

EXECUTIVE SUMMARY
for the
**HOUSATONIC WATER SUPPLY
MANAGEMENT AREA**

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HOUSATONIC PUBLIC WATER SUPPLY MANAGEMENT AREA

EXECUTIVE SUMMARY

SYNOPSIS

This Executive Summary is one of four documents which make up the Areawide Supplement for the Housatonic Public Water Supply Management Area. As discussed herein, the complete Areawide Assessment consists of this Summary, a Water Supply Assessment, a report on Exclusive Service Areas, and an Integrated Report. Each of these documents has been prepared to satisfy the requirements of Public Act 85-535, which established the Connecticut Plan for Public Water Supply Coordination.

These report components provide extensive information on such subjects as future utility boundaries, serviced populations, water demands, supply needs, and source protection. A variety of conclusions and recommendations are drawn, with the Housatonic Water Utilities Coordinating Committee (WUCC) feeling the following are of special importance:

- Although a variety of water supply problems and concerns were noted, the principal ongoing concern in the Area is likely to be associated with the many systems which suffer from inadequate financing or managerial capabilities. Many of these small utilities serve residential developments or multi-family housing, and do not regard water supply as their primary function. The WUCC urges the State to intensify efforts to identify these inadequate utilities and their specific problems. Several of the larger utilities in the area are prepared to provide technical and/or managerial assistance as required to these troubled systems.

- The WUCC has developed a set of guidelines and philosophies for providing assistance in the form of various types of cooperation and coordination between utilities. Chief among these cooperative

actions is likely to be the encouragement of future interconnections (where physically and financially feasible) and various types of satellite management. Activities under the latter program could range from contract operations and management (including laboratory services) to complete takeover of another facility. The WUCC recommends that the State encourage these sorts of cooperative actions by simplifying or modifying several existing requirements. These recommendations include greatly simplifying (or eliminating) diversion permit requirements for interconnections, simplifying rate increase applications, and the creation of a program which minimizes potential financial hardships for utilities that take on the task of operating or owning troubled systems.

- One of the key tasks the Housatonic WUCC grappled with was the delineation of Exclusive Service Areas. The WUCC fully supports the Exclusive Service Areas delineated during the planning process, with all mapped boundaries set by mutual agreement of the utilities that designated an expanded future service area.

- Very little need has been evidenced for new future water sources in the Management Area, with the few source shortfalls identified readily met by well-defined in-place programs. However, the WUCC has designated key water resources that should be protected as potential potable supplies, and is committed to working with local planning and zoning commissions to ensure future development is in accord with source protection needs. These potential sources have been defined by the WUCC in order to provide appropriate backup to existing sources, and to account for a variety of possible contingencies, including the following:
 - Estimated yields may change considerably following State review of individual plans, and further deficit situations may become evident.
 - Any projection of population or water consumption for a 50-year period is extremely tenuous, and could change dramatically in the future.

- Alternative sources may be needed to replace existing sources which become contaminated or to supplement existing sources during short or long-term emergencies and/or natural or man-made disasters.
 - Utilities may wish to develop new sources for reasons other than safe yield shortfalls, such as economics, location within the system, ability to meet peak demands, and the quality and quantity of water available.
 - Problems could develop with individual wells which would require an unanticipated expansion of public water supplies.
 - The safe yield information is suspect for many of the smaller systems in the Housatonic area, while many of these small systems also suffer from poor management. It is also likely that a number of these systems will be incorporated within the service areas of larger utilities over the planning period, thereby increasing demands over those projected herein.
- Candlewood Lake has been identified as a potential water supply source in order to economically meet the demands of the Margerie portion of the Danbury system, despite the fact that it is presently a Class B water body. The WUCC recommends that State policy and law be amended to allow the use of Candlewood Lake as a potable resource.
- Although the WUCC feels that the two-year Coordinated Planning Process has produced many valuable results, perhaps the greatest result is the understanding that much remains to be done. In many instances, the Areawide Supplement has proven to be more a broad plan for future action than a specific series of solutions to existing problems. The WUCC strongly believes that the programs outlined in the Areawide Supplement are critical to assuring the continued availability of adequate quantities of potable water for the Management Area, and intends to serve in a continuing role as an expediter and check-point organization for these programs.

The WUCC intends to actively pursue goals set during the planning process, and will continue to assign responsibilities on a committee basis to accomplish the following:

- Lobbying for regulatory relief, particularly in terms of rate increase applications, source availability, and troubled utility takeover programs.
- Encouraging and expediting interconnections wherever financially and physically feasible.
- Working with community officials in order to assure proper zoning and development in critical aquifer recharge and watershed areas.
- Working with the State in correcting the remaining instances of irresponsible management.
- Working with the State and other WUCC members to optimize coordination and cooperation between utilities, particularly in terms of assisting in the development of satellite management programs to meet the specific needs identified for the various smaller utilities reported to exhibit system deficiencies.

The WUCC's work in these areas will be in addition to their statutory responsibilities, which include review and approval of all significant changes to the Coordinated Plan and future comprehensive updates of the Areawide Supplement. These updates must be conducted at least every ten years, but are likely to be done at closer intervals due to the continuing potential for growth and change in the Housatonic Management Area.

HOUSATONIC PUBLIC WATER SUPPLY MANAGEMENT AREA

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SECTION ONE

INTRODUCTION

1.1 HOUSATONIC PUBLIC WATER SUPPLY MANAGEMENT AREA

The Housatonic Public Water Supply Management Area is shown on Figure 1, and consists of twelve communities located in the western part of Connecticut adjacent to the New York State line. In all, these communities cover an area of about 400 square miles of glacially manicured topography. The area is typified by rolling hills and stream valleys and is transected by the Housatonic River. Candlewood Lake dominates the western portion of the study area.

At the present time, about 54 percent of the Housatonic area's populace (estimated at about 197,000 in 1986) is served by public/private water utilities, with the remainder deriving their supply from individual groundwater wells. In all, 111 water utilities are located in or have watershed area in the Housatonic Study Area. Of these, only 19 have a customer base of more than 1000 individuals. The remainder of the utilities range from fairly loosely organized clusters of homes deriving their water from a common well to more formally structured organizations serving a few hundred users. More than half of the utilities are located in the five towns surrounding Candlewood Lake, some of which have highly variable seasonal demands.

The twelve town Housatonic Public Water Supply Management Area is the fastest growing area in Connecticut. Based on the Connecticut Office of Policy and Management (OPM) population projections for water supply planning, the population of the management area is projected to increase by 47 percent from 1980 to the year 2030. This growth has been stimulated by the relatively rural nature of the area as a whole (as compared to



FIGURE 1
HOUSATONIC WATER SUPPLY
MANAGEMENT AREA

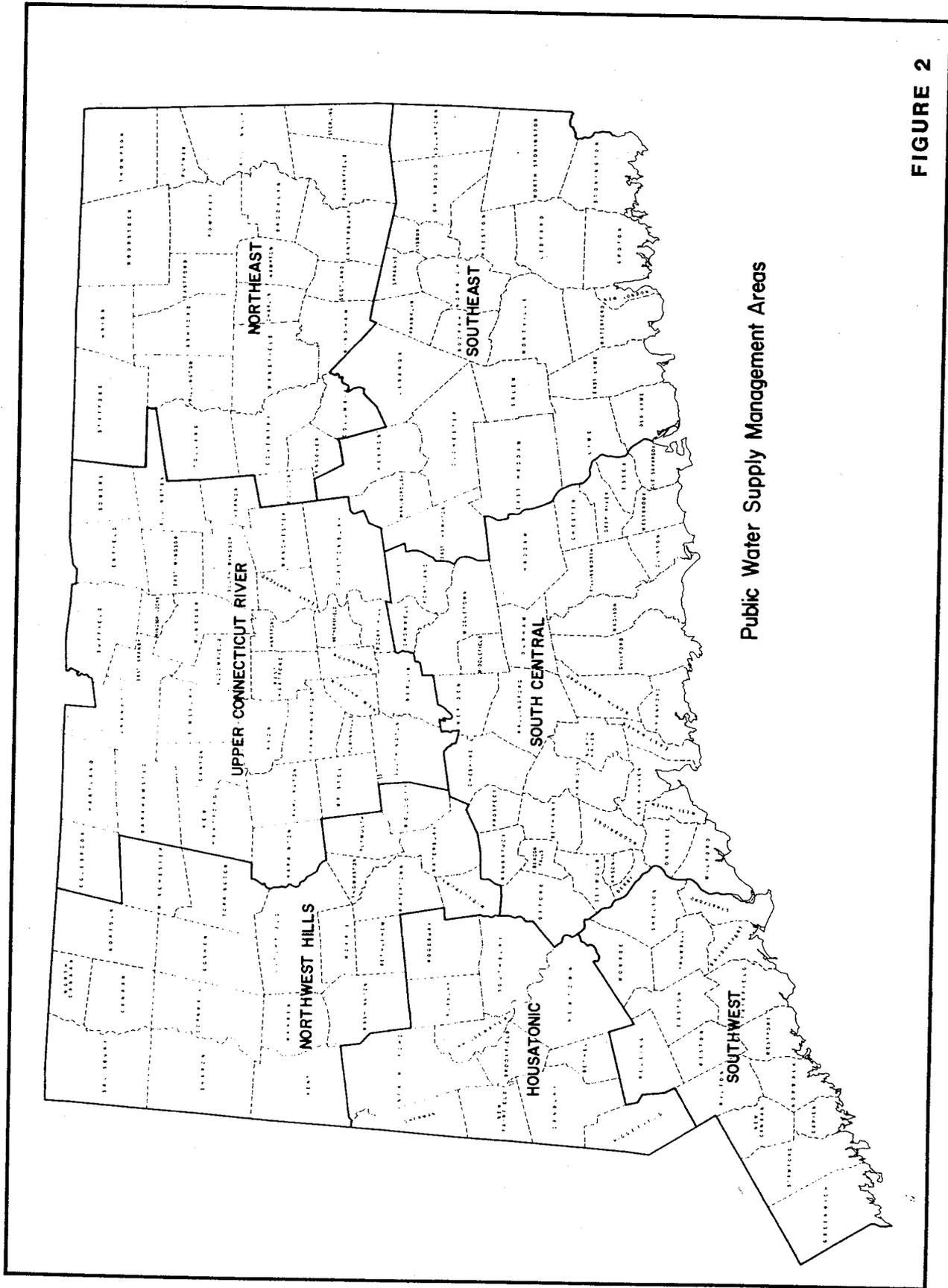
nearby urban centers) and the area's proximity to economically strong metropolitan areas in southern Connecticut and New York. An analysis conducted by the Housatonic Valley Council of Elected Officials (HVCEO) indicated that, based on 1978 data, nearly 30 percent of the region had been developed. Of the remaining 70 percent about half was considered to be unsuitable for development or otherwise reserved, and the remainder was available to absorb growth. Along with these growth pressures comes the need for both water and sewer services. The potable water supply issue is further exacerbated by the impact of various pollutants which have contaminated both ground and surface water resources throughout the area.

