



REGION I
WATER QUALITY MANAGEMENT PROGRAM REVIEW

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CASE STUDY

Housatonic River
Massachusetts - Connecticut

April, 1982

Housatonic River Basin Case Study

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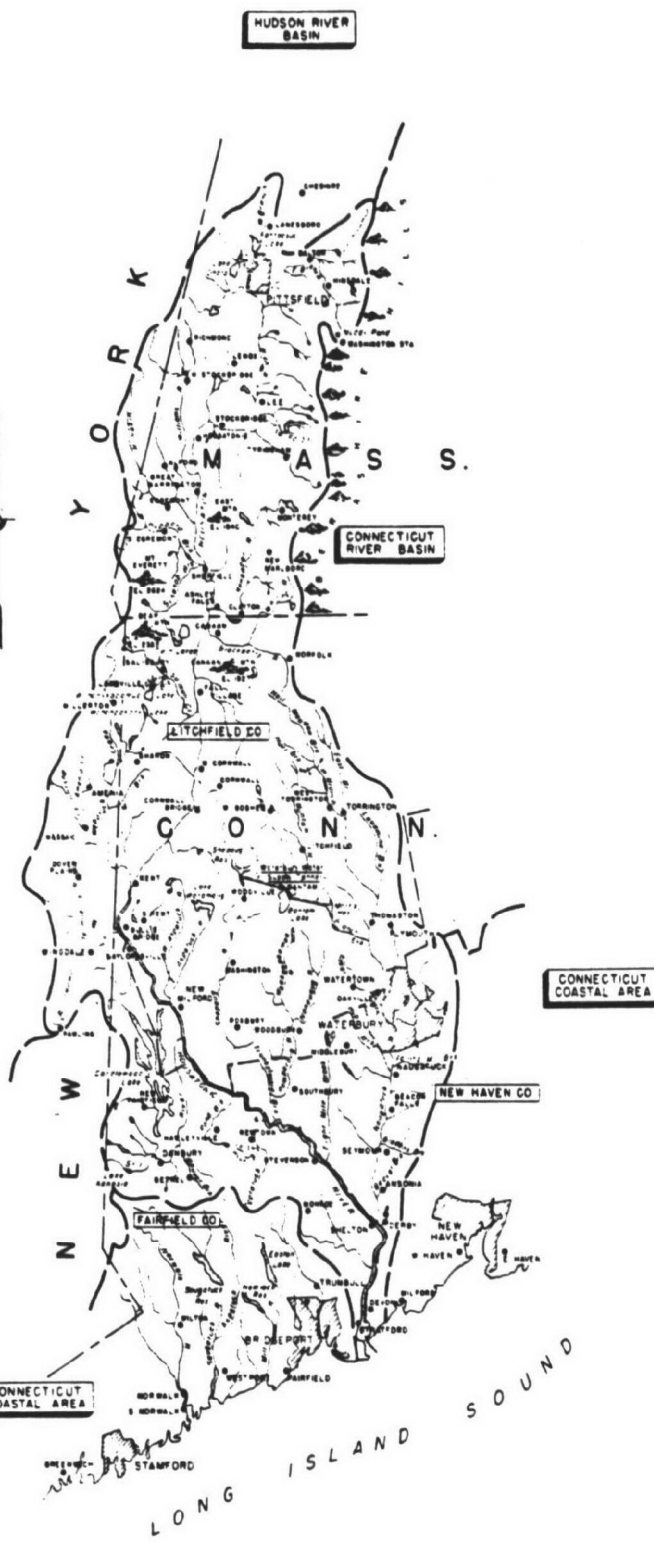
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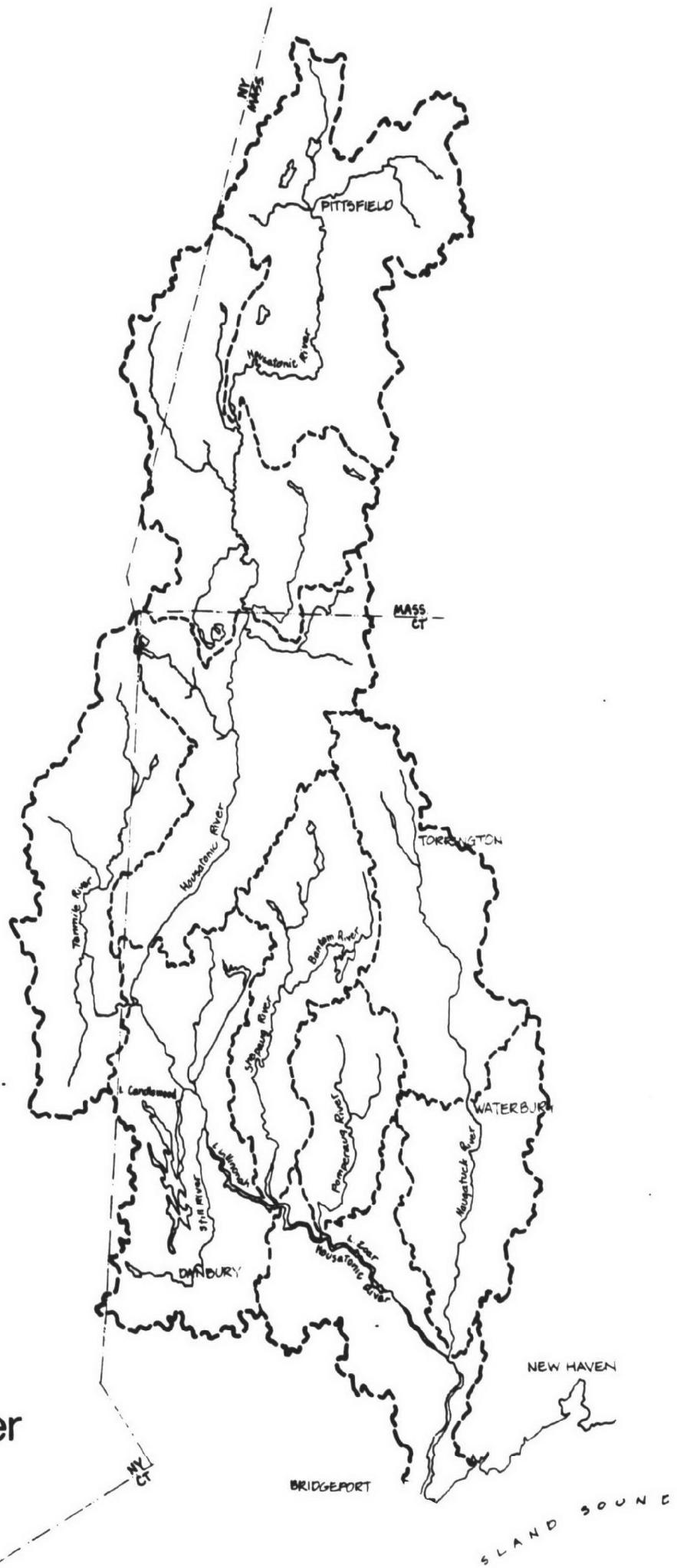
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LOCATION MAP
SCALE IN MILES
0 10 20 30



Housatonic River Basin



Housatonic River Case Study

I. Introduction/Background

A. Introduction - Major Problem Descriptions

The Housatonic River is located in western Massachusetts and western Connecticut and travels in a southerly direction for 131 miles before eventually emptying into Long Island Sound. The Housatonic River Basin includes the urban centers of Pittsfield, Massachusetts, Danbury, Ansonia, Shelton, Stratford, and Waterbury Connecticut. It also flows through extremely scenic rural and forested areas in western Massachusetts and northwestern Connecticut. Swimming and boating have always been popular attractions for the impoundments of the Housatonic in southwestern Connecticut, activities that ceased in MA in the early 1900's. The river always supported an active sport fishery. Local and visiting fishermen have fished the Housatonic for food and sport since colonial times. Portions of the Housatonic within Massachusetts were also known for bountiful catches of frogs.

The Housatonic River, however, suffers from two critical but distinct water pollution control problems: phosphorus-induced algae growth problems in the river impoundments, and PCB contamination of river sediments and the resulting high concentration of PCB in the river's fish and aquatic life. Both problems have adversely affected the recreational potentials of the river and have caused economic losses. These problems are particularly complex because they involve an interstate stream. The ultimate effects of some of the pollution sources are not uniquely felt in the originating state but are often most serious far downstream in another state.

B. Basin Description

The Housatonic River Basin extends 1,950 square miles across Connecticut, Massachusetts, and New York. The waters of the Housatonic River flow south from Pittsfield, Massachusetts, through western Massachusetts and western Connecticut before emptying into Long Island Sound. The total length of the river is approximately 132 miles. Major tributary rivers include Ten Mile River (portions in New York), Still River, Shepaug River, and Naugatuck River.

Over half of the basin's population resides in the major urban areas around Pittsfield, Massachusetts, in the north, and Danbury, Waterbury, and Stratford, Connecticut, in the south. Outside these urban areas the basin is largely undeveloped; forestry, agriculture, and recreation predominate. Many of the basin's unique ecological features and recreational opportunities center around the narrow, steep-walled valley of the Housatonic River.

The Housatonic's origins are some of the picturesque Berkshire County lakes near Pittsfield, MA. Approximately five miles south of Pittsfield the river backs up behind the Woods Pond Dam. The dam originally built to power a paper plant is no longer utilized for that purpose. The dam does serve to form a large sediment trap which has over the years caused heavy sludge accumulation and nutrient retention. The pond is in an advanced eutrophic stage and has lost much of its appeal as a recreational water body. The Woods Pond Dam has also served to trap PCB laden sediments transported from upstream. It has been estimated by the CT DEP that 70% of the total quantity of PCB contaminated sediments in the Housatonic are resting behind the Woods Pond Dam.

After flowing through the urban industrial centers of Lenox and Lee, MA, the Housatonic winds through picturesque southwestern Massachusetts and past the popular tourist areas of Stockbridge and Tanglewood.

The Housatonic Main Stem Basin from the CT - MA State line to the confluence with the Naugatuck River at Ansonia is primarily rural in nature and is a favorite recreational river in the State. Portions of the Housatonic near Cornwall, Connecticut, were considered one of the very best trout fishing areas in New England.

The Housatonic River is distinctive in Connecticut in that there are hydroelectric dams along the main stem of the river of which three form major lakes: Lake Lillinonah, Lake Zoar, and Lake Housatonic. The Housatonic and Naugatuck Rivers join 13 miles upstream from the mouth at Long Island Sound.

The Naugatuck River, the Housatonic's most important tributary, has historically been known for extremely poor quality. Extensive pollution control efforts have resulted in a clean-up success story for the Naugatuck. (See story in Appendix I).

Water pollution, flooding, the management of waters and related lands for recreation, and projected deficits in water supplies are all problems that need to be resolved in the basin. In the following paragraphs the major issues and problems confronting the Housatonic River basin are presented.

1. Water Supply

The basin supplies 136 million gallons of water per day to its residents and various industrial users through 154 public water supply systems and an out-of-basin diversion to the Bridgeport Hydraulic Company System in Connecticut. By 1990, these supplies will not be able to meet the increasing demand in 22 basin towns. The most serious shortages will occur in the Pittsfield, Danbury, and lower Naugatuck River areas. In some cases, proposed solutions, such as the Washington Mountain Brook PL-566 project in Massachusetts and the proposed Shepaug River diversion in Connecticut, have created considerable controversy.

