America (Mancini); College, New York, United States of America (DiToro)
SPONSORING ORGANIZATION	U.S. Environmental Protection Agency, Office of Research & Development, Municipal Evironmental Research Lab., 26 W. St. Clair St., Cincinnati, Ohio, 45268, United States of America
FUNDING	9/79 to 9/81 (1980) (GRANT) Proj. No. RB06828, CC35 - S1T75 (Prior Funding: FY79 ($20,000)
PROJECT MONITOR	Ammon, DC

ABSTRACT

OBJECTIVE: The objective is to develop information and a methodology for defining criteria for wet-weather water quality standards.

APPROACH: The approach involves development of load matrices for governing pollutants as a function of size of urban area and size and frequency of wet-weather events. These load matrices will act as inputs to short-term effects matrices that consider receiving water size and type and the organism/contaminant transformations.

TITLE	EVALAUTION OF URBAN RUNOFF MUTAGENICITY
INVESTIGATOR	Murphy, CB; Karanik, JM
ORGANIZATIONAL SOURCE	O'Brien and Gere Engineers, Inc., 1304 Buckley Rd., P.O. Box 4873, Syracuse, New York, 13221, United States of America (Murphy); Onondaga County Government, New York, United States of America (Karanik)
SPONSORING ORGANIZATION	U.S. Environmental Protection Agency, Office of Research & Development, Municipal Environmental Research Lab., 26 W. St. Clair St., Cincinnati, Ohio, 45168, United States of America
FUNDING	7/79 to 7/80 (1980) (GRANT) Proj. No. RB06640, CC35 - S1T59A (Prior Funding: FY79 $0)
PROJECT MONITOR	Turkeltaub, R

ABSTRACT

OBJECTIVE: a) The determination of the mutagenic potential of urban runoff and combined sewer overflow (CSO) in test catchment areas in Onondaga County of New York and its applicability to urban areas in general, b) The correlation of mutagenicity results with baseline analytical data for each catchment area, relating mutagenic potential to unique catchment area characteristics, and c) The evaluation of four treatment methodologies for their applicability to the reduction of the toxic potential imposed by untreated urban runoff and CSO.

APPROACH: Runoff and CSO samples will be collected from a cross section of urban areas in Onondaga County and from three other urban areas for a comparison of data. The Ames mutagenicity test will then be performed on the samples and the results will be analyzed and evaluated.

TITLE	ESTABLISHMENT OF AN URBAN RAINFALL/RUNOFF QUALITY DATA BASE
INVESTIGATOR	Huber, WC; Heaney, JP
ORGANIZATIONAL SOURCE	State University System of Florida, University of Florida School of Engineering Sciences, Dept. of Environmental Engineering Sciences, 220 Black Hall, Gainsville, Florida, 32611, United States of America (Huber); State University System of Florida, Florida, United States of America (Heaney)
SPONSORING ORGANIZATION	U.S. Environmental Protection Agency, Office of Research & Development, Municipal Environmental Research Lab., 26 W. St. Clair St., Cincinnati, Ohio, 45268, United States of America
FUNDING	3/78 to 4/80 (1980) (CONTRACT) Proj. No. 68-03-2663, CC35 - S1T030 (Prior Funding: FY79 $5,000)
PROJECT MONITOR	Ammon, DC

ABSTRACT

The University of Florida has attempted to obtain urban rainfall/runoff quality data, collected by others, to fulfill modeling needs as first priority with attention also to characterization needs. Specific objectives have been, broadly: 1. identify sources of data; 2. establish criteria for collection of data; 3. acquire available data; 4. construct initial data base; 5. define how continuing maintenance of the data base is to be accomplished; and 6. define how data dissemination should be done.

The data collection and evaluation process is a continuous one. Hence, data will be continually acquired as part of the project and addenda with new data from new or the same sources will be issued periodically. Work also includes statistical and loading analyses of much of the data.

PROGRESS: Statistical analyses have been completed. New rainfall/runoff quality data have been included.

TITLE	WATER QUALITY AND BIOLOGICAL EFFECTS OF URBAN RUNOFF ON COYOTE CREEK
INVESTIGATOR	Sartor, J
ORGANIZAITONAL SOURCE	Woodward-Clyde Consultants, 600 Montgomery St., San Francisco, California, 94111, United States of America (Sartor)
SPONSORING ORGANIZATION	U.S. Environmental Protection Agency, Office of Research & Development, Municipal Environmental Research Lab., 26 W. St. Clair St., Cincinnati, Ohio, 45268, United States of America
FUNDING	11/77 to 4/80 (1980) (GRANT) Proj. No. R805418, CC35 - S21023 (Prior Funding: FY79 $85,000)
PROJECT MONITOR	

ABSTRACT

The objective of this study is to quantify the biological and water quality changes of a small stream as it passes through the San Jose, California urban area. The selected stream has no industrial or municipal point discharges and the expected stream quality gradient will be a function only of non-point urban runoff. Detailed field measurements will be periodically conducted over a period of one year both upstream of the urban area and at selected locations within the urban area.