1.2 THE COORDINATED WATER SYSTEM PLANNING PROCESS

An Act Concerning a Connecticut Plan for Public Water Supply Coordination (Public Act 85-535) was passed by the Connecticut General Assembly in the 1985 legislative session. The Act provides for a coordinated approach to long range water supply planning, addressing water quality and quantity issues from an areawide perspective.

The regional planning process is designed to bring together utility representatives and agency representatives in a Water Utility Coordinating Committee (WUCC) to discuss long range water supply issues and to develop an areawide water supply plan. The plan should address future water supply needs and concerns, and should identify potential conflicts over future water supply sources, competition for future service areas, or areas of anticipated growth where public water supply is not available.

To facilitate this process, the State has been divided into seven areas for water supply planning, as shown on Figure 2. Some of the criteria that were considered in developing these boundaries included population density and distribution, existing sources of public water supply, service areas or franchise areas, interconnections between public systems, municipal and planning region boundaries, natural drainage basins, topography and geology, and the similarity of water supply



Public Water Supply Management Areas

FIGURE 2

COORDINATED WATER SYSTEM PLAN

**INDIVIDUAL
WATER SYSTEM PLANS
OF EACH
PUBLIC WATER SYSTEM.**

AREAWIDE SUPPLEMENT

A

WATER SUPPLY ASSESSMENT

B

**EXCLUSIVE
SERVICE AREA BOUNDARIES**

C

INTEGRATED REPORT

D

EXECUTIVE SUMMARY

PROJECT SCHEDULE

<u>ITEM</u>	<u>TIME FROM PROJECT START</u>
A	6 MONTHS
B	12 MONTHS
C & D	18 MONTHS
FINAL PLAN	24 MONTHS

**FIGURE 3
COORDINATED
WATER SYSTEM PLAN**

problems. The boundaries for these Public Water Supply Management Areas were adopted by the Commissioner of Health Services after considerable public comment, agency input and a series of public hearings.

To devote the necessary resources and funding to each area, it was necessary that priorities be established and the planning process begun in the areas accordingly. The Housatonic area, due to its population growth and proliferation of small systems, was selected as the first of the seven areas for initiation of the water supply planning process. The Commissioner of Health Services convened the Housatonic Water Utility Coordinating Committee on June 11, 1986. The WUCC is comprised of representatives from public water systems and regional planning organizations within the area.

As shown on Figure 3, the Coordinated Water System Plan prepared for the Housatonic Area incorporates the individual water system plans from each utility with greater than 1000 users within the management area as well as the Areawide Supplement prepared under the auspices of the WUCC. The Areawide Supplement includes four key components: the Water Supply Assessments (Chapter One), Exclusive Service Areas Report (Chapter Two), Integrated Report (Chapter Three), and the Executive Summary. The Water Supply Assessment constitutes the area's problem statement and serves as the basis for the balance of the planning work. The Assessment has been designed to evaluate water supply conditions and to identify areawide water system issues, concerns and needs.

The second component of the Areawide Supplement consists of the delineation of Exclusive Service Area Boundaries. During this phase of the process, each utility (WUCC member) within the management areas has been given the opportunity to define the area that the utility is committed to serve in the future. The following factors have been used in establishing exclusive service area boundaries:

- . existing water service area
- . land use plans, zoning regulations and growth trends
- . physical limitations to water service
- . political boundaries
- . water company rights as established by statute, special act or administrative decisions
- . system hydraulics, including potential elevations and pressure zones
- . ability of a water system to provide a pure and adequate supply of water now and in the future

The third component of the Areawide Supplement is the Integrated Report, which is designed to provide an overview of the individual public water systems within the management area; to address the areawide water supply issues, concerns and needs identified in the Water Supply Assessment; and to promote cooperation among public water systems. This report, by law, must address at least the following:

- . population, consumption and safe yield projections
- . compatibility with land use plans
- . alternative water resources for future supply needs
- . interconnection between public water supply systems
- . joint management or ownership of facilities
- . satellite management program
- . minimum design standards
- . financial data related to regionally significant projects
- . other uses of water resources

This Executive Summary represents the fourth and final component of the Areawide Supplement, and is designed to serve as an abbreviated overview of the Coordinated Water System Plan for the management area. The regulations for the coordinated planning process require that the Executive Summary include the following information:

- . maps of existing and potential service areas and exclusive service area boundaries
- . maps of existing or future sources of supply
- . a summary of the water supply assessment for the area
- . a summary of present and projected populations, water demands, and safe yields
- . a summary of plans for interconnections, joint use facilities, and satellite management

- . a summary of the potential impact of the plan on other uses of water resources
- . pertinent financial information
- . tables of contents for other components of the Areawide Supplement

Each of these items is discussed or included herein, along with other relevant summary information.

SECTION TWO

EXCLUSIVE SERVICE AREAS

2.1 INTRODUCTION

The implementing legislation for the coordinated water system planning process requires that the WUCC member utilities establish areas for future service following delineation of existing service area boundaries. The areas for future service are designated as a utility's "exclusive service area" which by legislative definition means "an area where public water is supplied by one system." The legislation stipulates that in establishing exclusive service area boundaries, the WUCC shall:

- . allow utilities to maintain existing service areas;
- . not leave areas as unserved islands, unless it can be demonstrated that there is not and will be no future need for public water service; and
- . not allow new service areas or main extensions which create duplication or overlap of service.

A variety of factors were considered in establishing exclusive service area boundaries, including the following factors which are required to be considered by the Coordinated Planning regulations:

- . existing water service area
- . land use plans, zoning regulations and growth trends
- . physical limitations to water service
- . political boundaries
- . water company rights as established by statute, special act or administrative decisions
- . system hydraulics, including potential elevations and pressure zones
- . ability of a water system to provide a pure and adequate supply of water now and in the future

The manner in which a utility serves customers in its exclusive service area may include development of supply sources, main extensions, or satellite management. The ability of a utility to provide a pure and adequate

supply of water to its existing and exclusive service areas is being investigated by various State regulatory agencies as they review the individual plans submitted by the utilities. Since this review is ongoing, the exclusive service area boundaries delineated in the Areawide Assessment may be subject to some changes based on the State's final evaluation.

2.2 EXCLUSIVE SERVICE AREA DECLARATION PROCESS AND RESULTS

All WUCC members, municipalities, and interested individuals or groups in the Housatonic Public Water Supply Management Area were appropriately notified on August 18, 1986 and January 20, 1987 as to the need for utilities to delineate their exclusive service areas or potentially waive their right for future expansion beyond their existing service area boundaries. This notification resulted in declarations by various utilities, many of which were consistent with their existing franchise areas.

Plate 3 depicts exclusive service areas for those utilities which desired to expand beyond the limits of their present service area. The exclusive service area of all other utilities in the Housatonic Management Area will remain consistent with the bounds of their present service area. Please note that an exclusive service area is where a specific water utility will provide public water supply should the need arise. Portions of exclusive service areas may not develop to the point that public water supply is needed, in which case individual wells will continue to be utilized.

Discussions among WUCC members indicated the need to more clearly define the bounds or limits of the exclusive service areas designated by utilities and to incorporate the appropriate descriptive verbiage into the final exclusive service area plan. For the Housatonic Public Water Supply Management Area, this is accomplished with a "Statement of Confirmation of Exclusive Service Area Boundaries" which has been completed by each utility for incorporation into the final exclusive service area plan. Completed copies of each utility's Statement of Confirmation of Service Boundaries have been appended to the final exclusive service area plan, and are on file at DOHS.

When a utility amends its exclusive service area via changes in its individual plan update or other unusual circumstances, its exclusive service area boundary and statement of confirmation must also be revised. Such changes must be approved by the WUCC to ensure consistency with the Coordinated Plan, and will be subject to review by regulatory agencies and the general public. Transfer of a utility's service area to another entity occurs only with the sale of the utility.

