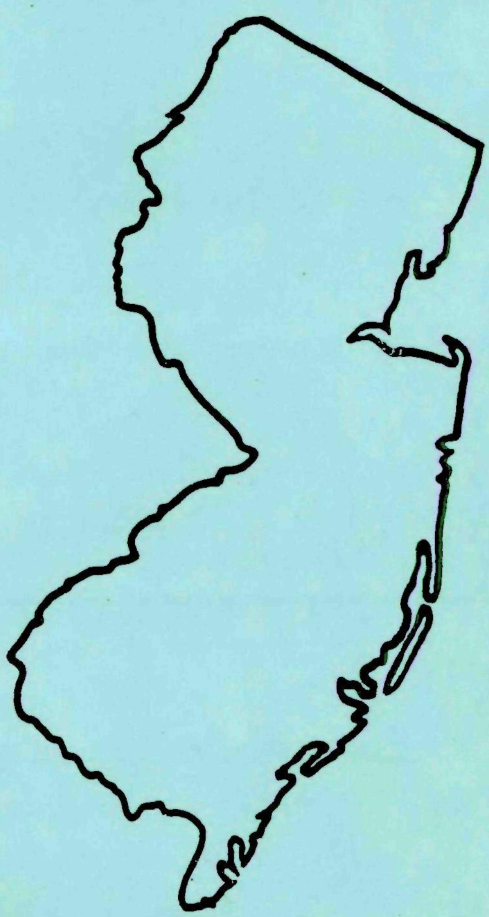
ENVIRONMENTAL STATUS REPORT

for the

STATE OF NEW JERSEY

May 1983



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

NEW JERSEY

ENVIRONMENTAL STATUS REPORT

MAY 1983

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AIR QUALITY

MEASURING AIR QUALITY TRENDS

Several indicators can be used to provide a picture of trends in air quality. For standards based on an annual average concentration at each monitoring site, the average can be plotted for a period of years to determine the trend in air quality. Standards that use a shorter averaging time can be examined by several different methods. Some of these methods are listed below.

- Number of Times the Standard is Exceeded - This indicator gives a direct assessment of how often the national standard was exceeded. Its usefulness is sometimes limited, however, since these exceedences are often associated with rare or low frequency meteorological events; the number of exceedences may vary widely over time due to changes in weather from year-to-year.

- Second Highest Value - For standards that allow one exceedence per year (i.e., TSP, SO_2, CO and O_3), the second highest value must be at or below the national standard for a location to attain the air quality standard. Besides the fact that this is the legal definition of the ambient standards, it is often better to use the second highest value rather than the highest value observed. The highest value can be more variable from year-to-year as it is often more closely linked to rare meteorological events than the second highest value.

- 95th Percentile Value - This indicator gives the concentration that was exceeded by only five percent of the observed concentrations. This is a more meaningful indicator of trends because it is not as likely to be strongly affected by changing weather conditions from year-to-year. Of course, the 95th percentile concentration of a pollutant cannot show attainment of standards that are based on an annual average or the second highest, short-term average.

These indicators are used throughout this report to discuss air quality in New Jersey.

PROGRESS IN CONTROL OF CONVENTIONAL AIR POLLUTANTS

The concentration of each conventional pollutant in the air has been routinely monitored over the past decade by the continuous and manual air monitoring networks operated by the New Jersey Department of Environmental Protection. The following graphs and discussion provide a statewide overview of the progress that has been made to date in controlling the following air pollutants for which ambient air quality standards have been established: sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone (photochemical oxidants), total suspended particulates, and lead.

It should be pointed out that the following analysis of trends is based on data from air quality networks that were standardized only recently; the National Air Monitoring Station (NAMS) network was approved in 1981, and the State and Local Air Monitoring Station (SLAMS) network was approved in 1983. Even now, a few monitoring sites in the state are not located optimally. The methods of measuring atmospheric pollutants and recording these data became more reliable during the late 1970's. However, earlier data are useful to show the large improvements in air quality that ocurred in the early 1970's.

Sulfur Dioxide (SO_2)

Statewide, New Jersey is in attainment of the SO_2 standards. Trends for SO_2 concentrations in Perth Amboy and Camden represent the most reliable data for major urban areas in the state. Although annual average SO_2 concentrations in Perth Amboy and Camden show no definite trend (Figure 1), the second highest 3-hr averages in Camden demonstrate a significant decline (Figure 2). Figure 3 shows that the second highest 24-hour averages have remained fairly constant. Longer-term SO_2 data are available from monitors in Bayonne, Newark, and Camden. These data show that SO_2 concentrations decreased dramatically from 1967 through 1972, and have decrased slowly since then (Figures 4-6).

FIGURE 1

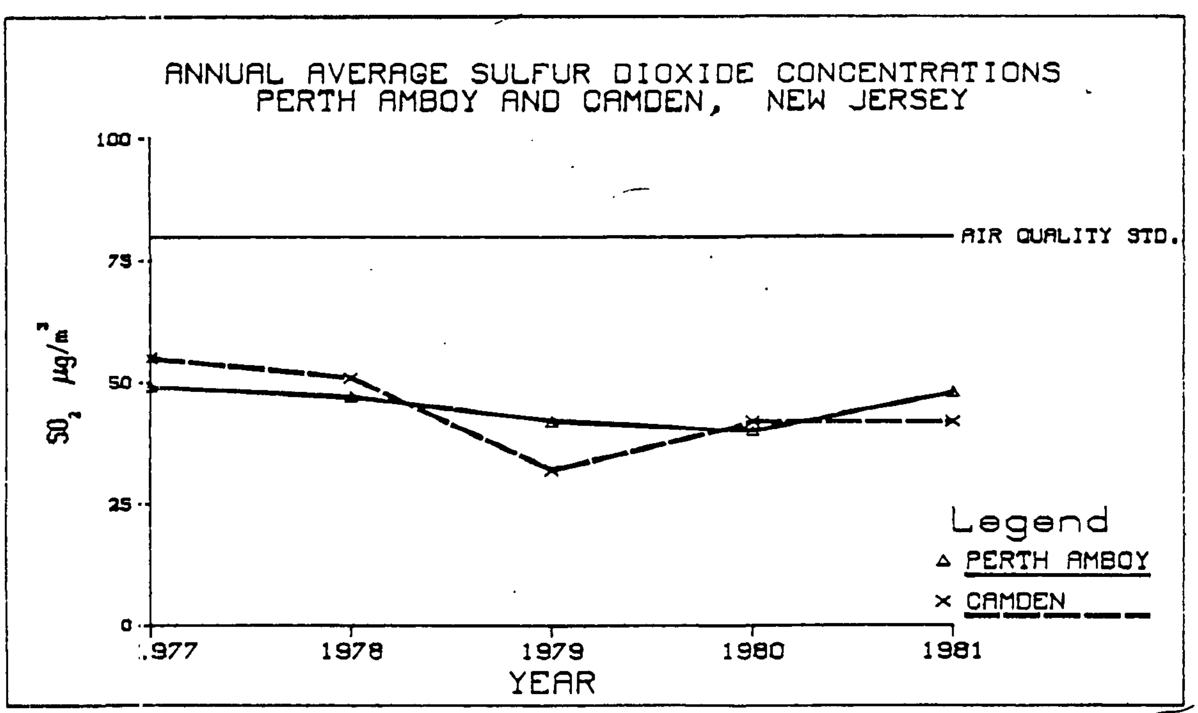


FIGURE 2

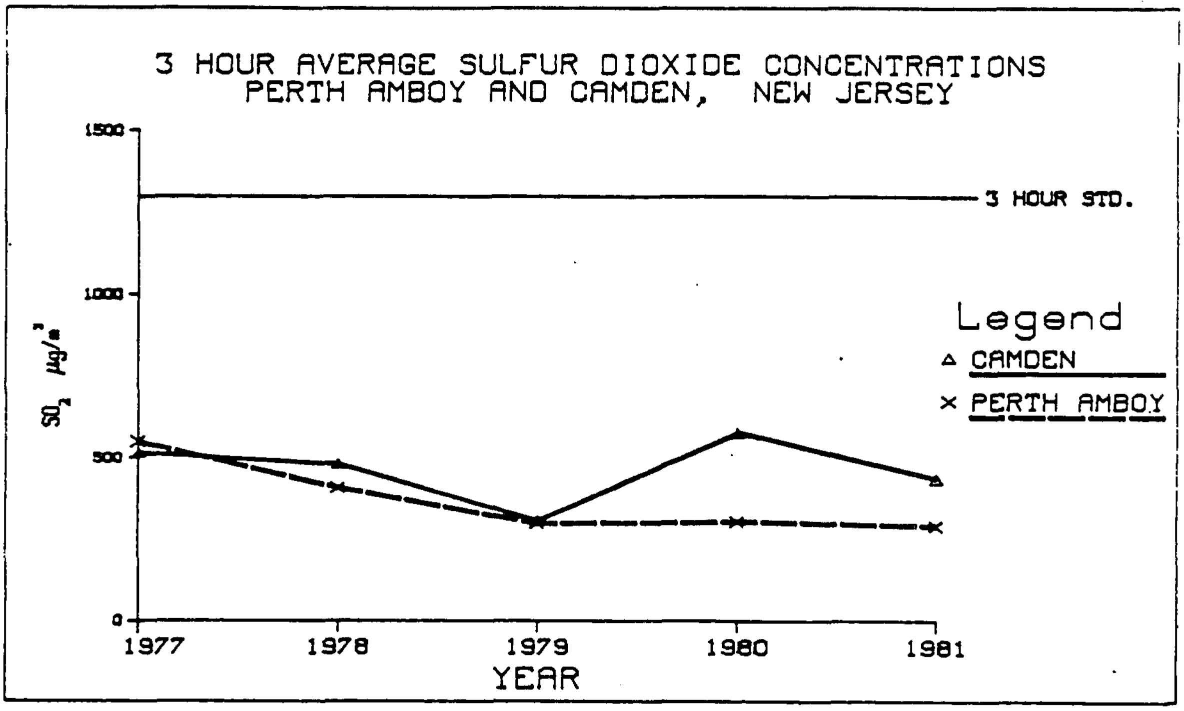


FIGURE 3

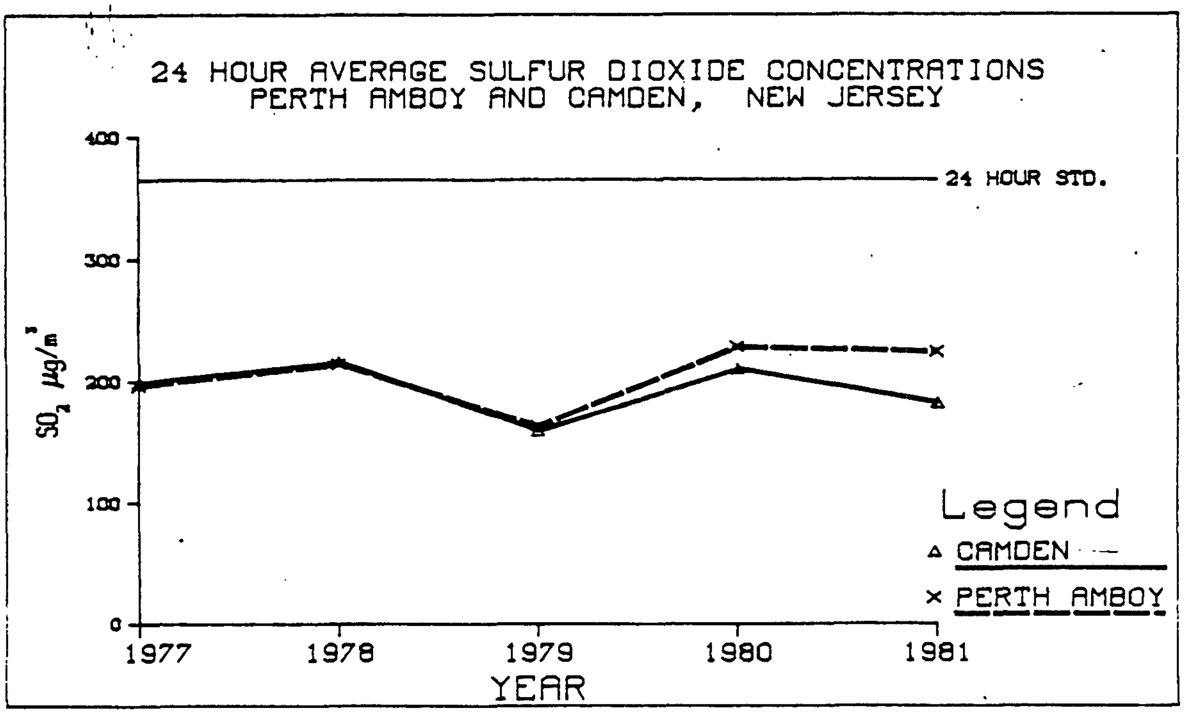


FIGURE 4

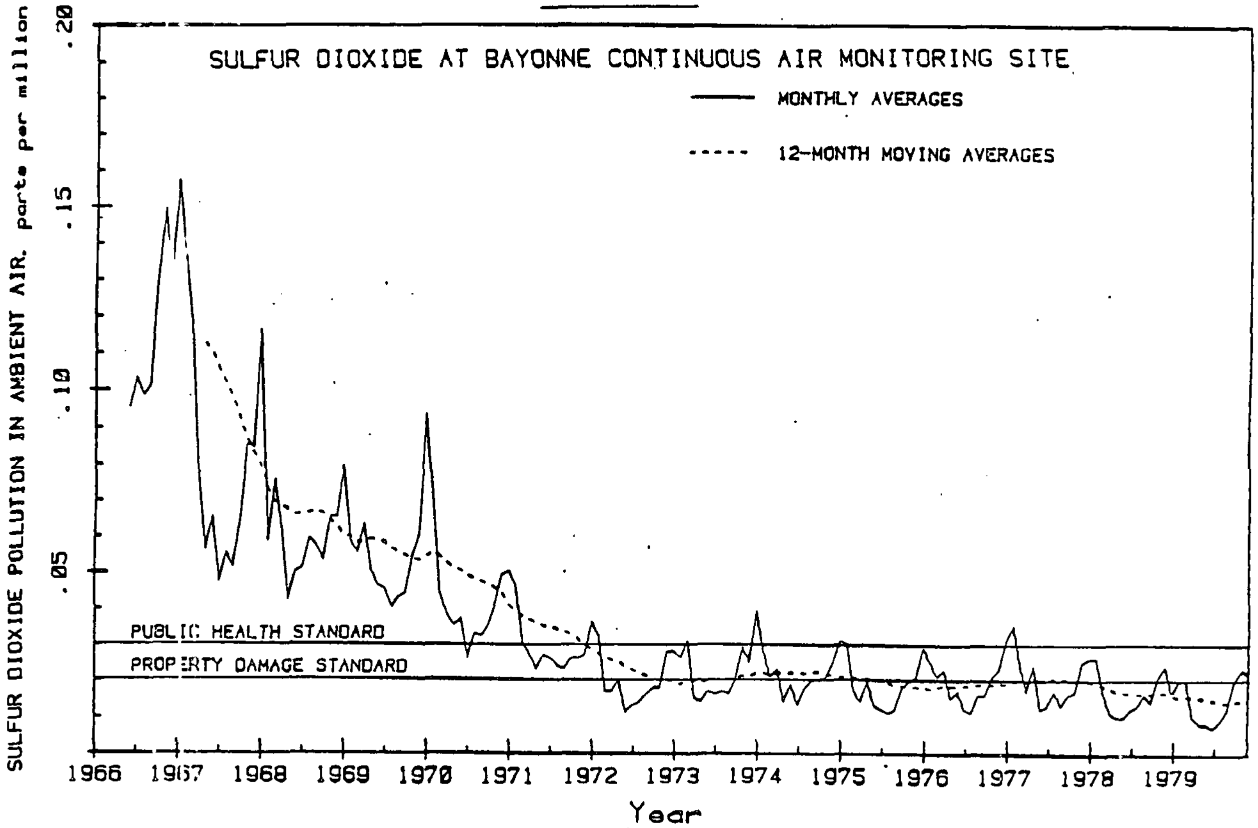


FIGURE 5

SULFUR DIOXIDE AT NEWARK CONTINUOUS AIR MONITORING SITE

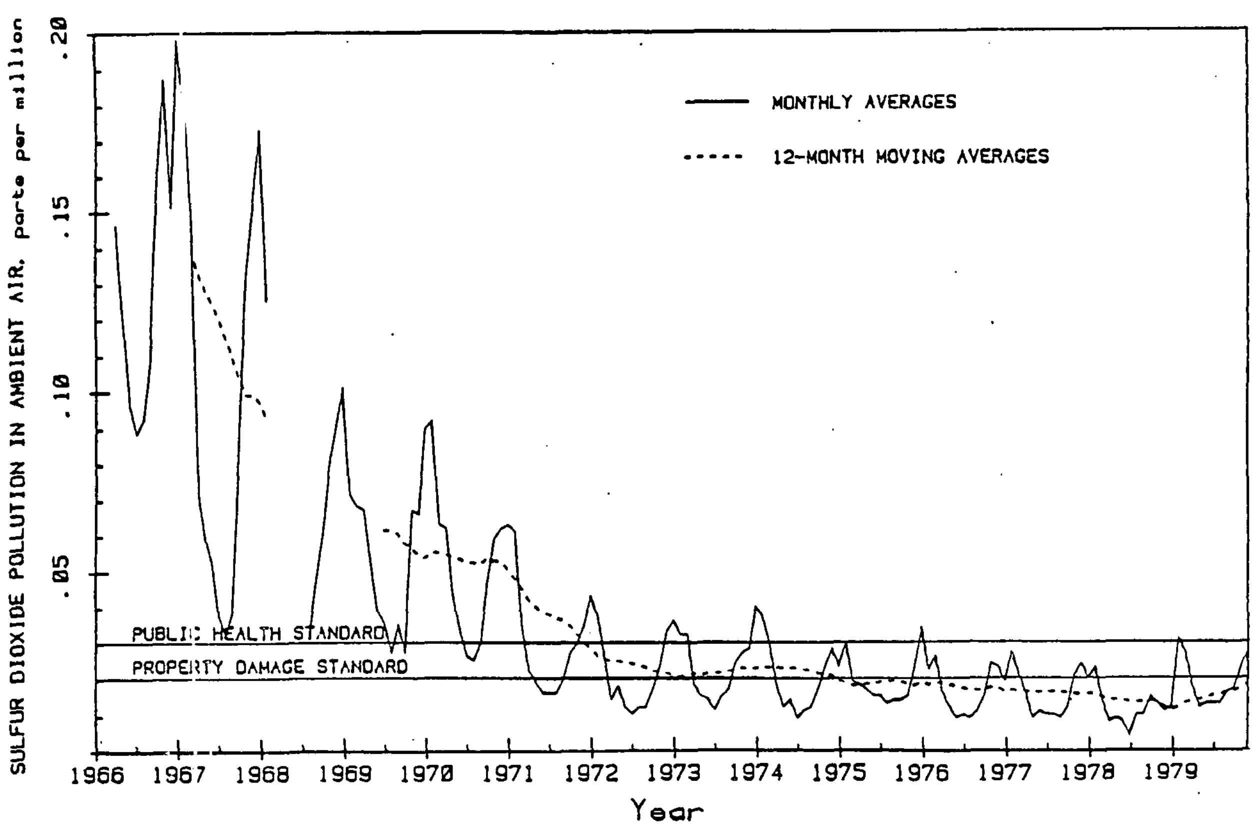
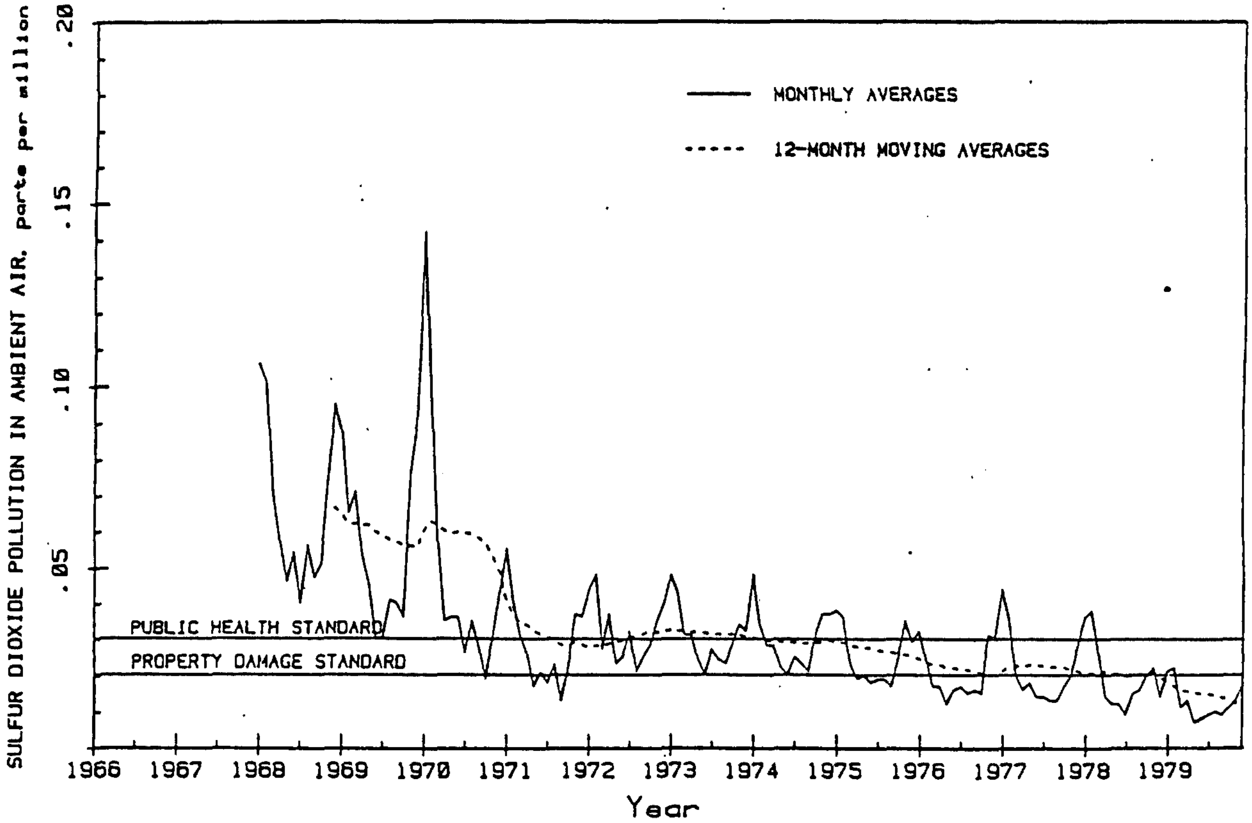


FIGURE 6

SULFUR DIOXIDE AT CAMDEN CONTINUOUS AIR MONITORING SITE, NUMBER 1



Carbon Monoxide (CO)

Figure 7 demonstrates a drastic reduction over eleven years in the number of violations of the 8-hour CO standard in New Jersey. This progress can, in large part, be attributed to the Federal Motor Vehicle Control Program and to the New Jersey Inspection and Maintenance Program. Figures 8, 9 and 10 show that, at New Jersey's two most severe CO non-attainment areas (Morristown and Jersey City), the frequency of the violations has decreased markedly from 1977 to 1981, while their severity has decreased more gradually.