Another task of the project is to measure the stormwater pollutant removal effectiveness and water quality changes that occur within an idealized catchbasin.

This project will be conducted in conjunction with a current EPA sponsored demonstration project in San Jose titled "Demonstration of Non Point Pollutant Abatement through Improved Street Cleaning Practices".

TITLE	ANALYSIS OF APPLIED BEST MANAGEMENT PRACTICES FOR STORMWATER QUALITY CONTROL
INVESTIGATOR	Bissonnette, P
ORGANIZATIONAL SOURCE	Bellevue City Government, Box 1768, Bellevue, Washington, 98009, United States of America (Bissonnette)
FUNDING	11/78 to 11/81 (1980) (GRANT) Proj. No. R805929, CC35 - S1T024 (Prior Funding: FY79 $0)
PROJECT MONITOR	Field, R

ABSTRACT

OBJECTIVES: To analyze, at the field demonstration level, the cost and effectiveness of Best Management Practices (BMPs), individually and in combination. During a portion of the first year some initial monitoring of two basins with no BMPs will be conducted to see if one is a reasonable replicate of the other. Such studies will include a complete street and drainage system inventory, non-storm surface and drainage system sampling, and as well as a few storms. Following the successful conclusion of these tasks, BMP application (street cleaning, culvert cleaning, catch basin cleaning, etc.) would begin in one of the basins, maintaining the other as a control. In this manner BMP effectiveness could be determined by direct comparison during the first year. Using such tools as a desktop annual load model, differences in annual load could be calculated using regional precipitation data. Each basin would be modeled and the study of parameter sensitivity could be improved using real data. During the second year the basins could be switched; direct comparison between basins on both an event and an annual bad basis would yield information on BMP effectiveness.

FINAL OUTPUTS: To report on and disseminate the results of the above objectives.

TITLE	TREATMENT OF STORMWATER RUNOFF BY A MARSH/ FLOOD BASIN
INVESTIGATOR	Litwin, YJ; Bursztynsky, T
ORGANIZATIONAL SOURCE	Ramlit Asociations, Inc., Hotel Claremont, Berkeley, California, 94705 United States of American (Litwin); Assn. of Bay Area Governments, California, United States of America (Bursztynsky)
SPONSORING ORGANIZATION	U.S. Environmental Protection Agency, Office of Research & Development, Municipal Environmental Research Lab., 26 W. St. Clair St., Cincinnati, Ohio, 45268, United States of America
FUNDING	9/78 to 3/81 (1980) (GRANT) Proj. No. R806357, CC35 - S2T026 (Prior Funding: FY79 $65,500)
PROJECT MONITOR	

ABSTRACT

OBJECTIVE: To analyze the qualitative changes of surface runoff as a result of ponding in a marsh/flood basin. Comparison will be made between using the marsh/flood basin as a treatment measure for mitigating for stormwater runoff pollution, other BMPs and structural techniques used for that purpose.

APPROACH: The objectives will be satisfied by an extensive sampling and monitoring program which will include collecting data and analyzing characteristics of the basin and the tributary watershed and cost information of basin operation. Also included via supplemental funding as described herein will be a thorough literature search updating the state-of-the-art on pollutant control utilizing best vegetative and hydraulic practices.

TITLE	STORMWATER MANAGEMENT TO IMPROVE LAKE WATER QUALITY
INVESTIGATOR	Wanielists, MP; Yousef, Y; Taylor, J
ORGANIZATIONAL SOURCE	State University System of Florida, University of Central Florida School of Engineering, Dept. of Civil Engineering & Environmental Sciences, P.O. Box 25000, Orlando, Florida, 32816, United States of America (Wanielista); State University System of Florida, Florida, United States of America (Yousef); State University System of Florida, Florida United States of America (Taylor)
SPONSORING ORGANIZATION	U.S. Environmental Protection Agency, Office of Research & Development, Municipal Environmental Research Lab., 26 W. St. Clair St., Cincinnati, Ohio, 45268, United States of America
FUNDING	8/78 to 2/80 (1980) (GRANT) Proj. No. R805580, CC35 - S2T011 (Prior Funding FY79 $0)
PROJECT MONITOR	Traver, RP

ABSTRACT

OBJECTIVE: The objective of this project is to determine cost effective means for restoring and maintaining urban lake water quality by determiing urban stormwater pollution impacts and its necessary management.