SECTION THREE

WATER SUPPLY ASSESSMENT/

INTEGRATED REPORT

3.1 INTRODUCTION

Chronologically, the Water Supply Assessment and the Integrated Report were the first and last elements prepared as a part of the Area-wide Supplement, with the Exclusive Service Areas report and the draft individual plans prepared in the interim period. The Water Supply Assessment provides baseline system descriptions and data for the Management Area, and develops a problem statement for addressment in the Integrated Report. The Integrated Report provides WUCC-recommended solutions to the problems noted in the Assessment, as well as an update of the data and projections of the Assessment based on the information provided in the individual plans and discussions among WUCC members. Both the Water Supply Assessment and the Integrated Report are briefly reviewed in the following paragraphs.

3.2 WATER SUPPLY ASSESSMENT

The Housatonic Water Supply Assessment addressed five criteria which are enumerated in the Coordinated Planning regulations, as well as a sixth criterion requested by the WUCC. These are as follows:

1. Description of existing water supply systems
2. Availability and adequacy of future sources
3. Existing service area boundaries
4. Land use and population trends
5. Status of water system planning, land use planning, and coordination between water systems
6. Identification of key water supply problems
(criterion added by the WUCC)

The findings of the Assessment in each of these areas are briefly summarized in the following sections.

3.2.1 Existing Water Supply Systems

Plate 1 depicts the service areas of the 111 existing water utilities in the Housatonic Management Area. Of these 111, only 19 have a customer base of greater than 1000 individuals. Within this group, 14 actually supply water to users within the study area, while the remaining five presently have only watershed area or wells within the bounds of the Housatonic management area. The percentage of residents in each community who receive water from one of the area's utilities varies dramatically, ranging from a low of zero percent for Roxbury to about 80 percent for the City of Danbury.

Wells constitute the vast majority of the supplies for the area's utilities. Only the Bethel Water Dept., Danbury Water Dept. and Ridgefield Water Co. utilize surface water sources as their primary water supply. The New Milford Water Co., Newtown Water Co., and Woodbury Water Co. own surface reservoirs, but use them only as emergency backups for groundwater sources. The higher yielding groundwater supplies, such as Newtown and New Milford, consist of wells in unconsolidated deposits (stratified drift). However, from a total number perspective, lower yield rock wells dominate the water supply picture in the Housatonic area.

In general, the majority of the utilities in the Housatonic area have not experienced serious problems with the quality of their water. This is not to say that there have not been isolated problems, with reports of wells being abandoned due to contamination in the Towns of Bethel, Southbury, Woodbury, and Brookfield. Although the number of presently known contaminated wells is not large, it is recognized that many potential contamination sources exist (e.g., landfill sites, failing septic systems, deteriorating gasoline tanks, and chemical spills). In addition, the State is in the process of developing a mapping system illustrating areas that have geologic formations which could lead to

radon contamination in bedrock wells. To date, there is not sufficient evidence to determine whether this is a widespread problem in the Housatonic area.

In addition to these scattered contamination problems, it is apparent from the available data that many of the smaller utilities do not have water supply capability during power outages. Various utilities experience supply difficulties under high flow demand conditions due either to a combination of inadequate supply and/or storage or due to old or inadequately sized distribution piping.

The Assessment noted that many area utilities do not have alternate sources available in the event their prime groundwater supply is lost. When a contamination problem or loss of capacity occurs, the users of the affected system may be without water for an extended period until a new or alternate supply is obtained. Single source wells also can be impacted by short-term outages resulting from routine well maintenance, pump replacement or other minor problems.

Other problems observed routinely throughout the Management Area (particularly for smaller systems) include the lack of emergency power, old or inadequately sized distribution piping, inadequate storage, and a lack of fire fighting capability. (Many of the smaller systems were not designed to incorporate fire fighting, and rely on alternate means such as on-site ponds or coverage by community tanker trucks.)

Overall, some concerns over water quality have been noted at one time or another for 42 systems in the Management Area, including 38 small systems. Concerns over supply adequacy have arisen for some 30 systems, several of which have also experienced water quality difficulties. Lack of firefighting capabilities and/or emergency power are much more common, and have been reported to be a concern in 87 and 81 systems, respectively.

A variety of utilities also reported the need for an expansion of their existing water sources, with Danbury noting the need to upgrade its Margerie Reservoir Treatment Plant. Other major monitoring and treatment needs will arise for the Management Area due to the 1986 Amendments to the Safe Drinking Water Act which, among other items, call for disinfection of all water supplies, filtration of surface supplies, and source and/or system monitoring of approximately 80 contaminants.

3.2.2 Availability and Adequacy of Future Sources

Significant potential water supply sources have, at least in a broad sense, been addressed in prior reports or studies, with other sources noted by the various utilities who have prepared individual plans. Generally, these sources consist of all significant stratified drift aquifers, surface water impoundments, and the area's streams and rivers. Typically, the potential aquifer yields are such that they are suitable for only the local area in which they are found. The river and lake diversion projects have a much larger single source safe yield, and represent potential supplies of a regional significance. Most of the major surface water sources identified are presently not suitable, under Connecticut law, as a drinking water source due to their present water quality classification (Class B or worse due to wastewater discharges into these water bodies).

Although the Assessment reviewed, in a preliminary way, the estimated yield of these potential sources and their relationship to system and areawide water demands, these values were refined in the Integrated Report following review of the individual plans prepared by the various utilities. This preliminary nature of the Assessment's projections should be kept in mind when reviewing this document, and conclusions should not be drawn without referencing the updated information in the Integrated Report.

3.2.3 Existing Service Area Boundaries

The service area boundaries for the existing utilities in the Housatonic Public Water Supply Management Area are illustrated on

Plate 1. Where possible, these boundaries were based on service area maps provided by the utilities. In lieu of utility-supplied information, service areas were extracted from the State's inventory map of community water supplies and from an interpretation of the probable areas served near the supply source locations shown in State's Atlas of Public Water Supply Sources.

The watershed areas for the surface water supplies in the Housatonic Public Water Supply Management Area are also illustrated on Plate 1, as are the watershed areas of utilities which do not supply water to residents within the 12 communities of the Housatonic planning area, but by virtue of the location of their watershed area are part of the Housatonic WUCC.

3.2.4 Land Use and Population Trends

As noted earlier, the twelve town Housatonic Public Water Supply Management Area is the fastest growing area in Connecticut. Based upon OPM population projections for water supply planning, the population of the area is projected to increase by 47 percent from 1980 to the year 2030. If this increase occurs as projected, about 50 percent of the developable land available in the late 1970's/early 1980's will be consumed by the year 2030.

3.2.5 Status of Water System and Land Use Planning and Coordination Between Public Water Systems

3.2.5.1 Water System Planning

The extent or degree of water system planning by the utilities in the Housatonic area varies considerably. Typically, for those utilities servicing residential areas or multi-family housing complexes which have no plans or space for growth little planning is really necessary. For systems such as these, plans for regular maintenance and periodic repairs typically constitute the bulk of the planning.

On the other hand, those systems servicing a larger and more diverse customer base normally conduct planning either with an internal

engineering staff or utilize outside engineering consultants to conduct their planning. These utilities typically assess their need for future water supplies and develop capital improvement programs for upgrading existing treatment and distribution facilities. All utilities greater than 1000 customers have been required to prepare an individual utility plan, with draft plans now available for all but two of the utilities in the Housatonic area which are under such a requirement.

3.2.5.2 Land Use Planning

Land use planning is typically carried out from a community perspective and takes the character of a community's plan of development. These plans are designed to set the framework for growth within a community and tend to reflect the desires of the community residents as implemented through the community's governing bodies. In the Housatonic Public Water Supply Management Area, community plans of development are in various stages of completion. From a water supply perspective, many older planning efforts did not place particular emphasis upon the potential incompatibility of water resource needs and development with surface supply watersheds or more critically groundwater recharge areas. The Water Supply Assessment created a framework of the water supply protection needs to be considered in a community's zoning and plan of development, with a more specific delineation of the protection needs and recommendations provided in the Integrated Report.

3.2.5.3 Coordination Between Public Water Systems

At the time the Assessment was prepared, there appeared to be little organized coordination between public water systems. Typically, utilities appeared to be cooperating more through a sense of need or as good neighbors versus an areawide vision of water supply planning. However, in a few cases, utility representatives have recognized and have been responsive to common needs, e.g., servicing customers of an adjacent community which lie along the supply line running through that community or extending service to another utility which may have difficulty meeting peak demands. The Assessment noted that the potential

exists, but for the most part goes unrealized, for greater cooperation and coordination between utilities in the Housatonic Public Water Supply Management Area.

3.2.6 Identification of Key Water Supply Problems Within the Housatonic Public Water Supply Management Area

The Water Supply Assessment identified various key problems within the Housatonic Management Area. These included the following:

- Inconsistent Data

One of the more prevalent problems which came to light during the development of the Water Supply Assessment was the availability and inconsistency of the utility data base for many systems which serve less than 1000 people - a void which was only partially filled by responses obtained to the questionnaire sent as a part of this planning process.

- Need For Technical and/or Managerial Support/Information

There are many utilities in the Housatonic Area which evolved from a need to supply water to a residential development or multi-family housing complex. Organizations such as these function with a minimum of staff, typically with no full-time commitment. Thus, a resource pool of managerial and/or technical support/information is needed.

- Regulatory Burden

Somewhat akin to the preceding problem is the application of regulatory requirements which are placed upon utilities regardless of their size. What may be easy or less burdensome for those organizations with a full-time staff may be entirely overburdening for those who function with a minimal, part-time staff commitment.

- Irresponsible Management

Although most utilities attempt to be responsible system managers, there are those utilities which apparently do not take the interests of the customers to heart. This is evidenced by improper maintenance of equipment or inattention to operations due to the absence or apparent lack of interest of those responsible for the management of the water supply equipment.