FIGURE 7

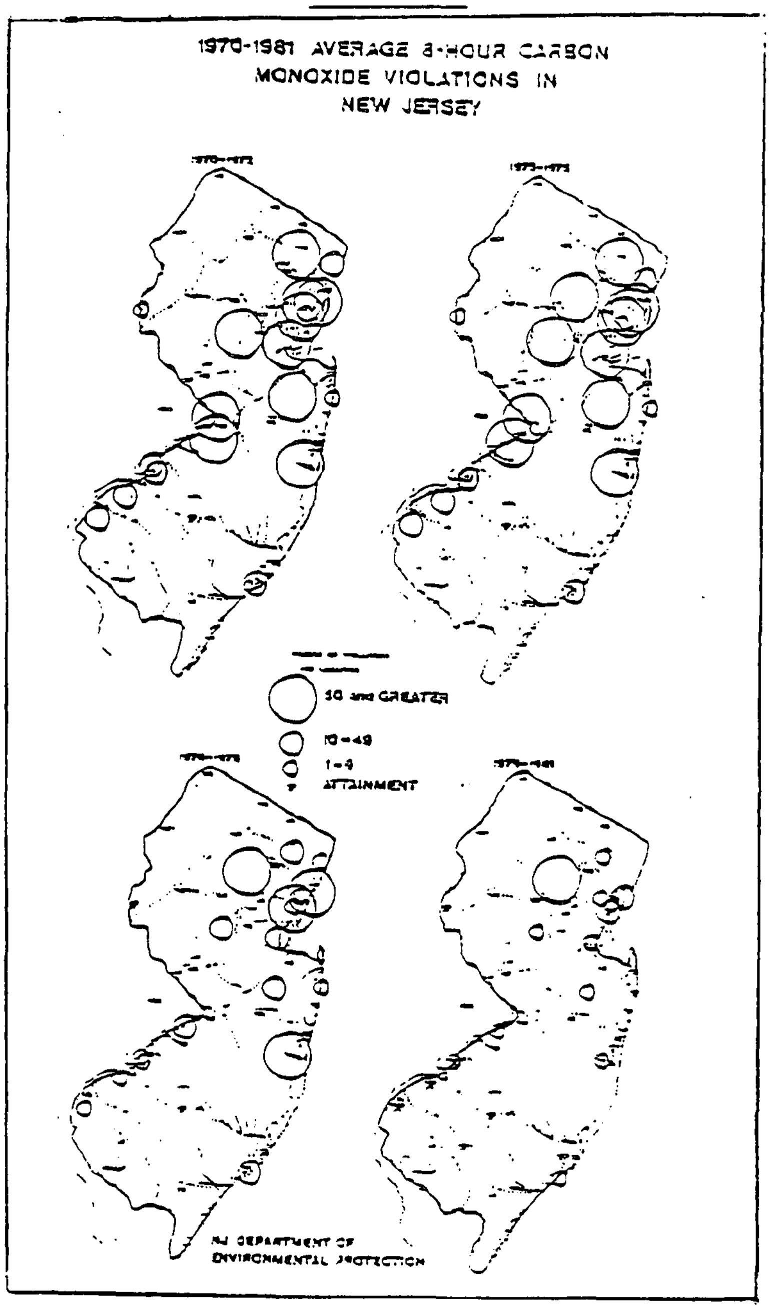


FIGURE 8

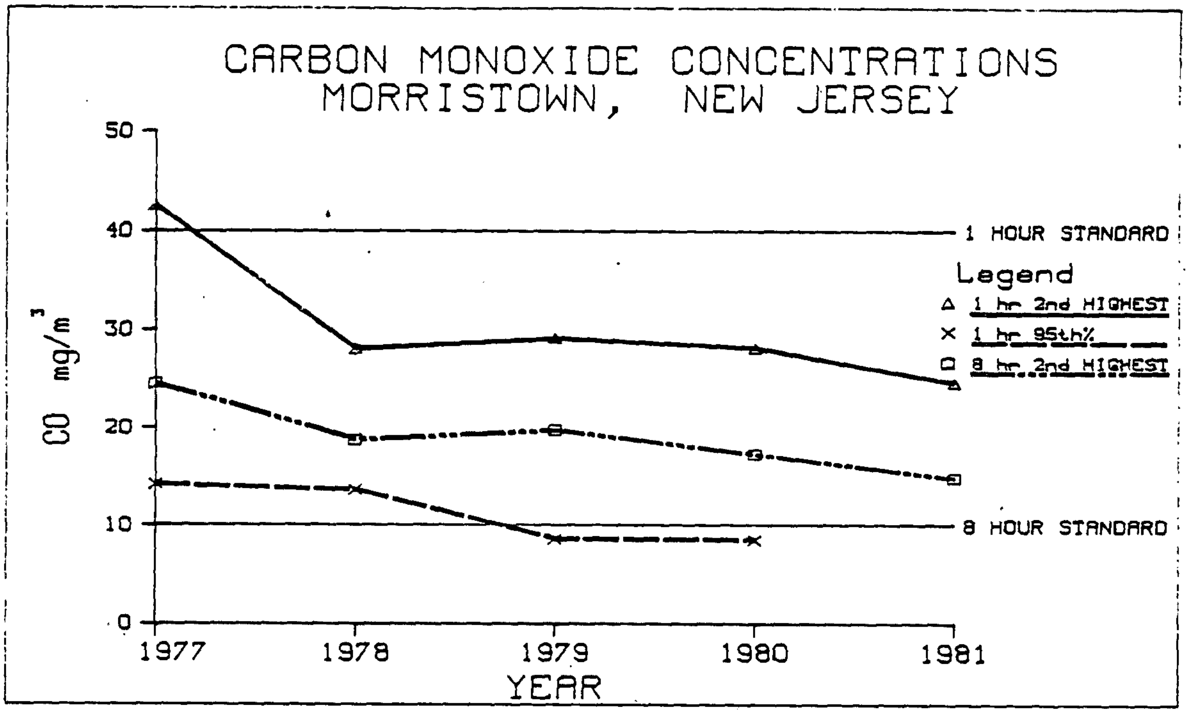


FIGURE 9

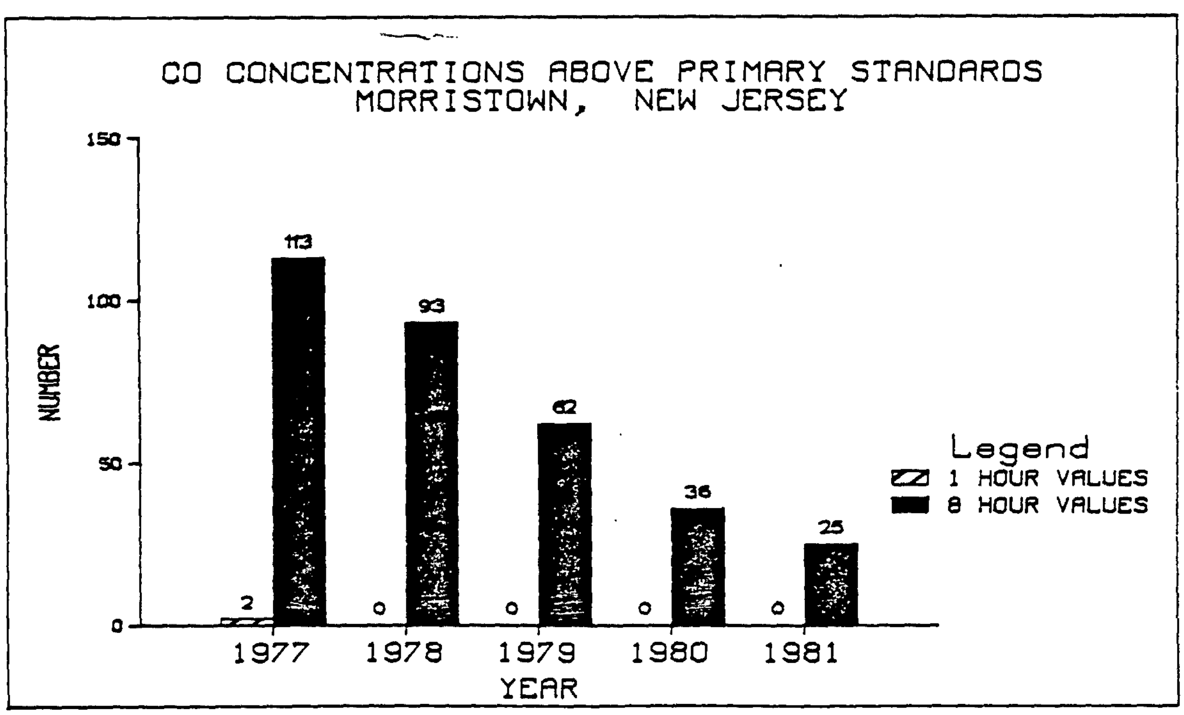
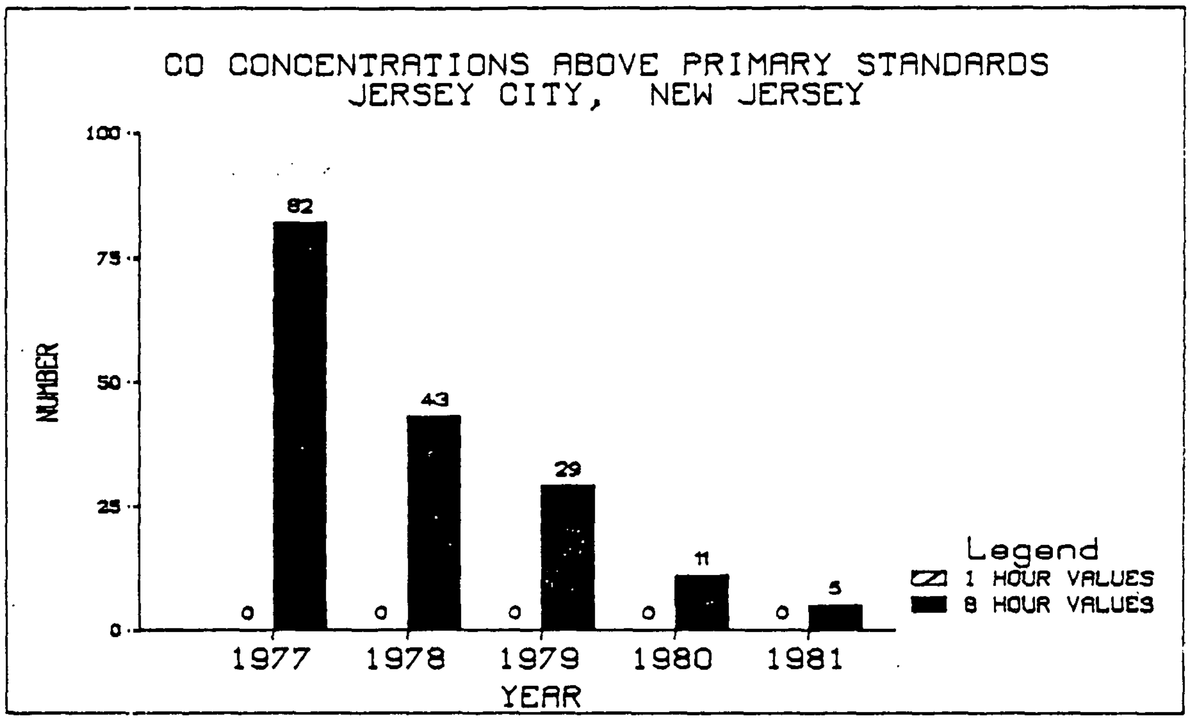


FIGURE 10



Nitrogen Dioxide (NO_2)

New Jersey has experienced some reduction in NO_2 concentrations, which are currently well below the standard. Figures 11-13 show longer-term data for three cities in New Jersey: Bayonne, Camden, and Newark. These graphs show a general downward trend in NO_2 concentrations during the 1970's.

FIGURE 11

NITROGEN DIOXIDE AT BAYONNE CONTINUOUS AIR MONITORING SITE

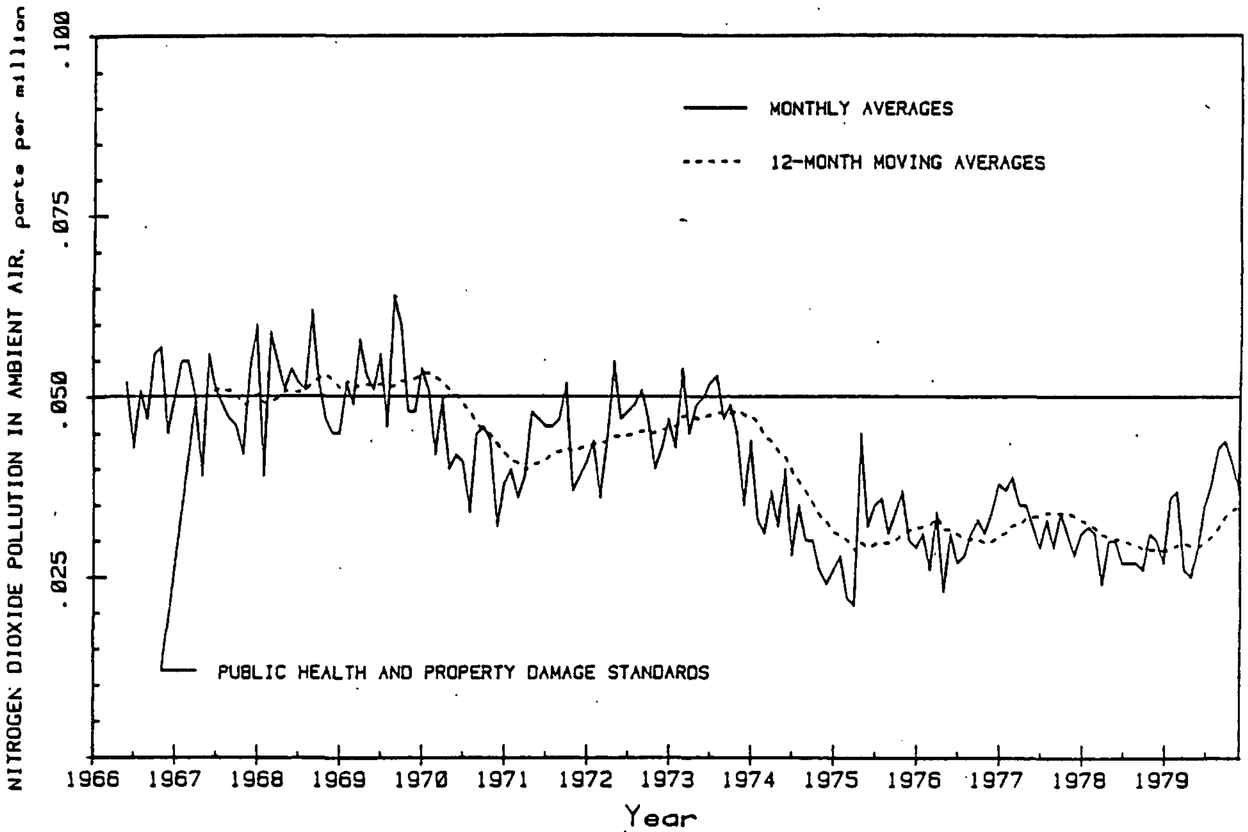


FIGURE 12

NITROGEN DIOXIDE AT CAMDEN CONTINUOUS AIR MONITORING SITE, NUMBER 1

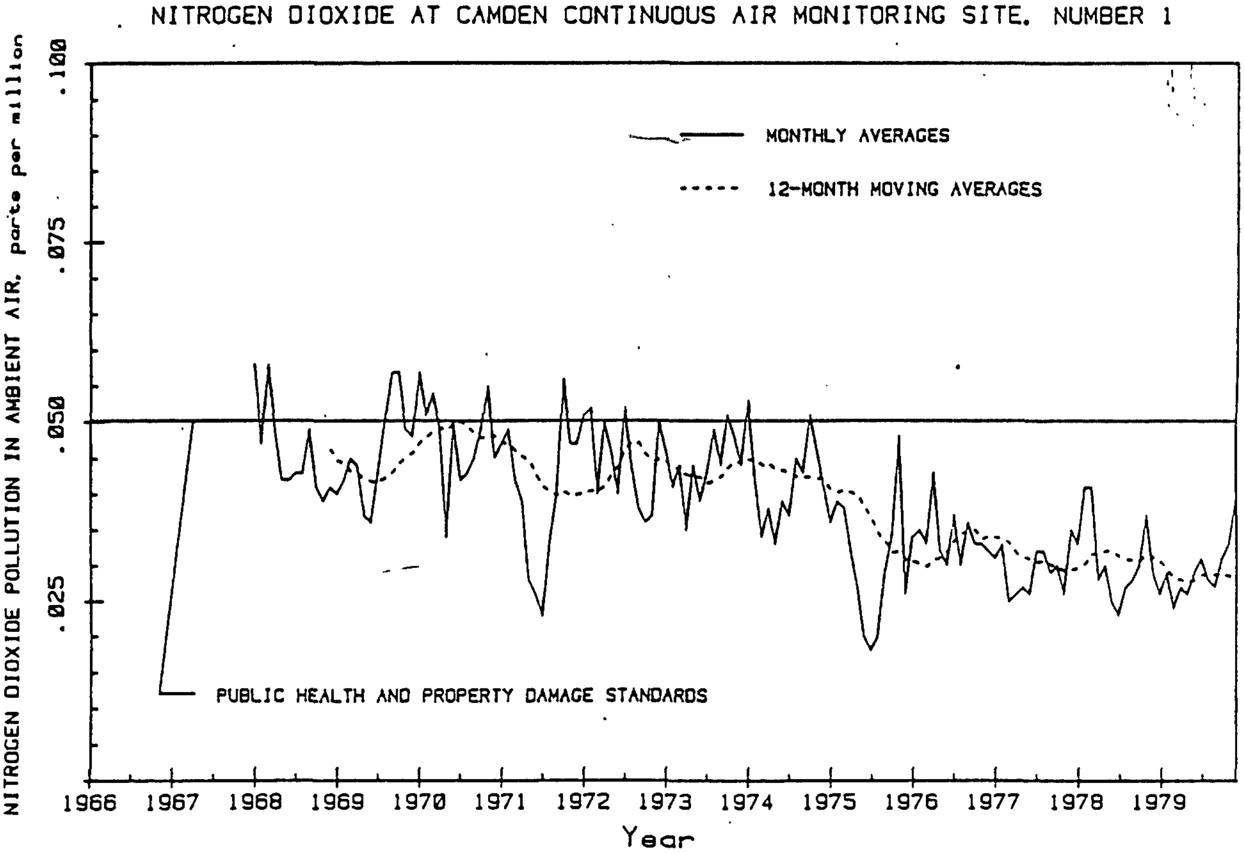
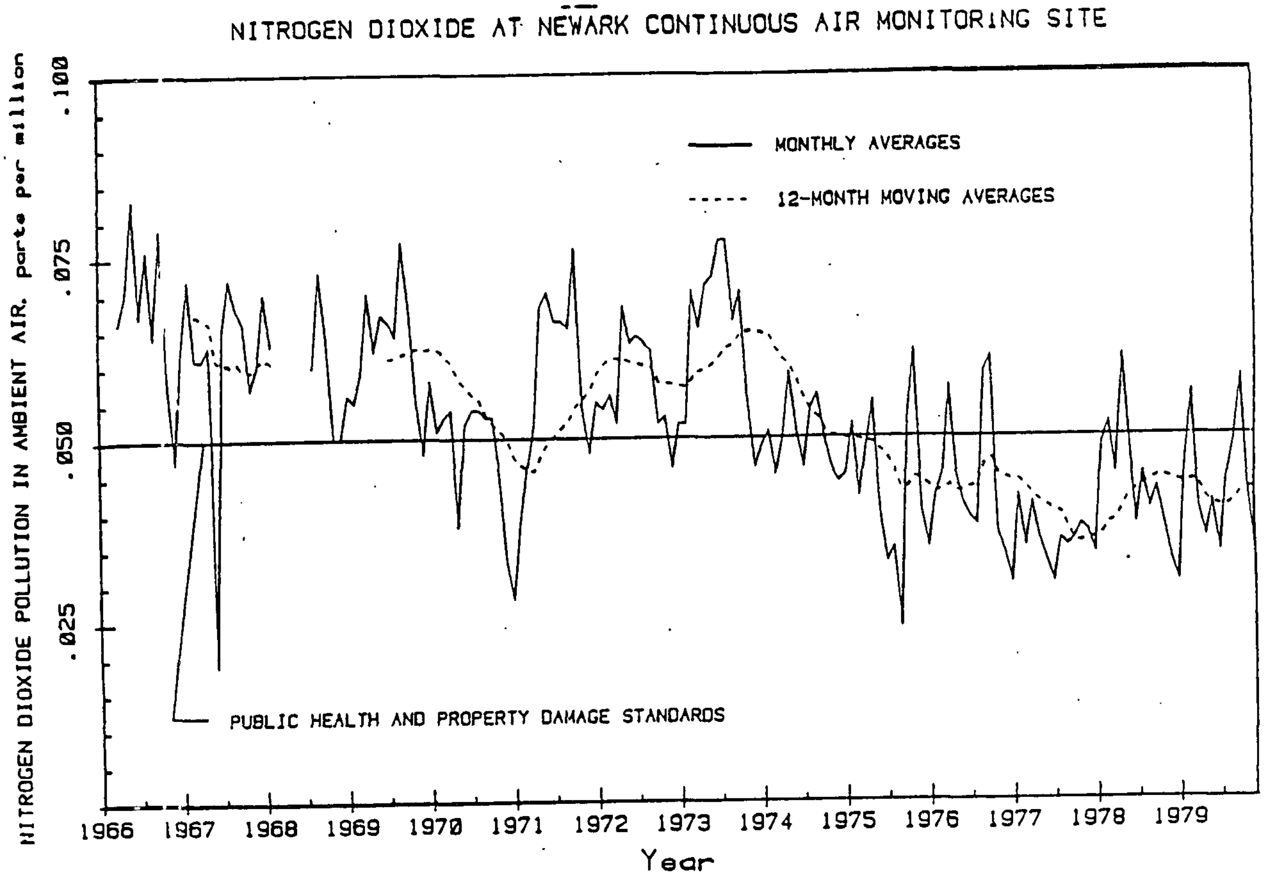


FIGURE 13



Ozone (O_3)

The O_3 standard is exceeded everywhere in the state. Although Figures 14 and 15 may indicate a slight trend towards decreasing ozone concentrations in Camden and Bayonne, large year-to-year variations in the number of exceedances of the standard and in the annual second highest daily value make discernment of a clear trend difficult.

FIGURE 14

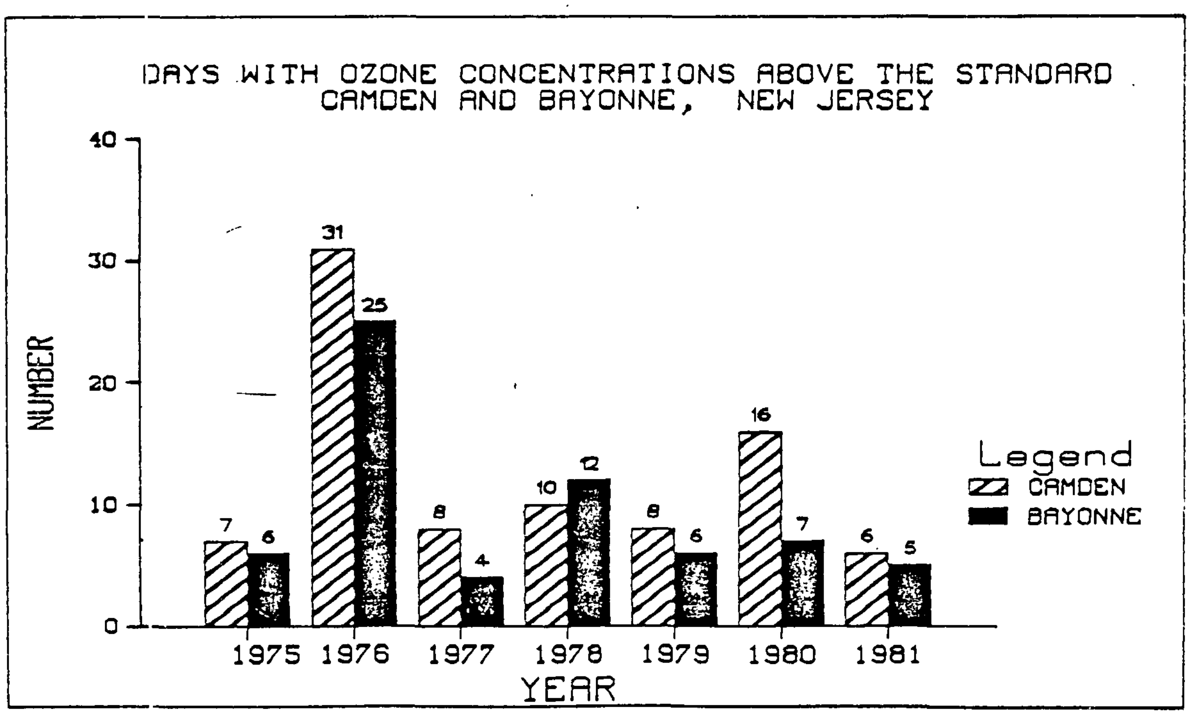
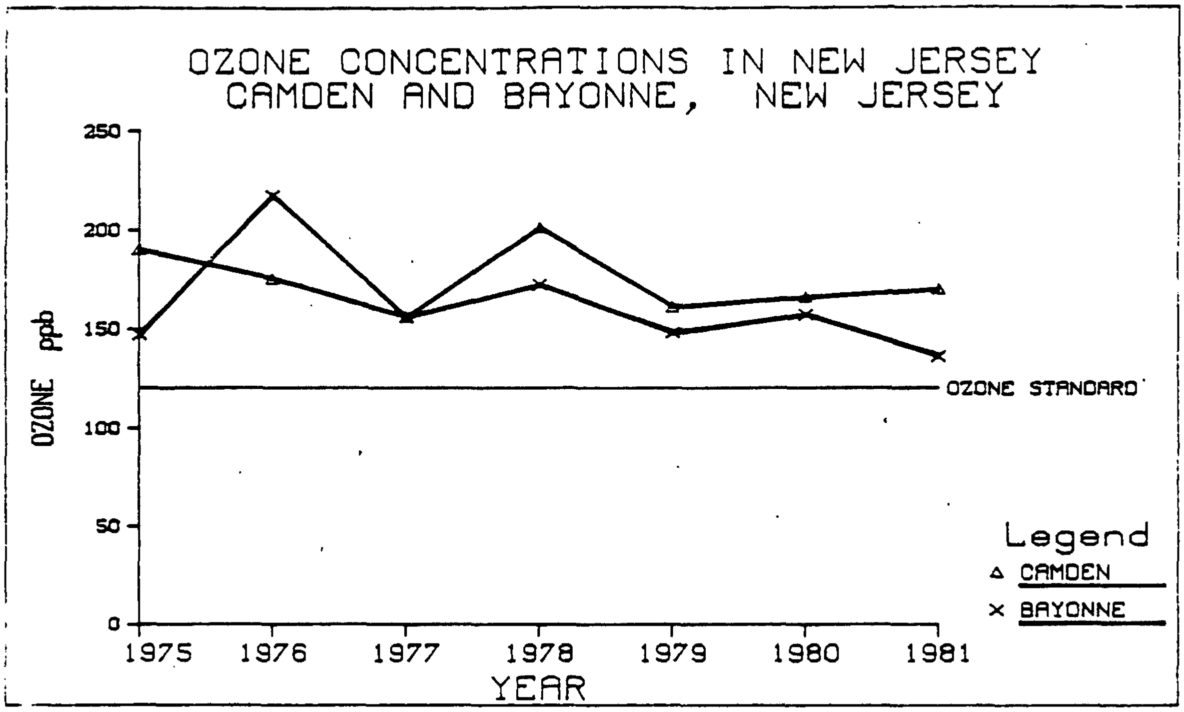


FIGURE 15



Total Suspended Particulates (TSP)

New Jersey is in attainment of the primary standard for TSP, although secondary standard violations occur. Figures 16 through 19 demonstrate the low frequency of violations of the primary and secondary 24-hour average TSP standards in Carteret and in Bayonne. However, no trend is easily discerned at either location. Note that the annual averages are close to the standard at both sites.