2. Water Quality

Water pollution is a serious problem in the Housatonic, Still, and Naugatuck Rivers and to a lesser extent in the Ten Mile River in New York, primarily as a result of inadequately-treated municipal and industrial wastes and combined sewer overflows. These discharges not only affect river segments immediately downstream of disposal sites, but also contribute phosphorus, which accelerates eutrophication, to run-of-river lakes used for recreation (such as Zoar and Lillinonah). Waste discharges in Massachusetts and possibly in New York adversely affect the quality of the Housatonic River in Connecticut.

PCBs have been found in the water and in the sediments from the bottom of the Housatonic River from Pittsfield south to Derby. PCB discharges from the major source, the General Electric Plant

in Pittsfield, have been stopped (NPDES allows about 10ppb to be discharged - about 10-15 pounds/month); however, PCBs continue to enter the river from landfills, storm runoff, and sediments. Both Connecticut and Massachusetts have issued health notices warning people not to eat fish taken from the Housatonic River; the Massachusetts health warning also included frogs and turtles. Some plans have recommended that riverside aquifers be used to enhance water supplies in the basin; however, concerns exist that pumping wells may draw PCB contaminated river water into the aquifers. To date, however, no contamination has been reported at the extensive Shelton well fields of the Bridgeport Hydraulic Company which currently are recharged with Housatonic River water. A USGS study in Massachusetts will provide additional data on the potential for PCB contamination of ground water.

In 1979, the Environmental Protection Agency (EPA) established a Working Group on Interstate Transport of Pollutants, composed of representatives from Massachusetts, Connecticut, and New York, to help resolve interstate water quality problems. For the Housatonic basin the Group has coordinated pollution control efforts for phosphorus and PCBs. The Working Group has assumed responsibility for the development of a comprehensive and coordinated strategy for resolving the problems of PCB contamination and for identifying resources available through various agencies to help it carry out its work.

3. Flooding

There are severe problems of coastal flooding and erosion in the basin which, at the river's mouth, reduce the recreational potential of coastal and beach resources. Federal agency studies have determined that federally-assisted projects are not feasible, but the State of Connecticut, through its Coastal Area Management Program and Flood Control and Beach Erosion Program, is continuing to assist coastal towns in developing approaches to managing their flood prone and erodible coastlines.

4. Recreation and Wild and Scenic Rivers

The water resources of the basin are used for recreation in the upland lakes in the northern basin, in Candlewood and run-of-river lakes such as Zoar and Lillinonah in the southern basin, along the Shepaug and Housatonic Rivers, and in the coastal areas. Although additional facilities are needed to meet the demands for recreational uses - particularly swimming - the proper management of recreational resources in the basin is of greater concern.

Areas around the upper Housatonic River in Connecticut and the Shepaug River are noted for their outstanding cultural and natural features: scenic mountains and valleys, productive wildlife habitat, rare ecological areas, and a variety of recreational opportunities. Forty-one miles of the upper Housatonic and 26 miles of the Shepaug qualify for inclusion in the National Wild and Scenic River System.

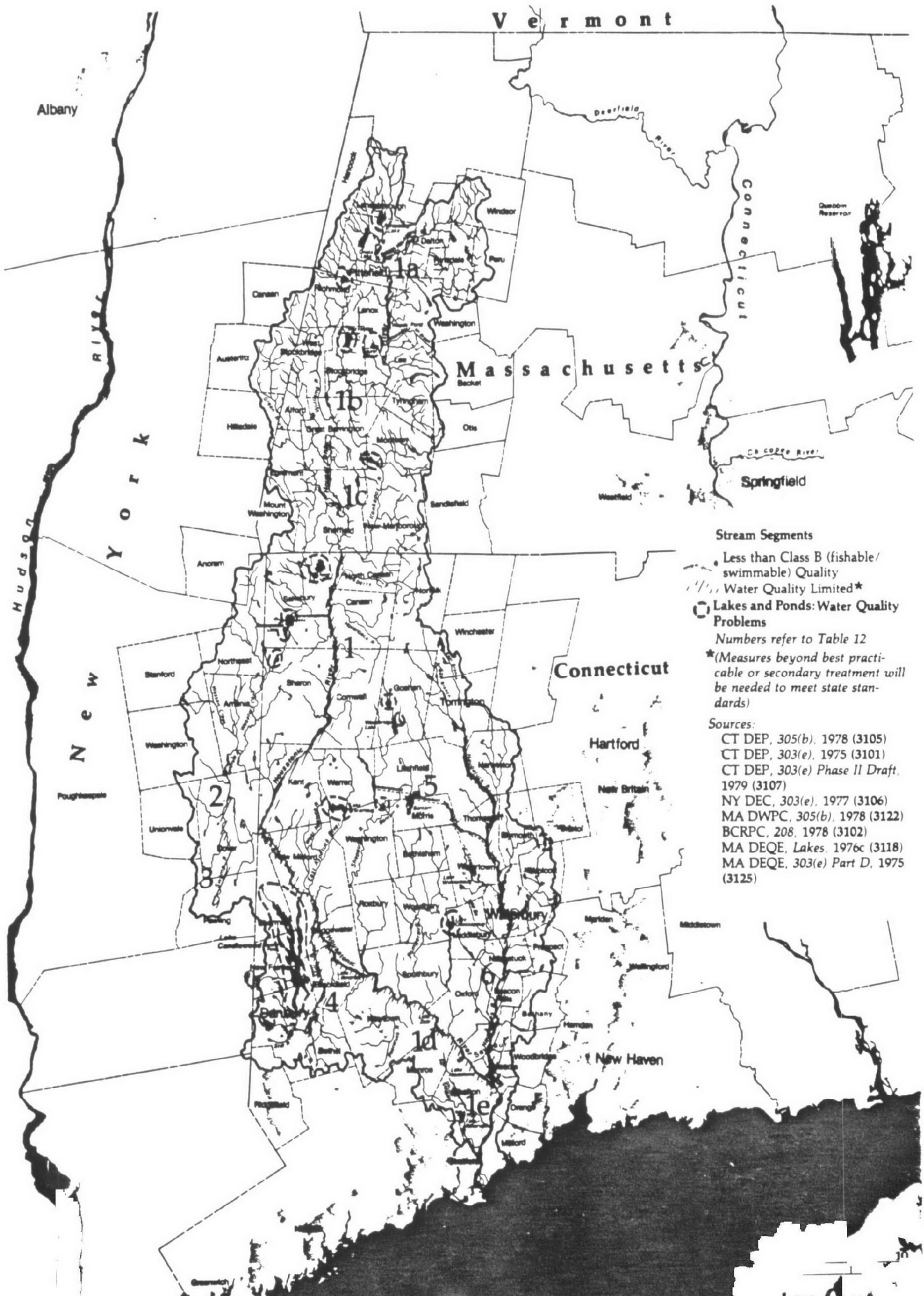
It is widely recognized that the rivers of the basin need to be protected from incompatible uses. A major concern of those dealing with the problems of the Housatonic is the nature of riverside development. Northeast Utilities has put forth a proposal to develop some of its riverside land for recreation (a condition of its hydropower license) which has caused considerable controversy. Part of the controversy stems from the fact that area towns fear that the increase in the use of the river would compromise the natural environment in which recreation is now pursued. A major concern of those dealing with the problems of the Shepaug River is the demand for water to be diverted from the Shepaug to adjacent areas in need of increased water supplies.

Socio-Economic Characteristics

1.B.2

- In 1975, a population of 732,609 resided in the Housatonic Basin (83% in Connecticut; 14 percent in Massachusetts; and 3% in New York).
- Average density of population in 1975 was 376 people per square mile, compared to Statewide averages of 704 for Massachusetts, and 618 for Connecticut.
- Population in Massachusetts and New York portions decreased between 1970 and 1975. The Connecticut portion has shown increased population growth rate.

◦ 1970 Employment	Massachusetts	Connecticut
manufacturing	50%	35%



Stream Segments

- Less than Class B (fishable/swimmable) Quality
- - - Water Quality Limited*

Lakes and Ponds: Water Quality Problems

Numbers refer to Table 12

* (Measures beyond best practicable or secondary treatment will be needed to meet state standards)

Sources:

- CT DEP, 305(b), 1978 (3105)
- CT DEP, 303(e), 1975 (3101)
- CT DEP, 303(e) Phase II Draft, 1979 (3107)
- NY DEC, 303(e), 1977 (3106)
- MA DWPC, 305(b), 1978 (3122)
- BCRPC, 208, 1978 (3102)
- MA DEQE, Lakes, 1976c (3118)
- MA DEQE, 303(e) Part D, 1975 (3125)

II. Major Water Quality Problem Areas

A. PCB's

1. Existing Conditions

The existing water quality classification of the Housatonic River was downgraded from Class B to D when it was discovered that PCB (Polychlorinated biphenyl) concentrations in Housatonic River fish exceeded limits set by the U.S. Food and Drug Administration. The PCB concentration varied from more than 40 ppm to less than one part per million in fish. The FDA limit is 5 ppm. In 1977, the Connecticut Department of Health placed a health advisory against eating fish from the Housatonic. PCB contamination will prevent 109 miles of the Housatonic (nearly the entire main stem) from meeting the 1983 fishable-swimmable goals of the 1977 Clean Water Act.

A study initiated by Connecticut reported that PCBs were found to have accumulated in the Housatonic River wherever sediment had accumulated. From the Stevenson Dam in Connecticut the concentration of PCBs in these sediments increased gradually with increasing distance upstream, and then increased sharply in Woods Pond, the first impoundment below Pittsfield, Massachusetts. The PCB concentrations found in the sediments ranged from less than 1 ppm in Lake Zoar to greater than 50 ppm in Wood's Pond. The distribution of PCBs within an impoundment was found to be controlled by the distribution of fine-grained sediment.