- Potential Groundwater Problems

The potential for groundwater contamination affects water supply reliability, and may influence growth by requiring public water system expansion or interconnection to meet the needs of individual homeowners or other utilities experiencing contamination. Furthermore, an understanding of existing contaminated groundwater sources or areas containing probable contamination sources will become increasingly important in siting new wells.

- Regulatory Barriers to the Use of Some Supplies

There has been sentiment expressed by individual WUCC members that a water body should not be excluded from use for water supply purposes due to its State Water Quality classification if its quality meets Federal and State criteria for a drinking water source. In the case of surface waters, those which presently serve as water supplies or have been proposed for water supply purposes are classified either as AA or have a goal of AA. Additionally, sources which may be suitable for existing or future water supply purposes are classified as A or have a goal of A. All other surface waters are designated as waste receiving streams with classifications of B, C or D, and cannot be used as public water supply sources under present Connecticut law. All these waters have a goal of at least B, and thus are generically referred to as "Class B waters."

- Aging and/or Substandard Infrastructure

The Assessment noted that continued use of water supply or distribution piping which is at, or near, the end of its useful life represents a liability to reliable water supply. Eventually such equipment or infrastructure must be replaced at increased cost to the system users.

- Financing

In the Housatonic Public Water Supply Management Area there is a broad cross-section of types of utility structures, including utilities which are essentially an adjunct of a residential or multi-family housing complex, privately or investor-owned companies, and municipal utilities. This difference in physical structure will also impact the rate structures and financing methods available to these utilities. Regardless of the methodology used to obtain financing, the inability to secure adequate monies can impact utilities in a variety of ways. These include the inability to make needed system improvements for replacement of aged facilities (maintenance), and improvements for system expansion or increased reliability (an interconnection or new supply source).

- Lack of Local Ordinances for Water Supply Protection

Development pressures have typically outpaced most communities' ability to deal with the lesser understood process of identifying and protecting water supply sources. Thus, conflicts of land use and water supply have occurred and have led to a situation where potential contamination sources have been located within aquifer recharge areas or water supply watersheds.

- Competing Uses of Sources

The issue of competing uses for potential water supply sources was highlighted throughout the Assessment, principally in

terms of Danbury's desire to designate Candlewood Lake as a potential supply source. With this source, potential recreational and power generation conflicts were cited. However, with any surface water supply a number of conflicts to water supply can be identified, including the stream's waste assimilative capacity, minimum flows, fisheries, recreation potential and aesthetics. Conflicts may also be present for groundwater supplies, particularly in terms of their impact on the low flow characteristics of nearby streams and the impact new wells may have on existing wells which draw from the same aquifer.

- System and Source Reliability

A number of utilities have single source supplies or wells that draw from similar depths, while others do not have sufficient storage and/or pumping capacity to meet peak demands or have system constrictions which impact their ability to deliver sufficient fire flows. All systems require preventative maintenance and replacement schedules so that system reliability can be maximized and the reaction to crisis syndrome can be avoided. In addition, a number of utilities do not have standby power which will enable them to operate adequately during power loss.

- Lack of Coordination Between Utilities and Communities

In many ways the lack of coordination between utilities and communities centers around land use and water supply protection. This problem appears to revolve around either the general lack of communication or lack of defined mechanisms or procedures for communicating information.

- Potential Conflict of Service and Franchise Areas

The language of each individual charter for a franchise area ultimately will determine the degree of potential conflict between one utility providing service in another's franchise

area. The delineation of exclusive service areas as part of the Coordinated Water System Plan has been designed to eliminate potential conflicts. (Conflicts of this nature did not arise in setting Exclusive Service Areas, and the concern expressed in the Assessment proved to be unfounded.)

- Lack of Coordination Between Utilities

The Assessment noted that many of the utilities in the Housatonic Area were somewhat unaware of the operations and needs of neighboring systems, even in some cases where interconnections exist between these systems. Such isolated operations could hamper the effectiveness of the utilities in a variety of ways, ranging from the lost potential for sharing specialized equipment to the possibility of emergency water shortages which could otherwise have been avoided through interconnections or other cooperative actions.

- Lack of Adequate Incentive to be a Satellite Manager

An investor-owned company is obviously not anxious to become an owner of a financially troubled utility if there is no reasonable way to recoup their potential investment. Also, there is a recognition that the 1986 tax law revision may make it even less attractive than previously to invest in other utilities. Until these financial issues become clearer, there may be a reluctance on the part of privately owned utilities to move too quickly toward complete satellite management or takeover of troubled systems.

3.3 INTEGRATED REPORT

As noted previously, the Integrated Report followed up on the work embodied in the Water Supply Assessment and the Exclusive Service Areas report using supplementary data obtained from the draft individual plans prepared by the various larger utilities. The Integrated Report was divided into nine sections; an Introduction and the following:

- . Population, Consumption, and Safe Yield
- . Compatibility with Land Use Plans
- . Alternative Water Resources for Future Supply Needs
- . Coordination and Cooperation Between Utilities
- . Minimum Design Standards
- . Financial Data
- . Impacts of the Plan on Other Uses of Water Resources
- . Overview of Problems and Proposed Solutions

The discussions and findings of each of these sections of the Integrated Report are briefly reviewed in the following paragraphs.

3.3.1 Population, Consumption, and Safe Yield

Population projections for each utility and community in the Housatonic Management Area are provided in Tables 3-1 and 3-2, respectively. Table 3-3 provides system consumption projections and presently estimated source yields. Only seven utilities provided a breakdown of residential versus nonresidential consumption - this data is shown in Table 3-4.

Table 3-5 summarizes projections of water supply surpluses or deficits for each utility, with Table 3-6 listing the six systems projected to have a deficit at some time during the 1986-2030 planning period. As shown in Table 3-6, three of the six systems had theoretical supply deficits as early as 1986, while five are projected to have deficits by the year 2000. The need for additional supply in the sixth system (Heritage Village Water Company) is not projected to materialize until after the year 2000.

TABLE 3-1

PROJECTIONS OF POPULATION SERVED FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	RESIDENTIAL POPULATION SERVED (1)				% OF TOWN POPULATION SERVED (2)			
		1986	1991	2000	2030	1986	1991	2000	2030
		Acre Lane, Inc.	40	40	45	45	0.2	0.2	0.2
Aqua Vista Assoc., Inc.	150	150	160	160	0.2	0.2	0.2	0.2	
Arrowhead Point Homeowners	225	225	235	235	1.2	1.5	1.4	1.0	
Ashlar of Newtown	155	155	165	165	0.7	0.7	0.7	0.5	
Ball Pond Water District	570	570	600	600	4.7	4.4	4.3	3.3	
Bay Colony Mobile Home Park	135	135	145	145	0.6	0.6	0.6	0.4	
Bethel Consolidated Co.	1840	2220	2910	5200	10.7	12.1	14.5	19.8	
Bethel Water Department	7780	8140	8680	9280	45.4	44.5	43.3	35.3	
Birch Grove Assoc.	240	240	250	250	1.2	1.1	1.1	0.9	
Boulder Ridge Assoc.	35	35	40	40	0.1	0.1	0.1	0.1	
Briar Ridge, Dancon Corp.	205	205	205	205	0.3	0.3	0.3	0.3	
Bridgewater Cannon Condos.	50	50	50	50	3.1	2.9	2.8	2.3	
Brook Acres, Rural Water Co.	200	210	220	230	1.4	1.4	1.3	1.0	
Brookfield Div. Rural W.C.	870	970	1045	1080	6.2	6.4	6.2	4.7	
Brookfield Elderly Housing	45	45	45	45	0.3	0.3	0.3	0.2	
Brookfield Hills Condos.	140	140	145	145	1.0	0.9	0.9	0.6	
Brookview Water Co.	70	70	75	75	0.3	0.3	0.3	0.3	
Brookwood, Dancon Corp.	230	230	240	240	1.6	1.5	1.4	1.0	
Butternut Ridge, Dancon Corp.	95	95	100	100	0.7	0.6	0.6	0.4	
Camelot Estates Water Co.	515	515	530	530	2.5	2.4	2.3	1.9	
Candlewood Acres Holding Corp.	65	65	70	70	0.5	0.4	0.4	0.3	
Candlewood Knolls Comm. Inc.	280	280	295	295	2.3	2.2	2.1	1.6	
Candlewood Lake Condos.	205	205	205	205	1.0	1.0	0.9	0.7	
Candlewood Orchards	110	110	110	110	0.8	0.7	0.6	0.5	
Candlewood Shores Estates	1470	1470	1545	1545	10.4	9.7	9.1	6.7	

TABLE 3-1 - (Continued)