FIGURE 16

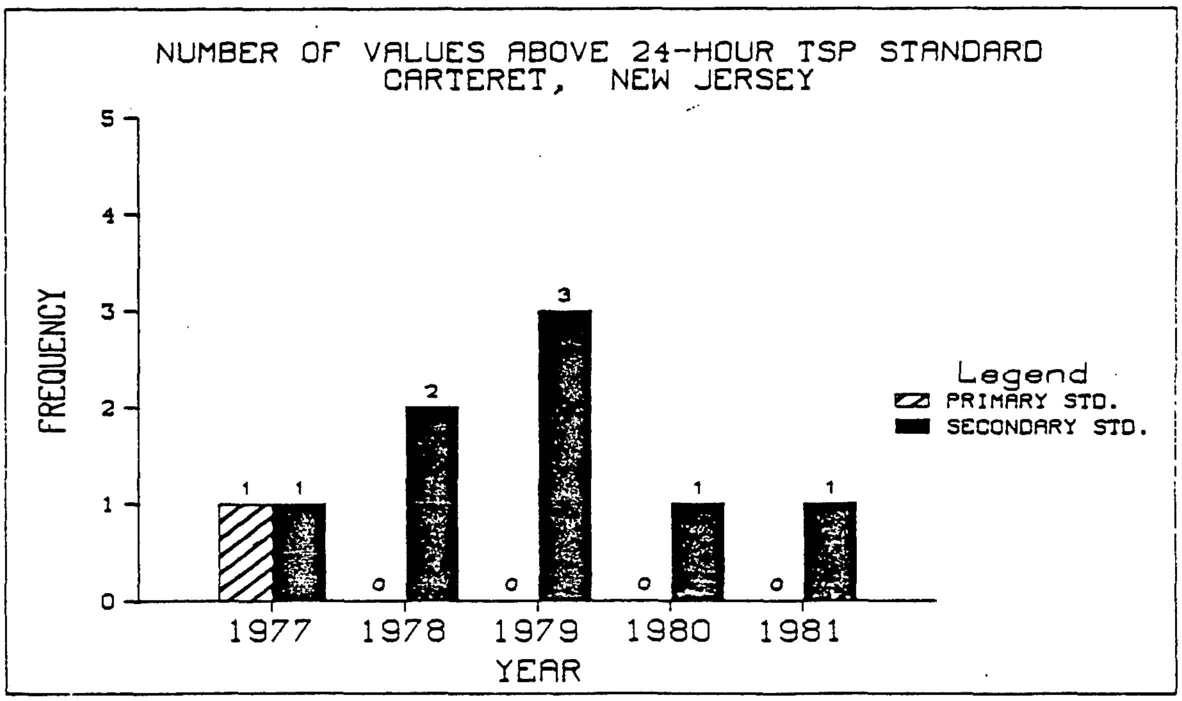


FIGURE 17

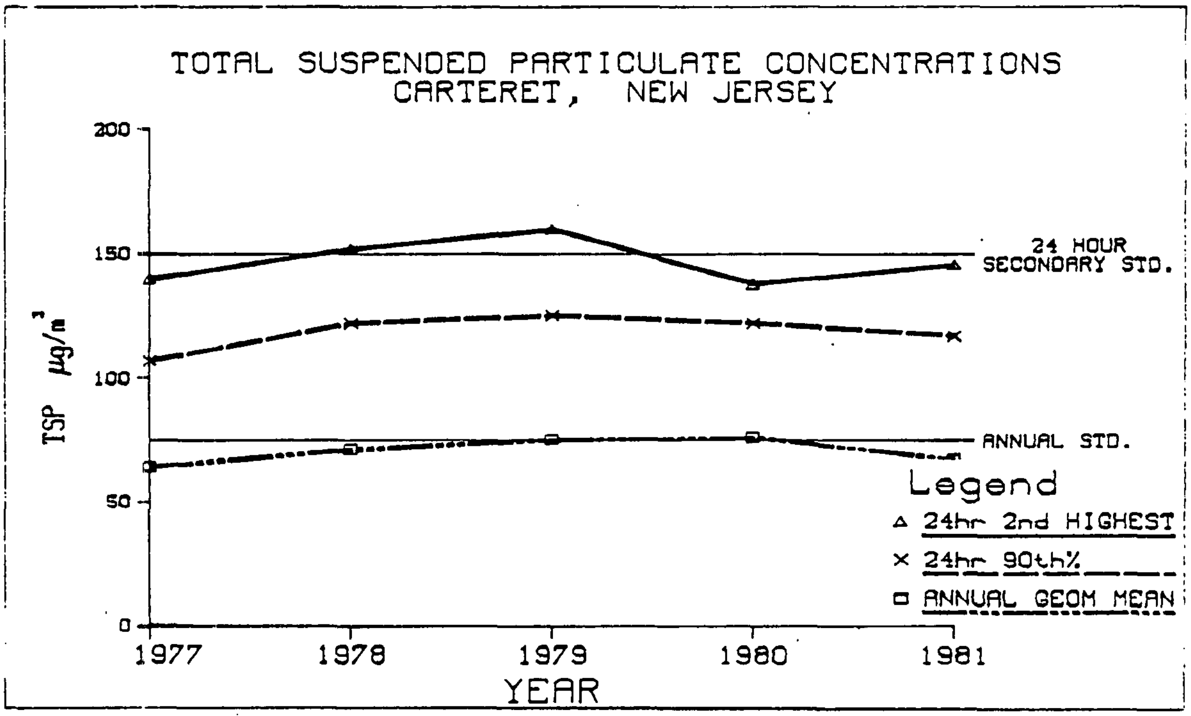


FIGURE 18

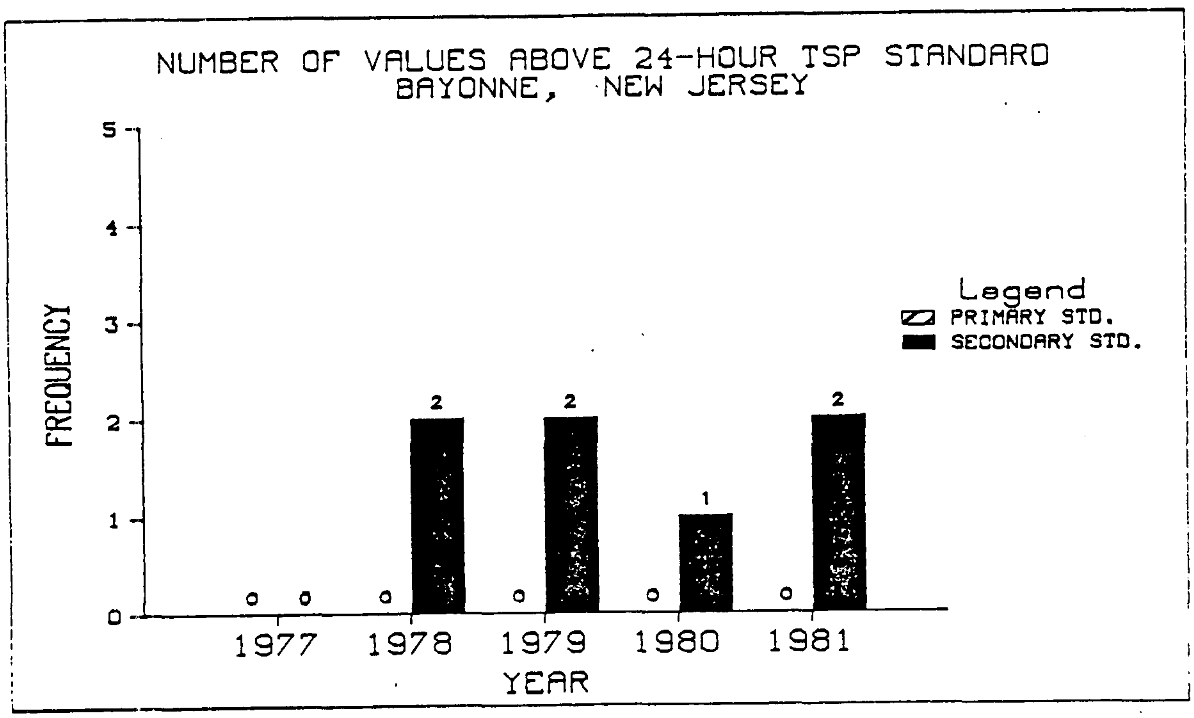
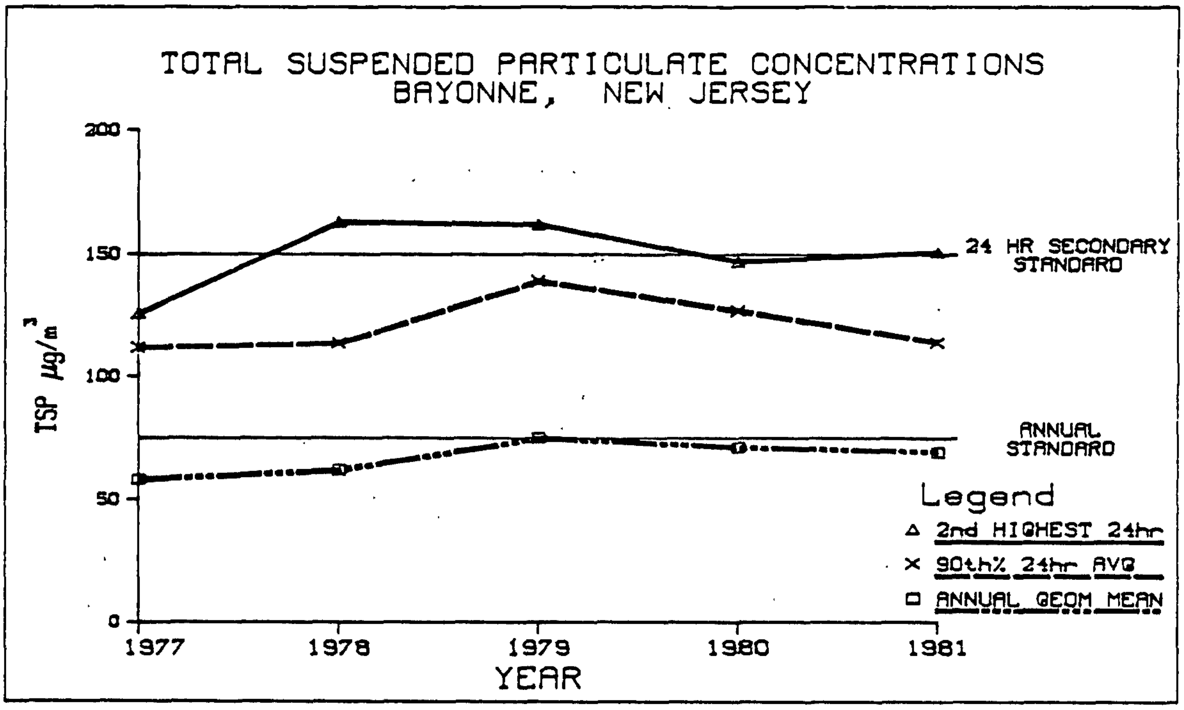


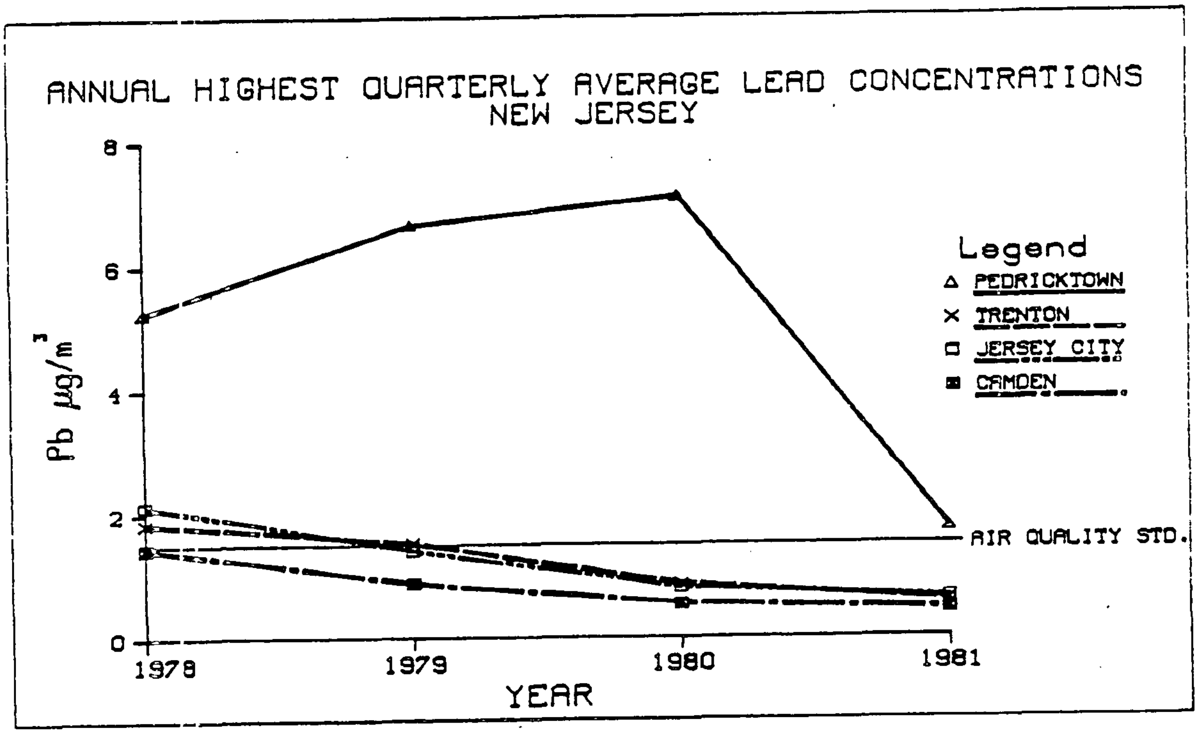
FIGURE 19



Lead (Pb)

Air quality data since 1978 show a steady decrease in Pb concentrations at most monitoring sites in New Jersey (Figure 20). This improvement can be attributed to the increased use of unleaded gasoline and to the decreased amount of Pb in leaded gasoline. A potential non-attainment area for Pb exists at Pedricktown in Salem County, and perhaps in other areas as well, due to industrial sources.

FIGURE 20



STATUS OF AIR QUALITY

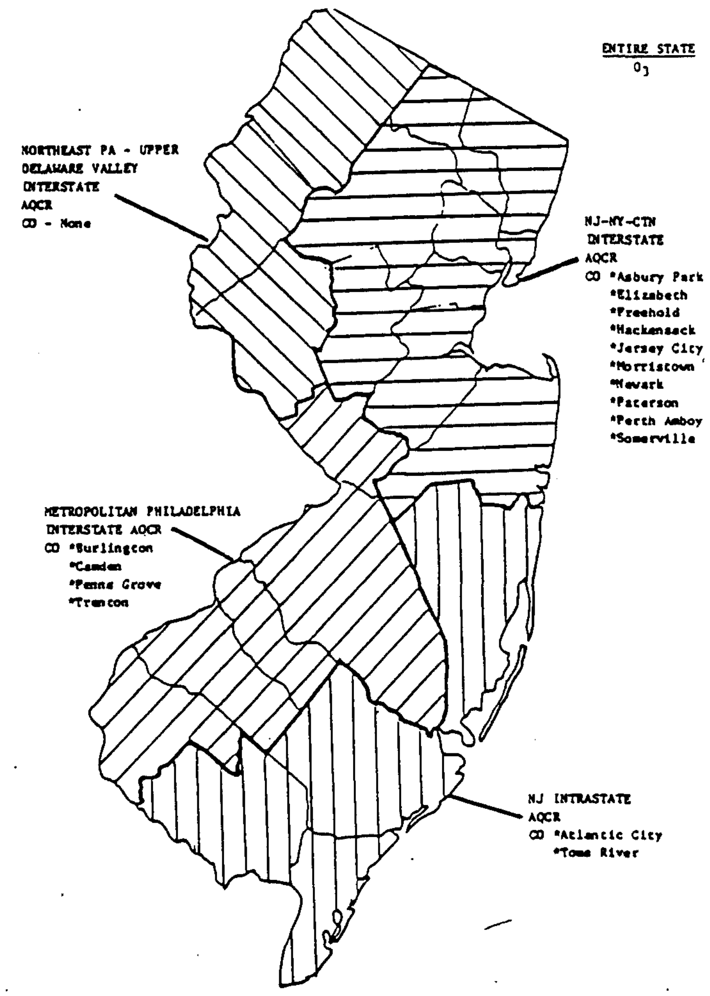
All areas of New Jersey are in attainment of the primary ambient air quality standards for total suspended particulates (TSP), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2). Non-attainment of primary standards is as follows:

° Ozone (O_3) - the entire state, with the most severe problems in areas of the state around New York City and central New Jersey, downwind of Philadelphia.

° Carbon Monoxide (CO) - sixteen municipalities (see Figure 21)

FIGURE 21

PRIMARY NON-ATTAINMENT AREAS



*EPA has proposed re-designation to attainment or unclassifiable status.

Table 1 lists the New Jersey areas that are not attaining secondary standards (TSP is the only secondary standard in non-attainment in New Jersey).

In addition to these primary and secondary standard non-attainment areas, there are also a number of areas in the State that, although currently in attainment, are close enough to the standard levels to pose a potential maintenance problem. Locations that have pollutant concentrations near the air quality standards for TSP, SO_2 and CO are listed in Table 2. These areas will require close surveillance to see if violations of the standards occur in the future.

TABLE 1

AREAS IN THE STATE OF NEW JERSEY NOT IN ATTAINMENT OF THE SECONDARY AIR QUALITY STANDARDS

(that are attaining the primary standards)

TSP

NJ-NY-CT INTERSTATE REGION

- Hudson County
- Newark (Part)
- Elizabeth
- Linden
- Carteret
- Woodbridge
- Perth Amboy

METROPOLITAN PHILADELPHIA INTERSTATE REGION

- Camden

NJ INTRASTATE REGION

- Bridgeton

SO_2 - None

CO, O_3, NO_2 - Secondary standard at same level as primary standard

TABLE 2

AREAS IN NEW JERSEY WHERE AIR QUALITY MONITORS HAVE RECORDED VALUES NEAR THE AIR QUALITY STANDARDS

(outside of cities with designated non-attainment areas)

TSP - Sites with an annual geometric mean of 55ug/m^3 (73% of the 75ug/m^3 annual primary standard) or more, or an annual second highest 24-hour average of 130ug/m3 (87% of the 150ug/m^3 secondary standard) or more.

- BURLINGTON
- SEWAREN
- PATERSON
- SOUTH AMBOY
- WOODBURY

SO_2 - Sites with an annual average of 52ug/m^3 (65% of the primary standard) or more, or annual second highest 24-hour average of 300ug/m^3 (82% of secondary 24-hour standard) or more, or annual second highest 3-hour average of 100ug/m^3 (77% of secondary 3-hour standard) or more.

- ELIZABETH

CO - Sites with a second highest 1-hour average of 30.0 ug/m^3 (75% of standard) or more, or a second highest 8-hour average of 7.5ug/m^3 (75% of standard) or more.

- EAST ORANGE

NOTE: 1981 data

Discussion of Air Quality for Each Air Quality Control Region

New Jersey - New York - Connecticut Interstate Region - This region has significant problems meeting the primary air quality standards for O_3 and CO, and also has problems in meeting the secondary standard for TSP.

The entire region fails to meet the O_3 standard. This is due to hydrocarbon and nitrogen oxide emissions from motor vehicles and industry in the region. Transport of ozone from other, upwind metropolitan areas also contributes to the New York City metropolitan area's severe problem with high O_3 concentrations.

New Jersey's worst CO problems are in this region. There are a number of locations that are not in attainment of the standards (Figure 16). Morristown has the worst CO problem of all the state's monitoring sites. Jersey City had the second highest number of exceedances in 1981.

Secondary standards for TSP are being violated in a number of cities in the region (Table 1). This problem is mostly due to industrial, power plant, residential, and fugitive emissions of particulate matter in the area. In addition to Bayonne and Carteret, sites in Jersey City, Linden, and Paterson have sometimes recorded concentrations above the annual, primary TSP standard and have a potential TSP problem.

NO_2 and SO_2 standards are being met in the region. However, the Perth Amboy SO_2 site recorded an exceedance of the SO_2 24-hour primary standard in 1980.

Due to the high traffic density in this region, Pb concentrations above the ambient air quality standard have occurred in the past. A State and Local Air Monitoring Station (SLAMS) network for Pb has been established to gather more accurate information on population exposure to Pb and trends in Pb concentrations.

Northeast Pennsylvania-Upper Delaware Valley Interstate Region. The only ambient air quality standard that is not being attained in the New Jersey section of this region is for O_3. The majority of the emissions causing this problem are generated outside this region.

Metropolitan Philadelphia Interstate Region. Primary standards for O_3, CO, and Pb have been violated in this region. TSP secondary standards have been violated in Camden due to area sources in New Jersey and Philadelphia.

The entire region has violations of the O_3 standard. There have been high O_3 concentrations downwind of Philadelphia for many years. The region's O_3 problem is largely due to the density of traffic and to industrial and residential sources of hydrocarbons and nitrogen oxides in the Philadelphia metropolitan area.

Violations of the CO standard have been found in a few cities in this region. While small areas, e.g., sites near busy intersections, may have concentrations of CO higher than the ambient air quality standard, the state has worked with county governments to decrease CO emissions. In many cases, CO emission reductions due to the Federal Motor Vehicle Control Program and the State Inspection and Maintenance Program may, by themselves, cause a decrease of CO concentrations to values below the air quality standards by the 1987 deadline.

The violations of the Pb standard have been caused by automotive emissions of Pb in urban areas and by industrial point sources of Pb in areas that are more rural.

NO_2 and SO_2 concentrations are below the ambient air quality standards.

New Jersey Intrastate Region. As in the rest of the state, violations of the O_3 standard have occurred in this region. The problem is primarily caused by emissions of hydrocarbons and nitrogen oxides from the Philadelphia metropolitan area and, occasionally, other metropolitan areas upwind of the region (e.g., Baltimore, Washington and Wilmington). Smaller urban areas within the region, such as Atlantic City, may also contribute to the problem.

The primary standard for CO is not being met in Atlantic City and Toms River. In addition, emissions of industrial particulate matter in Bridgeton have caused violations of the secondary TSP standard there. There appear to be no major SO_2, NO_2, or Pb problems in this region.

PRIORITY AIR QUALITY PROBLEMS

Table 3 presents a summary of the source control priorities for each Air Quality Control Region in New Jersey. As this table indicates, the high priority air quality problems are O_3 statewide, CO in urban areas, and toxics in two regions. The following section describes these problems in greater detail and presents data on the status and trends in air quality at representative monitoring stations.

TABLE 3

SUMMARY OF SOURCE CONTROL PRIORITIES BY REGION

Source Control Problem	NJ-NY-CT Inter-State	N.E. Pa-U.D.V Inter-State	Metro-Phila. Inter-State	NJ Intra-State
Point Sources	O_3 H TSP M		O_3 H TSP L	TSP L
Area Sources	O_3 H TSP M		O_3 H TSP L	TSP L
Mobile Sources	O_3 H CO H		O_3 H CO H	CO H
Long Range Transport	O_3 M	O_3 H	O_3 M	O_3 H
Toxics	H		H	

Key:

Priority Designations

H = High
M = Medium
L = Low

SO_2 = Sulfur Dioxide
TSP = Total Suspended Particulate
O_3 = Ozone
CO = Carbon Monoxide

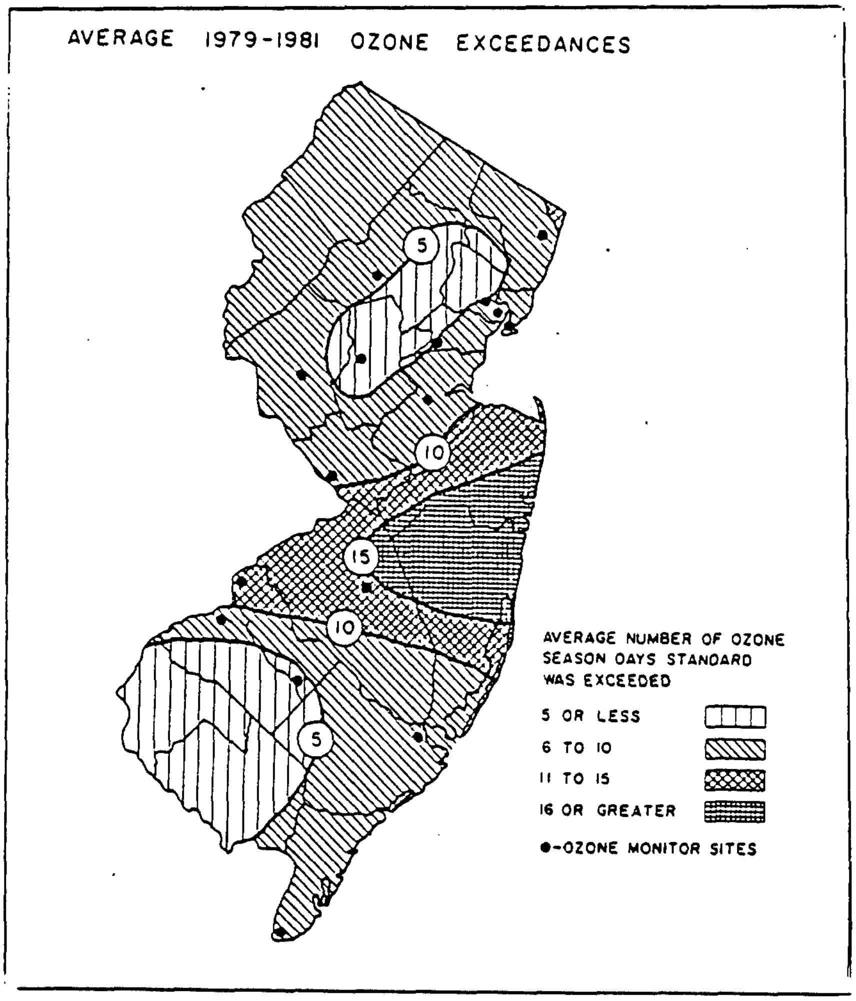
Detailed Discussion of Priority Problems

Current Air Quality Problems

° Ozone in New Jersey

The ambient air quality standard for ozone (O_3) is not being attained anywhere in the state (see Figure 22). Air quality data from 1981 indicate that O_3 concentrations observed in and downwind of New Jersey continue to be well in excess of the ambient air quality standard of 0.12 ppm maximum hourly average. The second highest daily maximum hourly value recorded at any one site in 1981 was 0.21 ppm.