APPROACH: Effectiveness of source managment, diversion, and treatment will be investigated. Nutrients, organics, solids, pathogens, metals, and other toxicants will be measured and the fate of pollutants documented. Using State-of-the-Art Program Reports O&M cost data for pollutional abatement and treatment practices will be reviewed for site specific applicability at the Lake Eola, Orlando, Florida location. The Lake input characterization and projected impacts will be used as parameters for the selection of the most cost-effective of stormwater management and/or treatment practices.

PROGRESS: One of the results of this project will be the development of a methodology for stormwater management in an urban lakeland watershed. The documented recommendations of this study are being used as the principal proposal to the USEPA 314 - Clean Lakes Restoration Program for phase 2 funding and implementation.

TITLE	URBAN STORM RUNOFF QUALITY IN SOUTHEAST MICHIGAN
AUTHORS	Collins, Peter G.; Ridgway, James W.
ORGANIZATIONAL SOURCE	Environ Res Group, Inc., Ann Arbor, Mich
SOURCE	ASCE J Environ Eng Div v 106 n 1 Feb 1980 p 153-162 (JEEGAV)
CATEGORY CODES	453; 931; 407; 444; 804
INDEX TERMS	*Water Pollution--Water Quality; Sedimentation; Rivers--Sedimentation; Nitrogen Compounds
SUPPLEMENTARY TERMS	Sediments; Nutrients
ABSTRACT	Methods of sampling urban runoff and its impacts on receiving waters are reviewed nd classified into three types. The field designs which yield data on mass emissions are generally most useful for evaluating alternatives to control urban nonpoint pollution. Recent field sampling of urban runoff in the Detroit, Mich. area (Southeast Michigan) permits better characterization of urban runoff quality, distribution of sizes of solids in runoff, and correlations of suspended solids with other constituents in runoff. It is concluded that region-specific runoff data are useful to planners and engineers engaged in analysis of alternative control strategies. Data from Southeast Michigan indicate that certain aspects of the urban nonpoint problem are not amenable to some source controls, such as street sweeping, but suggest that hydrologic modifications, such as detention and increased infiltration, may be more effective. 10 references

The following list of descriptions of urban runoff research and abstracts were obtained from the ENVIROLINE data base:

TITLE	REPORT OF THE URBAN DRAINAGE SUBCOMMITTEE PROJECTS CONDUCTED 1972-1978
SOURCE	Env. Canada Report 101, 1980 (142)
AVAILABILITY	Microfiche Av. from EIC
DOCUMENT TYPE	Special Report
CATEGORY CODES	Water Pollution
INDEX TERMS	*Great Lakes; *Storm Runoff; *Canada; Wastewater Treatment; Sludge Disposal; Wastewater Management; Ontario, Nova Scotia
ABSTRACT	The activities of the urban drainage subcommittee established under the Canada-Ontario agreement on Great Lakes quality are discussed. The significance of urban surface runoff and overflows from combined sewerage systems as pollution sources in Canada is determined. A research strategy is outlined, and proposed model policies to monitor and control urban drainage are presented. Various projects undertaken during 1972-78 are reviewed. These include full-scale evaluation of high rate screening devices for treatment of sanitary sewage by-pass flow; assessment of municipal sanitary sewer by-pass flows; evaluation of water quality of urban stormwater runoff in East York, North York, and Burlington; pilot-scale evaluation of a physical-chemical wastewater treatment system for combined sewer overflows; and hydraulics of sewer pipe connections and junctions (7 tables)

TITLE	LAKE SAMMAMISH RESPONSE TO WASTEWATER DIVERSION AND INCREASING URBAN RUNOFF
AUTHORS	Welch, E.B; Rock, C.A.; Howe, R.C.; Perkins, M.A.
ORGANIZATIONAL SOURCE	Univeristy of Washington
SOOURCE	Water Research, 1980, V14, N7, P821 (8)
AVAILABILITY	Microfiche Av. from EIC
DOCUMENT TYPE	Research Report
CATEGORY CODES	Water Pollution
INDEX TERMS	*Lakes, Washington; *Wastewater Treatment; Phosphorus; Entrophication; Storm Runoff; Phytoplankton; Sediment *XL; Watersheds; Mathematic Models-Water
ABSTRACT	The mean annual concentration of phosphorus in Lake Sammamish has decreased following diversion of about one/third of the external loading in 1968. Neither phytoplankton biomass or secchi visibility has changed. However, the blue-green component of the phytoplankton decreased by nearly 50%. The failure of biomass and visibility to improve is probabily a result of similar pre- and post-diversion winter-spring epilimnetic phosphorus concentrations. Runoff from a rapidly developing westside portion of the watershed is contributing substantially to a phosphorus loading of the lake. Future development of the eastside portion may increase phosphorus loading by 20%. (2 graphs, 1 map, 19 references, 2 tables)