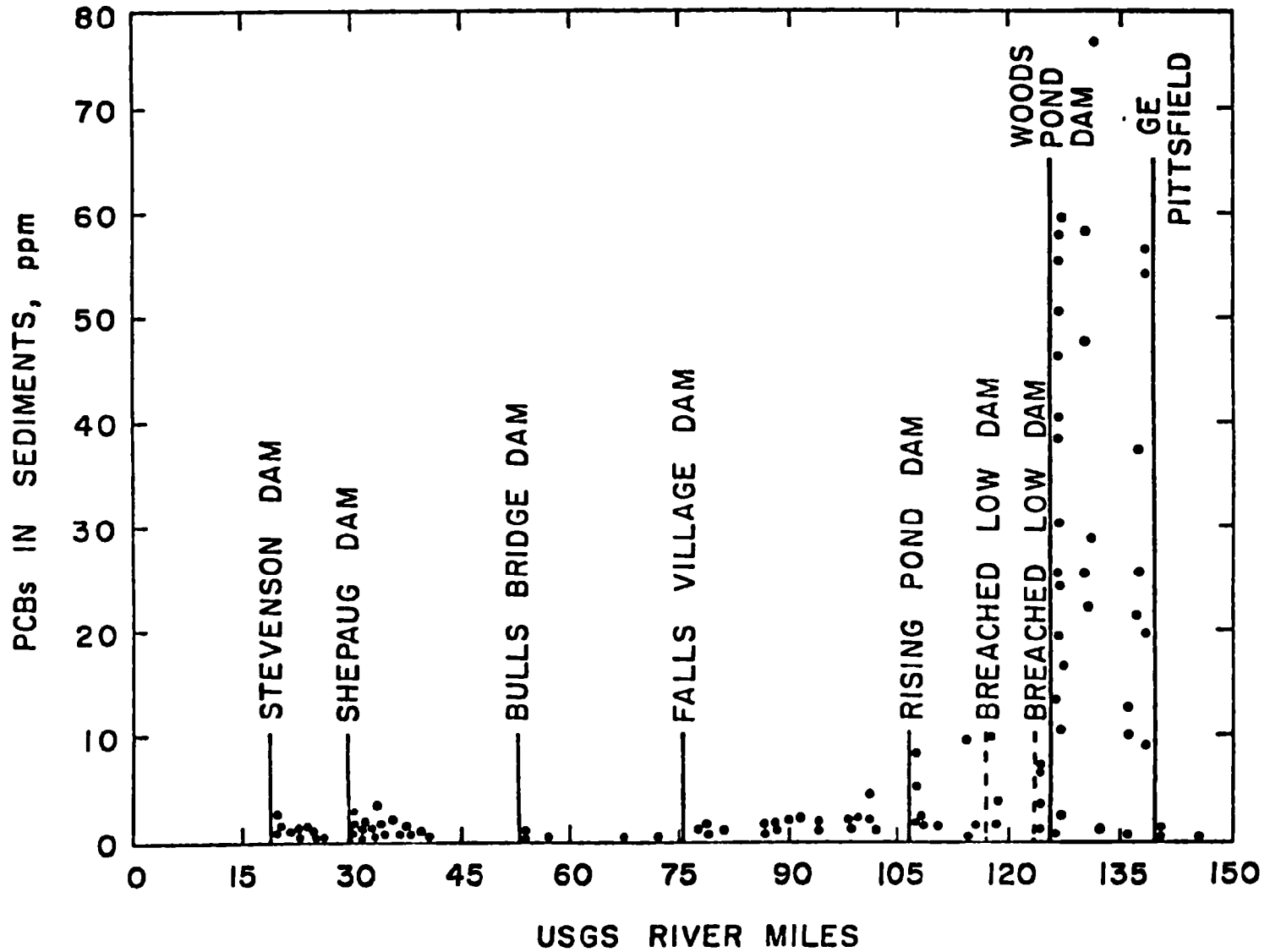
Sediment samples taken above Pittsfield, in the Ten Mile River in Connecticut, and in several lakes in Connecticut showed only typical

background concentrations of 0-0.1 ppm. Six samples from the Still River, a tributary in Connecticut, contained an average of 0.33 ppm, with Aroclor 1248 predominating. The ratio of Aroclor 1248 to Aroclor 1260 was higher in samples from Lakes Zoar and Lillinonah than in samples collected upstream, suggesting that some PCBs entered these lakes from the Still River. Differential transport of Aroclor 1248 downstream may also have occurred. Actual transport of PCBs by suspended sediment is still under study.

Calculations of the mass of PCBs in the sediments in the river suggest that of the estimated total of 22,200 lbs, about 60% is still located in Massachusetts with nearly all of this amount in sediments in Woods Pond. About 40% of the total mass of PCBs is in the sediments in Connecticut: about 29% is in Lake Lillinonah and 10% is in Lake Zoar with small amounts at other locations.

In conclusion, it appears that the principal source of PCBs in sediments of the Housatonic River in Connecticut is the PCB contaminated sediment from Woods Pond in Massachusetts. Because the only known user to date of large amounts of PCBs was the General Electric Company plant in Pittsfield, leakage from the plant to Woods Pond seems the likely source of Aroclors 1254 and 1260 in impoundments in Connecticut. The source of Aroclor 1248 is not known at this time.

PCBs IN HOUSATONIC RIVER SEDIMENTS



Concentration of PCBs in surficial sediment samples in the Housatonic River.

II.A.2 Pollution Sources (PCBs)

A major problem in the Housatonic from Pittsfield through Lake Zoar is the presence of high levels of polychlorinated biphenyl (PCB) compounds. These were discharged from the General Electric plant in Pittsfield from the early 1930s until 1977 and now continue to enter the environment from landfills, runoff and sediments, and in very low quantities from continuous GE discharges. Since PCB compounds have low solubility, they do not significantly affect water quality. However, they have become concentrated in fine-grained bottom sediments, enter the food chain, and accumulate in fish tissue at levels much higher than the maximum tolerance level set by the Food and Drug Administration [currently 5 parts per million (ppm)]. As a result, both Massachusetts and Connecticut have issued public health warnings against the consumption of fish taken from the river, and Connecticut DEP has downgraded its classification of the existing water quality of the river from a B_s (fishable-swimmable) to a D (nonfishable).

II.B. Phosphorus and Organic Loadings

1. Existing Conditions

Water quality problems due to conventional municipal and industrial pollutants in the Housatonic Basin have been recognized since the late 1800's. As early as 1884, Henry Parker Fellows, in his book "Boating Trips on New England Rivers" wrote about discoloration and odors in the Housatonic due to refuse emanating from the mills. The first extensive water quality survey was conducted in 1936 by the Works Progress Administration which resulted in a Massachusetts Senate act recommending corrective action. Another survey conducted in 1949 found conditions to be worse and the Massachusetts Senate again passed a resolution calling for clean-up of the Housatonic River. This scenario was repeated several times before significant remedial action was initiated.

A 1971 report by the Massachusetts Division of Water Pollution Control (MDWPC) based on a 1969 intensive water quality survey stated that discharges from Pittsfield and General Electric in Pittsfield required "tertiary treatment" if dissolved oxygen standards were to be met. Additionally the MDWPC noted high concentration of phosphorus in both the Pittsfield and GE effluents and concluded that the phosphorus levels would have to be reduced if the River were to become usable again.

The 1969 survey was the first Housatonic survey in Massachusetts to consider the impacts of nutrient discharges and subsequent algae growth. Three impoundments of the Housatonic, Center Pond in Dalton, Woods Pond in Lenox and Rising Pond in Great Barrington were all identified as being eutrophic. Woods Pond, immediately downstream of Pittsfield and GE was further described as a "waste assimilation" system for the upstream discharges. Solids, organic materials, nutrients, and coliform bacteria were all present in excessive amounts rendering this shallow impoundment virtually useless. Continuous

monitoring of dissolved oxygen showed extreme variations between day and night values due to overabundant planktonic algae photosynthesis and respiration. The periodic rapid die-off of the large algae population lead to odor and sediment problems further exacerbating the polluted condition of Woods Pond. Subsequent National Eutrophication Study and MDWPC reports on Woods Pond show that these conditions continue. On the other hand, the high productivity of the Pond make it an ideal community for certain tolerant warm water fish, frogs, and turtles as well as a highly regarded waterfowl habitat and hunting area. That is, until it was discovered that the Pond was not only the recipient of routine municipal and industrial wastes, but had had its sediments, aquatic life and waterfowl contaminated by high levels of PCB's.

At the same time Massachusetts was examining the impacts of wastewater on the Housatonic, the Connecticut DEP was investigating nuisance conditions in the three major Housatonic impoundments - Lakes Lillinonah, Zoar, and Housatonic. The Connecticut Agricultural Experiment Station (CAES) in 1968 and 1969 carried out nutrient budget studies. These detailed studies were supplemented in 1972 and 1973 by NEI work. Both of these studies indicated that the Housatonic River was a major source of phosphorus to the lakes and that MA discharges constituted about one-half the phosphorus in the Housatonic at the beginning of the lakes. A 1976 303(e) basin plan prepared by CT DEP recommended that MA should go forward with plans for phosphorus control at Pittsfield and GE, the two largest phosphorus sources in MA.

Based on the findings of the 1969 survey, the City of Pittsfield began planning for expansion and upgrading of its treatment facilities and GE started making provisions for further treatment of its wastewater and for reducing the amount of phosphorus used in their manufacturing processes. In addition, most of the other smaller municipal and industrial dischargers installed treatment facilities or upgraded to secondary during the 1970's.

In 1974 another Massachusetts water quality survey documented slight improvements in water quality but found continuing problems below Pittsfield. While GE had cut its phosphorus loading by 50%, Pittsfield was still discharging large amounts of phosphorus. Eutrophication problems were identified in the Sheffield meanders (about 40 miles downstream of Pittsfield and 10 miles above the Connecticut state line) as well as Woods Pond. At this time, the MDWPC concluded that phosphorus from the Pittsfield treatment facility was the likely cause of the problem but that the relationship between Pittsfield's phosphorus and the Housatonic's eutrophication problems were not fully understood.

Meanwhile, the CAES in 1973 and 1974 documented highly enriched waters in Lakes Lillinonah and Zoar. The resultant bluegreen algae blooms were inhibiting recreational uses of the lakes as well as causing dissolved oxygen depletion. The CT DEP enlisted the aid of the EPA National Environmental Investigation Center out of Denver to perform algae assays on Lake Lillinonah, the most upstream impoundment. These studies confirmed DEP's suspicions that phosphorus was the limiting nutrient for the nuisance algae. Based on this information and the phosphorus loading data calculated earlier, CT DEP and FMC Corporation conducted a two-year study of phosphorus removal at Danbury - the largest Connecticut source of phosphorus. This study showed that phosphorus removal was technically feasible on a large scale and concluded that Danbury should seasonally remove phosphorus. Further, the study recommended that additional data be collected on the Massachusetts sources, particularly Pittsfield, since phosphorus removal from only the Connecticut sources would possibly allow nuisance conditions to continue. Massachusetts and Connecticut both agreed that before Pittsfield, or any other source of phosphorus in Massachusetts, could be ordered to remove

phosphorus, that the benefits of this removal would have to be firmly established. Connecticut DEP urged EPA and MA DWPC to study the phosphorus transport from MA into CT and to develop orders, where necessary, to control this nutrient and hopefully the eutrophication problems in CT.

III. Water Quality Management Problem Solving Strategy

A. The SEA Process - The SEA Working Group on the Interstate Transport of Pollutants.

Several important interstate streams in New England have received pollutant loads from out of State sources that cause severe water quality problems. EPA and the States of Connecticut and Massachusetts negotiated State/EPA Agreements (SEA) issues with the intent of providing the critically needed high level of cooperation and coordination of pollution control efforts for 3 high priority water resources between Connecticut and Massachusetts (Housatonic River, Connecticut River, French River). An SEA Working Group on the Interstate Transport of Pollutants was formed to assist in the dissemination of technical information to the various State, Federal and local officials involved, and to coordinate the efforts and maintain an open, direct channel of communication between all parties.

EPA Region I took the lead role in coordinating the input and participation of the States of Connecticut, Massachusetts and New York, EPA Region II, the Corps of Engineers, and the New England Interstate Water Pollution Control Commission. Various representatives of local government, 208 planning agencies, local media and the public often attend the Work Group meetings. The excellent working relations and the spirit of cooperation engendered and supported by the SEA working group efforts have helped to promote progress in overcoming some particularly complex problems on the Housatonic River.

Although the SEA Issue project management rests with the Water Division, a great deal of effort and cooperation has been provided by the Enforcement Division (both Permits Branch and Enforcement Branch), and the Surveillance and Analysis Division.

III. B.1. Water Division (PCB's)

Until 1981, EPA did not play an active role in resolving the PCB problems in the Housatonic. From the early 1970's to 1981, EPA's role consisted of participating as an "ex-officio" member of Connecticut's PCB Program Guidance Committee. Since the mid 1970's, the Water Division played the lead role within EPA concerning the resolution of the Housatonic River PCB problems. The reason for the Water Division's lead role was primarily because it was felt that the PCB's were an in-stream water quality problem and not a case of storage or handling of PCB's which were under the purview of TSCA. Water Division staff was designated as the EPA representative to the Housatonic River Program Guidance Committee (PCB-PGC). The PCB-PGC was formed by Connecticut to guide the studies funded by a special \$200,000 appropriation by the Connecticut Legislature. The studies funded by Connecticut include: a sediment study including locations and concentrations of hot spots; a fish tissue study; and a human blood serum study. Through this phase EPA's role was primarily advisory; the EPA S&A labs also performed some monitoring activities during this period.