PROJECTIONS OF POPULATION SERVED FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	RESIDENTIAL POPULATION SERVED (1)				% OF TOWN POPULATION SERVED (2)			
		1986	1991	2000	2030	1986	1991	2000	2030
Candlewood Springs P.O.	New Milford	90	90	95	95	0.4	0.4	0.4	0.3
Candlewood Trails Assoc.	New Milford	190	190	190	190	0.9	0.9	0.8	0.7
Carmen Hill Orchards Water Co.	New Milford	300	300	315	315	1.5	1.4	1.4	1.1
Cedar Heights, Rural Water Co.	Danbury	470	470	480	490	0.7	0.7	0.7	0.6
Cedar Terrace Prop. Owners	Danbury	45	45	50	50	0.1	0.1	0.1	0.1
Cedarbrook Condo. Owners	Brookfield	100	100	105	105	0.7	0.7	0.6	0.5
Cedarhurst Assoc.	Newtown	60	60	65	65	0.3	0.3	0.3	0.2
Chestnut Hill Village	Bethel	145	145	155	155	0.8	0.8	0.8	0.6
Chestnut Tree Hill Water Co.	Newtown	145	145	145	145	0.7	0.7	0.6	0.4
Clapboard Ridge Heights	Danbury	110	110	110	110	0.2	0.2	0.2	0.1
CIC Owners Corp.	Brookfield	445	445	475	475	3.2	3.0	2.8	2.1
Cornell Hills Assoc.	New Milford	315	315	330	330	1.5	1.5	1.4	1.2
Craigmoor, Rural Water Co.	Danbury	80	80	85	85	0.1	0.1	0.1	0.1
Danbury Water Dept.	Ridgefield	70	70	95	110	0.3	0.3	0.4	0.4
Dean Heights Water Assoc.	Danbury	45000	49000	53000	59000	71.6	75.6	78.4	75.4
Eagle Hill Rehabilitation	New Milford	170	170	180	180	0.8	0.8	0.8	0.6
Fairfield Hills Hospital	Newtown	80	80	80	80	0.4	0.4	0.3	0.2
Fieldstone Ridge, Rural W.C.	Newtown	1950	1950	1950	1950	9.4	8.8	7.9	6.0
Greenridge Inc. Water Div.	New Fairfield	110	115	125	130	0.9	0.9	0.9	0.7
Harrybrooke Park Condos.	Brookfield	700	700	735	735	5.0	4.6	4.3	3.2
Har-Bil Water Co.	New Milford	115	115	115	115	0.6	0.5	0.5	0.4
Hawthorne East Apts.	New Milford	320	320	335	335	1.6	1.5	1.4	1.2
Hawthorne Terrace Assoc	New Milford	130	130	130	130	0.6	0.6	0.6	0.5
Heritage Hills Condo. Assoc (3)	Danbury	100	100	100	100	0.2	0.2	0.1	0.1
Heritage Village Water Co.	Woodbury	100	100	105	105	1.4	1.4	1.4	1.3
Hickory Hills Corp.	Southbury	7080	7545	8110	10245	46.6	47.4	47.0	47.0
High Acre Mobile Home Park	Brookfield	105	105	110	110	0.7	0.7	0.6	0.5
	Danbury	60	60	70	70	0.1	0.1	0.1	0.1

TABLE 3-1 - (Continued)

PROJECTIONS OF POPULATION SERVED FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	RESIDENTIAL POPULATION SERVED (1)				% OF TOWN POPULATION SERVED (2)			
		1986	1991	2000	2030	1986	1991	2000	2030
		Hi-Vu Water Co.	145	145	150	150	0.7	0.7	0.6
Holiday Point Assoc. Inc.	15	15	15	15	0.6	0.7	0.5	0.3	
Hollandale Estates, Top. H.C.	170	170	170	170	0.3	0.3	0.3	0.2	
Hollywyle Park Assoc.	30	30	30	30	0.2	0.2	0.2	0.2	
Indian Fields Homeowners	90	90	95	95	0.6	0.6	0.6	0.4	
Indian Ridge Water Co.	270	270	285	285	1.3	1.3	1.2	1.0	
Indian Spring Water Co.	250	250	250	250	0.4	0.4	0.4	0.3	
Interlaken Water Co.	50	50	55	55	0.4	0.4	0.4	0.3	
Iron Works Aqueduct Co.	35	45	50	70	0.2	0.3	0.3	0.3	
Ken Oaks, Rural Water Co.	200	200	210	215	0.3	0.3	0.3	0.3	
Knollcrest Real Estate Corp.	290	290	320	320	2.4	2.3	2.3	1.7	
Lake Lillinonah Shores	100	100	105	105	0.7	0.7	0.6	0.5	
Lake Waubeeka Prop. Owners	335	710	710	710	0.5	1.1	1.1	0.9	
Lakeside Water Co.	450	450	475	475	3.0	2.8	2.8	2.2	
Ledgewood Association	120	120	125	125	0.8	0.8	0.7	0.5	
Lillinoah Park Estates	85	85	90	90	0.4	0.4	0.4	0.3	
Lone Oak Water Co.	260	260	270	270	1.3	1.2	1.2	1.0	
Lords Mobile Home Park	180	180	190	190	0.9	0.8	0.8	0.7	
Mamasasco Lake	50	50	55	55	0.2	0.2	0.2	0.2	
Maple Glen Trailer Park	25	25	25	25	0	0	0	0	
Meadowbrook Terrace M.H. Park	140	140	140	140	0.7	0.6	0.6	0.4	
Meckauer Circle (RSKCON WC)	150	150	160	160	0.9	0.8	0.8	0.6	
Middle River, Dancon Corp.	195	195	205	205	0.3	0.3	0.3	0.3	
Millbrook Water Co.	500	500	525	525	2.4	2.3	2.3	1.8	
Millstone Ridge	280	280	310	310	1.4	1.3	1.3	1.1	
New Milford Water Co.	5460	9380	11320	12325	26.6	44.0	49.0	43.4	
Newbury Crossing	105	105	110	110	0.7	0.7	0.6	0.5	
Newtown Water Co.	3190	3430	4530	5265	15.3	15.5	18.4	16.1	

TABLE 3-1 - (Continued)

PROJECTIONS OF POPULATION SERVED FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	RESIDENTIAL POPULATION SERVED (1)				% OF TOWN POPULATION SERVED (2)			
		1986	1991	2000	2030	1986	1991	2000	2030
Oakdale Manor Water Assoc.	Southbury	25	25	30	30	0.2	0.2	0.2	0.1
Oakwood Acres, Rural Water Co.	New Fairfield	375	380	420	435	3.1	3.0	3.0	2.4
Old Farms Condo. Assoc.	New Milford	205	205	215	215	1.0	1.0	0.9	0.8
Olmstead Water Supply Co.	Newtown	350	420	430	440	1.7	1.9	1.7	1.3
Parkwood Acres	New Milford	40	40	45	45	0.2	0.2	0.2	0.2
Pearce Manor, Rural Water Co.	Danbury	200	200	205	210	0.3	0.3	0.3	0.3
Pleasant Acres Water Co.	Danbury	315	315	335	335	0.5	0.5	0.5	0.4
Pleasant View Estates	New Milford	50	50	55	55	0.2	0.2	0.2	0.2
Pocono Point	Danbury	35	35	40	40	0.1	0.1	0.1	0.1
Possum Ridge, Dancon Corp.	New Fairfield	395	395	415	415	3.3	3.1	3.0	2.3
Quassak Heights Condos	Woodbury	105	105	115	115	1.5	1.5	1.6	1.5
Racing Brook Water Co.	Danbury	300	300	300	300	0.5	0.5	0.4	0.4
Ridgebury Ests., Dancon Corp.	Danbury	235	235	245	245	0.4	0.4	0.4	0.3
Ridgefield Knolls, Top. H.C.	Ridgefield	240	240	240	240	1.1	1.1	1.0	0.9
Ridgefield Lakes, Rural W.C.	Ridgefield	670	685	755	790	3.2	3.1	3.3	2.8
Ridgefield Water Co.	Ridgefield	7015	7515	8090	11080	33.0	34.2	35.0	40.0
Ridgeview Gardens, Dancon Corp.	Danbury	80	80	85	85	0.1	0.1	0.1	0.1
River Glen Contin. Care Center	Southbury	160	160	170	170	1.0	1.0	1.0	0.7
River View Court Assoc.	New Milford	30	30	30	30	0.1	0.1	0.1	0.1
Robin Hill Condos.	Danbury	475	475	475	475	0.8	0.7	0.7	0.6
Rolling Ridge, Top. Hyd. Co.	Danbury	95	95	95	95	0.2	0.1	0.1	0.1
Rollingwood Condos.	Brookfield	460	460	485	485	3.3	3.1	2.9	2.1
Sandy Lane Village	Brookfield	260	260	275	275	1.8	1.7	1.6	1.2
Scodon, Rural Water Co.	Ridgefield	295	320	465	535	1.4	1.5	2.0	1.9
Sherwood Forest, Dancon Corp.	Danbury	115	115	120	120	0.2	0.2	0.2	0.2
Siboney Terrace	Danbury	25	25	25	25	0	0	0	0
Silvermine Manor	Brookfield	80	80	85	85	0.6	0.5	0.5	0.4
Snug Harbor Devel. Corp.	Danbury	100	100	105	105	0.2	0.2	0.2	0.1

TABLE 3-1 - (Continued)

PROJECTIONS OF POPULATION SERVED FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	RESIDENTIAL POPULATION SERVED (1)					% OF TOWN POPULATION SERVED (2)			
		1986	1991	2000	2030		1986	1991	2000	2030
Soundview, Rural Water Co.	Ridgefield	135	135	135	135	0.6	0.6	0.6	0.5	
Southbury Training School	Southbury	1150	1150	1150	1150	7.6	7.2	6.7	5.3	
Stony Hill Village	Brookfield	310	310	325	325	2.2	2.1	1.9	1.4	
St. Thomas Seminary	Ridgefield	65	65	70	70	0.3	0.3	0.3	0.3	
Sunny Valley Farm	New Milford	15	15	15	15	0.1	0.1	0.1	0.1	
Sunny Valley Tax District	New Milford	385	385	405	405	1.9	1.8	1.8	1.4	
Swiss Village Apts.	Woodbury	275	275	290	290	3.9	3.8	4.0	3.7	
Tavi Village Condo. Assoc.	Danbury	40	40	45	45	0.1	0.1	0.1	0.1	
Ta'agen Point	Danbury	40	40	45	45	0.1	0.1	0.1	0.1	
The Cedars Water Supply	Danbury	20	20	20	20	0	0	0	0	
Timber Trails Water Co.	New Fairfield	30	30	35	35	0.2	0.2	0.2	0.2	
	Sherman	280	280	295	295	11.1	10.3	9.6	6.9	
	Woodbury (4)	205	205	205	205	2.9	2.8	2.8	2.6	
Town in Country Condos.	Woodbury	0	NA	NA	NA	0	NA	NA	NA	
Watertown Fire District	Woodbury	115	115	115	115	0.6	0.5	0.5	0.4	
Westfall Mobile Home Park	New Milford	130	130	135	135	0.9	0.9	0.8	0.6	
Whisconier Village	Brookfield	110	110	115	115	0.2	0.2	0.2	0.1	
Willow Run, Dancon Corp.	Danbury	60	60	60	60	0.8	0.8	0.8	0.8	
Woodbury Place Condo Assoc.	Woodbury	1610	1855	2115	3290	22.5	25.7	29.1	42.2	
Woodbury Water Co.	Woodbury	75	75	75	75	0.5	0.5	0.4	0.3	
Woodcreek Village Condos.	Brookfield	1330	1330	1330	1330	18.6	18.4	18.3	17.1	
Woodlake Municipal Tax District	Woodbury									

NOTES:

1. The data used was submitted in individual water supply plans, or if not available, was obtained from the Water Supply Assessment.
2. Based on community populations from Connecticut OPM population projections.
3. Also serves areas outside the Housatonic in Oxford and Middlebury.
4. Only community served in Housatonic area.