FIGURE 22



Other upwind areas need to reduce precursor emissions to help New Jersey attain the standard. Similarly, emission reductions attained in New Jersey directly affect New York's and Connecticut's air quality. Maximum recorded ambient O_3 concentrations in the New Jersey-New York-Connecticut Interstate Air Quality Control Region are almost twice the standard. According to modeling estimates, about sixty percent of the emissions of volatile organic compounds (VOC) will have to be eliminated from sources in this area in order to attain the ozone standard.

° CO in New Jersey

Many locations in New Jersey violate the national ambient air quality standards for CO. In northeastern New Jersey, six cities recorded CO concentrations above the 8-hour CO standard in 1981. This CO problem is caused by the traffic congestion produced by the large number of motor vehicles in use in the state.

° Lead near Traffic and Industrial Centers

Concentrations of Pb in the air are above the air quality standard near industry in Pedickstown. In the past, Pb concentrations in urban areas violated the Pb standard. An improved state Pb network will focus on high traffic density urban areas and near industrial sources of Pb, and will provide better information on Pb air quality in these areas.

Potential Air Quality Maintenance Problems

This section presents additional data on one specific geographic area in New Jersey that, although currently attaining air quality standards, has pollutant concentrations that are relatively close to the standard. Therefore, this area presents a potential air quality maintenance problem (refer to Table 2, page 17) that will be watched closely in the coming years.

° TSP in Northeastern New Jersey

Total suspended particulate (TSP) concentrations in some of the urban areas of northeastern New Jersey have been near the primary air quality standard. More data is needed to decide if this problem is a major one in the state.

Emerging Problems

° Coal Conversions

The recent decline in fuel oil prices has diminished the interest of utilities and industries in burning coal. However, if oil prices increase in the future, a resurgence of interest in coal conversions would be likely. Many of the large sources that are candidates for reconversion to coal would not wish to do so under current emission regulations. If widespread conversion under relaxed emission limitations were allowed to take place, attainment of the national primary air quality standards could be endangered. In addition, widespread conversion could reduce increments of SO_2 and TSP available under the Prevention of Significant Deterioration (PSD) program. This situation is most critical in the New Jersey-New York-Connecticut

Air Quality Control Region, where there are several large sources that are candidates for reconversion to coal and where interstate air quality impact issues come into play.

° Toxics

There is very limited information regarding the sources and effects of toxic air contaminants. EPA has implemented regulations covering a few toxics under the National Emission Standards for Hazardous Air Pollutants program, all of which have been delegated to the state.

Emerging concerns about toxic problems are associated with emissions from landfills, combustion of illegally contaminated fuel oils, toxic waste handling and disposal facilities, and municipal waste incinerators. The potential for legal and illegal disposal practices to contaminate the atmosphere is indisputable. Whether such contamination poses a threat to human health is not clear. Information that is not now available, but that is essential to assessing potential hazards, includes: improved risk assessment information, field measurements of the types and quantities of fuel oil contaminants, information on the quantities of waste oil entering the marketplace, emission rate data for landfills, and better estimates of populations at risk.

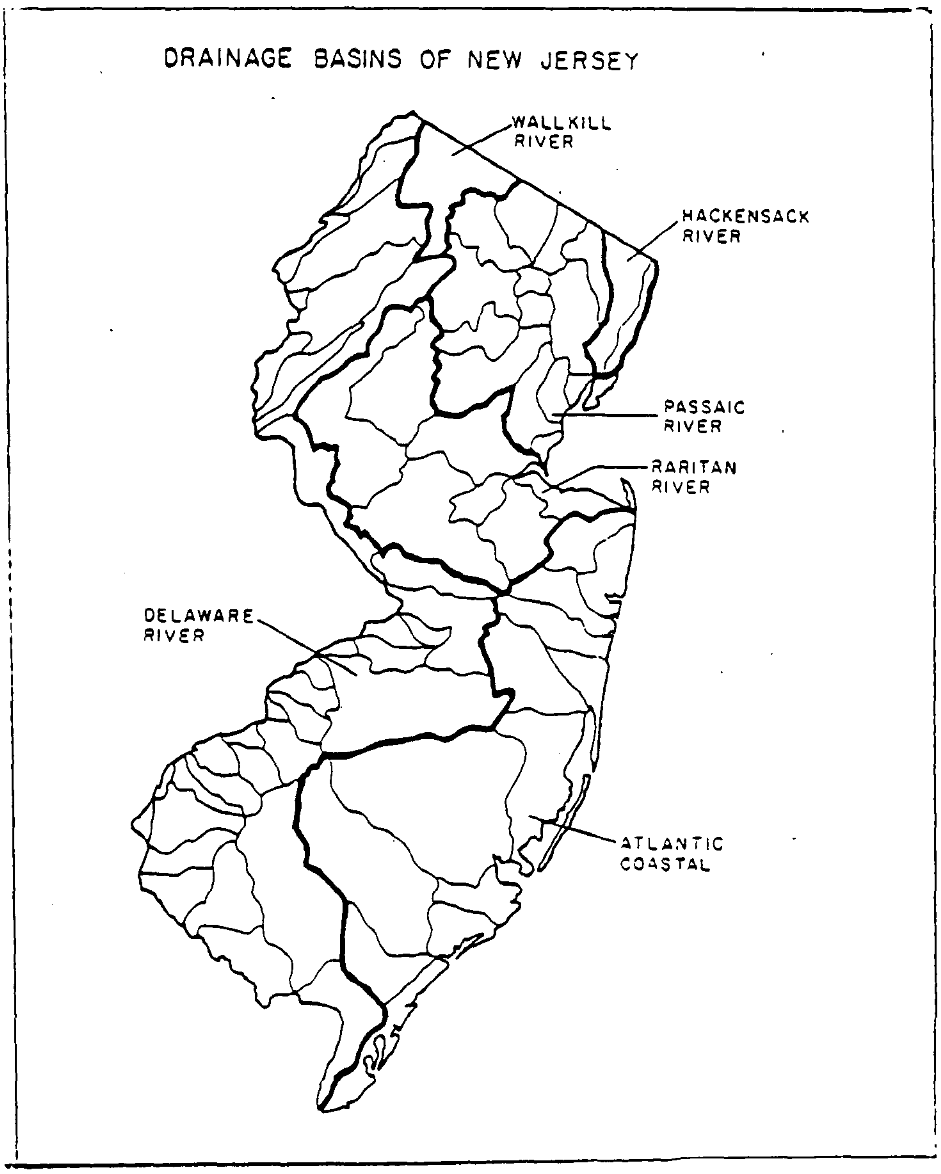
SURFACE WATER QUALITY

PROGRESS IN WATER QUALITY

The State of New Jersey is divided into the following six major drainage basins (shown on Figure 23):

- Delaware River Basin
- Atlantic Coastal Basin
- Raritan River Basin
- Passaic River Basin
- Hackensack River Basin
- Wallkill River Basin

FIGURE 23



Although water quality conditions vary widely throughout the state, some generalizations can be made. In the highly industrialized northeast and southwest portions of the state, water quality conditions are generally fair to poor. In other catchment areas such as the Pinelands of the Atlantic Coastal Basin, and the headwaters of the Raritan River and the Upper Delaware River Basin, water quality conditions tend to be significantly better. A number of problems associated primarily with municipal discharges (e.g., low dissolved oxygen (DO)) and with non-point sources (e.g., high bacterial and nutrient levels) are found throughout most of the state. Toxicants, generally in very low levels, tend to be found in the more urbanized and industrialized zones in the northeast and southwest quadrants of the state.

The New Jersey Department of Environmental Protection (NJDEP) has indicated that instream data for conventional pollutants collected over the past four to five years reveal that general water quality conditions in the state have stabilized. Water quality improvements and declines have been evident, however, in individual basins and sub-basins as indicated in Table 4.

The Atlantic coastal bays and estuarine areas have significantly improved over the last five years, especially with regard to lower bacterial levels. Although low summer DO levels are still quite common in Atlantic coastal back-bays (primarily because of natural background conditions), over 7,000 acres of shellfish harvesting areas have been upgraded over the past five years.

Numerous waterways throughout the state have been positively affected by the construction of municipal facilities funded under Section 201 of the Clean Water Act. Water quality conditions in Raritan Bay and Upper New York Harbor have shown some improvement due to the upgrading of the Middlesex County Utilities Authority and the Passaic Valley Sewerage Commission facilities, respectively, over the last few years. These two discharges alone represented almost 300 million gallons per day (MGD) of high strength municipal-industrial wastewaters which are on their way to receiving secondary treatment.

Other waterways throughout the state in which water quality improvement is anticipated as a result of future municipal treatment facilities are the Mid- and Upper-Passaic Basin; and Cooper River - Big Timber Creek - Pennsauken Creek region.

TABLE 4

NEW JERSEY SURFACE WATER QUALITY TRENDS - 1977 to 1981

Stream	DO	Total P	NH_3	TDS	BOD	DO Sat.	Fecal Coli.	NO_3/NO_2	NH_3/NH_4	pH	1982 Overall Water Quality***
DELAWARE BASIN											
Wallkil River	D	S	S	S	S	D	S	S	S	S	Fair
Flat Brook	S	S	S	S	S	S	S	S	S	S	Excellent
Paulins Kill	S	S	S	S	S	I	S	S	S	S	Good
Pequest River	S	S	S	S	S	S	S	S	S	S	Good
Musconetcong	S	S*	S	S	I	S	S	S	S	S	Good
Pohatcong Creek	S	D*	S	S	S	S	D	D	S	S	Good
Lopatcong Creek	S	D	S	S	S	S	D	D	S	S	Good
Delaware River Tribs.- Hunderdon County	D	S	S	D	S	S	S	S	S	S	Good
Assunpink Creek	I	I*	S	S	S	S	S	S	S	D	Fair
Crosswicks Creek	I	S*	S	S	I	S	S	S	S	S	Fair
Assiscunk Creek	I	S	S	S	I	S	S	S	S	S	Fair
Rancocas Creek - North Branch	S	I	S	S	I	I	S	S	S	S	Fair
Rancocas Creek - South Branch	S	I*	S	S	I	I	S	S	S	S	Fair
Pennsauken Creek	S	S*	S	S	S	S	S	S	S	S	Poor
Big Timber Creek	S	S*	S	S	S	S	S	S	S	S	Poor
Cooper River	S	S*	S	S	S	S	S	S	S	S	Poor
Mantau Creek	S	S*	S	S	S	S	D	S	S	S	Fair
Raccoon Creek	S	S*	S	S	S	S	S	S	S	S	Fair
Oldmans Creek	I	S	S	S	S	S	S	S	S	S	Fair
Salem River	S	S*	S	S	S	S	S	S	S	S	Poor
Cohansey River	S	D	S	S	S	S	D	S	S	S	Poor
Maurice River	I	I	S	S	S	S	S	S	S	S	Fair/Good
ATLANTIC COASTAL BASIN											
Tuckahoe River	S	S	D	S	S	S	S	S	D	D	Good
Great Egg Harbor	S	S	S	S	S	S	S	S	S	S	Fair
Mullica River	S	S	S	S	S	D	S	S	S	S	Excellent
Metedeconk River	I	I	S	S	S	S	S	S	S	S	Fair
Toms River	S	S	S	S	S	S	S	S	S	S	Fair
Manasquan River	S	S*	S	S	S	S	S	S	S	S	Fair
N. Atlantic Coastal - (Willow, Yellow, Jumping Br's)	S	S	S	S	S	S	S	S	S	S	Good
RARITAN BASIN											
North Branch Raritan River	S	S*	D	S	D	S	D	S	S	S	Good
South Branch Raritan River	S	S	D	S	S	S	S	S	S	S	Good
Millstone River	I	I*	S	S	I	S	S	S	S	S	Fair/Good
Lawrence Brook	S	D	S	S	S	S	I	S	S	S	Good
South River	S	S	S	S	S	S	S	S	S	S	Fair
Raritan River	I	D*	I	S	S	S	S	S	I	S	Poor/Fair
Elizabeth River	S	S	D	-	I	S	D	-	D	-	Poor
Rahway River	S	S	S	-	D	S	D	-	S	-	Poor/Fair
PASSAIC/HACKENSACK BASIN											
Upper Passaic River	S	S*	S	S	S	S	I	S	S	S	Poor/Fair
Mid-Passaic River	S	S*	S	S	S	S	S	S	S	S	Poor
Mid-Passaic Tributaries											
Rockaway River	S	S*	S	S	S	S	I	S	S	S	Poor
Whippany River	S	S*	S	S	S	S	D	S	S	S	Poor/Fair
Ramapo River	S	S*	S	S	S	S	S	S	S	S	Fair
Pompton River	S	S*	S	-	D	-	D	S	S	-	Fair
Lower Passaic River	S	S*	S	S	S	S	S	S	S	S	Poor
Hackensack River	S	S	S	S	S	S	S	S	S	S	Poor

Legend

I = Improving
D = Declining
S = Stable/Unchanged
- = Insufficient data to determine trend
* = Exceeded State Water Quality Standard 50% or more of the time
** = Classification may be based on additional information not presented here

STATUS OF WATER QUALITY

The surface water quality problems which are most pervasive in the State of New Jersey fall into the following categories:

- ° Oxygen balance problems
- ° Bacterial contamination
- ° Nutrient related problems
- ° Widespread toxicants at generally very low levels

Instream problems related to thermal discharges, high ammonia levels, acid rain, high total dissolved solids, and salinity levels, may be significant on a local level, but are not nearly as common on a statewide basis. The extent and severity of the problems caused by conventional and toxic pollutants in each of the six basins in the state are shown in Table 5,

TABLE 5

SUMMARY OF CONVENTIONAL AND TOXIC POLLUTION PROBLEMS

STREAM SEGMENTS	INFECTIOUS AGENTS	OXYGEN BALANCE	SEDIMENTS & MINERALS	NUTRIENTS	THERMAL LEVELS	TOXIC/ HAZARDOUS SUBSTANCES	GENERAL QUALITY
UPPER DELAWARE BASIN							
Wallkill River	M/H	M	L/M	M/H		M	Fair
Flat Brook and Paulinskill	L	L	L	M		L	Good/Ex.
Pequest and Musconetcong Rivers	H	L/M	L	M		L	Good
Pohatcong and Lopatcong Creeks	H	L	L	M			Good
Delaware Tributaries-Hunterdon County	M/H	L	L/M	M			Good
Assunpink Creek	H	H	L/M	H	M	M	Fair/Poor
LOWER DELAWARE BASIN							
Crosswicks and Assiscunk Creeks	H	M	L/M	M		L	Fair/Poor
Rancocas Creek	H	L	L/M	M		M/H	Fair
Pennsauken Creek and Cooper River	H	H	M	H		H	Poor
Newton and Big Timber Creeks	H	H	M	n		M/H	Poor
Woodbury, Mantua, and Raccoon Creeks	M/H	L	L	M		M/H	Fair/Poor
Oldman's, Salem, and Alloways Creeks	H	M	M	H		M/H	Poor/Fair
Cohansey River	M	L	M	H			Poor/Fair
Maurice River	L	L/M	L	M		L	Fair
Delaware River Mainstem & Delaware Bay	M/H	M/H	H	L	M	M	Fair/Poor
ATLANTIC COASTAL BASIN							
Southern Atlantic Coastal Area	M	L/M	M	L/M		L	Fair/Good
Great Egg Harbor River	H	M	L	M/H		M	Good
Central Pine Barrens	L/M	L/M	L/M	L/M		M	Good/Ex.
Toms and Metedeconk Rivers	M/H	L	L	H		M	Fair/Good
Manasquan and Shark Rivers	H	M	L	M/H		M/H	Poor/Fair
Northern Atlantic Coastal Area	M/H	L/M	L/M	M		M	Good/Fair
RARITAN BASIN							
Lawrence Brook and South River	M	M	L/M	M/H		M	Fair/Good
Millstone River and Stony Brook	M/H	M	L/M	H		L	Fair
South Branch Raritan River	M	L	L/M	H		M/H	Good
North Branch Raritan River	M	M	L	M			Good/Fair
Raritan River Mainstem	H	M	L	H		M/H	Poor/Fair
Raritan Bay/New York Harbor	H	M	H	H	L/M	H	Poor
PASSAIC BASIN							
Mid-Passaic River Tributaries	M/H	M	H	M/H	L/M	L	Good/Fair
Passaic Mainstem and Peckman Rivers	H	M	M/H	H		L/M/H	Poor/Fair
HACKENSACK BASIN							
Hackensack River	H/M	H/M	H/M	M	H	M/H	Poor
Hudson River	H	M	H	H	M	H	Poor

H = High Ranking of Severity of Instream Problems; M = Medium; L = Low

Based upon the severity of instream water quality conditions, the impairment of existing uses, and the potential population affected, the following three basins, shown on Figures 24 through 26, are considered the highest priority regions for point source control in the state:

- Passaic River Basin
- Raritan River Basin
- Lower Delaware River Tributaries

Passaic River Basin

- The upstream portion of the basin (Fresh Water Passaic area on the map) is heavily used as a potable water supply.

- The largest surface potable water intake in the state (Passaic Valley Water Commission (PVWC)) is located at Little Falls, N.J. along the Passaic River main stem.

- The basin has numerous municipal POTWs which discharge upstream from the PVWC intake; during extreme low flow months, more than half of the flow passing the intake represents domestic wastes from these facilities.

- The basin has a low capability to assimilate the numerous municipal discharges which are tributary to it; approximately 28 advanced waste treatment (AWT) facililties exist or will have to be constructed in the freshwater area to comply with instream standards and to protect the PVWC potable supply in the future.

- Significant industrial sources are located along the Whippany River, Peckman River, Saddle River, and mid- and lower Passaic River stretches.

- Water quality conditions throughout most of the non-tidal basin are poor to fair and are not expected to meet the 1983 fishable-swimmable goals for most of the basin.

- Water quality in the tidal portion of the basin (Urban Area) is poor: the Passaic Estuary receives relatively high strength municipal-industrial effluents from combined sewer overflows along the entire estuary and from direct industrial sources; extensive contravention of instream DO standards occurs and the presence of toxicants is consistent with other urbanized and industrial regions of the state.

Raritan River Basin

- Water quality conditions vary in the headwater region of the basin from fair to excellent.

- Non-point sources (NPS) and municipal POTWs contribute to elevated nutrient levels throughout the non-tidal basin to the extent that eutrophication problems and attendant DO and sedimentation problems exist in many of the basin's impoundments, e.g., Lake Carnegie.

- The Raritan River and tributaries play an important role in supplying potable water for central New Jersey, and also contain important fisheries resources.

- Elevated bacterial levels primarily from non-point sources preclude compliance with standards throughout the non-tidal basin.

- Water quality conditions in the Raritan Estuary and western Raritan Bay are poor; extensive areas of depressed DO and elevated coliform levels exist due to the combined effect of primary treatment plants still existing along Raritan Bay and the Arthur Kill and the mixing of poor quality water from the Arthur Kill, Lower New York Bay, and lower Raritan River.

- Bathing and shellfishing in Raritan Bay have been impaired due to elevated coliform levels and the presence of toxicants in the sediment, water column, and biota.

- Industrial discharges have significant water quality impacts on the central portions of the Raritan River.

<u>Lower Delaware River Tributaries</u> (Cooper River, Pennsauken Creek, Big Timber Creek)

- Water quality in these streams ranges from fair to poor. The downstream segments receive significant point source contributions that cause severe stress to the streams and overload their assimilative capacities.

- Summertime DO in the lower Cooper River has been recorded under 2.5 mg/l, BOD over 10 mg/l, and total phosphorus 15 times greater than standards.