TITLE	DETENTION STORAGE FOR URBAN FLOOD CONTROL
AUTHORS	Smith, David P.; Bedient, Philip B.
ORGANIZATIONAL SOURCE	Espey Huston & Assoc., Tex; Rice Univ.
SOURCE	J. Water Resources Planning & Management Div-Asce, Jul 80, V106, N2, P413 (13)
AVAILABILITY	Microfiche Av. from EIC
DOCUMENT TYPE	Technical Report
CATEGORY CODES	Renewable Resources-Water
INDEX TERMS	*Flood Control; *Water Storage; Urban Water Resources; Watersheds; Hydrology; Drainage; Mathematic Models-Water
ABSTRACT	A method of evaluating the effects of detention storage in urban watersheds is described. Effects of rainfall frequency, land use condition, and storage policy as they alter downstream flows are considered. The Usace HEC-1 model was used to calibrate flood flows of two recent storms on Brays Bayou in Houston, Tex. A storage detention model was used to predict design flows for both existing land use and project future developments. (3 graphs, 1 map, 17 references, 6 tables)

TITLE	SOCIO-ECONOMIC ASPECTS OF URBAN WATER RESOURCES PLANNING AND MANAGEMENT
SOURCE	Presented at UN (Pergamon) Water Conf., Mar Del Plata, Mar. 77, V2, P685 (13)
AVAILABILITY	Microfiche Av. from EIC
DOCUMENT TYPE	Technical Feature
CATEGORY CODES	Renewable Resources-Water
INDEX TERMS	*Urban Water Resources; *Water Resources Management; *Socioeconomics; Water Resources Planning; Multiple Use-Water; Water Quality Standards; Urban Planning; Effluent Standards; Water Supply; Economic Growth; UN Conf. Paper
ABSTRACT	Increasing urbanization causes increasing demand for water resources, changes in the physical environment that alter natural water balances, and the disposal of increasing volumes of waste that may contaminate usable water resources. This in turn results in socioeconomic constraints in the use, managment, and planning of urban water resources. Escalating costs associated with water resource developments and sewage treatment place economic burdens on consumers. Urban development causes erosion, stream and runoff pollution, and flooding condditions (7 references)

TITLE	LAND USE INFLUENCES ON HEAVY METALS IN AN URBAN RESERVOIR SYSTEM
AUTHORS	Helsel, Dennis R.
ORGANIZATIONAL SOURCE	Virginia Polytechnic Inst. & State Univ.
SOURCE	NTIS Report P,-296 724, Jul 78 (243)
AVAILABILITY	Microfiche Av. from EIC
DOCUMENT TYPE	Special Report
CATEGORY CODES	Chemical/Biological Contamination
INDEX TERMS	*Heavy Metals; *Land Use Classification; Reservoirs; Cities; Storm Runoff; Sediment; Sewage Outfalls; Lead; Zinc; Copper; Cadmium; Chromium
ABSTRACT	Storm water from several basins, each of a different land use type, was analyzed for the presence of heavy metals. Atmospheric and land surface contributions to metal loadings are considered. Urban land use types are found to be the greatest contributers of lead, zinc, copper, cadmium, and chromium compared with agricultural lands. Most metals absorb onto bottom sediments of the reservoir. Unless mobilization of the metals occurs, no public health concern is warranted for heavy metals in reservoirs.

TITLE	AESTHETIC STORMWATER BASINS-THE WINNIPEG EXPERIENCE
AUTHORS	Tottle, Cliff
SOURCE	Water & Pollution Control, Jan 80, V118, N1, P9 (7)
DOCUMENT TYPE	Technical Feature
CATEGORY CODES	Water Pollution
INDEX TERMS	*Winnipeg; *Impoundments; *Storm Runoff; *Water Storage; Water Quality Criteria; Economics, Env-Water; Aerobic Systems; Sediment; Dissolved Oxygen; Algae; Suspended Solids; Biochemical Oxygen Demand; Recreation; Outdoor-Water
ABSTRACT	The development of Winnepeg's artificial lake storage facilities in Manitoba is described. The water quality, treatment potential, and sedimentation performance of Winnipeg's stormwater basins were monitored during the summers of 1976 and 1977. Water quality was found to be exceptionally high, DO levels averaged 8-9 ppm, and algae and weed growth were controlled at costs of about $7/acre of drainage area. Treatment of urban runoff in the basins is examined.