As the Connecticut studies (and funds) neared completion, Connecticut sought a more active role by EPA and Massachusetts. The 1979 SEA issue on the Interstate Transport of Pollutants sought to elevate the priority of this, and other interstate water quality problems, and help focus additional resources on these areas. Since 1979, the Housatonic River (PCB's and Phosphorus) have taken on increasing emphasis in the SEA process. Water Division Staff continue to

provide project management for this SEA issue and therefore maintain a leading role in the coordination of State and Federal efforts in this area. The items listed below show current Water Division activities:

- (IM,WQB) - Provide project management for SEA Issue on the Interstate Transport of Pollutants
- (IM) - Schedule SEA Work Group Meetings and provide agenda
- (IM) - Chair and lead SEA Work Group discussions
- (IM) - Summarize SEA Work Group discussions and highlight "actions needed"; distribute to all participants
- (IM,WQB, - Provide technical guidance to EPA Enforcement Division on
DWB) Administrative Orders with GE
- (IM) - Participate in meetings of Connecticut's PCB Program Guidance Committee
- (IM) - Prepare coordinated responses for RA on most Housatonic related correspondence from State agencies and congressional offices
- (DWB) - Provide technical guidance to Enforcement Division and S&A relative to groundwater contamination

III. B.2. Enforcement Division (PCB's)

a. Enforcement Branch

The General Electric Company is in the process of complying with the July 1981 consent order requiring reporting on PCB disposal practices and studies of the Housatonic River. For background on the Order, appended to this memo is a copy of the Executive Summary which was sent by Region I to the EPA Administrator, and a copy of the memo from Larry Goldman, former Enforcement Division Director to the Regional Administrator including a chronology, an outline of the tasks required by the Order, and maps.

Since the order was issued, G.E. has submitted the required proposals. After two highly satisfactory meetings with G.E., its consultants, and personnel from MA DEQE and CT DEP, EPA and DEQE approved the proposals, with the concurrence of CT DEP. A letter from EPA dated December 17, 1981, recorded two changes which had been agreed to. On January 12, 1982, after some extensions in the deadlines, G.E. submitted its report on past disposals practices. Under its approved schedule, the study of Housatonic PCB's will be completed by December 1982, and the Woods Pond remedial action study by the Spring of 1983. Thereafter EPA, DEQE and DEP will have to evaluate the results and make decisions, possibly difficult ones, concerning further action.

The Region is optimistic that solutions to this problem will emerge, and we will be able to restore the river to fishable quality within a few years. Moreover, the spirit of the people involved, particularly G.E., Stewart Laboratories, Steve Joyce of DEQE, and the

Berkshire County Regional Planning Commission, promised to make this an open and cooperative effort.

Other possible sources of PCB's in the Housatonic have been investigated by EPA under the Versar contract. Some TSCA violations have been found, and enforcement action is being considered at some sites, all in Connecticut along the lower part of the river. Final decisions about these violations have not been made. At this time, it does not appear that any of them represent significant sources of PCB's in the river. EPA hopes to visit two or three remaining sites in the Spring under the Versar contract, but we do not expect to find significant releases into the river.

III.B.2.

b. Permits Branch

PCB's - General Electric Co.

The PCB issue was addressed in a 2/3/78 modification to G.E.'s original NPDES permit #MA0003891. The original permit and modification both expired on 12/1/80 and are presently being considered for reissuance.

G.E. was required to implement a control program to reduce effluent PCB levels at outfalls 005 and 006 to weekly averages of 0.055 lbs/day and 0.023 lbs/day and weekly maximum of 0.170 lbs/day and 0.070 lbs/day, respectively by April 1, 1979. These limits were achieved by the implementation of a multi phase program including discontinuation of PCB usage, pipe relining, excavation, construction, oil/water separator upgrading, and other "housekeeping measures."

The company was further required to annually report on the possibility of further PCB effluent reductions through the use of all available technologies. G.E. has indicated in its 1979 annual report that certain technologies are available to further reduce PCB levels but requested that EPA wait until the existing construction and housekeeping had been completed for a sufficient "stabilization" period to allow for an adequate assessment of the work already completed before any further permit requirements were imposed. EPA agreed to this in March of 1979.

The Permits Branch is now reviewing the reapplication. If it is determined that further treatment is needed, the forthcoming "BAT" permit will include these requirements.

EPA Permits Branch recently (2/82) issued a permit to GE to incinerate PCBs at the Pittsfield facility. The GE incinerator was built specifically for incineration of PCBs.

III.B.3. Surveillance and Analysis Division (PCBs)

In 1972 when the hazards of PCB's first became suspect, S&A conducted an industrial sampling program at the General Electric Company, Pittsfield, Massachusetts, to determine if they were discharging PCB's to the Housatonic River. In conjunction with this, a series of river stations were also sampled. This early work confirmed that PCB's were being discharged to the river, but the extent of the problem was not known.

In 1975 when hearings and litigation brought PCB's into national prominence as a major pollutant, the Surveillance and Analysis Division began looking at further PCB contamination in the Housatonic River. Working with the Massachusetts Division of Fish and Wildlife, water, sediment, and fish samples were collected and analyzed for PCB's. This early in 1976, the Region and States were made aware that PCB's were affecting sediment and fish populations downstream from Pittsfield, Massachusetts. The area of major concern at this point was the impoundment known as Woods Pond in Lenox, Massachusetts. Also, early in 1976, further sampling was conducted to confirm the discharge of PCB's from General Electric to the East Branch of the Housatonic River.

These initial studies contributed to the State of Connecticut becoming more involved with PCB's in their portion of the river. These studies led to Connecticut's issuing of an "advisory warning" on the taking of finfish for human consumption from what had been described as "the best trout fishing" stream in the State.

Additionally, the early PCB work in this river basin and the preliminary identification of Woods Pond as a major PCB sink led to the awarding of a contract to examine the extent of the contamination in Woods Pond and suggested remedial actions.

These issues continue to be examined through the EPA/Connecticut/Massachusetts SEA process.

III.C.1 Water Programs (Phosphorus)

In the late 1970's, the MDWPC concluded that phosphorus from the Pittsfield treatment facility was the likely cause of the downstream eutrophication problems in the Housatonic. However, the relationship between Pittsfield phosphorus and the Housatonic eutrophication problems were not fully understood. Before Pittsfield could be ordered to remove phosphorus, the benefits of this removal would have to be established.

Agreements between the water quality branch and enforcement staffs of both EPA and MDWPC resulted in a modification to Pittsfield's NPDES permit. Pittsfield was required to remove phosphorus during the summer so that a joint EPA-MDWPC intensive survey could evaluate the impacts of phosphorus removal. The Connecticut Department of Environmental Protection (CT DEP) had also surveyed its portion of the Housatonic River with particular attention paid to the major recreational impoundments on the mainstem. Residents near the impoundments and recreational users had been complaining in greater frequency that algal blooms were restricting use of the impoundments and were becoming increasingly severe. It was not clear to the Connecticut Department of Environmental Protection whether the smaller, instate sources of phosphorus were the cause of the problem or whether it was carryover from the distant (70 miles) Massachusetts discharges.

Based on the 1978 survey a draft NPDES permit was sent out for public notice with the requirement that Pittsfield practice phosphorus removal to 1.0 mg/L each year from April through October. Many comments were received on the permit and based on a request from the City of Pittsfield, a public hearing was scheduled for July 9, 1980. Testimony was heard from residents near the Connecticut impoundments who believed that phosphorus should be removed regardless of demonstrable benefits.

However, testimony by the Berkshire County Regional Planning Commission 208 Agency indicated that nonpoint sources in the southern Massachusetts and northern Connecticut portion may be contributing to the problem. There were claims made that even if Massachusetts point sources were eliminated, there would be enough phosphorus from nonpoint sources to lead to continued problems in the Connecticut impoundments. In addition, there were many commenters who felt that the fate of the phosphorus in the 70 miles between the discharge and their impoundments was not well understood. Further, the City of Pittsfield described the high cost of chemicals and sludge handling/disposal associated with phosphorus removal.

The EPA Water Quality Branch ,after considering the testimony and data received at the hearing, recommended to the Enforcement Branch that permanent seasonal phosphorus removal could not be technically supported without additional data . The WQB and the MDWPC agreed that further studies were necessary and that the basin in both Connecticut and Mass. should be studied simultaneously.

At about this time, due to a high level of concern on the part of Connecticut, it was decided to make the phosphorus loadings and impacts an SEA issue with both Connecticut and Massachusetts to insure cooperation in all studies and mutual agreement in all decisions. Through the SEA process, both States and EPA were able to combine forces and carry out simultaneous intensive studies of phosphorus sources and instream impacts from May through September, 1981. Also through the SEA process, assistance was received from USGS (flow), USDA (nonpoint source), and Berkshire County RPC 208 (storm runoff). The 1981 surveys were conducted with no phosphorus removal at Pittsfield and with phosphorus removal at the Danbury STP in Connecticut. Additional cooperative surveys are planned for 1982 with Pittsfield removing phosphorus. After the data from both of these studies are available, a decision on permanent, seasonal phosphorus removal at Pittsfield will be made.

It is expected that the data analysis and establishment of Pittsfield's NPDES permit limits will be done utilizing the SEA process. Quarterly, all of the involved parties meet to discuss the progress and needs of the surveillance and analysis, NPDES permits, construction grants, nonpoint source planning, and interagency cooperation. This process has resulted in a high level of interaction among several agencies in both states as well as bringing together three Divisions and the RA's office in the Regional Office. The combined efforts of the Regional Office has brought praise from both states.

III.C.2. Enforcement Division

a. Permits

1) Phosphorus - City of Pittsfield

The present NPDES permit #MA0101681 for the City of Pittsfield requires that the City meet effluent limitations of 1.0 mg/l monthly average, 1.0 mg/l weekly average, and 1.5 mg/l daily maximum during the period April 1, 1982 through October 1, 1982 only. During this time period, further stream studies will be conducted in an attempt to conclusively demonstrate the impacts of P removal by the City on the river quality, particularly in the impoundments downstream in Connecticut. The permit also contains a reopener clause to allow EPA to revise the permit to include effluent limits, compliance schedules, and/or other provisions should the future stream studies demonstrate that P removal by the City is necessary to achieve water quality standards in the Housatonic River. The MDWPC has provided certification under Section 401(a) of the Clean Water Act that the above conditions are necessary to satisfy the Clean Water Act requirements of Sections 208(e), 301, 302, 303, 306, 307, and 40 CFR 124.53.

It is noted that the need for P removal has been a longstanding, controversial issue and has been questioned by the City and the 208 planning agency on cost/benefit grounds.

2) Phosphorus - General Electric Co.

Phosphorus is not regulated in the existing permit. The company has requested that if a P limit is to be established in the new permit, that a "bubble concept" be employed, i.e. limit the P loading from the entire facility rather than outfall by outfall. This requirement will not be imposed until further stream studies are conducted to justify the need. (See Item 1).