TABLE 3-2

POPULATION PROJECTIONS AND POPULATION SERVED FOR EACH COMMUNITY

COMMUNITY	COMMUNITY POPULATION PROJECTIONS (1)			WATER UTILITY SERVICED POPULATION (2)			% POPULATION SERVED					
	1986	1991	2000	2030	1986	1991	(3)	2000	(3)	1986	1991	2000
Bethel	17144	18280	20040	26300	9915	10655	11905	14795	57.8	58.3	59.4	56.2
Bridgewater	1626	1700	1810	2200	50	50	50	50	3.0	3.0	2.8	2.3
Brookfield	14070	15080	16970	23100	6565	6685	7045	7110	46.7	44.3	41.5	30.8
Danbury	62870	64780	67570	78300	49615	53990	58125	64145	78.9	83.3	86.0	81.9
New Fairfield	12056	12820	14050	18400	2130	2140	2295	2315	17.7	16.7	16.3	12.6
New Milford	20560	21320	23120	28400	10610	14530	16695	17700	51.6	68.1	72.2	62.3
Newtown	20850	22090	24610	32700	6205	6515	7650	8395	29.8	29.5	31.1	25.7
Ridgefield	21260	21950	23120	27700	8650	9190	10025	13135	40.7	41.9	43.4	47.4
Roxbury	1616	1750	1970	2700	0	0	0	0	0	0	0	0
Sherman	2520	2720	3080	4300	295	295	310	310	11.7	10.8	10.1	7.2
Southbury	15200	15910	17260	21800	8865	9330	9935	12070	58.3	62.4	57.6	55.4
Woodbury	7132	7220	7260	7800	3685	3930	4220	5395	51.7	54.4	58.1	69.2
TOTALS	196904	205620	220860	273700	106585	117310	128255	145420	54.1	57.1	58.1	53.1

(1) Connecticut OPM Projections (interpolated from OPM projections to obtain listed values for 1986 and 1991).
 (2) From Individual Supply Plans, questionnaires, or DOHS files.
 (3) Includes 1986 value where projected population values were not available.

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TABLE 3-3

AVERAGE DAILY DEMAND AND ESTIMATED YIELD FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	AVERAGE DAILY DEMAND (1000 gpd)				ESTIMATED YIELD (1000 gpd)
		1986	1991	2000	2030	
Acre Lane, Inc.	Ridgefield	3.0	3.0	3.4	3.4	
Aqua Vista Assoc., Inc.	Danbury	11.3	11.3	12.0	12.0	
Arrowhead Point Homeowners	Brookfield	16.8	16.8	17.6	17.6	
Ashlar of Newtown	Newtown	11.6	11.6	12.4	12.4	
Ball Pond Water District	New Fairfield	42.8	42.8	45.0	45.0	
Bay Colony Mobile Home Park	Newtown	10.1	10.1	10.9	10.9	
(3) Bethel Consolidated Co.	Bethel	115.0	145.0	260.0	490.0	
Bethel Water Department	Bethel	1126.0	1108.0	1130.0	1252.0	
Birch Grove Assoc.	New Milford	18.0	18.0	18.8	18.8	
Boulder Ridge Assoc	Danbury	2.6	2.6	3.0	3.0	
Briar Ridge, Dancon Corp.	Danbury	15.4	15.4	15.4	15.4	
Bridgewater Cannon Condos.	Bridgewater	3.8	3.8	3.8	3.8	
Brook Acres, Rural Water Co.	Brookfield	13.7	13.8	14.6	15.0	
Brookfield Div. Rural W.C.	Brookfield	53.7	54.3	58.6	60.4	
Brookfield Elderly Housing	Brookfield	3.2	3.2	3.2	3.2	
Brookfield Hills Condos.	Brookfield	10.5	10.5	10.9	10.9	
Brookview Water Supply Co.	Ridgefield	5.3	5.3	5.6	5.6	
Brookwood, Dancon Corp	Brookfield	17.3	17.3	18.0	18.0	
Butternut Ridge, Dancon Corp.	Brookfield	7.1	7.1	7.5	7.5	
Camelot Estates Water Co.	New Milford	38.6	38.6	39.8	39.8	
Candlewood Acres Holding Corp.	Brookfield	4.9	4.9	5.3	5.3	
Candlewood Knolls Comm. Inc.	New Fairfield	21.0	21.0	22.1	22.1	
Candlewood Lake Condos.	New Milford	15.4	15.4	15.4	15.4	
Candlewood Orchards	Brookfield	8.3	8.3	8.3	8.3	
Candlewood Shores Estates	Brookfield	110.3	110.3	115.9	115.9	
Candlewood Springs P.O.	New Milford	6.8	6.8	7.1	7.1	
Candlewood Trails Assoc.	New Milford	14.3	14.3	14.3	14.3	
Carmen Hill Orchards Water Co.	New Milford	22.5	22.5	23.6	23.6	
Cedar Heights, Rural Water Co.	Danbury	23.8	23.9	24.5	24.9	
Cedar Terrace Prop. Owners	Danbury	3.3	3.3	3.8	3.8	
Cedarbrook Condo. Owners	Brookfield	7.5	7.5	7.9	7.9	
Cedarhurst Assoc.	Newtown	4.5	4.5	4.9	4.9	
Chestnut Hill Village	Bethel	10.8	10.8	11.6	11.6	
Chestnut Tree Hill Water Co.	Newtown	10.9	10.9	10.9	10.9	

TABLE 3-3
(continued)

AVERAGE DAILY DEMAND AND ESTIMATED YIELD FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	AVERAGE DAILY DEMAND (1000 gpd)				ESTIMATED YIELD (1000 gpd)
		1986	1991	2000	2030	
Clapboard Ridge Heights	Danbury	8.3	8.3	8.3	8.3	
CLC Owners Corp.	Brookfield	6.7	8.8	9.0	9.9	
	New Milford	20.3	24.0	24.7	27.1	
Cornell Hills Assoc.	Danbury	6.0	6.0	6.4	6.4	
Craigmoor, Rural Water Co.	Ridgefield	3.9	4.2	5.5	6.2	
(1) Danbury Water Dept.	Danbury	6700	7300	7900	8800	
Dean Heights Water Assoc.	New Milford	12.8	12.8	13.5	13.5	
Eagle Hill Rehabilitation	Newtown	2.0	2.0	2.0	2.0	
Fairfield Hills Hospital	Newtown	358.0	358.0	358.0	358.0	
Fieldstone Ridge, Rural W.C.	New Fairfield	5.2	5.3	5.8	6.0	
Greenridge Inc. Water Div.	Brookfield	52.5	52.5	52.5	52.5	
Harrybrooke Park Condos.	New Milford	8.6	8.6	8.6	8.6	
Har-Bil Water Co.	New Milford	24.0	24.0	25.1	25.1	
Hawthorne East Apts.	New Milford	9.8	9.8	9.8	9.8	
Hawthorne Terrace Assoc	Danbury	7.5	7.5	7.5	7.5	
Heritage Hills Condo. Assoc.	Woodbury	7.5	7.5	7.9	7.9	
Heritage Village Water Co.	Southbury	769	925	1048	1537	
Hickory Hills Corp.	Brookfield	7.9	7.9	8.2	8.2	
High Acre Mobile Home Park	Danbury	4.5	4.5	5.3	5.3	
Hi-Vu Water Co.	New Milford	10.9	10.9	11.2	11.2	
Holiday Point Assoc. Inc.	Sherman	1.2	1.2	1.2	1.2	
(1) Hollandale Estates, Top. H.C.	Danbury	14.9	14.9	14.9	14.9	
Hollywyle Park Assoc.	New Fairfield	2.3	2.3	2.3	2.3	
Indian Fields Homeowners	Brookfield	6.8	6.8	7.1	7.1	
Indian Ridge Water Co.	New Milford	20.3	20.3	21.3	21.3	
Indian Springs Water Co.	Danbury	18.8	18.8	18.8	18.8	
Interlaken Water Co.	New Fairfield	3.7	3.7	4.1	4.1	
Iron Works Aqueduct Co.	Brookfield	2.0	2.7	2.8	3.1	
Ken Oaks, Rural Water Co.	Danbury	9.0	9.0	9.5	9.7	
Knollcrest Real Estate Corp.	New Fairfield	21.8	21.8	24.0	24.0	
Lake Lillinonah Shores	Brookfield	7.5	7.5	7.9	7.9	
Lake Waubeeka Prop. Owners	Danbury	25.0	53.4	53.4	53.4	
Lakeside Water Co.	Southbury	24.9	24.9	26.1	26.1	
Ledgewood Association	Brookfield	9.0	9.0	9.4	9.4	
Lillinoah Park Estates	New Milford	6.4	6.4	6.8	6.8	
Lone Oak Water Co.	New Milford	19.5	19.5	20.2	20.2	
Lords Mobile Home Park	New Milford	13.5	13.5	14.3	14.3	