TITLE	URBAN RUNOFF CONTROL PLANNING
AUTHORS	McPherson, M.B.
ORGANIZATIONAL SOURCE	ASCE Urban Water Resources Research Program, Mass.
SOURCE	EPA Report EPA-600/9-78-035, Oct 78 (194)
AVAILABILITY	Microfiche Av. from EIC
DOCUMENT TYPE	Special Report
CATEGORY CODES	Water Pollution
INDEX TERMS	*Storm Runoff; *Water Rersources Management; *Water Quality Criteria; Flow Measurement; Economics, Env-Water; Flood Control; Erosion Control, Water; Storm Sewers; Sediment; Flood Plains
ABSTRACT	Section 208 of the Federal Water Pollution Control Act of 1972 encourages areawide planning for water pollution abatement management, including urban runoff considerations where applicable. Areawide studies are under way or planned in nearly all metropolitan areas. Information is presented to assist local governmental agencies to prepare areawide plans while considering major urban runoff technical issues in long-range planning. The importance of conjunctive Consideration of urban runoff quantity and quality is emphasized. A database must be developed to support decisions regarding proposed actions and programs. Some technical issues that are often slighted or poorly handled in water pollution abatement management planning are discussed. (Numerous diagrams, graphs, references, tables)

TITLE	EVALUATION OF DETENTION BASINS FOR CONTROLLING URBAN RUNOFF AND SEDIMENTATION
AUTHORS	Haan, C.T.; Ward, A.D.
ORGANIZATIONAL SOURCE	NTIS, VA
SOURCE	NTIS Report PB-286-965, Aug 78 (28)
AVAILABILITY	Microfiche Av. From EIC
DOCUMENT TYPE	Special Report
CATEGORY CODES	Water Pollution
INDEX TERMS	*Storm Runoff; Sediment; Mathematic Models-Water; Water Storage; Cities
ABSTRACT	Studies were initiated to determine the feasibility of using urban stormwater detention basins as opposed to individual basin designs. A mathematical simulation model of the performance of sediment retention basins is described. Design recommendations based on simulations made with the model are described.

TITLE	CONVIVIAL STORM WATER MANAGEMENT STRATEGIES
AUTHORS	Tourbier, Joachim; Westmacott, Richard; Goedken, Charles
ORGANIZATIONAL SOURCE	Univ of Delaware
SOURCE	ENV Comment, Nov 79, P4 (3)
AVAILABILITY	Microfiche Av. From EIC
DOCUMENT TYPE	Feature Article
CATEGORY CODES	Renewable Resources-Water
INDEX TERMS	*Water Resources Management; *Flood Control; Storm Runoff; Erosion Control, Water; Water Quality Criteria; Infiltration; Sediment; Storm Sewers; Water Resources Financing; Watershed Management; Zoning
ABSTRACT	Through implementation of nonconventional stormwater management technologies, the costs of urban flooding and drainage controls could be reduced by nearly $5 Billion/yr. Four basic storm water problems and design solutions for them are outlined. These alternative management practices include both structural and nonstructural measures. Nonstructural control measures include surface sanitation, chemical use control, and surface drainage; structural measures involve at-source controls, such as rooftop detention, dutch drains,a nd porous pavements. Political obstacles to the implementation of unconventional storm control measures are discussed. (1 drawing, 13 references)

TITLE	DISTRIBUTION OF METALS IN STREET SWEEPINGS, STORMWATER SOLIDS, AND URBAN AQUATIC SEDIMENTS
AUTHORS	Wilbur, William G.; Hunter, Joseph V.
ORGANIZATIONAL SOURCE	Rutgers Univ
SOURCE	WPCF J. Dec 79, V51, N12, P2810 (13)
DOCUMENT TYPE	Research Report
CATEGORY CODES	Chemical/Biological Contamination
INDEX TERMS	*Heavy Metals; *Storm Runoff; *Sediment; *New Jersey; Rivers; Suspended Solids; Water Quality Criteria; Water Analysis; Lead; Zinc; Cooper; Nickel; Chromium; Chemical Oxygen Demand
ABSTRACT	The distribution of heavy metals in street sweepings, stormwater solids, and aquatic sediments of the Passaic River Basin, N.J., is discussed. Samples were analyzed for lead, zinc, copper, nickel, chromium, magnanese, and iron. Less than 1 percent of the total metals in all samples were soluble in river water. (1 diagram, 2 maps, 22 references, 8 tables)