It is noted that neither BPT, BCT, or BAT for this industry type presently requires P removal.

b) Pretreatment - City of Pittsfield

The NPDES permit requires the City to develop and implement a pretreatment program and to submit the program for approval by March 1, 1982. Whether or not controls on industrial inputs of phosphorus are to be implemented will depend on the outcome of the river survey and P removal issue referenced above. Another possible outcome of the pretreatment program could be the imposition of controls on the industrial input of phenols as necessary to allow the City to comply with the phenol effluent limitation in its NPDES permit.

The City's permit does not limit PCB's since the City's outfalls presumably do not contain this pollutant. Therefore, the pretreatment program would not be concerned with the PCB issue.

III.C.3. Surveillance and Analysis Division (Phosphorus)

Since EPA's inception in 1970, water quality problems in the Housatonic River have kept the Region I Surveillance and Analysis Division (S&A) involved with the Massachusetts and Connecticut State Agencies responsible for their respective reaches of the river. Most of the water quality problems have manifested themselves in Connecticut's portion of the Housatonic River; however, major contributors to the pollution problems in Connecticut lie on the Massachusetts side of the border.

Over the years, the Surveillance and Analysis Division has participated with the State governments in developing a data base for water quality planning activities. In 1973, at the request of Connecticut, the S&A Division conducted a water quality study of the Housatonic River to document the effects of nutrients in Lake Lillinonah and Lake Zoar, two impoundments which are used extensively for recreation. In conjunction with that study, dye studies were also performed in the tidal portion of the river for time of travel and dispersion analyses.

In 1978, S&A again joined forces with the States of Connecticut and Massachusetts. Crews working with personnel from each state conducted water quality studies in the Housatonic River from Pittsfield, Massachusetts, to Lake Lillinonah in Connecticut during early and late summertime periods. The data collected from these studies were to be used for verifying a mathematical model of the river. The model, in turn, was to be used for establishing TMDL's to the river.

From 1975 through 1980, the Connecticut Department of Environmental Protection (DEP) conducted nutrient studies on various sources and tributaries to the Housatonic River as well as lakes studies in Lake Lillinonah and Lake Zoar, trying to establish cause and effect relationships between

loads and summer algal blooms in the lakes. In 1981, Connecticut approached Massachusetts and EPA, Region I, about performing a study of phosphorus levels in the Housatonic River from Pittsfield, Massachusetts, downstream to New Milford, Connecticut (Lake Lillinonah). The study was designed to show if phosphorus sources, primarily the Pittsfield POTW, are the major contributor to the nutrient problem in the Connecticut lakes. S&A crews, jointly with Connecticut DEP personnel and coincidentally with crews from the Massachusetts Division of Water Pollution Control, sampled the Housatonic River tributaries and discharges during the months of May, June, July, August, and September. Preliminary results have shown a large phosphorus load emanating from Massachusetts. Presently, data analyses are ongoing to isolate the origin of the loadings, and plans are being developed to perform further joint studies during the summer of 1982.

IV. Future Activities

A. PCB Problem

Through the FY82 SEA process, Connecticut, Massachusetts and EPA designated the SEA working group as the primary coordination mechanism between EPA and State efforts concerning PCB's in the Housatonic River. The Commissioners of the MA DEQE, CT DEP and the EPA RA agreed to meet periodically as a policy group to review progress, evaluate program strategies, and redirect efforts, if necessary. Major activities:

- SEA working group meets on a quarterly basis to provide coordinating and reporting mechanism for PCB efforts.
- PCB policy group (Commissioners, RA) meet periodically (or as required) to direct agencies' efforts.
- EPA Enforcement takes lead agency role in monitoring of A.O. with G.E.
- EPA reviews A.O. study results. Revise A.O. in conformance with study findings.

B. Phosphorus

- Continue to track progress and exchange information through the quarterly SEA process.
- During 2/82 EPA-WQB, CT DEP, MDWPC review 1981 river data to decide what level of sampling is needed for 1982. Decide whether seasonal P-removal will be required at Pittsfield during 1982.
- Organize and execute sampling program during summer 1982.
- Assess basinwide impacts of Pittsfield P-removal. Based on these results make recommendations for Pittsfield NPDES permit.

Office of
Water
Planning
and Standards

U.S. Environmental Protection Agency
Washington, D.C.
20460

EPA

Environmental Information

3/78

A Water Quality Success Story

THE NAUGATUCK AND LOWER HOUSATONIC RIVERS

For well over a hundred years, the fast-flowing Naugatuck River, a major tributary to the Housatonic River in western Connecticut, supplied waterpower to the factory towns which lined its shores.

In 1950, the scenic valley through which the Naugatuck passes was one of America's largest producers of nonferrous metals and rubber products. By then, state water quality experts called the Naugatuck Connecticut's most polluted river.

Twenty years later the Naugatuck was indeed so degraded that a State of Connecticut sanitary engineer could say without exaggeration: "When I came here in 1970, the river was totally annihilated. There wasn't even any grass on the banks. There were no fish, no insect life, nothing."

What happened over the years?

Let's start at Torrington, some 37 miles above the point where the Naugatuck eventually flows into the Lower Housatonic River at Derby.

Torrington manufactures brass products and machine tools. Below Torrington there's Thomaston. Thomaston makes brass, cutlery, automatic machinery, and clocks.

Farther downstream there's Waterbury, known for its brass products, automatic machinery, metal manufacturing, and textiles.

Downriver is the Borough of Naugatuck. Naugatuck turns out rubber products and chemicals. Then comes Seymour with its machine tools and brass articles.

Ansonia appears next with its brass and copper products, foundry products and iron castings, followed by Derby which manufactures brass, copper, and bronze products, textiles, and automobile and airplane parts.

All in all, close to 40 miles of Naugatuck River packed with 57 industrial concerns, many of them metalforming and electroplating plants, all of which discharged untreated industrial wastes including toxic zinc, copper, cyanide and cadmium into its waters, killing fish and aquatic life in the Naugatuck and in the 13-mile-long Lower Housatonic River from Derby down to Long Island Sound.

As industry grew, so did population. Between 1950 and 1970, for example, the populations of Thomaston, the Borough of Naugatuck, and Beacon Falls alone grew by 27, 32, and 72 percent, respectively, yet the sewage from these and other fast-growing cities on the Naugatuck River was inadequately treated by primary and malfunctioning municipal waste treatment plants. The Naugatuck, in effect, was a dumping ground for the region's domestic sewage.

On the Lower Housatonic River, the industrial centers of Shelton, upriver, and Milford and Stratford near the mouth of the river, dumped their untreated municipal and industrial wastes -- including the wastes from metalworking industries -- into a stream already degraded by the wastes from the Naugatuck.

In addition to its industrial plants, the Milford area was known for its thousands of acres of oyster beds. Due to industrial pollution the oyster business declined after 1900 and had continued to decline when a severe storm in 1951 wiped out the cultch to which seed oysters attach themselves. After 1951, progressive pollution over the ensuing years prevented natural recovery.

STATE AND FEDERAL CLEANUP ACTIONS

In 1967, the Connecticut Legislature enacted the Clean Water Program. The Legislature then gave Connecticut's Water Resources Commission broad powers to establish water quality standards for all of Connecticut's waters, issue cleanup orders to existing dischargers to these waters and also issue permits to new dischargers, and, finally, directed the Commission to administer a statewide municipal sewage treatment plant construction program.

The end-goal of the Clean Water Act was a statewide effort to improve water quality on all state waters to eventually make them swimmable and fishable. For the Naugatuck and Lower Housatonic Rivers, this meant upgrading their water quality to Connecticut's



Class B rating, a water quality classification which enables people to fish, swim, and enjoy water contact sports in clean, aesthetically pleasing surroundings, and also enables fish and wildlife to live in a pollution-free habitat.

Between 1968 and 1974, the U.S. Environmental Protection Agency (EPA) and its predecessor agency, the Federal Water Pollution Control Administration (FWCPA) awarded \$20 million to construct upgraded waste treatment plants on the Naugatuck River at Torrington, Thomaston, Waterbury, Naugatuck, Seymour, Beacon Falls, Ansonia, and Watertown, a community on Steele Brook, a tributary to the Naugatuck. The State of Connecticut, in addition, awarded \$29 million to upgrade these plants.

All operational by the end of 1976, these facilities, with one exception at Watertown, are activated sludge secondary treatment plants with chlorination. The Watertown facility is a trickling filter secondary treatment plant with chlorination. Each facility is designed to remove 85 percent of oxygen-demanding wastes and suspended solids in municipal sewage.

Between 1966 and 1973, the EPA and the FWPCA awarded \$18 million, and the State of Connecticut awarded \$11.4 million, to construct both new and upgraded waste treatment plants on the Lower Housatonic River at Derby, Shelton, Milford and Stratford. All operational since mid-1976, these plants are also activated sludge secondary treatment facilities with chlorination. Like their counterparts on the Naugatuck River, they remove 85 percent of oxygen-demanding wastes and suspended solids from municipal sewage.

During the late 1960's, the Water Resources Commission ordered industry on the Naugatuck and Lower Housatonic Rivers to construct and install industrial pollution controls. Working under tax credit incentives, the metalworking plants developed systems to neutralize industrial acids, destroy cyanide wastes, and precipitate heavy metals. The Commission also required that metalworking industries discharging to sanitary sewers provide their own pretreatment facilities and, where possible, discharge to surface streams rather than to municipal sewage systems -- reducing the amount of waste flows to municipal sewage treatment plants and eliminating the possibility of plant malfunction due to heavy metals in toxic discharges.

On October 18, 1972 Congress passed the 1972 Amendment to the Federal Water Pollution Control Act. Section 402 of the Act established the National Pollutant Discharge Elimination System (NPDES). Implemented since its inception by the EPA and the states, this system defines the requirements for permits to discharge into the nation's waters.

Since 1973, the State of Connecticut has issued NPDES permits under EPA authority.

Between 1973 and 1976, Connecticut's former Water Resources Commission -- consolidated in 1971 with other state agencies to form the Department of Environmental Protection (DEP) -- issued discharge permits under the NPDES Program to 9 major municipal, 35 major industrial, and 42 minor industrial dischargers on the Naugatuck River. Between 1974 and 1977, the DEP also issued NPDES permits to 3 major municipal, 14 major industrial, and 11 minor industrial dischargers on the Lower Housatonic River. By 1977, all dischargers had been issued permits. The Connecticut DEP, however, took legal action against one discharger for failing to comply with orders to provide adequate waste treatment.

With this one exception, all major industrial dischargers on both rivers were brought under control within the statutory time frame.

RESULTS

The Naugatuck River

According to Robert B. Taylor, Director of the Connecticut DEP's Water Compliance and Hazardous Substances Unit, "since the majority of modern industrial and domestic treatment systems went on line in the early to mid-1970's, the amount of heavy metals and organic wastes going into the Naugatuck River decreased dramatically."

Since mid-1974, the DEP and the U.S. Geological Survey have conducted an on-going chemical water quality sampling program along the river. The results clearly show there have been marked reductions of manganese, copper, and zinc concentrations in the Naugatuck. Before cleanup, these pollutants seriously degraded the river's water quality and were extremely unfavorable to its fish and aquatic life. The results also show markedly improved pH levels (a measure of acidity or alkalinity in water), and dissolved oxygen concentrations.

Between mid-1974 and 1976, the DEP, in cooperation with an environmental consulting firm, also conducted a biological monitoring program on the Naugatuck. "We wanted to verify," says DEP Senior Sanitary Engineer Charles G. Fredette, "that improved chemical characteristics in these waters were having a positive effect in terms of the amounts and diversity of fish and aquatic life reappearing in the river.