TABLE 3-3
(continued)

AVERAGE DAILY DEMAND AND ESTIMATED YIELD FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	AVERAGE DAILY DEMAND (1000 gpd)				ESTIMATED YIELD (1000 gpd)
		1986	1991	2000	2030	
Mamasasco Lake	Ridgefield	3.7	3.7	4.1	4.1	
Maple Glen Trailer Park	Danbury	1.8	1.8	1.8	1.8	
Meadowbrook Terrace M.H. Park	Newtown	10.5	10.5	10.5	10.5	
Meckauer Circle (RSKCON WC)	Bethel	11.2	11.2	12.0	12.0	
Middle River, Dancon Corp.	Danbury	14.6	14.6	15.3	15.3	
Millbrook Water Co.	New Milford	37.5	37.5	39.4	39.4	
Millstone Ridge	New Milford	21.0	21.0	23.3	23.3	
New Milford Water Co.	New Milford	779	1102	1463	1593	
Newbury Crossing	Brookfield	7.9	7.9	8.2	8.2	
Newtown Water Co.	Newtown	265	329	432	538	
Oakdale Manor Water Assoc.	Southbury	1.9	1.9	2.3	2.3	
Oakwood Acres, Rural Water Co.	New Fairfield	27.0	27.5	30.0	31.3	
Old Farms Condo. Assoc.	New Milford	15.4	15.4	16.1	16.1	
Olmstead Water Supply Co.	Newtown	14.0	23.3	23.9	26.2	
Parkwood Acres	New Milford	3.0	3.0	3.4	3.4	
Pearce Manor, Rural Water Co.	Danbury	9.4	9.5	9.7	9.8	
Pleasant Acres Water Co.	Danbury	23.6	23.6	25.1	25.1	
Pleasant View Estates	New Milford	3.8	3.8	4.1	4.1	
Pocono Point	Danbury	2.6	2.6	3.0	3.0	
Possum Ridge, Dancon Corp.	New Fairfield	29.6	29.6	31.1	31.1	
Quassak Heights Condos	Woodbury	7.9	7.9	8.6	8.6	
Racing Brook Water Co.	Danbury	22.5	22.5	22.5	22.5	
Ridgebury Ests., Dancon Corp.	Danbury	17.6	17.6	18.3	18.3	
Ridgefield Knolls, Top. H.C.	Ridgefield	14.9	14.9	14.9	14.9	
Ridgefield Lakes, Rural W.C.	Ridgefield	28.1	32.1	35.1	37.1	
Ridgefield Water Co.	Ridgefield	720	888	944	1408	
Ridgeview Gardens, Dancon Corp.	Danbury	6.0	6.0	6.4	6.4	
River Glen Contin. Care Center	Southbury	12.0	12.0	12.8	12.8	
River View Court Assoc.	New Milford	2.3	2.3	2.3	2.3	
Robin Hill Condos.	Danbury	35.6	35.6	35.6	35.6	
Rolling Ridge, Top. Hyd. Co.	Danbury	7.1	7.1	7.1	7.1	
Rollingwood Condos.	Brookfield	34.5	34.5	36.4	36.4	
Sandy Lane Village	Brookfield	19.5	19.5	20.6	20.6	
Scodon, Rural Water Co.	Ridgefield	20.3	21.0	30.4	35.1	
Sherwood Forest, Dancon Corp.	Danbury	8.6	8.6	9.0	9.0	
Siboney Terrace	Danbury	1.8	1.8	1.8	1.8	
Silvermine Manor	Brookfield	6.0	6.0	6.4	6.4	

TABLE 3-3
(continued)

AVERAGE DAILY DEMAND AND ESTIMATED YIELD FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	AVERAGE DAILY DEMAND (1000 gpd)				ESTIMATED YIELD (1000 gpd)
		1986	1991	2000	2030	
Snug Harbor Devel. Corp.	Danbury	7.5	7.5	7.9	7.9	
Soundview, Rural Water Co.	Ridgefield	7.3	7.3	7.3	7.3	
Southbury Training School	Southbury	270.0	270.0	270.0	270.0	
Stony Hill Village	Brookfield	23.3	23.3	24.4	24.4	
St. Thomas Seminary	Ridgefield	4.9	4.9	5.2	5.2	
Sunny Valley Farm	New Milford	1.1	1.1	1.1	1.1	
Sunny Valley Tax District	New Milford	28.9	28.9	30.4	30.4	
Swiss Village Apts.	Woodbury	20.6	20.6	21.8	21.8	
Tavi Village Condo. Assoc.	Danbury	3.0	3.0	3.4	3.4	
Ta'agen Point	Danbury	3.0	3.0	3.4	3.4	
The Cedars Water Supply	Danbury	1.5	1.5	1.5	1.5	
Timber Trails Water Co.	New Fairfield	2.3	2.3	2.6	2.6	
	Sherman	21.0	21.0	22.1	22.1	
Town in Country Condos.	Woodbury	15.4	15.4	15.4	15.4	
(2) Watertown Fire District	Woodbury	600	850.0	870.0	930.0	
Westfall Mobile Home Park	New Milford	8.6	8.6	8.6	8.6	
Whisconier Village	Brookfield	9.8	9.8	10.1	10.1	
Willow Run, Dancon Corp.	Danbury	8.3	8.3	8.6	8.6	
Woodbury Place Condo Assoc.	Woodbury	4.5	4.5	4.5	4.5	
Woodbury Water Co.	Woodbury	128	135	172	269	
Woodcreek Village Condos.	Brookfield	5.6	5.6	5.6	5.6	
Woodlake Municipal Tax District	Woodbury	74.6	74.6	74.6	74.6	

NOTES:

- (1) Hollandale Estates purchased 14,910 in 1986.
- (2) Watertown Fire Dist. has 720,000 gpd capacity interconnection for emergency use.
- (3) Values represent consumption in years 1990, 2005 and 2035.

TABLE 3-4

RESIDENTIAL/NON-RESIDENTIAL WATER DEMAND PROJECTIONS
(1000 gpd)

	<u>1991</u>	<u>2000</u>	<u>2030</u>
Bethel Water Dept.			
Residential	596.0	608.0	673.0
Non-residential	512.0	522.0	579.0
Bethel Consolidated Water Co. (1)			
Residential	130.0	222.5	390.0
Industrial/Commercial	15.0	37.5	100.0
TOTAL	145.0	260.0	490.0
Heritage Village Water Co.			
Residential	456	511	748
Non-residential	469	537	789
New Milford Water Co.			
Residential	649	835	NA
Non-residential	453	628	NA
Newtown Water Co.			
Residential	170	229	NA
Non-residential	159	203	NA
Ridgefield Water Supply Co.			
Residential	526	566	886
Non-residential	362	378	522
Woodbury Water Co.			
Residential	71	90	NA
Non-residential	64	82	NA

(1) Values represent demand in years 1990, 2005, and 2035.

NA = Information Not Available

TABLE 3-5

PROJECTED WATER SUPPLY SURPLUS OR DEFICIT FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	PROJECTED SURPLUS OR (DEFICIT) (1000 gpd)			
		1986	1991	2000	2030
Acre Lane, Inc.	Ridgefield	20.8	20.8	20.4	20.4
Aqua Vista Assoc., Inc.	Danbury	28.7	28.7	28.0	28.0
Arrowhead Point Homeowners	Brookfield	13.4	13.4	12.6	12.6
Ashlar of Newtown	Newtown	52.1	52.1	51.3	51.3
Ball Pond Water District	New Fairfield	7.2	7.2	5.0	5.0
Bay Colony Mobile Home Park	Newtown	13.9	13.9	13.1	13.1
Bethel Consolidated Co.	Bethel	485.0	355.0	240.0	110.0
Bethel Water Department	Bethel	524.0	542.0	520.0	398.0
Birch Grove Assoc.	New Milford	57.6	57.6	56.8	56.8
Boulder Ridge Assoc	Danbury	11.4	11.4	11.0	11.0
Briar Ridge, Dancon Corp.	Danbury	20.2	20.2	20.2	20.2
Bridgewater Cannon Condos.	Bridgewater	3.7	3.7	3.7	3.7
Brook Acres, Rural Water Co.	Brookfield	15.5	15.4	14.6	14.2
Brookfield Div. Rural W.C.	Brookfield	58.3	57.7	53.4	51.6
Brookfield Elderly Housing	Brookfield	11.9	11.9	11.9	11.9
Brookfield Hills Condos.	Brookfield	32.2	32.2	31.8	31.8
Brookview Water Co.	Ridgefield	10.9	10.9	10.6	10.6
Brookwood, Dancon Corp	Brookfield	52.9	52.9	52.2	52.2
Butternut Ridge, Dancon Corp.	Brookfield	51.2	51.2	50.8	50.8
Camelot Estates Water Co.	New Milford	18.6	18.6	17.4	17.4
Candlewood Acres Holding Corp.	Brookfield	12.4	12.4	12.0	12.0
Candlewood Knolls Comm. Inc.	New Fairfield	66.0	66.0	64.9	64.9
Candlewood Lake Condos.	New Milford	25.6	25.6	25.6	25.6
Candlewood Orchards P.O.	Brookfield	21.9	21.9	21.9	21.9
Candlewood Shores Estates	Brookfield	(13.7)	(13.7)	(19.3)	(19.3)
Candlewood Springs P.O.	New Milford	32.1	32.1	31.8	31.8
Candlewood Trails Assoc.	New Milford	33.2	33.2	33.2	33.2
Carmen Hill Orchards Water Co.	New Milford	30.4	30.4	29.3	29.3
Cedar Heights, Rural Water Co.	Danbury	(2.4)	(2.5)	(3.1)	(3.5)
Cedar Terrace Prop. Owners	Danbury	26.9	26.9	26.4	26.4
Cedarbrook Condo. Owners	Brookfield	22.7	22.7	22.3	22.3
Cedarhurst Assoc.	Newtown	27.9	27.9	27.5	27.5
Chestnut Hill Village	Bethel	10.8	10.8	10.0	10.0
Chestnut Tree Hill Water Co.	Newtown	0.7	0.7	0.7	0.7