TITLE	THE BENEFICIAL REUSE OF URBAN STORMWATER
AUTHORS	Field, Richard; Fan, Chi-Yuan
ORGANIZATIONAL SURCE	EPA, NJ; EPA, New York City
SOURCE	Presented at WWEMA 7th Annual Industrial Pollution Conf. Philadelphia, Jun 5-7, 79, P279 (22)
AVAILABILITY	Microfiche Av. From EIC
DOCUMENT TYPE	Technical Report
CATEGORY CODES	Water Pollution
INDEX TERMS	*Storm Runoff; *Wastewater Reuse; Urban Water Resources; Combined Sewer Overflows; Water Quality Criteria; Sedimentation; Filtration; Water Storage; Chlorination; Biological Treatment; Economics, ENV-Water; Activated Carbon Adsorption; Trickling Filters; Conf Paper
ABSTRACT	Current urban stormwater control and treatment technology leading to the feasibility of urban stormwater reuse are examined. The reuse of the water for industrial cooling and process, irrigation, and recreational water supplies is discussed. Process treatment efficiencies are surveyed for sedimentation, fine screening, filtration, biological treatment methods, activated carbon adsorption, and disinfection. A hypothetical case study provides evidence that the reclamation of urban stormwater for industrial subpotable water supply is technically feasible and economically attractive when compared with city water sources. Other important benefits, such as reduction of pollutant discharges and more effective control of stormwater drainage, also can be achieved through stormwater reuse. (3 diagrams, 25 references, 13 tables)

TITLE	URBAN RUNOFF CONTROL PLANNING
AUTHORS	McPherson, Murray B.
SOURCE	NTIS Report PB-291 522, Oct 78 (196)
AVAILABILITY	Microfiche Av. From EIC
DOCUMENT TYPE	Special Report
CATEGORY CODES	Water Pollution
INDEX TERMS	*Storm Runoff; *Storm Sewers; Urban Planning; Water Quality Programs; Law, ENV

ABSTRACT

Major urban runoff issues in long-range planning are reviewed from a technical standpoint. Emphasized are the importance of conjunctive consideration of urban runoff quantity and quality, and the need to develop a factual basis that will support expected reliability of performance of proposed actions and programs. Important technical issues that are often slighted or poorly handled, such as the utilization of simulation, are examined. Recognizing that the ultimate test of any plan lies in its implementation, topics are viewed from the perspective and experience of the local government level where implementation takes place.

TITLE	POLLUTIONAL CHARACTERISTICS OF STORMWATER RUNOFF
AUTHORS	Bennett, Ediwn R.; Linstedt, K. Daniel
ORGANIZATIONAL SOURCE	Colorado State Univ
SOURCE	NTIS Report PB-290 309, Sep 78 (226)
AVAILABILITY	Microfiche Av From EIC
DOCUMENT TYPE	Special Report
CATEGORY CODES	Water Pollution
INDEX TERMS	*Storm runoff; *Snowmelt; *Sewage outfalls; Storm Sewers; Colorado; Urban-Rural Comparisons; Water Analysis; Coagulation; Filtration

ABSTRACT

The pollution characteristics of stormwater runoff were studied by sampling stormsewer discharges at three locations in Boulder, Colorado. Sampling locations included a stormsewer for outfall for an urban residential area with a population density of 25 persons/acre; a stormsewer for outfall for a suburban area with a density population of 12 persons/acre; and an uninhabited, unsewered mountain watershed. Results indicate that pollution from snowmelt is released more slowly than pollution from rainfall. Presented are data from preliminary treatment evaluations of stormwater runoff made using the processes of plain sedimentation; coagulation sedimentation with lime, alum, and ferric chlorides; and sand filtration.

TITLE	PHOSPHORUS LOADING FROM URBAN STORMWATER RUNOFF AS A FACTOR IN LAKE EUTROPHICATION: I. THEORETICAL CONSIDERTIONS AND QUALITATIVE ASPECTS
AUTHORS	Browman, M.G.; Harris, R.F.; Ryden, J.C.; Seyers, J.K.
ORGANIZATIONAL SOURCE	Washington Univ
SOURCE	J ENV Quality, Oct-Dec 79, V8, N4, P561 (7)
DOCUMENT TYPE	Research Report
CATEGORY CODES	Water Pollution
INDEX TERMS	*Eutrophication, Phosphate; *Storm Runoff; *Wisconsin; Monitoring, ENV-Water; Stormsewers; Particulate Size; Dissolved Solids
ABSTRACT	Urban stormwater runoff from two Madison, Wis., stormsewer was examined to: measure the concentrations of various phorphorus species in the stormwater runoff; determine the effect of various phosphorus species on Lake Eutrophication; and suggest target phosphorus species that would optimize the analytical estimation of the eutrophication potential of urban runoff. Species considered were organic, dissolved, and particulate phosphorus. Data for the watersheds studied indicated that the potential contribution of phosphorus in urban runoff to Lake Eutrophication could reasonably be determined by two analyses that measured dissolved and particulate phosphorus. (1 diagram, 16 references, 4 tables)