FIGURE 24

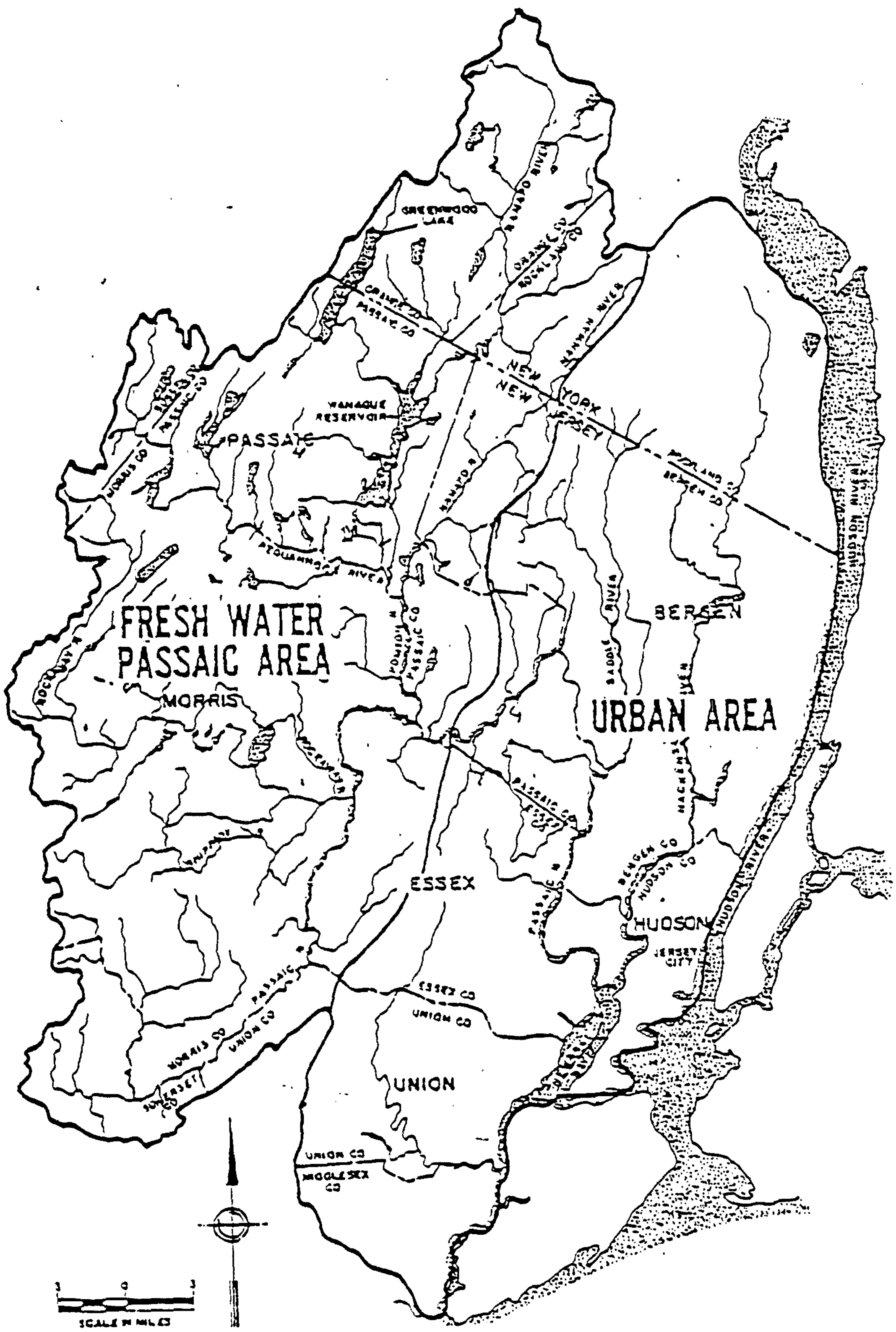

FRESH WATER
PASSAIC AREA
URBAN AREA
PASSAIC
MORRIS
BERGEN
ESSEX
HUDSON
UNION
NEW YORK
NEW JERSEY

FIGURE 25

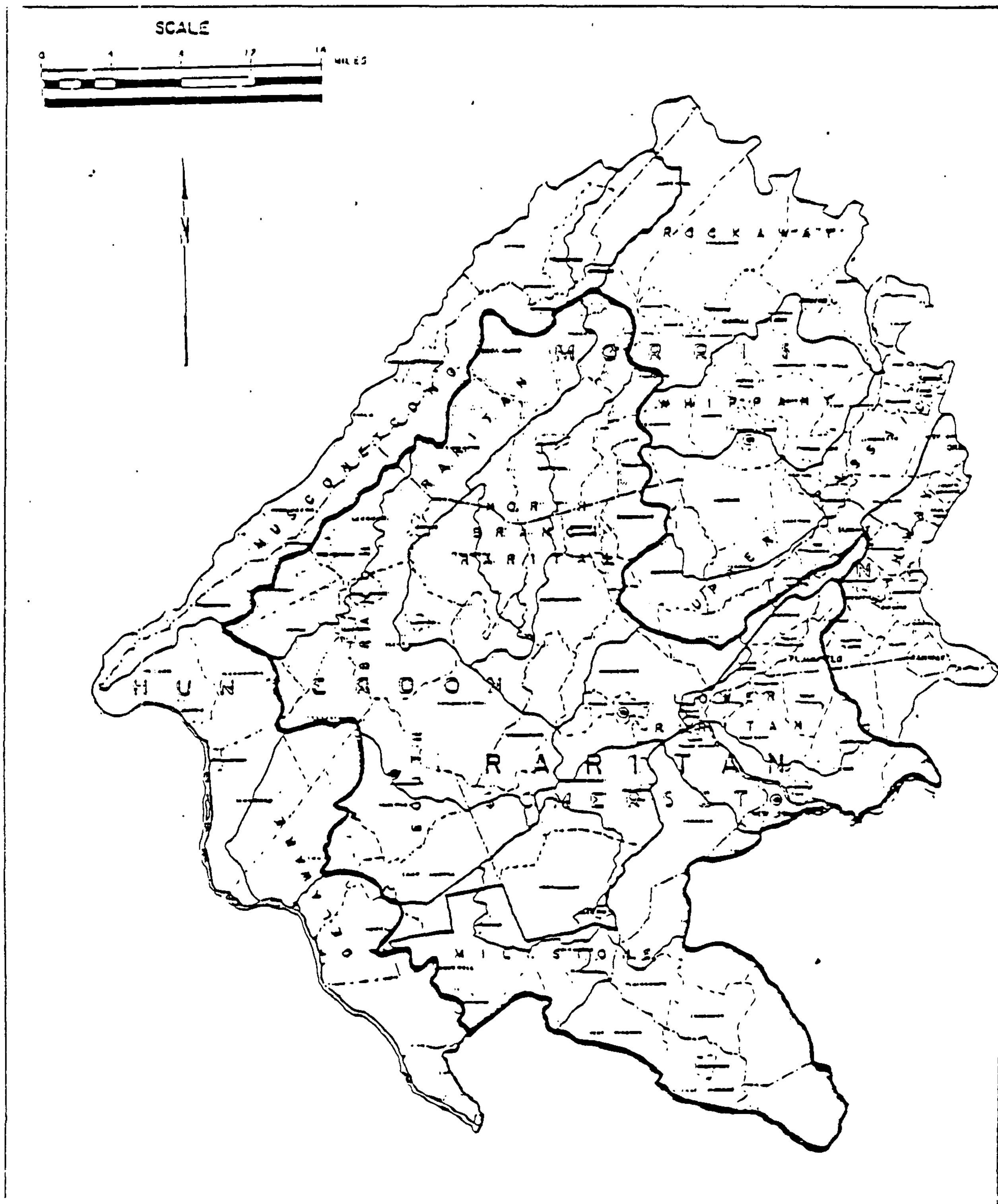
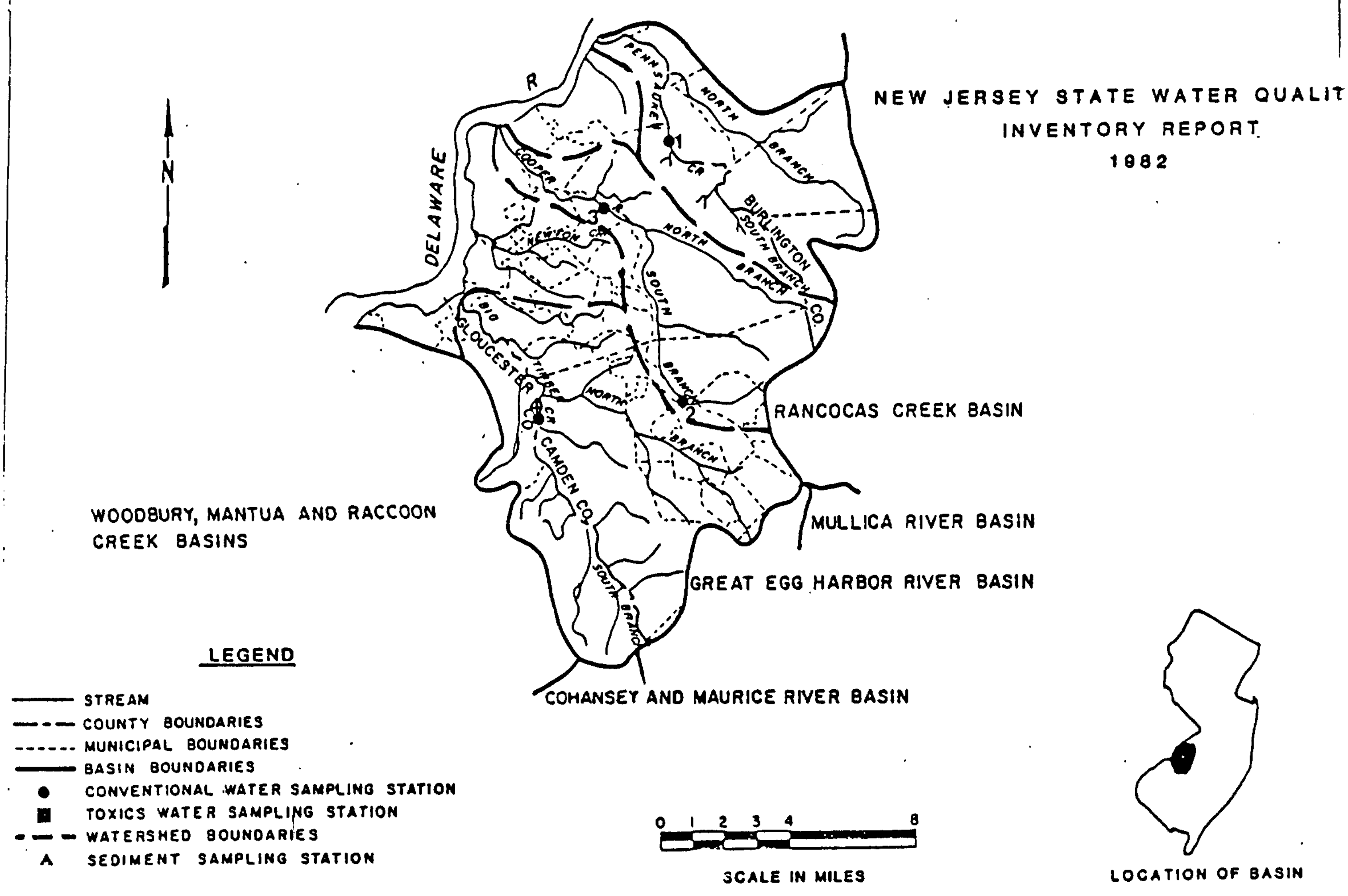

SCALE
MILES
ROCKAWAY
MORRIS
WHIPPANY
NORTH BRANCH RARITAN
RARITAN
LOWER RARITAN
MILLSTONE

FIGURE 26

PENNSAUKEN CREEK, BIG TIMBER CREEK AND COOPER RIVER BASINS
(INCLUDING NEWTON CREEK)



PRIORITY WATER QUALITY PROBLEMS

Table 6 summarizes for each basin the problems that are high priority relative to other problems in the state.

TABLE 6

Summary of Source Control Priorities by Basin

Basins / WQM/ Source Problem	Delaware River	Atlantic Coastal	Raritan River	Hackensack River	Wallkill River	Passaic River
Point Source Conventional	X		X	X	X	X
Toxics	X	X	X	X		X
Non-point Source	X	X	X	X	X	X
Ocean Dumping		X				

Detailed Discussion of Priority Problems

° Conventional Pollution Problems in Inland Waters Associated with Municipal Discharges

Summertime dissolved oxygen (DO) problems exist statewide and are significantly contributed to by discharges from municipal facilities, or are related to eutrophication and associated benthic uptake which occur in many of the shallow lakes and sluggish waterways throughout the state. The generally low ambient flows in the waterways of the state combined with high population and industrial densities have resulted in numerous waterways which contravene instream DO standards. DO levels in surface waters of the state are depressed due to point, non-point, and intermittent loadings from industrial and municipal discharges, thermal discharges, suburban/rural runoff, urban storm runoff and agricultural runoff/seepage. The problems associated with these organic waste sources are aggravated by the reduced assimilative capacity of many of the state's streams due to their physical characteristics and/or substantial withdrawals by water purveyors.

DO levels have also been depressed in many stretches of the Passaic River basin, as well as in portions of the Raritan Bay-Arthur Kill-Newark Bay-Hackensack Estuary complex, the Upper Millstone River basin, and along many stretches of tidal tributaries to the Delaware River-Main Stem. DO concentrations in streams within the Atlantic Coastal Plain and the Delaware tributaries below Trenton are expected to improve to satisfactory levels when municipal treatment plants are upgraded to at least secondary treatment or their discharges are diverted to waterways having greater assimilative capacity. Surface waters in Camden and Mercer counties, will also require relief from urban runoff and combined sewer overflow loadings before DO levels can be restored to levels stipulated within the state water quality standards.

° Surface Waters Contaminated by Toxics

The presence of toxics in the water column, fish tissue and/or sediments can become the most significant water quality problem in the state. Although data on instream toxic levels are limited, sufficient information is available to conclude that industrial toxicants are a potentially widespread problem. Volatile organics, pesticides, PCBs, and heavy metals exist in at least very low concentrations throughout state waterways.

The highest volatile organic levels were found to be in areas adjacent to industrialized or urban centers. Metals, PCBs, and pesticides were discovered in fish tissue from many areas of the state and appeared to be highest in certain catadromous and anadromous species. Some waterways of the state are of particular concern. The tidal waterways which adjoin New York Harbor, for example, have shown signs of toxicant contamination in the sediment, water column, and biota. Elevated PCB levels and abnormally high metal concentrations have been recorded in sediments in Raritan Bay. Petroleum-based hydrocarbons are at levels sufficient to cause mortality to some benthic species, and many dissolved metals in the water column in Raritan Bay are also at levels sufficient to impair certain organisms. Toxicant problems of varying levels of severity are by no means limited to just waters in the New York Harbor complex.

Instream un-ionized ammonia levels caused by municipal and industrial sources in both the Passaic and Raritan basins have at times reached levels which are potentially toxic to instream species. Landfills in many areas of the state continue to pose serious threats to both surface and ground water quality due to toxicant leachate, (e.g., the Ventron site in the Hackensack Meadowlands and the Kin-Buc landfill in the lower Raritan Basin).

The presence of toxics in New Jersey waters has impacted finfishing in the state. All fishing is banned in some tributaries of the Delaware Estuary due to chlordane contamination. Striped bass and American eel harvested from certain waterways are prohibited from being sold in the state due to high PCB levels. The state has also urged that bluefish, white perch, striped bass, American eel, and white catfish taken from other waterways be eaten only once a week due to possible PCB contamination.

° Lack of Data on the Contamination of Surface Waters by Toxics

As just discussed, one of the most significant water quality problems in the state of New Jersey is contamination by toxic substances. Municipal and industrial discharges, residual wastes (sludges), sewer overflows, oil and hazardous material spills, landfill leachate, and other sources contribute to the toxics found in New Jersey waters. To date, toxics monitoring has been conducted to establish base conditions and on a case-by-case basis in New Jersey. As additional monitoring is conducted, new toxics contamination problems may be discovered. For this reason, toxics are considered to be a potential environmental problem area throughout the state.

° Marine Pollution Problems

Impaired Fishing - Shellfish

Over the period from 1971 to 1979, 18,660 acres of shellfish harvest areas along the Jersey coast were downgraded from "Approved" to a more restrictive classification. Approximately 25 percent of these areas were reclassified "Fully Condemned". The general decline in classification was attributed to increased recreational and development pressures in coastal areas and to municipal discharges. In 1980, over 5,000 acres were upgraded. During 1981 an additional net gain of approximately 2,500 acres was established. The 1982 reclassifications resulted in a net loss of slightly over 200 acres. This recent, overall change in trends is largely attributable to the upgrading of municipal facilities, and the subsequent diversion of these discharges into coastal waters offshore via regional ocean outfall lines.

Tabulations of shellfish closure/reopening records, annual shellfish harvest catch and shellfish harvest compositions are indicated in Tables 7, 8, and 9.

Impaired Contact Recreation

Swimming is a major recreational activity in New Jersey. NJDEP estimates that the state had over 114,000 linear feet of freshwater beaches and 285,000 feet of saltwater beaches potentially available for recreational bathing. Cape May and Ocean counties, located on the Atlantic coast, have the greatest number of beaches in the state.

The quality of most of New Jersey's fresh waters is unsuitable for contact recreation, based upon the results of ambient monitoring programs. The presence of fecal coliform in surface fresh waters, is widespread throughout the state, and often exists in high concentrations (greater than 200 MPN/ /100 ml). Field data show that four entire watersheds in the state are considered swimmable on the basis of ambient monitoring: the Flat Brook, Paulins Kill and Mullica River watersheds and the Delaware River mainstem above Trenton. These watersheds are also the only basins which in their entirety will meet the 1983 swimmable goal of the Clean Water Act. In the remainder of the state many bathing beaches exist in non-tidal waters, but are limited for the most part to the headwater areas in each basin.

TABLE 7

OCEAN AND ESTUARINE SHELLFISH GROWING AREA ACREAGE RECLASSIFIED

Year Adopted	Total Acres Downgraded	Total Acres Upgraded	Net Change
1982	3,011	2,800	- 211
1981	98	5,403	+ 5,305
1980	173	14,332	+14,157
1979	12,858	8,275	- 4,583
1978	583	1,129	+ 546
1977	42	1,599	+ 1,557
1976	2,353	2,135	- 218
1975	5,018	885	- 4,133
1974	5,462	146	- 5,316
1973	2,490	0	- 2,490
1972	2,951	5,511	+ 2,560

TABLE 8

YEARLY NEW JERSEY SHELLFISH CATCHES

Year	Catch (in pounds)
1970	42,955,839
1971	32,067,077
1972	25,303,811
1973	24,896 494
1974	25,501,852
1975	38,325,940
1976	31,519,713
1977	39,302,494
1978	34,925,000
1979	45,281,000
1980	37,616,000

TABLE 9

COMPOSITION OF SHELLFISH YEARLY CATCHES AND MONETARY VALUES
1979-1980

	1979		1980	
Species	Catch (pounds)	Values (dollars)	Catch	Value
Hard Clam	898,000	1,570,000	845,000	1,695,000
Soft Clam	1,190,000	208,000	336,000	375,000
Oyster	1,675,000	2,360,000	771,000	1,167,300
Surf Clam	12,325,000	6,300,000	9,597,700	4,791,000
Quahog	24,968,000	7,500,000	22,574,300	6,772,800
Scallops (ocean)	5,225,000	16,850,000	3,492,600	13,760,100
Totals	45,281,000	34,790,000	37,616,600	28,561,200

The coastal waters of the Atlantic Ocean are swimmable with the exception of some small, localized beaches which may be closed after storm events. Large stretches adjoining Raritan Bay in Monmouth County, however, are closed to bathing and also shellfishing due in part to bacterial contamination entering from the Raritan Estuary and Arthur Kill to the west.

Impaired Fisheries In The Ocean

The large quantities of raw and inadequately treated municipal wastes, and present and past industrial discharges in the Hudson/Raritan estuaries, combined with the ocean dumping of dredged material and sewage sludge has impacted finfish populations and shellfish beds in the New York Bight. Marine pollution has contributed to three major problems: (1) the closure of shellfishing areas due to bacterial contamination, (2) toxic contamination of sediments and fish from the New York Bight Apex to the outer continental shelf-slope break, (3) coastal eutrophication.

There are currently six active dump sites in the New York Bight, where the disposal of waste materials from New Jersey, as well as New York, is permitted. Four of these sites are located in the New York Bight Apex. The six active sites (Figure 27) are:

- Sewage Sludge (12-mile) Dump Site
- Acid Waste Dump Site
- Cellar Dirt (Rubble) Dump Site
- Chemical Waste (106-mile) Dump Site
- Wood Incineration Dump Site
- Dredged Material (Mud) Dump Site

The annual average discharge of dredged material in the Bight over the next several years is expected to be between 8 to 10 million cubic yards (5 to 7 million cubic yards from federal projects, and 2 to 3 million cubic yards from non-federal projects). The quantities of waste materials (other than dredged materials) ocean dumped at these sites are shown in Table 10.

Studies conducted by the National Oceangraphic and Atmospheric Administration (NOAA) have demonstrated that many fishery resources of the New York Bight are contaminated with toxics, including petroleum hydrocarbons and PCBs. Species occurring from the coastal waters of the New York Bight Apex to the outer continental shelf-slope break showed unexpectedly high levels of these contaminants. Measurements of trace metals and organic contaminants in sediments collected over a broad area of the continental shelf indicate that the seaward extent of pollution may be greater than earlier expected. In addition, outflow plumes from the Raritan/Hudson River complex carry particulates and adsorbed toxic contaminants out to the continental shelf. Such materials eventually settle to the seabed and may be causing adverse effects on benthic communities and finfish populations. Studies have identified a higher incidence of skeletal deformities, mutagenic aberrations and various shell or skin lesions in organisms collected inshore and in and around dump sites.

FIGURE 27

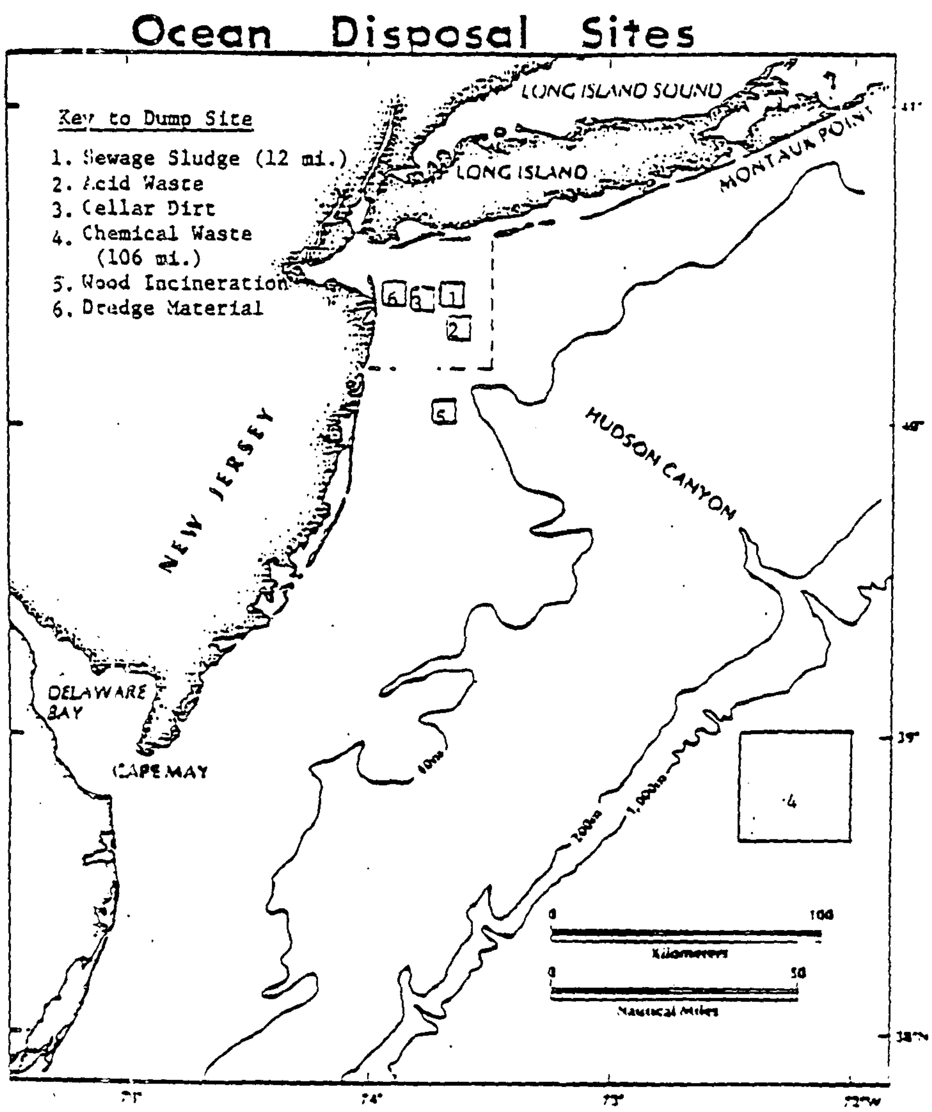


TABLE 10

QUANTITIES OF WASTE MATERIALS OCEAN

DUMPED IN THE NEW YORK BIGHT

(in thousand wet tons)

	Sewage Sludge Site	1973	1974	1975	1976	1977	1978	1979	1980	1981
NJ	Bergen Co. Util. Auth.	231	242	278	246	225	235	250	273	271
NJ	Joint Meeting	129	125	116	88	86	226	307	416	467
NJ	Linden Rosella/Rahway Valley	67	142	142	228	227	232	253	347	278
NJ	Middlesex Co. Sew. Auth.	342	340	331	300	305	544	900	1227	931
NJ	Middletown Twp. Sew. Auth.	10	11	20	18	15	19	19	19	21
NJ	Passaic Valley Sew. Comm.	555	517	570	576	729	602	534	654	589
NJ	Municipalities	260	348	300	212	139	134	107	97	53
NY	Glen Cove	7	4	4	7	6	4	7	6	23
NY	Nassau Co. DPW	363	344	357	409	386	390	400	465	503
NY	New York City DEP	2540	2050	2040	2150	2210	2480	2809	3255	3320
NY	Wetchester Co. DEF	74	80	112	138	157	108	346	425	226
		4578	4203	4270	4375	4485	4974	5932	7184	6682
	Acid Wastes Site									
NJ	Allied Chemical Corp.	65	62	53	52	32	29	33	40	36
NJ	DuPont - Grasselli	157	86	—	—	—	—	—	—	—
NJ	NL Industries, Inc.	2540	2190	2030	1360	666	1360	1509	1907	1720
		2762	2338	2083	1412	698	1389	1539	1047	1756
	Cellar Dirt Site (1)									
*	Moran Towing Corp.	835	770	396	315	379	241	107	89	0
*	Water Tunnel Contractors	139	—	—	—	—	—	—	—	—
		974	770	396	315	379	241	107	89	0
	Chemical Waste Site									
NJ	American Cyanamid Co.	130	151	128	131	143	122	101	68	25
NJ	Camden Sewage Sludge	—	—	—	—	53	59	—	—	—
NJ	Chevron Oil Co.	27	29	24	—	—	—	—	—	—
NY	Con Edison - Fly Ash	—	—	—	—	—	—	—	2	—
*	Digest Cleanout	45	102	106	27	18	18	90	52	20
DE	Dupont - Edge Moor	—	—	—	—	418	409	308	238	22
NJ	Dupont - Grasselli	127	170	290	180	118	189	156	237	200
*	General Marine Trans. Corp	—	—	—	5	—	—	4	—	—
NJ	Hess Oil Co.	8	—	—	—	—	—	—	—	—
*	Modern Trans. Co.	37	39	86	69	91	79	46	23	—
		374	491	634	412	843	879	706	620	267
	Wood Incineration (1)									
*	Corps of Engineers	—	8	.2	.3	13	16	35	5.6	9.7
	New York City	11	8	6	8	2	2	10	3.1	0.4
*	Ocean Burning, Inc.	—	—	—	—	—	—	—	0.8	0.3
*	Weeks Stevedoring	—	—	—	—	—	—	—	1.0	5.7
		11	16	6	8	15	18	45	10	16

(1) Quantities in thousands of dry tons
(*) Wastes generated in New York and New Jersey

NOAA studies of benthic populations and communities indicate that benthic diversity and standing stocks are low in active ocean dump site areas, and also suggest a slow recovery in the benthos at discontinued dump sites.

Evidence from NOAA studies also points to severe coastal eutrophication in waters of the Bight. This eutrophication may have increased the organic loading in areas to beyond their assimilative capacity, thus causing local areas to have bottom oxygen concentrations below those which are healthy for most marine life. Hypoxia (very low oxygen), causing mortality, has occurred in the Bight several times in the last decade and a half. Seabed oxygen demand was found to be greater nearshore and in areas receiving inputs of organic carbon due to ocean dumping.

While these environmental impacts are associated with several pollution sources, ocean dumping plays a major adverse role. Additional applications for ocean dumping other wastes (e.g., coal ash and low level radioactive wastes) are expected. Applications for significantly increasing the volume of wastes dumped by current users are highly probable.

° Impact of Non-Point Sources on Water Quality

Non-point source (NPS) impacts are significant in many areas of the state. The major NPS categories include direct urban runoff, agricultural runoff, and septic and landfill leachate. These dispersed sources have resulted in a host of instream problems ranging from bacterial contamination (e.g., from dairy runoff) to lake eutrophication (e.g., in agricultural basins) to toxicant elevations (e.g., from pesticide runoff in rural areas and industrial toxicant discharges from landfills and from runoff in urban areas). The cumulative impact of these sources has been significant in many of the basins in the state.

Many lakes are directly affected by agricultural NPS runoff and consequently experience excessive algal proliferation and lake sedimentation. The extent of this problem is reflected by the high percentage of lakes statewide which experience algal blooms and by data which indicate that over 45 percent of the values sampled over the last few years exceed instream phosphorus standards. Agricultural runoff is also suspected of contributing to high levels of pesticides in some basins of the state.

Direct urban storm runoff is a serious problem in heavily populated and industrialized sections of New Jersey, particularly in the northeastern part of the state. The problem is compounded by the fact that many sewer systems are still operating as combined sewer overflows (CSOs). In addition to carrying organic pollutants and high bacterial levels, urban storm runoff can carry toxic and other hazardous substances from industrial sites and other urban locations. The high bacterial and toxicant levels in waterways in the New York Harbor complex (e.g., Raritan Bay, and the Arthur Kill) undoubtedly reflect urban NPS runoff and other sources, such as CSOs.

Leachate and seepage of pollutants from dumps and poorly designed or inadequate landfills are causing serious contamination of resources throughout the state (primarily ground water). Municipal and industrial wastes deposited in landfills and dumps often contain or produce toxic and other hazardous pollutants which pose threats to both instream species and potable water supplies.

High bacterial levels are a problem in both tidal and non-tidal waterways. Non-point sources (NPS), and improperly operating and antiquated treatment plants are suspected of being the primary origin of the high bacterial levels in non-tidal waterways, while both NPS and combined sewer overflows contribute to the bacterial contamination of tidal waterways such as the Passaic, Hackensack, Raritan, and Delaware estuaries and the back-bay areas of Atlantic and Cape May counties. Excessive fecal coliform levels in lakes and streams in southern New Jersey have been caused primarily by malfunctioning septic tanks. Urban runoff and combined and storm sewers and, in some cases, inadequate disinfection of wastewaters have resulted in the high fecal coliform levels found in the lower reaches of most streams in Camden County, Mercer County, and the urban northeast. Dairy farm runoff probably plays a significant role in elevated bacterial levels in the Delaware River tributaries north of Mercer County. As a result of these widespread bacterial sources, the majority of the state's non-tidal waterways do not at present meet the national fishable-swimmable objective because of bacterial concentrations.

Another problem which is quite pervasive throughout the state is high instream nutrient levels and resulting eutrophication. In many of the rural areas of the state, the high nutrient levels are often related to agricultural or suburban runoff or to the inability of streams to assimilate treatment plant effluent. New Jersey has approximately 1,000 lakes and ponds within its borders on which DEP has undertaken biological investigations and evaluated eutrophication levels under the Clean Lakes program. At least 460 lakes have been sampled once since the program began in 1975 and 299 have been sampled twice. Of the lakes sampled in each county, those with the largest percentage of eutrophic conditions occur in Middlesex, Cape May. Sussex, and Salem counties. The survey also indicates that Passaic County has the lowest percentage of presumed eutrophic lakes, 3.4 percent.