"We monitored the Naugatuck three times a year," Fredette continues, "to determine the kinds and numbers of 'indicator species' in the water -- organisms with varying tolerances for pollution. Since some of these species can live only in clean or mildly polluted waters, an increase in their numbers indicates improved water quality."

Fish sampling conducted during the summer of 1975 showed that smallmouth bass, bluegills, bullheads, killifish and eels were living at Beacon Falls. "While these fish were small, they were in good condition. None of them showed signs of parasites or disease," Fredette says.

Similar results were found in samples taken downstream on the Naugatuck at Ansonia and Derby. According to Fredette, "the results were encouraging because we had sampled these areas before and found no fish. We also received numerous reports from fishermen in Waterbury who took smallmouth bass and yellow perch from the river."

Invertebrate sampling on the Naugatuck also revealed large numbers of clean water indicator species such as dragonfly larvae, dobsonfly larvae, worms, and sow bugs. The DEP used

"natural substrate" and "artificial substrate" testing methods to detect these creatures.

Natural substrate testing refers to material on the river bottom, which is scooped up and analyzed for organisms. Organisms found in the natural substrate indicate if the river water and river bottom are suitable for aquatic life.

Artificial substrate testing involves packing leaves in a wire cage, suspending the cage in the water for a number of months and counting the organisms found among the leaves. Since the substrate makes little contact with the river bottom, organisms found there indicate only what the quality of the water is.

According to Fredette, far more organisms were found in the artificial substrate than in river bottom sediment. "The river bottom may still be somewhat toxic from past industrial discharges," he points out. "While water quality has improved dramatically, it may take several more years for the bottom material to clean. We still find levels of zinc, lead and manganese in the bottom mud, and zinc, chromium, and cadmium in fish. But, surprisingly, the levels in fish are not as high as we expected.

"Since damaging discharges were discontinued," Fredette concludes, "we expect bottom conditions in the Naugatuck to improve over the years."

The Lower Housatonic River

Today, the benefits of improved water quality enjoyed on the Lower Housatonic exemplify Barry Commoner's famous remark about the interconnectedness of all things in the environment.

Bluefish now swim from Long Island Sound up the Lower Housatonic as far up as Derby not simply because of pollution cleanup on that river alone. Bluefish would be avoiding the Housatonic if it were not for massive pollution control efforts by the cities and industries on the Naugatuck River as well.

By 1976, the oyster industry, wiped out by the storm in 1951 and kept out for years thereafter by progressive and pervasive pollution, was back to its pre-1951 levels and improving.

The State of Connecticut Department of Agriculture's Aquaculture Division is presently conducting a shellfish management program which provides more stable, silt-free bottom conditions. The Department of Agriculture also runs a hatchery in Stratford where it raises oyster seed under protected conditions.

Since the river's water quality has improved dramatically, whole food chains now exist, making it possible, for instance, with the comeback of menhaden, for bluefish to feed all the way up the Housatonic to Derby. This expanded habitat for bluefish is matched by a phenomenal comeback of blue shell crabs, although they are yet to be found in the same abundance as far north in the Housatonic as bluefish.

Blue shell crabbing as a sports attraction draws great interest near the mouth of the river, a fact appreciated by sportsmen who had seen this species disappear in the past. And local citizens can now fish, picnic by, and boat along a pleasant and far cleaner river.

EPILOGUE

Today, with the exception of one discharger, all of the Naugatuck's heaviest polluting industries have some kind of pollution control. All of the industries along the Lower Housatonic also have controls.

In 1967, the water quality of the Naugatuck and Lower Housatonic Rivers was rated at Class D or below, fit only for navigation.

In 1977, the Naugatuck from Torrington to Thomaston was rated at a swimmable and fishable Class B. From Torrington to the point where the Naugatuck meets the Lower Housatonic at Derby, the river was rated at Class C, a quality level capable of supporting recreational boating and a fish and wildlife habitat.

The Lower Housatonic had improved to full Class B status, but municipal sewer overflows during rainfall at Derby and Shelton prevent the river from achieving a consistent Class B rating. The Connecticut DEP has ordered these communities to study solutions to these problems.

When will the entire Naugatuck River be swimmable and fishable?

The Connecticut DEP is presently conducting studies to determine the degree of advanced waste treatment that the cities on the Naugatuck will have to provide to remove additional organic wastes in their municipal waste discharges. Assuming that all of the treatment plants on the Naugatuck can be upgraded soon to provide advanced treatment, the DEP anticipates that the Naugatuck River will achieve full Class B water quality status by 1984.

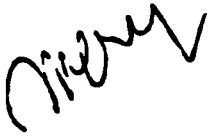
(Information for this story was contributed by Messrs. Richard J. Barlow, Charles G. Fredette, and Brian D. Coss, Connecticut DEP, and by Mr. Steven Berkowitz, Valley Regional Planning Agency, Derby, Connecticut. Their valued assistance is greatly appreciated).

Other success stories in print:

Buffalo River, New York
Detroit River, Michigan
Kodiak Harbor, Alaska
Escambia Bay, Florida
Willamette River, Oregon
Monongahela River, West Virginia
and Pennsylvania
Pearl River near Bogalusa, Louisiana
Ogden Bay, Great Salt Lake, Utah
Grove and Center Creeks, Missouri
Sope Creek, Cobb County, Georgia
Dillon Reservoir, Colorado
Yellowstone National Park, Wyoming
Lake Minnetonka, Minnesota
Hackensack River, New Jersey

5/29/81
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

DATE :



SUBJECT: Consent order to General Electric Company ("GE") under sections 3007, 3013 and 7003 of RCRA, 42 U.S.C. §§6927, 6933 and 6973, concerning PCBs in the Housatonic River in Massachusetts and Connecticut

FROM : Leslie Carothers
Acting Regional Administrator
Region I

TO : Anne M. Gorsuch
Administrator

THROUGH: Richard Wilson
Acting Assistant Administrator
for Enforcement

ISSUE:

Should the Administrator approve and sign the enclosed consent order requiring GE to study and develop remedial plans for PCB's disposed of by the company in the Housatonic River and neighboring sites?

DISCUSSION:1. Synopsis

This is an administrative order which GE has agreed to enter as a consent order. It involves an interstate pollution problem, the contamination of the Housatonic River in western Massachusetts and Connecticut by PCBs disposed of by GE since the 1930s at its Pittsfield, Massachusetts, factory. This order is the product of extensive discussions among the technical and legal staff of GE, EPA and the Massachusetts Department of Environmental Quality Engineering ("DEQE"). DEQE has issued a consent order which imposes the same requirements as EPA's, except that EPA's requires additional work in the state of Connecticut. The Connecticut Department of Environmental Protection ("DEP") sought EPA's involvement in this case, and reviewed and commented on a draft of the order. The order requires studies of PCBs in the sediments, waters and fish of the rivers, a study of alternative courses of remedial action at a PCB "hot spot" identified in previous studies, and reporting on past PCB disposal practices. The order would be issued under provisions added to RCRA in 1980. Authority to use those provisions has not been delegated to the Regions. Staff attorneys from the Office of Hazardous Waste Enforcement have participated in the development of this order and are familiar with its contents.

2. Description of Source

GE operates a factory at 100 Woodlawn Avenue, Pittsfield, Massachusetts, 01201, employing more than three thousand people. Its operations include the manufacture of power transformers, in which it used polychlorinated biphenyls (PCBs) from the early 1930s until 1977. GE also manufactured electric capacitors in Pittsfield from the 1930's until the 1950s, when it moved the capacitor operation to New York.

During the four decades of PCB use in Pittsfield, PCB-contaminated wastes were disposed of at various sites in Pittsfield, and large quantities were discharged into the Housatonic River and two bodies of water which empty into the Housatonic, Silver Lake and Unkameet Brook. The discharge of PCBs was first subject to limits under GE's National Pollutant Discharge Elimination System (NPDES) Permit (No. MA0003891) in 1975; GE complied with these limits. GE began voluntarily phasing out PCB use, so that it was entirely eliminated by 1977. Residual trace amounts are still allowed by the permit; effluent samples taken by EPA in November, 1990 found PCBs in two of the ten outfalls, but the quantities, 1.6 and 0.4 parts per billion (ppb), were insignificant. This order is thus not based on permit violations, but on EPA's authority to address substantial hazards to health or the environment arising from past disposal of hazardous waste, under sections 3007, 3013 and 7003 of RCRA.

In addition to PCBs, GE has generated other hazardous wastes at Pittsfield. One measure for disposal of PCBs and other hazardous wastes was the "Waste Stabilization Basin," which discharged into Unkameet Brook. GE recently discovered that PCBs and other hazardous wastes have accumulated in the sediments of the lagoon and the brook, and entered the groundwater. This order requires that GE report on its disposal of both PCBs and other wastes at the Basin, and similar locations if any exist. The order also requires that GE report on its remedial measures and on its plans for future monitoring.

3. EPA's Authority Under RCRA

Section 3007 of RCRA, as amended in 1980, gives EPA the authority, "for the purposes of enforcing the provisions of this title," i.e., all the provisions of RCRA, including sections 3013 and 7003, to request from "any person who generates, ... disposes of, or otherwise handles or has handled hazardous wastes," to "furnish information relating to such wastes...."

Section 3013(a) of RCRA, added in 1980, provides:

If the Administrator determines, upon receipt of any information, that -

"(1) the presence of any hazardous waste at a facility or site at which hazardous waste is, or has been, stored, treated, or disposed of, or

"(2) the release of any such waste from such facility or site

may present a substantial hazard to human health or the environment, he may issue an order requiring the owner or operator of such facility or site to conduct such monitoring, testing, analysis, and reporting with respect to such facility or site as the Administrator deems reasonable to ascertain the nature and extent of such hazard.

Section 7003(a) of RCRA, as amended in 1980, provides, in its relevant parts, that:

... upon receipt of evidence that the handling, storage, treatment, transportation or disposal of any solid waste or hazardous waste may present an imminent and substantial endangerment to health or the environment... (t)he Administrator may..., after notice to the affected State, take... action..., including... issuing such orders as may be necessary to protect public health and the environment.

These sections require only evidence of a potential danger to health or the environment, not proof of actual harm, or a violation of law. The danger may be only environmental; proof of a threat to human health is not required.

Neither section requires that the waste involved be listed as a hazardous waste by EPA under section 3001 of RCRA. Section 3013 requires that the wastes be hazardous wastes as defined in RCRA, and section 7003 deals with both solid and hazardous waste, as defined in RCRA. RCRA's definitions, sections 1004(5) and (27), are set forth on pages two and three of the order. Thus, these sections can be applied to a case involving PCBs, even though PCBs are not listed as a hazardous waste under RCRA.* PCB-contaminated waste meets the definition of hazardous waste, in section 1004(5) of RCRA, i.e., it is a waste

which because of its... characteristics may... pose a substantial present or potential hazard to human health or the environment when improperly... disposed of....

The PCBs in this case were disposed of prior to April 18, 1978, the effective date of the PCB disposal regulations promulgated under the Toxic Substances Control Act, 15 U.S.C. 2601 et seq. (TSCA).

*PCBs are listed as a "Hazardous Constituent" in Appendix VIII to 40 C.F.R. Part 261. The presence of one of these constituents in a waste is a criterion for listing the waste as hazardous under Part 261.

This case is thus not governed by TSCA. Moreover, section 9(b) of TSCA provides for the use of other laws by EPA to address risks to health or the environment associated with toxic substances. Thus, TSCA does not preclude the application of sections 3013 and 7003 of RCRA to this case.