TITLE	THE ORIGIN, DISTRIBUTION AND FATE OF HEAVY METALS IN STORMWATER RUNOFF
AUTHORS	Randall, Clifford W.; Grizzard, Thomas J.; Hoehn, Robert C.; Helsel, Dennis R.
ORGANIZATIONAL SOURCE	Virginia Polytechnic Inst and State Univ
SOURCE	Presented at Commission of European Communities/et al. heavy metals in the ENV Intl Conf, London, Sep 79, P239 (4)
DOCUMENT TYPE	Research Report
CATEGORY CODES	Chemical/Biological Contamination
INDEX TERMS	*Storm Runoff; *Heavy Metals; Atmospheric Pollutant Deposition; Land Use Classification; Urban-Rural Comparisons; Sediment; Copper; Lead; Automobile Emissions; Cadmium; Zinc; Aquatic Ecosystems; Agricultural Runoff; Conf Paper
ABSTRACT	An extensive survey of seven heavy metals in storm runoff was conducted intheNorthern Virginia portion of the Washington, D.C., Metropolitan Area. Iron, Zinc, and Lead were found to be the most abundant metals, and only trace quantities of cadium were detected. It was determined tht rainfall and dustfall can account for all the metal inputs in runoff from most land use types. Dry dustfall was a significant source of lead, iron, manganese, and chromium in highly urbanized areas. (8 references, 5 tables)

The following list of descriptions of urban runoff research and abstracts were obtained from the COMPENDEX data base.

TITLE	HEAVY METALS AND THEIR RELATIONSHIP TO SOLIDS IN URBAN RUNOFF
AUTHORS	Bourcier D.R.; Sharma R.P.
ORGANIZATIONAL SOURCE	Utah STate Univ., Logan
SOURCE	Int J Environ Anal Chem v 7 n 4 1980 p 273-283 (IJEAA3) ISSN 0306-7319
CATEGORY CODES	453; 442; 444; 445; 801
INDEX TERMS	*Water Pollution; Runoff; Water Analysis
ABSTRACT	Although a considerable amount of work has been done in order to develop models for estimating metal loadings in urban runoff, some basic information on the relationships between various storm water parameters is still lacking. In a previous study at a viaduct road runoff sit in Pullman, WA, metal input from sources other than motor vehicles was excluded and a definite relationship was observed between total solids and metal concentrations. This study was undertaken to determine if the same models can be used for storm events occurring at different locations where the input of solids and metals from sources other than motor vehicles was not controlled. Significant correlations were observed between metals vs. total solids and regression equaitons were developed for the two parameters. The models were compared to those obtianed from the earlier study. It was observed that the regression models are only similar in the case of chromium and lead vs. total solids at the two locations indicating that simple models for the two metals might be used to estimate metal loadings at different geogrpahical areas. 16 references

TITLE	URBAN RUNOFF MANAGEMNT: FUTURE MODELING
AUTHORS	Torno, Harry C
ORGANIZATIONAL SOURCE	US EPA, Washington, DC
SOURCE	J TEchn Counc ASCE v 106 n 1 Aug 1980 p 165-169 (JTCAD9) ISSN 0148-9909
CATEGORY CODES	442; 444; 921; 452; 723; 453
INDEX TERMS	*RUNOFF--Mathematical Models; SEWERS--Storm Drainage; URBAN PLANNING--Water Supply; WATER POLLUTION--Water Quality
ABSTRACT	Several recent studies have demonstrated that computer based mathematical models are becoming a standard part of the engineer's arsenal of tools for anlayzing and designing urban drainage systems, and for evaluating the impats of runoff-generated pollution and the remedial measures therefore. It is equally clear that while the catalogue of available models is quite large, only a few are in common use. Future model use will emphsize applicaitons. New model development will proceed at a slower pace until an adequate data base is available. Receiving water quality models will receive increased use. The use of mini/micro computers will increase rapidly, and models will be dapted for use with low-cost hardware. 12 references

TITLE	BUILDUP STRENGTH AND WASHOFF OF URBAN POLLUTANTS
AUTHORS	Terstriep, Michael L.; Bender, G. Michael; Benoit, Dennis 4.
ORGANIZATIONAL SOURCE	ILL State Water Surv, Urbana
SOURCE	J Techn Counc ASCE v 106 n 1 Aug 1980 p 73-91 (JTCAD9) ISSN 0148-9909
CATEGORY CODES	453; 442; 444; 403
INDEX TERMS	*Water Pollution; Runoff; Urban Planning-Water Supply
ABSTRACT	A study performed to satisfy the requirements of Section 208 of Public Law 92-500 for the nondesignated urban area of Illinois is described. The data collection program involving up to 34 constituents on both water samples and dry accumulation samples is summarized. The data are used to calibrate an urban runoff, quantity-quality model known as QUAL-ILLUDAS. The accumulation rates and composition of street surface pollutants needed inthe model are determined. Model results are related to land use and other parameters by means of regression equations. It is concluded that water quality modeling is a useful tool and that urban runoff contains heavy metals and other constituents in excess of Illinois Water Quality Standards.