Non-point sources have contributed to the impairment of contact recreation in over half of the non-tidal waterways of the state and, in shoreline regions close to urban areas, have precluded shellfish harvesting in many coastal back-bay areas. They have also reduced the availability of potable supplies in some basins, and contributed to elevated toxicant levels in tidal and non-tidal waterways.

There is a need for greater water quality monitoring so that specific pollution sources can be identified. The long-term ambient water quality monitoring programs currently in use in the state may be adequate for identifying general water quality conditions. However, if water quality is to be improved in the most efficient manner, monitoring is needed to determine actual water pollution sources and impacts on designated uses. Water quality management activities can then be directed to alleviate the problems.

° Loss of Wetlands in Coastal Zones

In and around the highly developed areas of the state, urban sprawl continues to destroy wetlands. The loss of wetlands in coastal zones contributes to the loss of fish spawning habitat and fisheries resources and decreases water quality. Estimates indicate that New Jersey has lost abut 40 percent of its wetlands since the 1930's. The Hackensack Meadowlands and wetlands in the vicinity of Atlantic City are under intense pressure for development. The piecemeal alteration and destruction of wetlands through draining, dredging, filling, and other means has had an adverse cumulative impact on natural resources in the coastal zone. The destruction of wetlands, and /or their degradation, represents an irreversible and irretrievable loss of valuable aquatic resources.

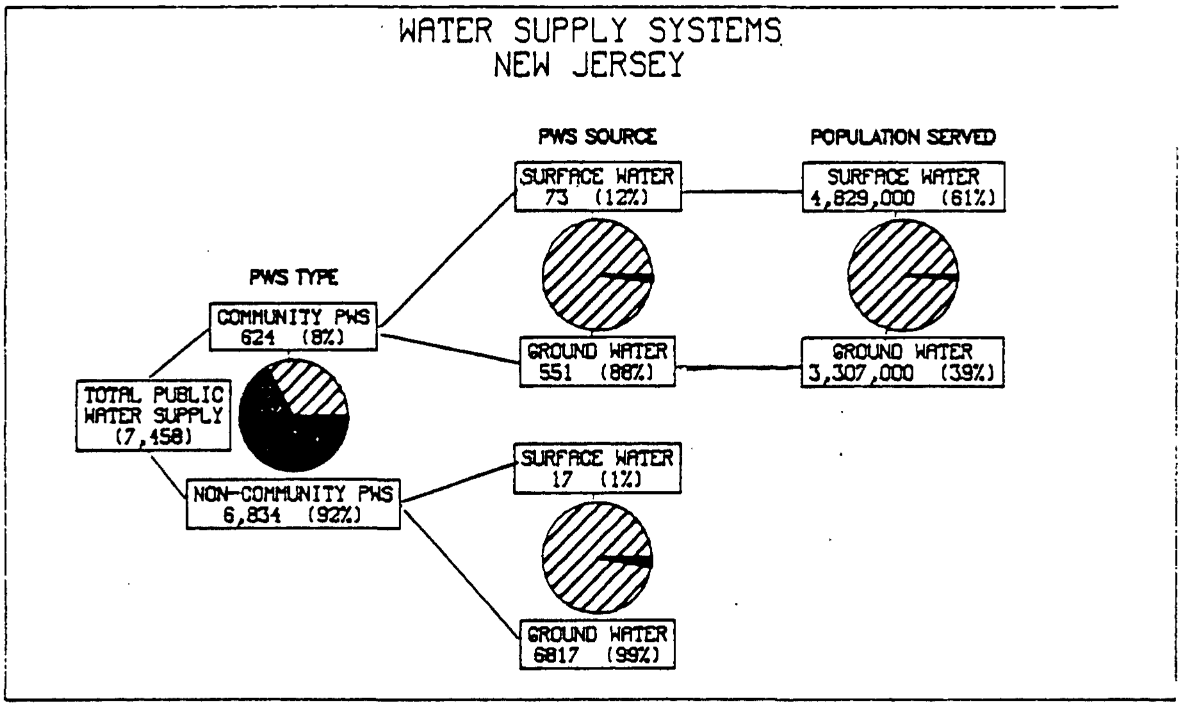
The further loss of wetlands may arise from continued unwise land use practices. The Corps of Engineers and EPA can prevent any further degradation of this important natural resource by carefully reviewing Section 404 permit.applications for construction projects, or in the provision of financial or technical assistance for EPA or Corps funded activities. Activities in wetland areas should be scrutinized so that losses are avoided or minimized wherever possible.

SURFACE DRINKING WATER

Status of Public Water Supply Systems

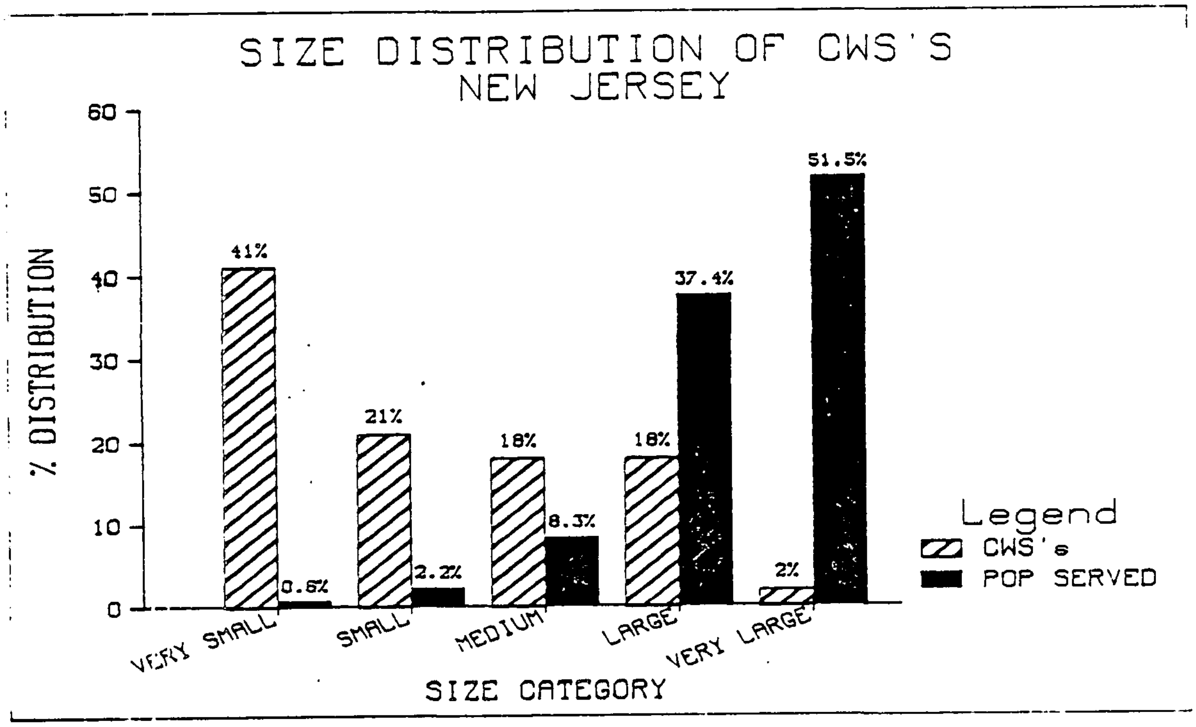
The sources of drinking water in New Jersey include rivers, reservoirs, streams, lakes, and groundwater. There are over 7,000 active public water systems throughout the state. The systems are characterized in Figure 28 by the type of system, water supply source, and population served.

FIGURE 28



The majority (61 percent) of New Jersey's population served by community water supplies (CWS) uses surface waters as the primary source of drinking water; the rest use ground water. The larger systems are usually well operated and experience relatively few violations of drinking water standards. As shown in Figure 29, there are numerous small and very small systems throughout the state. Most violations of drinking water standards occur in these smaller systems.

FIGURE 29



Overall, the quality of drinking water provided in these public water supply systems is fair. (Figures 30 and 31). In 1981, 60 percent of the systems were in full compliance with the national drinking water standards pertaining to microbiological quality; 26 percent were intermittent violators and 14 percent were persistent violators.

FIGURE 30

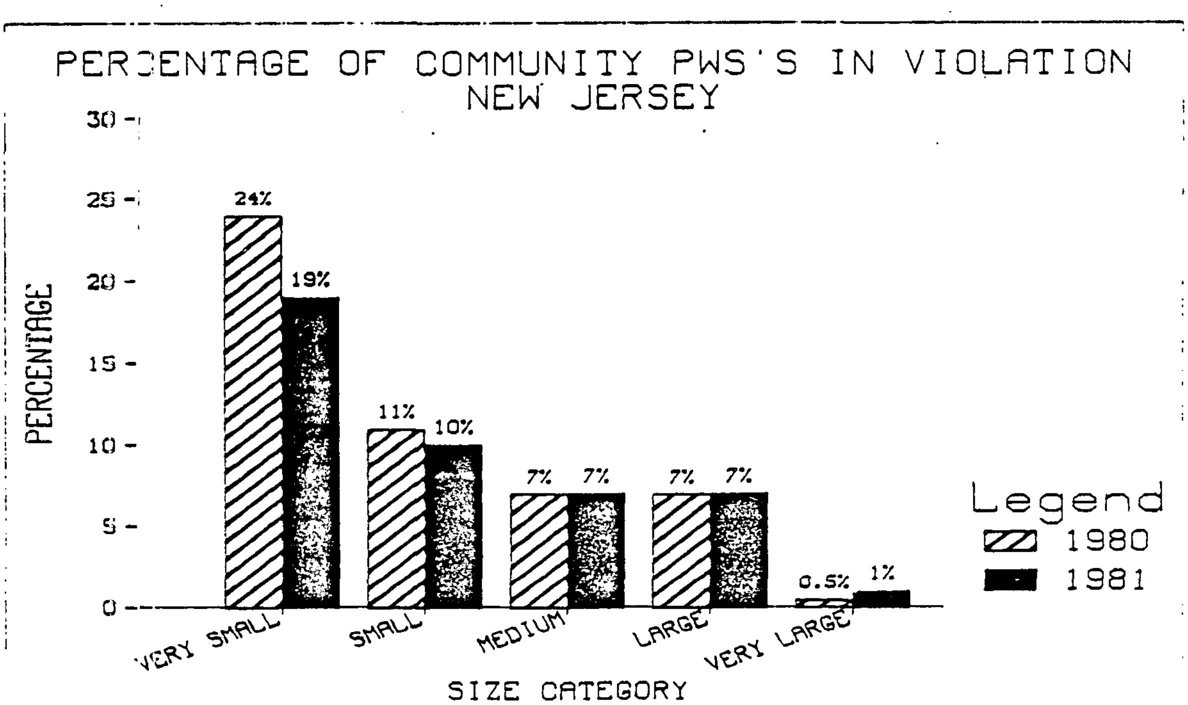
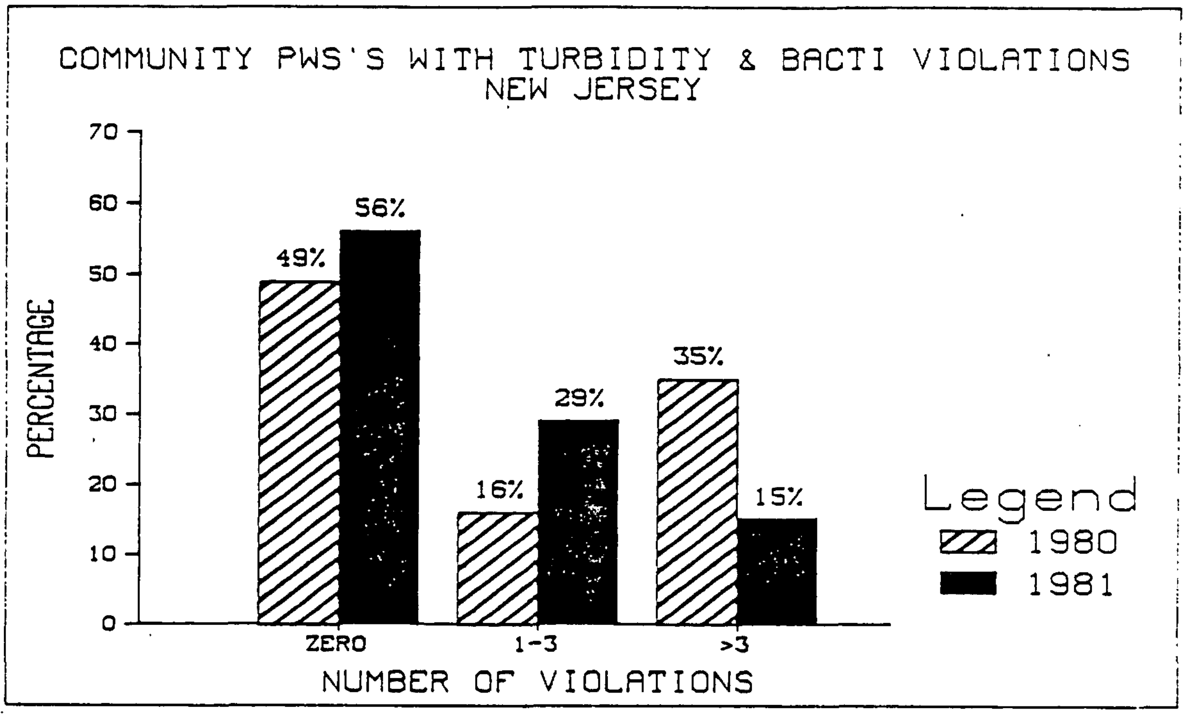


FIGURE 31



Of the total, 76 percent of the systems met the turbidity standard, 14 percent were intermittent violators, and 10 percent were persistent violators.

There were no significant violations of the inorganic drinking water standards for arsenic, barium, cadmium, chromium, lead, mercury, nitrate, selenium, silver, and flouride or of the organic drinking water standards for endrin, lindane, methoxychlor, toxaphene, 2,4-D, and 2,4,5-TP silvex or the standard for trihalomethanes. No data are available on the radiation drinking water standards.

Priority Drinking Water Problems

° Insufficient Water Quantity

Northeastern New Jersey's water supply shows serious shortages especially during drought periods. Water demand forecasts show a potential drought condition deficit of 107 million gallons per day by 1990. The overall state deficit by 1990 is projected to be 181 million gallons per day.

Drought situations are a major cause of water quantity shortfalls, with summer tourism, groundwater contamination, and development of critical watershed areas contributing to the problem. Experience from drought situations indicates that the water quantity problem is exaggerated by poor interconnection capabilities, which prevent dependable distribution during drought conditions.

° <u>Persistent Violations in Public Water Supply Systems</u>

In FY'81, 60 percent of the public water supply systems were in full compliance with national drinking water standards pertaining to microbiological quality; of the 40 percent out of compliance, 14 percent were persistent violators. Seventy-six percent of the systems met the turbidity standards with only one percent characterized as persistent violators.

The persistent violations problem in New Jersey is caused by:

- ° Failure of some purveyors to submit their monthly report to DEP, and
- ° Failure on the part of DEP to initiate adequate enforcement action against repeat violators.

Major problems stem from water purveyor non-compliance with rules concerning regulated contaminants, and from the state not evaluating an adequate number of public non-community supplies. Data on the compliance of the state's approximately 620 public community water supplies over a three-month period identified 5 violations for turbidity and 541 violations involving failure on the part of the purveyors to monitor or to report monitoring results.

Another major problem currently faced in the drinking water program is contamination of groundwater sources by toxic pollutants and salt water intrustion. As discussed in the next section on ground water, a number of wells have been closed throughout the state due to contamination by organic chemicals. There are no national drinking water standards for these toxic contaminants, nor are there routine analyses for them in drinking water supplies.

GROUND WATER

Status of Ground Water Resources

Natural groundwater quality is generally very good throughout New Jersey; most groundwaters can be used for potable purposes without treatment. Common problems which are naturally occurring and require treatment in some areas include high iron, dissolved solids, manganese, hardness, and variations in pH. However, these problems do not limit use of the groundwaters.

The development of groundwater resources can be limited by contamination of the resources through man's activities. The two common methods of contamination include introduction of pollutants, especially toxics, and overpumping.

The major geologic regions of the state are shown in Figure 32.

FIGURE 32

PRINCIPAL GEOLOGIC REGIONS IN NEW JERSEY

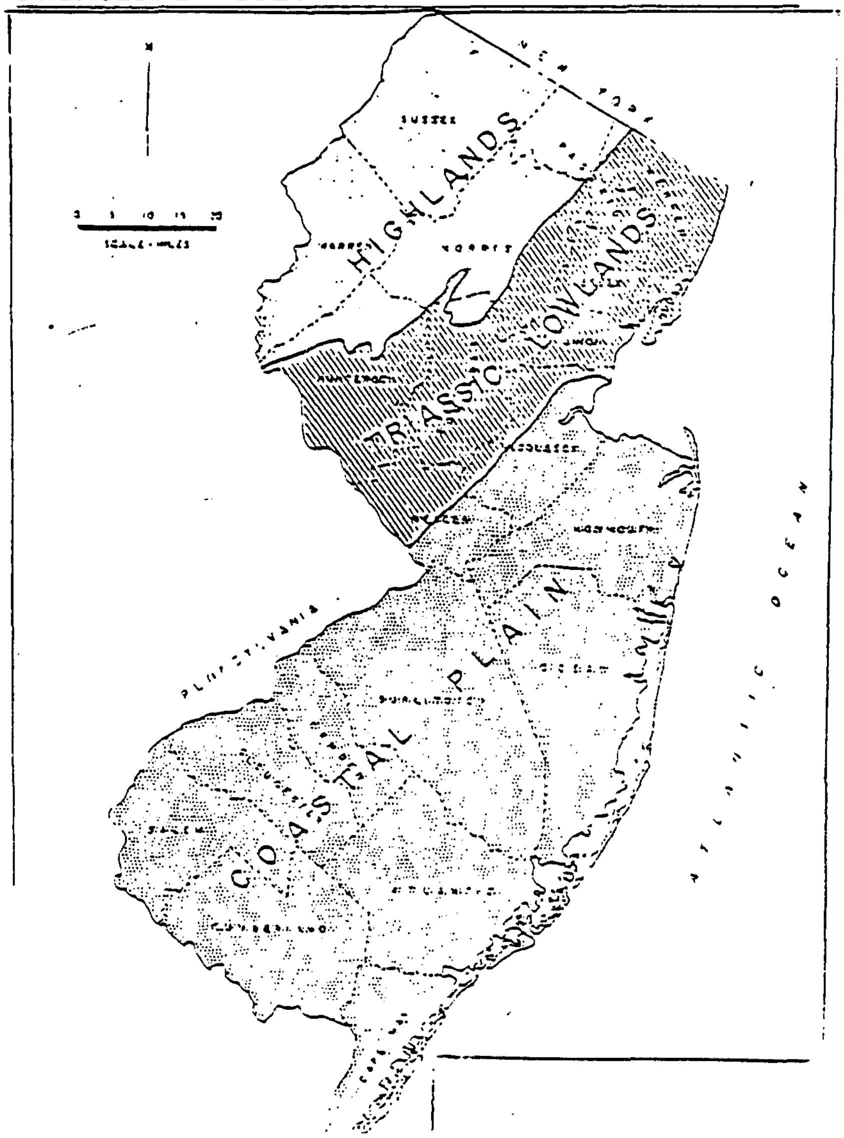
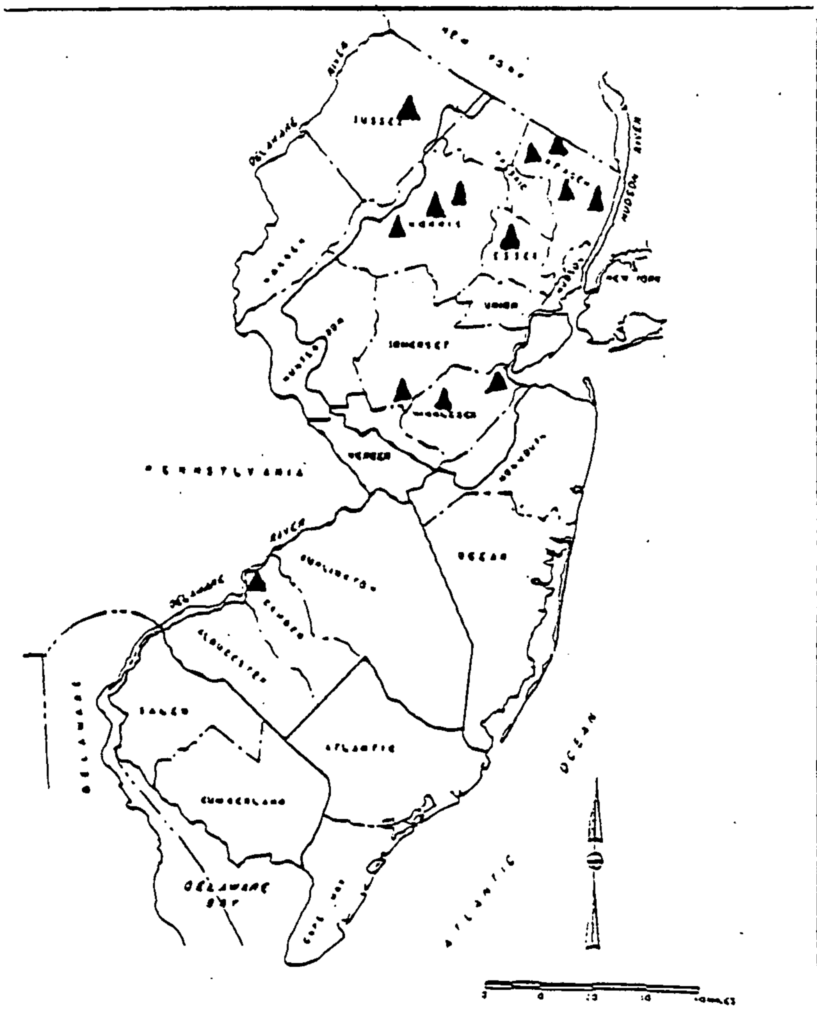


Figure 33 shows the location of communities where public water supply (PWSS) wells are contaminated with synthetic organic chemicals. It shows that the contamination is widespread and not restricted to a particular area of the state. Currently, 20 wells in 13 community public water supply systems are closed due to synthetic organic chemical contamination.

FIGURE 33

COMMUNITIES WITH WELL CONTAMINATION IN NEW JERSEY



▲ = communities with 1 or more contaminated PWS well

Priority Groundwater Problems

° Toxic Contamination of Groundwater Supplies

Groundwater pollution is a serious and immediate problem when municipal or residential supplies are contaminated. The NJDEP has closed 74 public supply wells since 1971. Ninety percent were closed because of contamination by organic and industrial chemicals. Many of these contamination events were due directly to point sources. A monitoring study by the NJDEP Office of Cancer and Toxic Substances Research found approximately 30 wells (out of 670) to be contaminated, with more than one chemical group.

Many causes of groundwater pollution exist. Three-hundred registered landfills are found in the state, along with 91 known abandoned landfills and illegal dump sites. Of these 391 sites, 75 are or are suspected of contaminating ground water. Roughly 7 billion gallons of landfill leachate are generated in New Jersey each year and much of this leachate enters groundwater systems. Three hundred and fifty-six waste disposal surface impoundments have been identified in the state, 65 percent of which are unlined. This may be leading to 6 billion gallons of leachate liquid entering the ground water each year. Accidental spills (2,512 petroleum and chemical spills in 1981 alone), leaking underground storage tanks and pipelines, on-site wastewater disposal systems, and other sources are contaminating groundwater resources to a varying extent. Over the next several decades it is expected that of the 75 million gallons a day of ground water used for potable purposes, 40 to 50 million gallons a day will be lost because of pollution. Major investments in the 1980s will be required for additional water treatment, groundwater resource development and protection, and aquifer restoration in New Jersey. Adequate funding for permitting, monitoring, and enforcement programs must be provided if this resource is to be protected.

There is substantial evidence that the groundwater underlying the Lang Dump Site in the Pine Barrens is contaminated. Contamination from the Price Landfill in Pleasantville may threaten Atlantic City's water supply. Hazardous wastes dumped at a municipal disposal site in Jackson Township in Ocean County have resulted in the leaching of chlorinated industrial solvents and other toxic organic chemicals into the aquifer, which is the source of private drinking water for more than 100 homes in a nearby development. The wells have been closed, and an alternative water supply system has been constructed for the area. However, the decontamination of these ground waters is technically difficult and expensive.

° Saltwater Intrusion into Groundwater Supplies

Overpumpage has led to the intrusion of saltwater into formerly freshwater wells along the coast, rendering the water unsuitable for use. Lowering of groundwater levels has also resulted from overpumpage in many water-bearing formations throughout the state, although it is most severe in the Coastal Plain. Currently, an estimated 500 million gallons per day (mgd) are being pumped from Coastal Plain Aquifers, causing lowering water levels in areas of Middlesex, Monmouth, Burlington, Camden, Ocean, Atlantic, Cape May, Gloucester, and Salem counties. In addition, this problem may be affecting streams dependent upon groundwater inflows.

Many of the above noted problems in the Coastal Plain of southern New Jersey are also occurring in northern New Jersey where resource development has exceeded the recovery capacity of certain groundwater systems. Basic information gathering activities (mapping, exploration, consumption and recharge rates, and impact on water levels) are in the planning process, but lacking in many regions of central and northern New Jersey.

SOLID WASTE

There are two primary classifications of solid waste: hazardous and non-hazardous. Hazardous wastes are defined as wastes that have the potential to cause or significantly contribute to serious illness or death, or pose a substantial threat to human health or the environment when improperly managed. Non-hazardous waste includes all discarded materials (such as municipal refuse, rubbish, incinerator residue, demolition and construction debris, and sludges) that do not fall under the definition of hazardous waste.

STATUS OF NON-HAZARDOUS WASTE MANAGEMENT

There are three major non-hazardous waste management problems in New Jersey:

- Commingling of hazardous and non-hazardous wastes in municipal landfills,
- Exhaustion of available disposal volume in active sites currently in use by both urban and rural areas, and
- Contamination of groundwater by uncontrolled municipal dumps.