Authority to issue administrative orders under these 1980 amendments to RCRA has not yet been delegated to the Regional Administrators. This order must therefore be signed by the Administrator.

4. Nature of the Environmental and Health Hazards

PCB contamination of the Housatonic has been extensively documented. Warnings against eating the river's fish have been in effect since 1975. The river is popular for fishing and recreation, so there can be no doubt that the warnings and subsequent curtailment of fish stocking have had an economic impact on the region. Actual health effects on humans are harder to determine. Connecticut is studying PCBs in people who eat Housatonic fish, but the data is not yet available. Further details of the environmental impact are set forth in the order.

One question not addressed in the order is the difference in toxicity among the various PCB mixtures. Information is not yet available on the composition of the PCBs in the river, so this question must be addressed when more data on the river has been obtained.

A principal focus of this order is an impoundment of the river known as Woods Pond, which is in Massachusetts behind the first dam downstream of GE's Pittsfield facilities. Studies have indicated that a large portion of GE's PCBs have accumulated in the sediments in Woods Pond. This "hot spot" may be a continuing source of PCBs in both the waters and food chains of the river, and may account for the continuing high levels of PCBs in fish downstream. It may also pose a threat of catastrophic release in the event of a major storm, or a failure of the dam. Concern with these dangers is high among people downstream.

A second focus of this order is groundwater contamination in locations near the Housatonic in Pittsfield. GE has voluntarily addressed some of these problems, so that the principal need is for further monitoring and reporting. However, Pittsfield residents have requested both the state and EPA to conduct independent sampling and review of GE's work to assure them that any hazards which may exist will be identified, and that proper remedial measures either have been, or will be, taken. It is also necessary to assure, as much as possible, that groundwater contamination of the Housatonic is not taking place.

5. Regulatory History

GE Pittsfield has generally complied with all environmental laws and permits. They have, however, been issued two orders, one in 1972 by the state, requiring development of treatment at several different outfalls, and the other in 1973 by EPA, for failure to meet permit limits for the discharge of phenols into Unkamet Brook.

GE has been involved in proceedings in other places involving PCBs, particularly in New York State, where GE entered a consent agreement with the state in 1976, concerning clean-up of PCBs in the Hudson River.

6. State Coordination

EPA has worked closely with Massachusetts DEQE in developing this order. DEQE has issued a parallel order, the only difference being that DEQE does not require study in Connecticut.

The provision of the order which calls for a report on past hazardous waste disposal practices was developed by DEQE. GE has used numerous disposal sites in the Pittsfield area, and has also caused groundwater contamination by accidental leakage and spillage in some locations. GE has voluntarily undertaken to abate some of this pollution, but the state wishes to be sure that all known sites are being addressed, and wishes to gather as much information from GE as possible.

The Connecticut DEP which has already carried out extensive studies of the Housatonic, reviewed and commented on the penultimate draft of this order, and several of their comments were incorporated into the final draft. Further coordination with DEP is anticipated in respect to study of the river in Connecticut, and the interstate transport of PCBs.

EPA Region I is planning a study of possible PCB sources other than GE, which will require coordination with both states. There is also an ongoing State-EPA Agreement on the Interstate Transport of Pollutants ("SEA"), which provides for quarterly public meetings on the Housatonic and other interstate rivers.

7. GE's Willingness and Readiness to Comply

GE has indicated that it has already budgeted for, and begun work on, the studies called for in this order. The order is the product of lengthy discussions among technical and legal staff of EPA, DEQE and GE. By entering the order as a consent order, GE has certified its willingness to comply.

8. Citizen Suits

An important aspect of this case is the existence of at least two citizen lawsuits seeking injunctive relief against GE. The plaintiffs are all Connecticut residents. One group petitioned EPA in October, 1980 to take action under section 7003 of RCRA. EPA responded to this petition in December, 1980, pointing out that action under section 7003 is discretionary, so that EPA cannot be sued for choosing not to take action. The suits against GE are still awaiting trial; the plaintiffs may be willing to have them continued pending the completion of the studies required by this order.

Citizens and public officials from Pittsfield, Massachusetts, have also sought EPA's involvement with these problems.

RECOMMENDATION

It is recommended that this administrative order ^e be issued in the form agreed to by GE. The order will require GE to perform an extensive study of PCB hazards in the Housatonic and related waters, and to study alternative courses of remedial action, including no action, at Woods Pond. The studies will enable EPA to provide a fully informed response to intense and widespread public concern.

Although a parallel state order is being issued, federal action is needed, particularly in light of the substantial interstate aspect of this case. EPA involvement has repeatedly been sought by citizens, state officials and Congressmen from Connecticut. Close state/federal cooperation is planned for the review of GE's study proposals, and for analysis of duplicate samples in the oversight of the studies. EPA's technical resources are needed for this work. In addition, many concerned citizens have sought EPA's review of GE's voluntary studies, in order to assure their credibility; this assurance will undoubtedly be sought in the future.

Compliance by GE is assured. This order will initiate a program for an effective restoration of the Housatonic as a valuable economic resource, a central asset to one of the principal recreational regions accessible to New York City and Southern New England. If successful, the program will be a major cooperative accomplishment for EPA, the states, and private industry.

Questions concerning this order may be addressed to Lawrence M. Goldman, the Acting Director of the Enforcement Division of Region I, at (617) 223-3470, or Charles Bering, an attorney in Region I's Enforcement Division, at (617) 223-5470, or Jim Okun, an engineer in Region I's Enforcement Division, at (617) 223-2007.

Charlie Bering

DATE: August 21, 1981

SUBJECT: PCBs from GE's Pittsfield Facility - Chronology of Government Actions

FROM: Lawrence M. Goldman, Acting Director
Enforcement Division *L.M.G.*

TO: Lester A. Sutton, P.E.
Regional Administrator

The following is a chronology of events relating to GE's facility in Pittsfield, Massachusetts. The chronology covers four different issues: PCBs in the Housatonic River; PCBs in the ground in Pittsfield, particularly in the "Lakewood" neighborhood; PCBs and other hazardous wastes in Unkamet Brook; and PCB incineration. Attached are three maps. The first shows the entire Housatonic River, and indicates the location of Woods Pond, the principal PCB "hotspot." The second and third attachments are part of a map of Pittsfield, showing GE's facilities and outfalls into the Housatonic, Silver Lake and Unkamet Brook. The second map also shows the "Lakewood" neighborhood. Also attached is a one-page summary of tasks required of GE under the 1981 consent order.

CHRONOLOGY

1932 (approximately)	GE begins use and discharge of PCBs in Pittsfield.
1970-1977	Water, fish and sediment studies of PCBs reveal continuing high levels in the Housatonic River. After extensive sampling in 1976, EPA proposes modification of the NPDES permit to address the PCB potential hazard.
December 16, 1974	NPDES permit issued limiting PCB discharges.
1977	Massachusetts and Connecticut issue health warnings against eating Housatonic fish, and curtail trout fishing.
March, 1977	GE terminates use of PCBs in manufacturing in anticipation of TSCA prohibition.
September 15, 1977	First of five citizen law suits against GE filed. Others filed 11/77, 12/77, 6/78 and 7/79.
1978	CT begins studies of PCBs in the Housatonic with \$200,000 appropriation from legislature. These studies are still in progress.

- January 23, 1980 GE notifies EPA of ongoing study of ground-water contamination by PCBs and other hazardous wastes.
- February, 1980 GE reports to EPA and DEQE on PCBs and other hazardous wastes in Waste Stabilization Basin and Unkamet Brook.
- July 1, 1980 CT releases preliminary results of study of Housatonic sediments by Dr. Charles Frink, identifying Woods Pond as principal hotspot.
- August 19, 1980 EPA responds to GE's incineration requests, authorizing incineration of liquids under 500 ppm PCBs, but denying GE's request to burn PCBs in concentrations greater than 500 ppm until a trial burn has been successfully completed.
- October 20, 1980 EPA receives petition for action against GE under RCRA Section 7003 from Connecticut citizens group, who have already sued GE.
- November, 1980 Massachusetts State Representative Scelsi requests EPA assistance in reviewing GE's study of PCB plume near "Lakewood" neighborhood in Pittsfield.
- December 2, 1980 Connecticut DEP presents results of trout studies to quarterly SEA meeting, indicating continued high levels of PCBs. CT citizens group, the "PCB Watchdog Committee," issues statement calling for EPA leadership in remedying the Housatonic's problems.
- December 4, 1980 Letter from Congressman Toby Moffett of Connecticut to EPA, Region I, repeats Watchdog Committee's call for EPA action; also calls for meeting between Commissioners Pac (CT) and Cortese (MA) and EPA RA.
- December, 1980 to April, 1981 EPA, DEQE and GE agree to negotiate an administrative order to initiate further studies of PCB contamination in the River and to develop remedial action alternatives for certain known or suspected hotspots.
- May 26, 1981 GE signs federal and state consent orders. DEQE order formally issued. It is identical to EPA's order, except that it does not address the Connecticut portion of the river. EPA order transmitted to HQ.
- June, 1981 Draft FIT report on Lakewood released. GE objects to certain aspects of the report.

June 30, 1981 Deputy Administrator Hernandez, EPA, signs EPA order for Administrator Gorsuch.

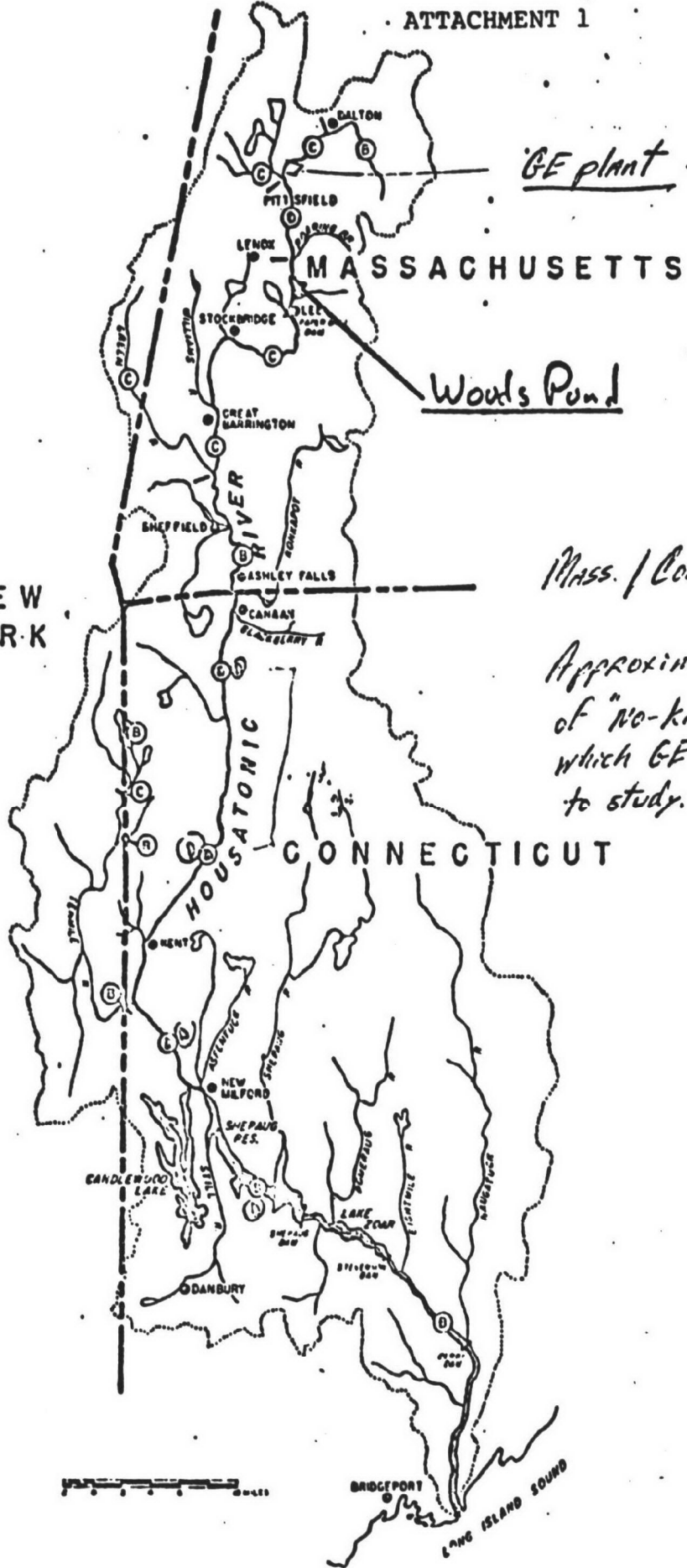
July, 1981 S&A performs air samples for PCBs in Lakewood basements.