TITLE	URBAN RUNOFF QUALITY: INFORMTION NEEDS
AUTHORS	Sonnen, Michael B.
ORGANIZATIONAL SOURCE	M.B. Sonnen Co. Inc., Wlanut Creek, Calif.
SOURCE	J Tech Counc ASCE v 106 n 1 Aug 1980 p 29-40 (JTCAD9) ISSN 0148-9909
CATEGORY CODES	442; 444; 453; 403; 452
INDEX TERMS	*Runoff--Measurements; Water Pollution--Control; Urban Planning--Water Supply; Sewers--Storm Drainage
SUPPLEMENTARY TERMS	Urban Runoff
ABSTRACT	Current perceptions of runoff water quality viewed by government and by university and private scientists tend to be limited to immediate and pressing regulatory requirements. As a consequence, the true importance or insignificance of urban runoff as a source of damaging pollution is going undiscovered. Current mathematical models purporting to be theoretically sound expressions of urban runoff and land surface behavior are shown to be quite rudimentary, based on statistically invalid informtion, and are of questionable predictive value. Newer planning methods are needed on which to base decisions about costly pollution control alternatives. These methods can be forthcoming only through derivation of more comprehensive theory and by its proof in turn by more comprehensive sampling. Many information gaps, which are considered, should be filled. Limited, though perhaps still quite expensive, pilot programs of sampling are proposed. 24 references

TITLE	EPA RESEARCH IN URBAN STORMWATER POLLUTION CONTROL
AUTHORS	Field, Richard
ORGANIZATIONAL SOURCE	US EPA, Edison, NJ
SOURCE	ASCE 4 Hydraul Div v 106 n 5 May 1980 p 819-835 (JYCEAJ) ISSN 0044-796X
CATEGORY CODES	453; 452; 901; 442; 444
INDEX TERMS	*Water Pollution--Control; Sewers--Storm Drainage; Environmental Protection; Runoff
SUPPLEMENTARY TERMS	Combined Sewers; Urban Runoff
ABSTRACT	This state-of-the-art on the Environmental Protection Agency's research in urban stormwater and combined sewer overflow pollution control describes the major elements of the Urban Runoff Pollution Control Program. Problem definition, users assistance tools, management alternatives and technology transfer are covered, including some of the highlights of the Program's future direction and products from over 150 of its reserach projects. Capital cost comparisons for storm and combined sewer control and treatment are given, along with a specific example of cost-effect solution for urban runoff pollution control by in-line storge in Seattle. In a study done in Des Moines, using a simplified receiving water model, four control alternatives were compared, considering cost and effectiveness in terms of a frequency of dissolved oxygen standard violations. 60 references

TITLE	URBAN STORM RUNOFF QUALITY IN SOUTHEAST MICHIGAN
AUTHORS	Collins, Peter G.; Ridgway, James W.
ORGANIZATIONAL SOURCE	Environ Res Group, Inc., Ann Arbor, Mich
SOURCE	ASCE J Environ Eng Div v 106 n 1 Feb 1980 p 153-162 (JEEGAV)
CATEGORY CODES	453; 931; 407; 444; 804
INDEX TERMS	*Water Pollution--Water Quality; Sedimentation; Rivers--Sedimentation; Nitrogen Compounds
SUPPLEMENTARY TERMS	Sediments; Nutrients
ABSTRACT	Methods of sampling urban runoff and its impacts on receiving waters are reviewed nd classified into three types. The field designs which yield data on mass emissions are generally most useful for evaluating alternatives to control urban nonpoint pollution. Recent field sampling of urban runoff in the Detroit, Mich. area (Southeast Michigan) permits better characterization of urban runoff quality, distribution of sizes of solids in runoff, and correlations of suspended solids with other constituents in runoff. It is concluded that region-specific runoff data are useful to planners and engineers engaged in analysis of alternative control strategies. Data from Southeast Michigan indicate that certain aspects of the urban nonpoint problem are not amenable to some source controls, such as street sweeping, but suggest that hydrologic modifications, such as detention and increased infiltration, may be more effective. 10 references