The commingling problem is evidenced by the fact that out of 65 Superfund sites located in New Jersey, 15 were actually municipal waste landfills contaminated by hazardous wastes. Exhaustion of available disposal volume is a potential waste management problem that may soon be faced by several large municipalities in the state. The diminishing capacity of landfills in the Hackensack Meadowlands is an example of this problem. Impacts on groundwater from past disposal practices are evident throughout New Jersey (see Groundwater, page 49).

Two promising approaches to dealing with non-hazardous waste management problems are resource recovery and improved landfill technology. Resource recovery takes two basic forms: recovery of materials through source separation techniques, and recovery of energy through controlled incineration. In addition to providing disposal capacity, resource recovery is a partial answer to the problem of commingling of hazardous with non-hazardous wastes. A modern plant provides opportunities to examine and control the contents of incoming refuse to screen out hazardous wastes. For example, tank trucks and drums cannot pass undetected onto the tipping floor of an incinerator. Fears of toxic contamination, however, have generated citizen opposition to incineration. Sampling and analysis to prove the safety of energy-producing incineration would help private disposal firms, states, and local governments to implement needed resource recovery projects.

Improvement of land disposal technology generally takes the form of liners and leachate collection in new facilities-- the same techniques as for hazardous waste landfills. Existing sites, however, can be remediated only at great expense, and will in most cases, continue to degrade local groundwater over decades to come.

PRIORITY NON-HAZARDOUS WASTE PROBLEM

° Municipal Landfills Containing Toxic Materials

Contamination of surface water and groundwater supplies has occurred in New Jersey as a result of viral, bacterial, and toxic contaminants from municipal landfills.

EPA no longer supports state non-hazardous waste programs. The result in New York and New Jersey is that two major activities mandated by Subtitle D of the Resource Conservation and Recovery Act (RCRA) are left incomplete: the Open Dump Inventory and the state Solid Waste Management Plans. Federal oversight of state nonhazardous waste programs has also ceased, except for ad hoc attention as important problems surface.

STATUS OF HAZARDOUS WASTE DISPOSAL

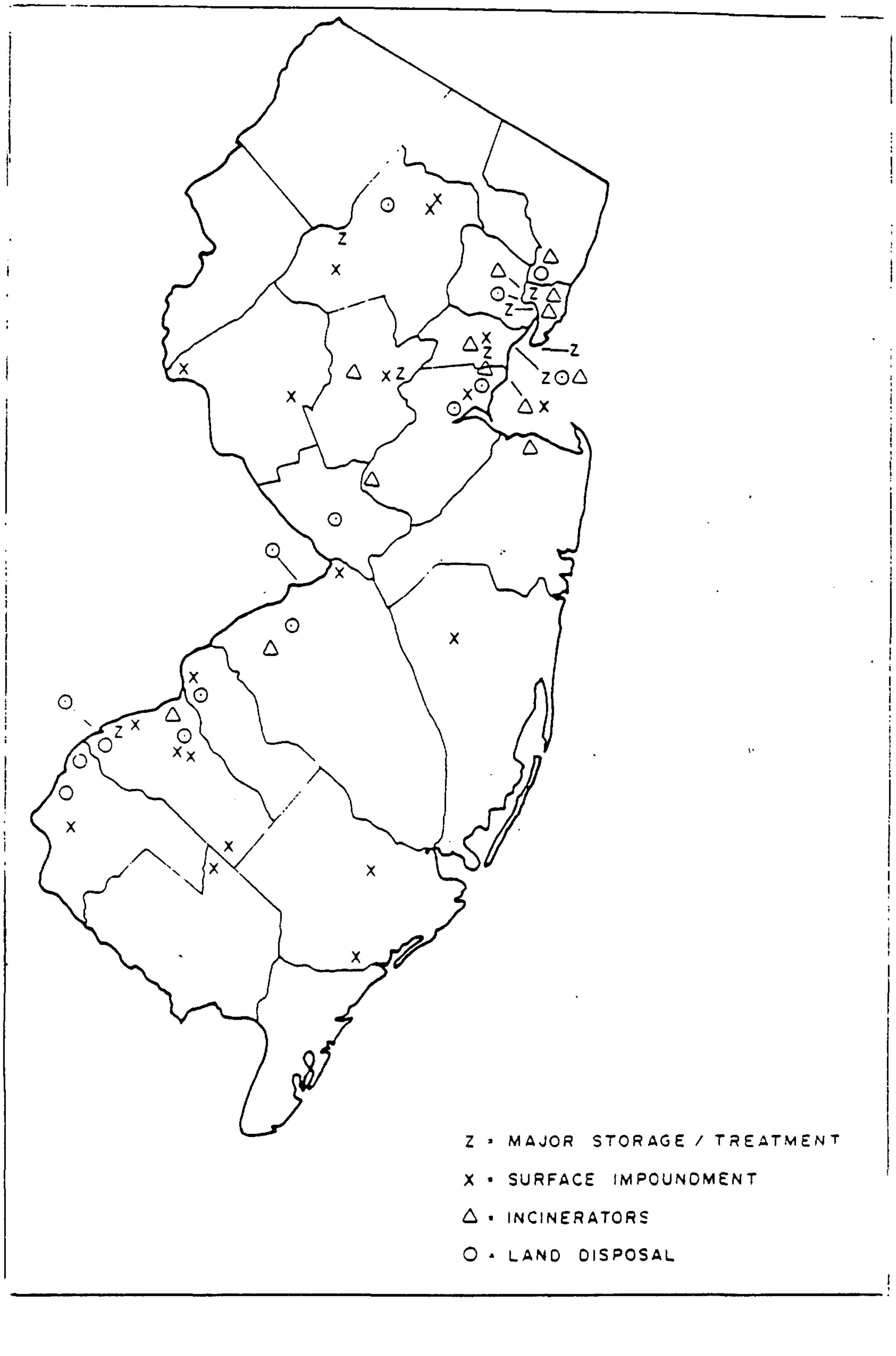
Over 3,600 companies and institutions in New Jersey handle hazardous waste. This includes generators, as well as facilities that store, treat or dispose of hazardous wastes. Facilities that treat, store or dispose (TSDs) of hazardous wastes are required to apply for a permit from EPA. There are 505 of these facilities in New Jersey.

In an effort to identify facilities that have a significant potential for adverse environmental effects, priority has been given to TSDs that are required to comply with the interim status groundwater monitoring standards of Part 265. There are 65 such TSDs in New Jersey, each having a hazardous waste landfill, surface impoundment, land treatment activity, waste pile, or some combination (Figure 34).

New Jersey's manifest system logs off-site shipments of "special wastes", which is somewhat more inclusive than the federal definition of hazardous wastes under Part 261. For example, PCBs are included in the state category, and the small generator exclusion is more strict than the federal one. During its first year of operation, the system recorded that 400,000 tons of special waste were shipped.

FIGURE 34

PRIORITY TSDs IN NEW JERSEY



PRIORITY HAZARDOUS WASTE DISPOSAL PROBLEMS

° Siting of Hazardous Waste Facilities

Of the 20 facilities that provide off-site treatment in New Jersey, only Rollins Environmental Services currently provides a broad range of treatment processes, including incineration.

Rollins has the state's only commercial off-site incinerator for hazardous wastes. Inland Chemical and SCA Services-Earthline Division, both in Newark, are regional reprocessing facilities, specializing in solvent and materials recovery. The remaining firms are smaller, providing waste oil or petrochemical recovery, or temporary waste storage and repacking prior to transfer to an ultimate disposal facility. If new facilities are needed their siting will likely be a significant problem.

° Timely Issuance of RCRA Permits

Safe management and oversight of hazardous waste treatment, storage and disposal (TSD) facilities involves the inspection and technical evaluation process of RCRA permits. Current EPA and state resources are insufficient to complete all necessary permits in a timely manner.

° Class I Violators of RCRA Requirements

Region II is experiencing significant problems in having TSD facilities comply with the monitoring and financial responsibility requirements of the RCRA regulations. Monitoring is needed at selected TSD facilities to determine if that facility is having an impact on groundwaters. In financial requirements, many TSD facilities have not posted insurance to cover damages, these Class I violations could lead to future environmental problems.

STATUS OF UNCONTROLLED HAZARDOUS WASTE SITES

In December 1982, EPA published a list of the worst 418 uncontrolled hazardous waste sites in the country. EPA asked for public review of and comment on this list, which is known as the National Priorities List. The list included 65 sites in the State of New Jersey. These sites are shown on Figure 35 and are listed in Table 11. Many of these sites threaten public drinking water supplies, or they are located in substantially populated areas, or both.

PRIORITY SUPERFUND PROBLEMS

° Uncontrolled Sites on the National Priorities List (NPL)

As mentioned above, New Jersey has 65 sites on the NPL. Each of these is considered a high priority by both Regional and state management.

FIGURE 35

SUPERFUND SITES IN NEW JERSEY

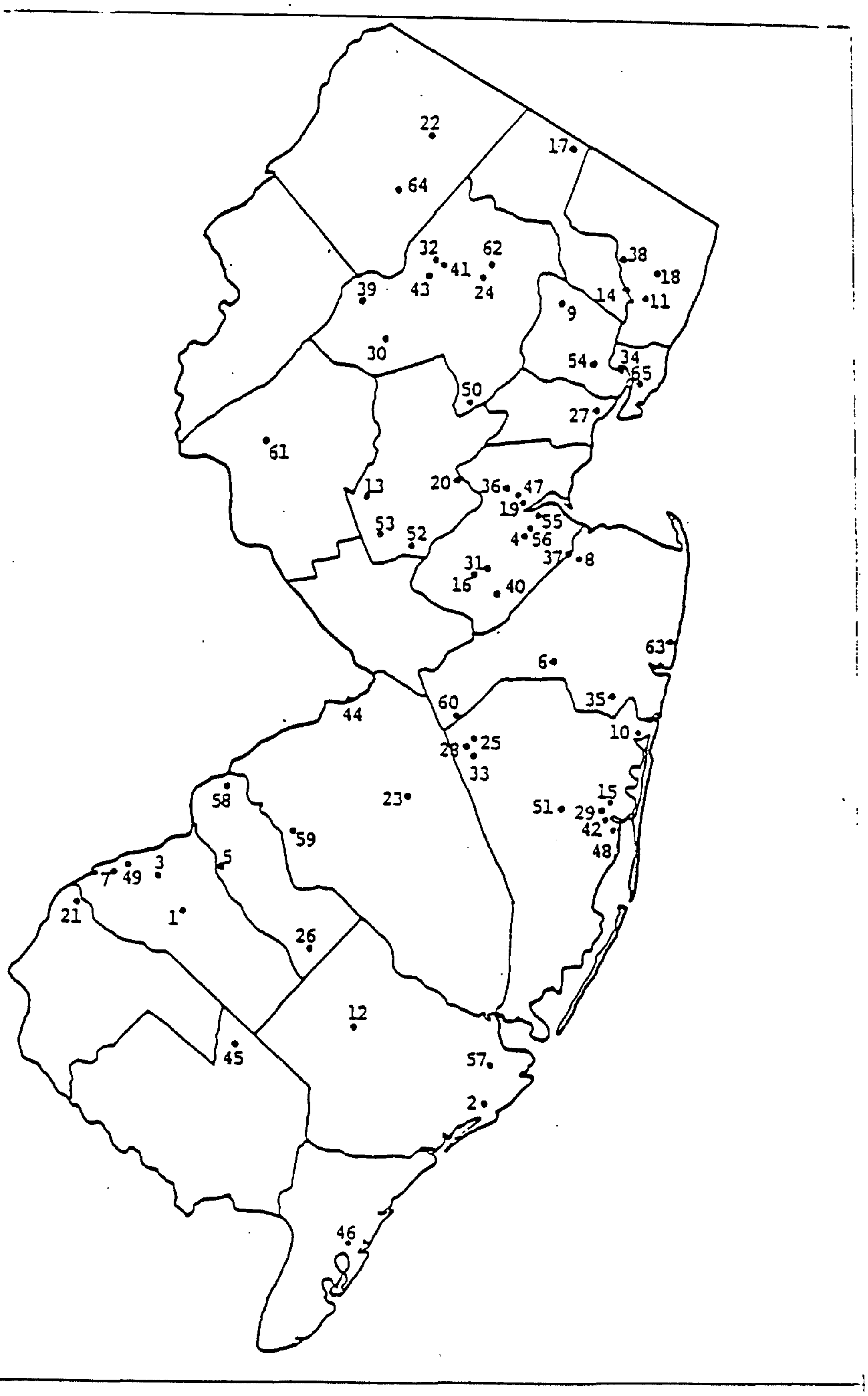


TABLE 11

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES
National Priorities List December 30, 1982

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean up Action
20	American Cyanamid	Ground Water ° Benzene ° Trichloroethylene ° Chloroform 1,2 dichloroethane	° Private & public water supply are threatened.	
		Surface Water ° Chloroform	° Raritan river used for public water supply serving 500,000 people is threatened.	
64	A.O. Polymer	Ground Water ° Trifluorotrichloro-ethane ° Acetone ° Methyl ethyl ketone ° Methylene chloride ° Trichloroethane ° Trichloroethylene ° Tetrachloroethylene	° Privately owned wells serving 760 people may be threatened.	
		Surface Water ° Trichloroethylene ° Chloroform ° Formaldehyde		
50	Asbestos Dump	Surface Water ° Asbestos	° Asbestos is entering the Passaic River which supplies the Passic Valley Water Comm. with raw water. Serves 300,000 people.	° National Gypsum Co., in agreement with NJDEP to cover the dump and stabilize the river bank.

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
42	Beachwood/Berkley Wells	Ground Water ° Lead	° Private residential wells contaminated with lead.	
35	Bog Creek Farm	Ground Water ° Tetrachloroethylene ° Toluene ° Trichloroethylene		° Remedial Action Master Plan under development
		Surface Water ° Trichloroethylene ° Toluene ° Tetrachloroethylene ° Benzene	° State Park and trout stream and North Branch Squankom Brook leading to Manasquan River are threatened.	
10	Brick Township Landfill	Ground Water ° Benzene ° Chlorobenzene ° 1,2 Dichloroethane ° Chlordane ° Heptachlor	° Private domestic wells near landfill were recommended to be closed. ° Water supply of 26,600 people is threatened.	
7	Bridgeport Rental and Oil Services, Inc.	Ground Water ° Bis(2-chloroethyl)ether ° Chlorobenzene ° Trichloroethylene ° Pentachlorophenol ° Benzene ° Vinyl chloride ° Polychlorinated biphenyls Surface Water ° Benzene ° Vinyl chloride ° Trichloroethylene ° Polychlorinated biphenyls	° The public and private drinking water supplies for approximately 4900 people in Gloucester County are threatened; the supplies include Pureland Water Company wells, a Pennsgrove municipal well, two Brunswick municipal wells and some privately-owned wells.	A State Superfund Contract was signed on 10/29/82 for surficial clean-up of the lagoon.

NEW JERSEY

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
8	Burnt Fly Bog	Ground Water ° 1,2-dichloroethane ° Arsenic ° Lead ° Benzene ° Polychlorinated biphenyls Surface Water ° Polychlorinated biphenyls ° Xylene	° The public and private drinking water supplies for at least 15,000 people in Monmouth County are threatened.	° A feasibility study is expected in 12/82. ° Remedial design is expected in 3/83.
9	Caldwell Trucking	Ground Water ° Trichloroethylene ° Chloroform ° 1,2-dichloroethylene ° Lead ° 1,1,1-trichloroethane Surface Water ° Chloroform	° Two public wells in Fairfield serving approximately 8,000 people have been condemned. ° 1,300 private drinking water wells that serve approximately 5,000 people are threatened. ° Contaminated groundwater empties into the Passaic River at a point approximately 2 miles from the potable water intake on the river. Approximately 200,000 people get their drinking water from the river.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
27	Chemical Control	Ground Water ° Polychlorinated biphenyls ° Toluene ° Dichloroethylene Surface Water ° Toluene ° Polychlorinated biphenyls ° Benzene ° Trichloroethene ° Trihalomethanes Air ° Benzene ° Toluene ° Xylene ° Phosgene	° Contaminated surface run-off flows into the Arthur Kill and the Elizabeth River. ° Approximately 14,000 people in Elizabeth who live within a 1-mile radius of the site may be affected by airborne emissions. ° Metropolitan New York City's population may be affected by airborne emissions, if there are further fires or if explosions occur.	° The State is completing procurement for the following: ° cleaning sewers ° removing and replacing damaged catch basins ° completing site enclosure ° removing and disposing gas cylinders ° removing and disposing truck bodies and trailers ° The State may take action regarding other identified objects (possibly drums).
36	Chemsol	Ground Water ° Chloroform ° Tetrachlorethylene ° Trichloroethylene ° Carbon tetrachloride ° Toluene ° Benzene Surface Water ° Chloroform ° Tetrachloroethylene ° Carbon tetrachloride ° Trichloroethylene	° The public and private drinking water supplies for approximately 26,000 people, within a 3 mile radius in Piscataway and adjacent towns, are threatened. ° Industrial process water may be contaminated.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
39	Combe Fill North Landfill	Ground Water ° Toluene ° 1,1,2-trichlorethane ° Chloroform Surface Water ° Chloroform ° Benzene	° Musconetcong River -recreational fishing threatened.	
30	Combe Fill South Landfill	Ground Water ° Carbon tetrachloride ° Tetrachloroethylene ° Trichloroethylene Surface Water ° Carbon tetrachloride ° Benzene	° Private and public water supply wells are threatened in Charter Boro and Washington Township. ° Trout Brook threatened.	
4	CPS Chemical/Madison Industries	Ground Water ° Benzene ° Carbon tetrachloride ° Bromoform ° 1,1,1-trichloroethane ° Methylene chloride Surface Water ° Carbon tetrachloride ° Tetrachloroethylene ° Trichloroethylene ° Lead ° Cadmium Air ° Zinc powder ° Acid vapors ° Methanol ° Dimethyl adipate ° Organic vapors	° The potable water supplies for the 70,000 residents of Perth Amboy and Sayreville are threatened. ° Industrial water supplies for CPS chemical and Madison Industries are threatened. ° Prickett's Pond, which recharges the Perth Amboy well field, receives contaminated surface run-off via Prickett's Brook. ° Air contamination potentially affects more than 67,000 people who live within a 4-mile radius from the site.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
48	Denzer and Schafer X-Ray Co.	Ground Water ° 1,1, Dichloroethane ° Phenols ° Toluene ° Sodium Hydroxide	° Cohansey Aquifer - Public and private wells: serving 25,500 people are threatened.	° 1981 Administrative Order by DEP to clean up site.
12	D'Imperio Property	Ground Water ° Chloroform ° Toluene ° Xylene ° Vinyl chloride ° 1,2-dichloroethane	° The private and public drinking water supplies for approximately 10,000 people in Hamilton Township (Atlantic County) are threatened.	A State Superfund Contract that was signed on 9/23/82 provides for the following: ° design and construction of a fence to enclose the site
43	Dover Municipal Well #4	Ground Water ° 1,1,1, trichloroethane ° Trichloroethylene ° Tetrachloroethylene	° Public Water Supply wells serving 32,000 people are threatened.	° Wells closed August 1980. ° Relocated town wells 1.5-2.5 miles upgradient
59	Ellis Property	Ground Water ° PCBs ° Hydrochloric Acid Surface Water ° PCBs ° Hydrochloric Acid	° No ground water analysis, but soil contamination exists. ° Private wells may be threatened.	
56	Evor Phillips Leasing	Ground Water ° Nitroquanadine ° Unknown Surface Water ° Nitroquanadine	° The public drinking water supplies for Perth Amboy and Sayreville may be threatened. ° Tennant Pond, which is used as a alternate source of drinking water for Perth Amboy and which recharges the Perth Amboy well field, may be threatened.	

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
38	Fairlawn Wellfield	Ground Water ° Carbon tetrachloride ° Trichloroethylene ° Tetrachloroethylene ° Chloroform ° 1,1,1 trichloroethane	° Public water supply wells serving 32,000 people are threatened.	
60	Friedman Property	Ground Water ° Mercury ° Chromium ° Lead ° 1,2-trans-dichloroethylene ° pentachlorophenol Surface Water ° Methylene chloride ° Mercury	° The privately-owned drink-water supplies for approximately 400 people are threatened.	A Cooperative Agreement that was signed on 9/23/82 provides for a feasibility study to do the following: ° assess the site conditions ° evaluate alternative clean-up strategies
5	Gloucester Environmental Mangagement Services (GEMS) Landfill	Ground Water ° Benzene ° Carbon tetrachloride ° Chloroform ° Toluene ° 1,1,1-trichloroethane ° 1,1-dichloroethylene Surface Water ° Benzene ° Carbon tetrachloride ° 1,1,1-trichloroethane ° Chloroform ° 1,1-dichloroethylene ° Toluene Air ° Organic vapors (analyzed as benzene)	° The private and public drinking water supplies for approximately 38,000 people in Gloucester Township (Camden County) are threatened. ° The recreational use of Brink Lake is jeopardized. ° Airborne emissions may affect 38,000 people who live within a 4-mile radius of the site.	A Cooperative Agreement is currently being developed.

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
25	Goose Farm	Ground Water ° Benzene ° Toluene ° Ethyl benzene ° Pentachlorophenol ° Polychlorinated biphenyls Surface Water ° Octane ° Benzene ° Toluene ° Polychlorinated biphenyls	° The private and public drinking water supplies for approximately 1100 people in Plumstead Township are threatened.	An Action Memorandum that was signed on 8/17/82 asks for a feasibility study.
49	Hercules, Inc. [Gibbstown]	Ground Water ° Benzene Surface Water ° Benzene	° Drinking water supplies for approximately 13,500 people in Greenwich and Paulsboro are threatened. ° Irrigation water for 182 acres (equivalent to 273 people) is threatened. ° Contaminated run-off empties into the Delaware River.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
37	Imperial Oil	Ground Water ° PCBs ° Petroleum Hydrocarbons ° Arsenic ° Trichloroethane ° Xylene ° Phenols ° 1,2 Dichlorethane	° Private and public water supply serving 20,076 people is threatened.	
		Surface Water ° PCB's ° Arsenic ° Lead ° Petroleum Hydrocarbons	° Lake Lefferts w/in 7000 ft. (Recreational usage)	
51	Jackson Township Landfill	Ground Water ° Toluene ° Benzene ° 1,1,1-trichloroethane ° Chloroform ° 1,1,2-trichloroethane		Public water suppply provided by state in 1979.
31	JIS Landfill	Ground Water ° Trichloroethylene ° Benzene ° 1,2 dichlorothane ° Xylene ° 1,1, dichloroethylene ° Chloroform	° Private residentail wells serving 33,000 people are threatened.	Unknown
		Surface Water ° Trichlorothylene ° Benzene ° 1,2 dichlorothane ° Xylene ° Chloroform	° Brook used for recreational and agricultural uses is threatened.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
19	Kin-Buc Landfill	Ground Water ° 1,2,trans-dichloroethylen ° Phenol ° Benzene ° Chlorobenzene ° Toluene ° Polychlorinated biphenyls Surface Water ° Polychlorinated biphenyls Air ° 1,1,1-trichloroethylene	° Industrial water supplies for users within a 3-mile radius are threatened. ° A coastal wetland is threatened by surface run-off from the site. ° At least 2400 people living within 0.5 mile of the site plus industrial workers within 0.25 mile may be affected by the airborne emissions.	° A party assumed responsibility for collecting and storing, in one area of the landfill, the oily phase of the leachate. ° A State Superfund contract that was signed on 7/7/82 provides for the following: ° interim remedial action ° a long-term remedial study
26	King of Prussia	Ground Water ° Arsenic ° Chloroform Surface Water ° Copper	° Great Egg Harbor River is threatened.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
3	Kramer Landfill	Ground Water ° Chloroform ° Toluene ° Heptachlor ° Benzene ° 1,2-dichlorobenzene ° Styrene ° Cyanide Surface Water ° Chloroform ° Toluene ° Heptachlor ° Vinyl chloride ° Styrene ° Cyanide Air ° Benzene ° Ethylbenzene ° Toluene ° Styrene ° Cyanide	° The drinking water supply for approximately 1500 people within a 3-mile radius of the site is threatened. ° Edwards Run, which is used for irrigation and which borders a recreational park, may be contaminated with surface run-off. ° Approximately 710,000 people who live within a 4-mile radius may be affected by the airborne emissions.	An Action Memorandum that was submitted to EPA HQ asks for the following: ° remedial investigation ° a feasibility study

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
13	Krysowaty Farm	Ground Water ° Benzidine ° Toluene ° 1,2-trans-dichloroethylene ° Ethylbenzene	° The privately-owned drinking water supplies for approximately 5000 people who live within a 3-mile radius are threatened. ° Approximately 1500 acres of irrigated land (equivalent to 2250 people) are threatened.	A State Superfund contract is currently being developed.
		Surface Water ° Toluene ° 1,2-trans-dichloroethylene ° Naphthalene ° Benzidine	° Contaminated surface run-off flows into the South Branch of the Raritan River.	
		Air ° Benzene (measured by photo-ionizing detection method that was calibrated to benzene)	° Approximately 1200 people who live or go to school within a 1-mile radius of the site may be affected by the airborne emissions.	
23	Lang Property	Ground Water ° Methylene chloride ° Toluene ° Xylene ° Trichlorethylene	° Private drinking water wells threatened. ° Possible contamination of a small stream nearby.	
		Surface Water ° Methylene chloride ° Toluene ° Xylene ° Trichlorethylene	° Commercial cranberry and blueberry operations exist adjacent to the site.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
1	LiPari Landfill	Ground Water ° Bis(2-chloroethyl)ether ° Bis(2-chloroethoxy)-ethane ° Methylene chloride ° Arsenic ° Cadmium ° Chromium ° Dichloromethane Surface Water ° Bis(2-chloroethyl)ether ° Phenol ° Toluene ° 1,2-dichloroethane ° Lead ° Ethylbenzene ° Trichloroehtylene ° Vinyl chloride Air ° Bis(chloroethyl)ether ° Toluene ° m- and p-Xylene	° The public drinking water supply for Pitman (population 11,000) is contaminated. ° Irrigation water is contaminated. ° Lake Alcyon, which is used for fishing, recreation and irrigation, is threatened. ° Approximately 210 people who live within 0.25 mile of the site may be affected by air-borne emissions.	A State Superfund contract that was signed on 9/23/82 provides for the following: ° the design and construction of a slurry wall and cap ° a feasibility study on the treatment of the groundwater within the area

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
6	Lone Pine Landfill	Ground Water ° Benzene ° Trichloroethane ° Ethylbenzene ° Toluene ° Vinyl chloride ° Aldrin Surface Water ° Benzene ° Toluene ° Ethylbenzene Air ° Benzene	° The privately-owned drinking water supplies for 6000 people who live within a 3-mile radius of the site are threatened. ° The irrigation water for approximately 400 acres (equivalent to 600 people) is threatened. ° The Manasaquan River may receive contaminated surface run-off. ° Approximately 1000 people who live within a 1-mile radius of the site may be affected by the airborne emissions.	A State Superfund contract that was signed on 7/7/82 provides for a feasibility study to evaluate alternative remedies.
63	M and T Delisa Landfill	Ground Water ° Polynuclear aromatics ° Hydrocarbon ° Acenapthene ° Fluorene ° Phenanthrene Surface Water ° Mercury ° Beryllium ° Polynuclear aromatics ° Hydrocarbons ° Acenapthene ° Fluorene ° Phenanthrene	° Leachate has been noted entering a stream that empties into Deal Lake. ° Deal Lake, used for recreational fishing is threatened.	