July 16, 1981 Signed copy of order transmitted to GE. Letter from Acting RA, EPA, designates July 16, 1981 as effective date. GE immediately submits Housatonic River Study Proposal for review by EPA.

August, 1981 Region I is awaiting comments on GE's proposal from CT DEP. DEQE has approved proposal. EPA HQ is still reviewing. Region I, GE and its consultant, Stewart Labs, and DEQE are planning to meet in Lexington in September. Results of the Lakewood air sampling show no significant levels of PCBs; a report on the Lakewood air sampling is being prepared. HQ has put the Versar contract* on hold. We are still awaiting word on GE's trial burn at its incinerator.

attachments

*Versar contract - EPA funded investigation to locate other possible sources of PCB discharges to the Housatonic River.



NEW YORK

CONNECTICUT

GE plant

Woods Pond

Mass. / Conn. boundary

Approximate extent of "no-kill" section which GE is required to study.



NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION
 HOUSATONIC RIVER BASIN
 CLASSIFICATION

WATER USE CLASSES - (A) (B) (C) (D)

Figure 1

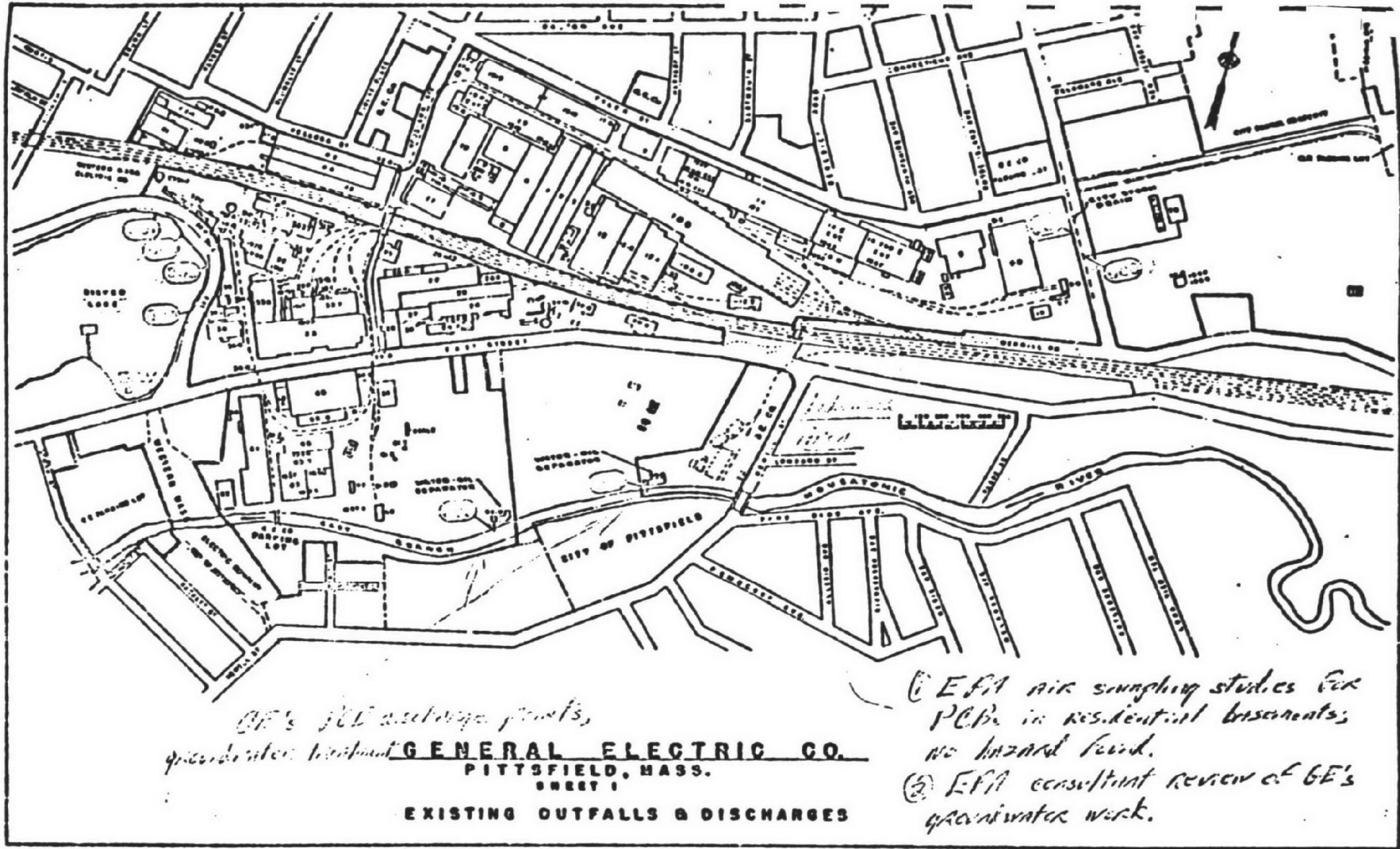


EXHIBIT II

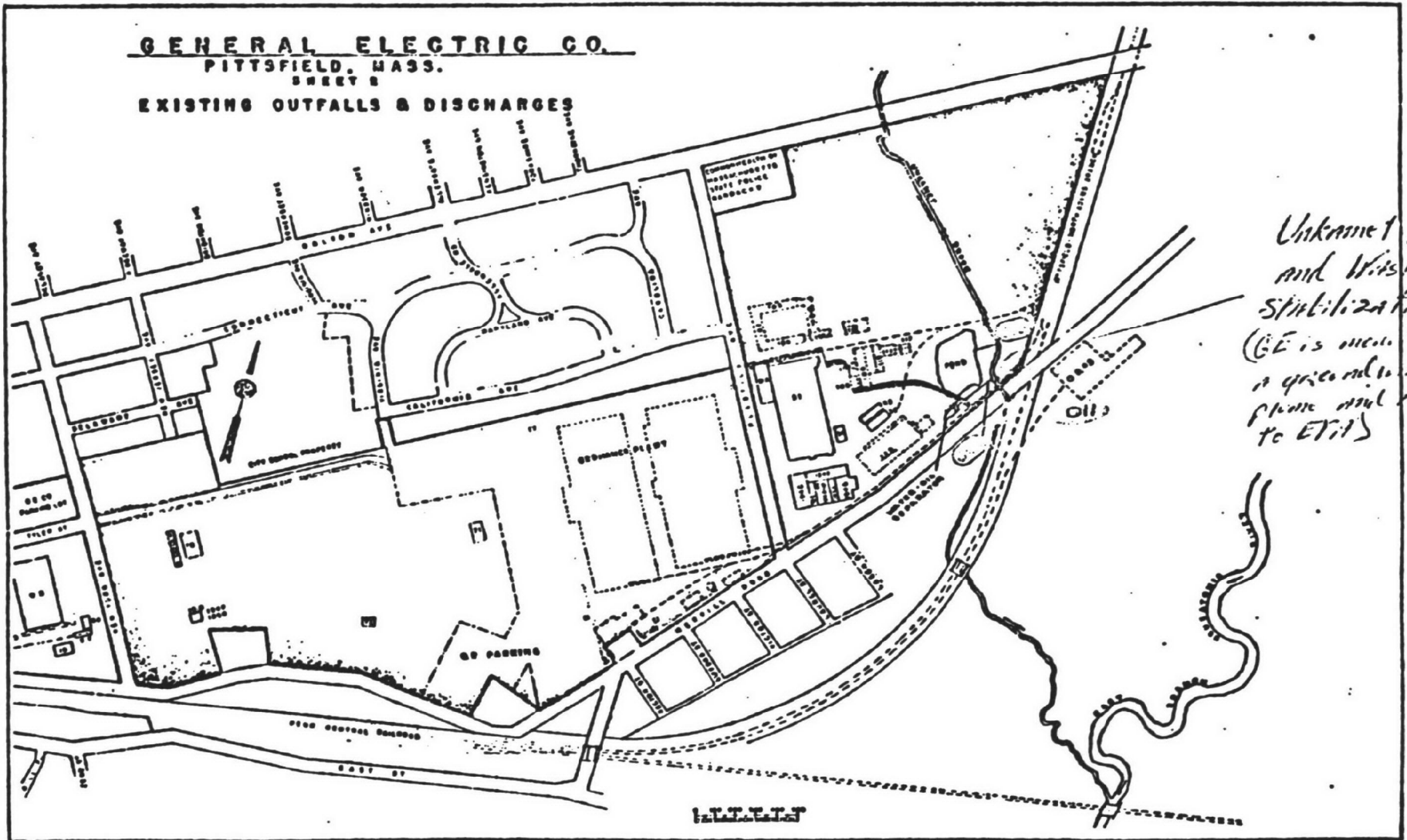


Figure 2

Tasks Required of General Electric Company (Pittsfield)

All times are from the issuance date of the order (July 16, 1981).

Within thirty (30) days:

"The Housatonic River Study Proposal", which was submitted on July 17, 1981, called for in III, b. of the order.

The purpose of this study is to monitor, test, analyze, and report on the contamination of the Housatonic River, Unkamet Brook, and Silver Lake. The order calls for completion of the study within one year of issuance of the order, a deadline which may now have to be amended due to the nearness to the end of warm weather.

2. Within ninety (90) days:

Summary portion of report on the "Report on Past Hazardous Waste Disposal Practices and Remedial Actions"

This summary is to inform EPA of the remedial actions and environmental studies GE has taken to date, and its plans for future monitoring at the Waste Stabilization Basin and Unkamet Brook.

3. Within one hundred and eighty (180) days:

Report on Past Hazardous Waste Disposal Practices and Remedial Actions"

For this report, GE is to search all of its relevant files and interview appropriate plant employees to determine all possible past hazardous waste disposal sites. This information, with the information on ongoing remedial action measures, make up this report.

4. Within sixty (60) days of the completion of the Housatonic River Study:

"Woods Pond Study Proposal"

At this time, evidence has been submitted to EPA which indicates a large accumulation of PCBs in the impoundment known as Woods Pond. As this is in all likelihood the most contaminated area, a plan for complete study, and possible remedial action is required. The order calls for completion of the study within one hundred and eighty (180) days of approval of the proposal by EPA.