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
57	Mannheim Ave. Dump	Ground Water ° Trichloroethylene Surface Water ° Trichloroethylene	° 349 private wells w/in 3 mi. radius are threatened.	
18	Maywood Chemical Sites	Soil ° Thorium	° Contamination by thorium tailings; exposure to radiation and radon gas.	° Removal of contaminated soil.
22	Metaltec/Aerosystems	Ground Water ° Lead	° Public and privately owned wells serving 4,000 people are threatened.	° An Administrative Order requiring a remedial action plan was issued on 6/26/81.
40	Monroe Township Landfill	Ground Water ° 1,1,2,2 Tetrachloro-ethane ° Toluene ° Benzene ° Hydrochloric Acid	° Public and private wells are threatened.	
53	Montgomery Housing Development	Ground Water ° Trichloroethylene ° Tetrachloroethylene ° 1,1,1 trichloroethane ° Chloroform ° 1,1, dichloroethane ° 1,2, dichloroethylene ° 1,1,2 trichloro-trifluoroethane	° Privately owned wells serving 6,110 people are threatened.	° Connected to alternate municipal water system.

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
61	Myers Property	Ground Water ° Trichloroethylene ° DDD ° DDE ° DDT ° Hexachlorobenzene ° 1,2,4 trichlorobenzene ° 1,3 dichlorobenzene ° 1,4 dichlorobenzene ° 1,2 dichlorobenzene ° Chlorobenzene ° 1,2 dichloroethane ° 1,1,2,2 tetrachloroethane ° Tetrachloroethane ° PCB-1242 ° Bis (2-ethylhexyl) phthalate ° Di-n-butylphthalate ° Hexachlorobenzene ° Naphthalene ° Phenol ° Asbestos ° White lead	° Privately owned wells serving 3,430 people may be threatened.	
21	N. L. Industries	Ground Water ° Lead ° Selenium ° Arsenic ° Chromium ° Copper	° Private wells serving 2,700 people are threatened.	
		Surface Water ° Lead ° Chromium	° Potential contamination of wetland and nearby creek.	

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
62	Pepe Field	Ground Water ° Lindane ° Copper ° Zinc Surface Water ° Lindane Air ° Hydrogen sulfide odors	° Privately owned wells serving 90,100 people may be threatened. ° Runoff to Boonton Reservoir could potentially threaten public water supply serving 240,000 people.	
33	Pijak Farm	Ground Water ° 2-chlorophenol ° 2,4-dichlorophenol ° 4-nitrophenol Surface Water ° 2,4-dichlorophenol	° The private and public drinking water supplies for approximately 1500 people who live within a 3-mile radius of the are threatened.	° A Cooperative Agreement that was signed on 9/23/82 provides for a feasibility study to do the following: ° assess site conditions ° evaluate alternative remedies ° Funds have been obligated for the feasibility study.

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
65	PJP Landfill	Ground Water ° Barium ° Chromium ° Benzene ° Chlorobenzene ° Arsenic ° Lead Air ° Phenol ° Benzene ° Chlorobenzene	° Potential contamination of surface water from runoff. ° Potenial health hazard due to combustion of landfill debris.	
2	Price Landfill	Ground Water ° Dichloroethylene ° Trans-chloroethylene ° Ethylene dichloride ° Vinyl chloride ° Lead ° Arsenic ° Chloroform ° Benzene Surface Water ° Arsenic ° Lead ° Chloroform ° Benzene ° Vinyl chloride Air ° Benzene ° Vinyl Chloride ° Chloroform	° The municipal drinking water supply for at least 100,000 people in Atlantic City is threatened. ° The private drinking water supplies for approximately 35 houses are threatened. ° Absecon Bay, which is used for recreation and fishing, may be threatened by contaminated surface run-off from the site. ° Approximately 10,000 people who live in Pleasantville, Egg Harbor and Absecon may be affected by airborne emissions.	° A Cooperative Agreement that was signed on 6/18/82 provides for the following: ° leasing and installing activated carbon filters at two Atlantic City water supply wells ° redeveloping or restoring three existing Atlantic City water supply wells ° implementing an on-going monitoring program ° contingent funding for the purchase of activated carbon for the public wells

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
15	Reich Farms	Ground Water ° Toluene ° Styrene ° Phenol ° Carbon chloroform	° Cohansey Aquifer - public water supply which serves approx. 45,000 people is threatened.	
47	Renora, Inc.	Ground Water ° Toluene ° o-,m- and p- xylene ° Nonane ° Chloroform ° 1,1,2 trichloroethane Surface Water ° Toluene ° o-,m- and p- xylene ° Nonane ° Chloroform ° 1,1,1 trichloroethane ° Tetrachloroethylene	° An Edison Township drinking water well that serves 24,000 people is threatened.	
17	Ringwood Mines	Ground Water ° Benzene ° Ethylbenzene ° Xylene ° Chloroethane ° 1,1, dichloroethane ° bis (2-ethyl hexylpthalate) ° Cadmium ° Napthalene Surface Water ° Cadmium ° Chromium	° Private and public water supplies serving 10,000 people are threatened.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
41	Rockaway Boro Wellfield	Groundwater ° Carbon tetrachloride ° Trichloroethylene ° Tetrachloroethylene ° 1,1 dichloroethane ° 1,2 dichloroethylene ° Trichlorofluoromethane ° Chloroform	° Privately owned wells and public water supplies of 30,000 people may be threatened. ° Groundwater flows to surface water. Potential for contamination of Rockaway River.	° Well water supply treat with granulated activated carbon.
32	Rockaway Township Wells	Ground Water ° Trichloroethylene ° Di-isopropylether	° Privately owned wells and public water supplies of ened. ° Potential for surface water contamination due to proximity to Beaver Brook.	° Well water treated with granulated activated prior to distribution.
52	Rockyhill Municipal Well	Ground Water ° Trichloroethylene ° 1,1,1 trichloroethane ° 1,2 dichloroethane ° Tetrachloroethylene ° 1,2 dichloroethylene ° Chloroform	° Privately-owned wells and public water supplies of 7,200 people may be threatened.	° Alternate water supply was provided.
44	Roebling Steel	Ground Water ° Cadmium ° Copper ° Lead ° Zinc ° Barium Surface Water ° Cadmium ° Copper ° Lead ° Zinc ° Barium	° Private drinking water wells and a municipal well may be affected.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
55	Sayreville Landfill	Ground Water ° Pentachlorophenol ° p-ethyltoluene Surface Water ° p-ethyltoluene ° Pentachlorophenol	° The public drinking water supplies for Perth Amboy and Sayreville (combined populations: 67,000) are threatened. ° Contaminated run-off flows into the wetlands adjacent to the South River.	
11	Scientific Chemical Processing	Ground Water ° benzene ° chloroform Surface ° benzene ° chloroform ° toluene ° trichloroethylene ° tetrachloroethylene	° Public wells serving 21,8000 people are threatened. ° Surface water bodies and for recreation and industrial use are threatened.	Surficial clean-up of drums and tanks, potential ground water remedial action.
24	Sharkey Landfill	Ground Water ° benzene ° toluene ° Chloroform ° Methylenechloride ° Dichloroethylene	° Privately owned wells and municipal water supplies of 42,000 people may be threatened.	

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
16	South Brunswick Landfill	Ground Water ° Phenol ° Benzene ° Methylene Chloride ° Vinyl Chloride ° Lead	° Private and public water supplies servng 17,000 people are threatened.	° Consent Order has been signed with EPA by the site owner.
		Surface Water ° Mercury ° Lead ° Zinc ° Phenol ° Methylene Chloride	° On-site stream is contaminated which is used for recreational purposes.	° Remedial action master plan is under review.
28	Spence Farm	Ground Water ° Pentachlorophenol ° Benzene ° Tichloroethylene ° Mercury Surface Water ° 2,4-dinitrophenol ° Pentachlorophenol	° The drinking water supplies for approximately 1600 people in Plumstead Township are threatened. ° The body of water receiving surface run-off may be threatened; its primary purpose is for recreation.	° A Cooperative Agreement that was signed on 9/23/82 provides for a feasibility study which will: ° assess site conditions ° evaluate alternative remedies ° evaluate excavation of the waste, consistent with the selected alternative

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
58	Swope Oil & Chemical	Ground Water ° Trichloroethylene ° Benzene ° Toluene Surface Water ° Trichloroethylene ° Benzene ° Toluene Air ° Benzene (instrument calibrated to this gas)	° The public drinking water supplies for more than 51,000 people in the Pennsauken area are threatened. ° The commercial and recreational uses of the Delaware River, which receives contaminated surface run-off, may be threatened. ° The half of the population of Pennsauken who live with in a 4-mile radius of the site may be affected by the airborne emissions.	° A Remedial Action Master Plan was begun in 10/82. ° An Action Memorandum that was submitted to EPA HQ on 8/11/82 asks for the following: ° remedial investigation ° a feasibility study
34	Syncon Resins	Ground Water ° Polychlorinated biphenyls ° Toluene ° Benzene ° Carbon tetrachloride ° Total lead ° Chloroform Surface Water ° Polychlorinated biphenyls ° Carbon tetrachloride ° Chloroform Air ° Vinyl acetate ° Toluene ° Polychlorinated biphenyls	° An industrial water supply well that is located on-site may be contaminated. ° Privately-owned drinking water supplies for two companies (maximum employment: approximately 1200) may be threatened. ° The Passaic River receives contaminated surface run-off. ° More than 10,000 people in Jersey City and Newark who live within a 4-mile radius may be affected by the airborne emissions.	° A Remedial Action Master Plan was begun in 9/82. ° An Action Memorandum that was submitted to EPA HQ on 8/10/82 asks for the following: ° initial remedial action (drum removal) ° remedial investigation ° a feasibility study ° A Cooperative Agreement is currently being developed.

New Jersey

CHARACTERISTICS OF PRIORITY SUPERFUND CLEAN-UP SITES

Map No.	Site Name	Potential Contaminants	Potential Impacts	Clean-up Action
29	Toms River Chemical	Ground Water ° Arsenic ° Lead ° Chlorobenzene ° Dichloroethylene ° Tetrachloroethylene	° Toms River Water Company water supply wells serving serving 64,000 people is threatened.	
		Surface Water ° Lead ° Arsenic		
14	Universal Oil Products	Ground Water ° Chloroform ° Benzene ° Acrolein ° Toluene ° Mercury	° Public water supply wells may be affected.	
		Surface Water ° Benzene ° Toluene	° Sampling of Ackerman's Creek has detected these contaminants.	
54	U.S. Radium	Soil	° Contamination from waste oil resulting from radium processing. ° Excessive gamma radiation.	
45	Vineland State School	Ground Water ° Mercury	° Private drinking water wells may be threatened.	
		Surface Water ° Mercury	° Bear Branch is used for irrigation purposes.	
46	Williams Property	Ground Water ° Chloroform ° Benzene ° Methyl Isobutyl Ketone ° Tetrochloroethylene ° Dichlorobenezene	° Private wells serving 4,912 people are threatened.	

° Potential Priority Candidates

In addition to these 65 sites, the New Jersey Department of Environmental Protection (NJDEP) and EPA have identified other uncontrolled hazardous waste sites that, although not included on the National Priorities List, may also require some clean-up effort. Some of these are TSD facilities. Ongoing investigation at many of these sites will define the hazards that they pose. As more information is obtained from these investigations, EPA may add some or all of these sites to the National Priorities List; this action depends upon the degree of hazard of the sites. Otherwise these sites will be assigned a lower priority and will be addressed in the future either by NJDEP or, as appropriate, by the Superfund program.

SPILLS OF OIL AND HAZARDOUS MATERIALS

Unintentional spills of oil and hazardous materials have significant impacts on waterways throughout Region II. Both surface water and ground water are affected.

In New Jersey, most spills have occurred on waterways used as transportation arteries, notably the Arthur Kill, Kill Van Kull, Newark Bay, Delaware River, Raritan River, Passaic River, and the Hackensack River.

The number of spills reported are given in Table 12. To various degrees, these spills have resulted in fish kills or other environmental damage.

TABLE 12

History of Hazardous Material Spills

Year	Number of Spills Reported	Gallons Spilled*
1971	55	159,994
1972	194	183,895
1973	514	2,124,185
1974	546	1,305,710
1975	676	30,947,321
1976	826	7,264,012
1977	1,281	728,247

* Value shown is less than the actual value spilled because volume spilled is not always reported.

Two other types of spills are of concern, but not quantifiable at this time: groundwater spills from underground storage tanks and spills from overturned tank trucks.

PESTICIDES

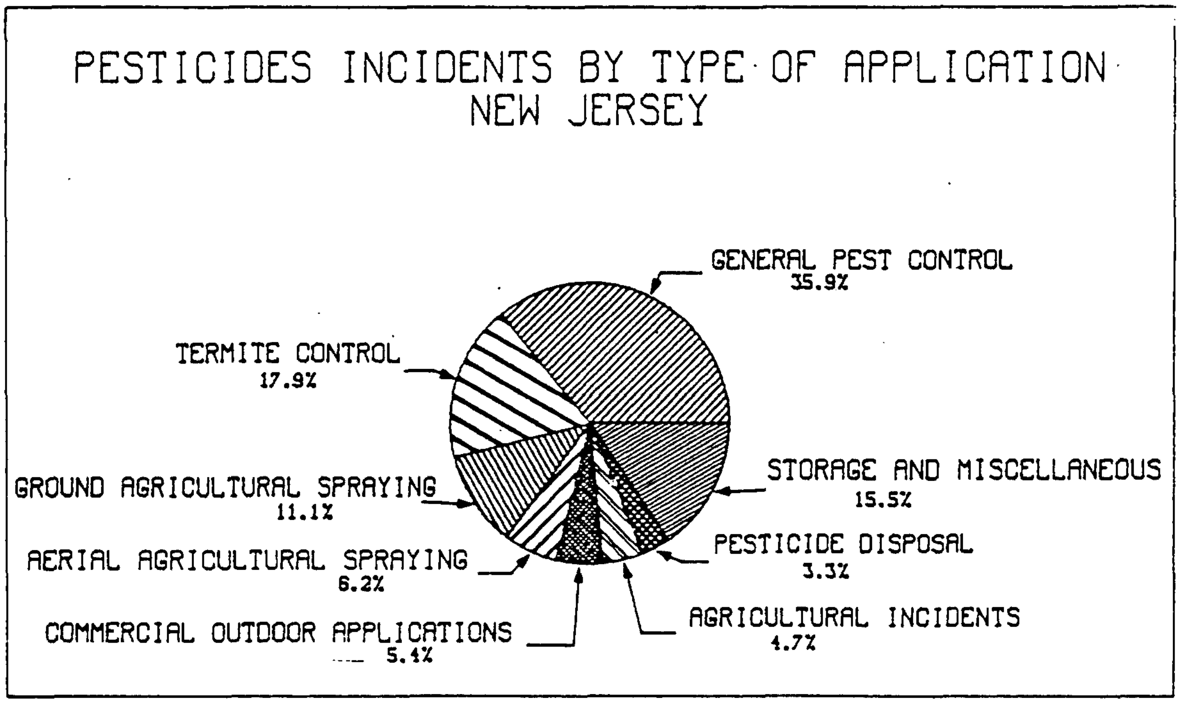
The EPA pesticide programs are directed toward oversite of the federally-funded, state-implemented programs. The New Jersey program is mainly concerned with certification of pesticide applicators, licensing of pesticide dealers, and monitoring of the manufacture, sale, and use of pesticides to assure safe storage handling, and application of these items.

There are approximately 271 pesticide manufacturers and formulators and 3 custom blenders in the state. These firms produced about 210 million pounds and 67 million gallons of pesticides in 1981.

New Jersey recently conducted an evaluation of the types of pesticide misuse violations that occur in the state (Figure 36). Most incidents involve pest control operators including general pest control applications and termite control.

New Jersey establishes enforcement priorities on the basis of percentage of harm from various categories of pesticides application.

FIGURE 36



In addition to response to consumer complaints, the state schedules routine observations, training, and public liaison activities with professional organizations to reinforce proper application techniques.

Some long-residual pesticides, many water soluble, have the potential for contamination of ground water. Monitoring of pesticide groundwater contamination will focus on large areas of southern New Jersey where aquifers are very close to the surface.

The New Jersey Bureau of Pesticide Control and the NJDEP's Office of Cancer and Toxic Substances Research are in the initial planning stages of an environmental assessmment program to identify potential pesticide health problems.

RADIATION

The EPA has established a network of sampling points to reflect ambient radiation levels caused by nuclear activities. Samples of environmental pathway media (air, drinking and surface water, and milk), by which radioactivity can reach the general public, are collected periodically at designated locations in New Jersey by the state or by a local agency (Table 13). These samples are analyzed at the Eastern Environmental Radiation Facility (EERF) in Montgomery, Alabama.

TABLE 13

Environmental Radiation Ambient Monitoring System (ERAMS)

Type of Sample	Monitoring Location
Air	Trenton
Drinking Water	Trenton Wareton
Surface Water	Bayside Toms River
Milk*	Trenton

* in cooperation with the U.S. Food and Drug Administration

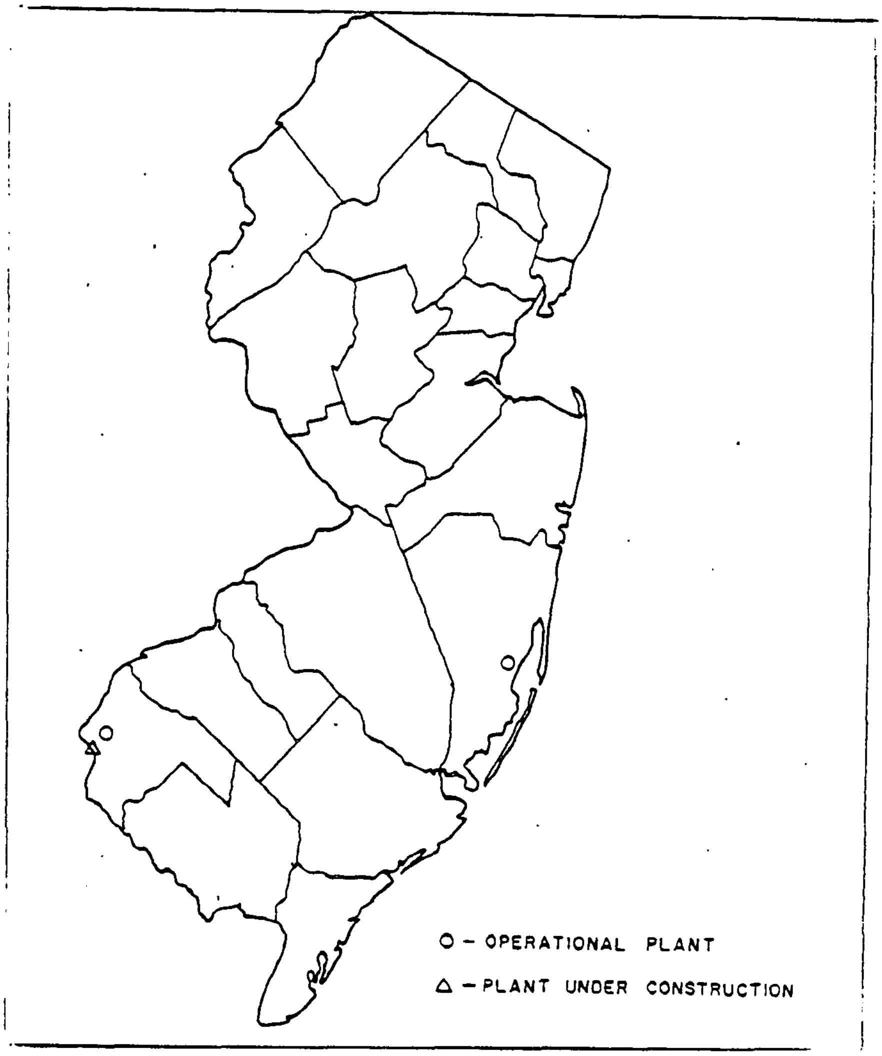
The maintenance of the ERAMS network is gaining increased importance because of heightened concern over radiation by the general public. Both the baseline and unusual activity data provide quantitative information on trends and potential population exposure

Power Plants

Figure 37 indicates the locations in New Jersey where radioactive materials are used for generating electricity. EPA provides technical assistance and oversight for evaluating potential environmental impacts on these sites.

FIGURE 37

NUCLEAR POWER PLANTS IN NEW JERSEY



New Jersey has three operating nuclear power plants which are located at the following sites:

- Salem 1 and 2 (Lower Alloways Creek)
- Oyster Creek (Forked River)

One additional plant is under construction at the Salem site:

- Hope Creek

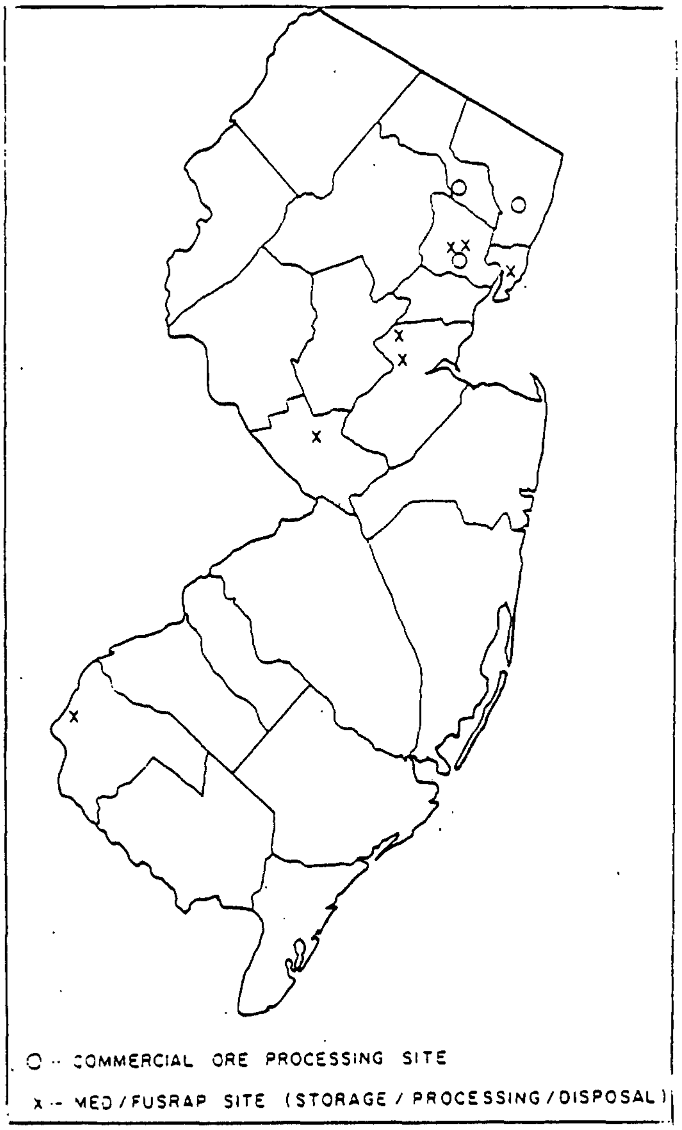
Ore Processing/Storage Sites

Figure 38 indicates those sites in New Jersey where radioactive ores have been or are being processed or stored. In some cases, radioactive contamination has occurred at these sites. Three former commercial processing sites, at Orange, Maywood, and Wayne, have been nominated by the state for clean-up.

The Orange site was contaminated as a result of the accumulation of ore residues from radium extraction processes and dial painting activities.

FIGURE 38

ORE PROCESSING/STORAGE SITES IN NEW JERSEY



The Maywood site was formerly involved in the extraction of thorium for use in gas heating mantles. The ore residues from the processing operation were disposed of on the company's property and possibly used as landfill nearby. As a result, several commerical properties and private residences have been found to have elevated indoor levels of radon, a radioactive gas which is known to cause lung cancer.

A third commercial processing site, located in Wayne, was formerly used for extraction of thorium and rare earth compounds. The sediments in the bank of the brook flowing from the facility have been found to have radiation levels up to ten times background. However, these levels present no immediate hazard to persons working or living near the site.

The EPA is available to the state for technical assistance at these sites.

The Middlesex Storage Facility was used for uranium ore storage and sampling. The facility was later used by the U.S. Marine Corps as a reserve training center. Residue material has also been removed to localized offsite areas to be used as landfill. These areas have been decontaminated and the materials were placed onsite and stabilized for temporary storage. Long-term monitoring is continuing at the site until a permanent disposal site is found.

Also under the remedial action program of the DOE is a surplus federal facility, New Brunswick Laboratory. All above-ground structures have been dismantled and contaminated building debris was disposed of at the Nevada Test Site. Contaminated soil at the present site will be removed at a later date, when a permanent disposal facility is available.