TABLE 3-5
(Continued)

PROJECTED WATER SUPPLY SURPLUS OR DEFICIT FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	PROJECTED SURPLUS OR (DEFICIT) (1000 gpd)			
		1986	1991	2000	2030
Clapboard Ridge Heights	Danbury	24.1	24.1	24.1	24.1
CLC Owners Corp.	Brookfield	122.9	120.8	120.6	119.7
	New Milford	109.3	105.6	104.9	102.5
Cornell Hills Assoc.	Danbury	2.6	2.6	2.4	1.8
Craigmoor, Rural Water Co.	Ridgefield	0.5	0.2	(1.1)	(1.8)
Danbury Water Dept.	Danbury	3300	2700	2100	1200
Dean Heights Water Assoc.	New Milford	NA	NA	NA	NA
Eagle Hill Rehabilitation	Newtown	34.7	34.7	34.7	34.7
Fairfield Hills Hospital	Newtown	1478.0	1478.0	1478.0	1478.0
Fieldstone Ridge, Rural W.C.	New Fairfield	24.0	23.9	23.4	23.2
Greenridge Inc. Water Div.	Brookfield	31.7	31.7	31.7	31.7
Harrybrooke Park Condos.	New Milford	29.2	29.2	29.2	29.2
Har-Bil Water Co.	New Milford	66.7	66.7	65.6	65.6
Hawthorne East Apts.	New Milford	22.6	22.6	22.6	22.6
Hawthorne Terrace Assoc	Danbury	46.5	46.5	46.5	46.5
Heritage Hills Condo. Assoc.	Woodbury	24.9	24.9	24.5	24.5
Heritage Village Water Co.	Southbury	531	375	252	(237)
Hickory Hills Corp.	Brookfield	20.2	20.2	19.9	19.9
High Acre Mobile Home Park	Danbury	8.5	8.5	7.7	7.7
Hi-Vu Water Co.	New Milford	48.5	48.5	48.2	48.2
Holiday Point Assoc. Inc.	Sherman	106.8	106.8	106.8	106.8
Hollandale Estates, Top. H.C.	Danbury	0	0	0	0
Hollywyle Park Assoc.	New Fairfield	17.7	17.7	17.7	17.7
Indian Fields Homeowners	Brookfield	50.2	50.2	49.9	49.9
Indian Ridge Water Co.	New Milford	70.4	70.4	69.4	69.4
Indian Springs Water Co.	Danbury	48.2	48.2	48.2	48.2
Interlaken Water Co.	New Fairfield	NA	NA	NA	NA
Iron Works Aqueduct Co.	Brookfield	22.2	21.5	21.4	21.1
Ken Oaks, Rural Water Co.	Danbury	38.6	38.6	38.1	37.9
Knollcrest Real Estate Corp.	New Fairfield	85.1	85.1	82.9	82.9
Lake Lillinonah Shores	Brookfield	62.7	62.7	62.3	62.3
Lake Waubeeka Prop. Owners	Danbury	234	205.6	205.6	205.6
Lakeside Water Co.	Southbury	11.8	11.8	10.6	10.6
Ledgewood Association	Brookfield	21.2	21.2	20.8	20.8
Lillinoah Park Estates	New Milford	26.0	26.0	25.6	25.6
Lone Oak Water Co.	New Milford	3.7	3.7	3.0	3.0
Lords Mobile Home Park	New Milford	5.9	5.9	5.1	5.1
Mamasasco Lake	Ridgefield	15.7	15.7	15.3	15.3
Maple Glen Trailer Park	Danbury	NA	NA	NA	NA
Meadowbrook Terrace M.H. Park	Newtown	NA	NA	NA	NA
Meckauer Circle (RSKCON WC)	Bethel	21.2	21.2	20.4	20.4
Middle River, Dancon Corp.	Danbury	17.8	17.8	17.1	17.1

TABLE 3-5
(Continued)

PROJECTED WATER SUPPLY SURPLUS OR DEFICIT FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	PROJECTED SURPLUS OR (DEFICIT) (1000 gpd)			
		1986	1991	2000	2030
Millbrook Water Co.	New Milford	3.0	3.0	1.1	1.1
Millstone Ridge	New Milford	20	20	17.7	17.7
New Milford Water Co.	New Milford	591	268	(93)	(223)
Newbury Crossing	Brookfield	13.7	13.7	13.4	13.4
Newtown Water Co.	Newtown	1235	1171	1018	962
Oakdale Manor Water Assoc.	Southbury	19.7	19.7	19.3	19.3
Oakwood Acres, Rural Water Co.	New Fairfield	41	40.5	38.0	36.7
Old Farms Condo. Assoc.	New Milford	22.9	22.9	22.2	22.2
Olmstead Water Supply Co.	Newtown	19.9	10.6	10.0	7.7
Parkwood Acres	New Milford	1.3	1.3	0.9	0.9
Pearce Manor, Rural Water Co.	Danbury	38.2	38.1	37.9	37.8
Pleasant Acres Water Co.	Danbury	15.3	15.3	13.8	13.8
Pleasant View Estates	New Milford	43.7	43.7	43.4	43.4
Pocono Point	Danbury	13.6	13.6	13.2	13.2
Possum Ridge, Dancon Corp.	New Fairfield	2.8	2.8	1.3	1.3
Quassak Heights Condos	Woodbury	5.1	5.1	4.4	4.4
Racing Brook Water Co.	Danbury	47.7	47.7	47.7	47.7
Ridgebury Ests., Dancon Corp.	Danbury	86.1	86.1	85.4	85.4
Ridgefield Knolls, Top. H.C.	Ridgefield	157.9	157.9	157.9	157.9
Ridgefield Lakes, Rural W.C.	Ridgefield	50.6	46.6	43.6	41.6
Ridgefield Water Co.	Ridgefield	(16)	(184)	(240)	(704)
Ridgeview Gardens, Dancon Corp.	Danbury	10.2	10.2	9.8	9.8
River Glen Contin. Care Center	Southbury	83.0	83.0	82.2	82.2
River View Court Assoc.	New Milford	NA	NA	NA	NA
Robin Hill Condos.	Danbury	5.4	5.4	5.4	5.4
Rolling Ridge, Top. Hyd. Co.	Danbury	60.6	60.6	60.6	60.6
Rollingwood Condos.	Brookfield	29.2	29.2	27.3	27.3
Sandy Lane Village	Brookfield	31.3	31.3	30.2	30.2
Scodon, Rural Water Co.	Ridgefield	72.0	71.3	61.9	57.2
Sherwood Forest, Dancon Corp.	Danbury	7.6	7.6	7.2	7.2
Siboney Terrace	Danbury	4.4	4.4	4.4	4.4
Silvermine Manor	Brookfield	26.4	26.4	26.0	26.0
Snug Harbor Devel. Corp.	Danbury	7.5	7.5	7.1	7.1
Soundview, Rural Water Co.	Ridgefield	7.3	7.3	7.3	7.3
Southbury Training School	Southbury	30.0	30.	30.	30.
Stony Hill Village	Brookfield	737.7	737.7	736.6	736.6
St. Thomas Seminary	Ridgefield	NA	NA	NA	NA
Sunny Valley Farm	New Milford	NA	NA	NA	NA
Sunny Valley Tax District	New Milford	160.1	160.1	158.6	158.6
Swiss Village Apts.	Woodbury	6.4	6.4	5.2	5.2

TABLE 3-5
(Continued)

PROJECTED WATER SUPPLY SURPLUS OR DEFICIT FOR EACH WATER UTILITY

WATER UTILITY	COMMUNITY SERVED	PROJECTED SURPLUS OR (DEFICIT) (1000 gpd)			
		1986	1991	2000	2030
Tavi Village Condo. Assoc.	Danbury	NA	NA	NA	NA
Ta'agen Point	Danbury	7.8	7.8	7.4	7.4
The Cedars Water Supply	Danbury	11.5	11.5	11.5	11.5
Timber Trails Water Co.	New Fairfield	101.7	101.7	101.4	101.4
	Sherman	83.8	83.8	82.7	82.7
Town in Country Condos.	Woodbury	65.6	65.6	65.6	65.6
Watertown Fire District	Woodbury	700	550	530	470
Westfall Mobile Home Park	New Milford	19.5	19.5	19.5	19.5
Whisconier Village	Brookfield	NA	NA	NA	NA
Willow Run, Dancon Corp.	Danbury	14.4	14.4	14.1	14.1
Woodbury Place Condo Assoc.	Woodbury	33.3	33.3	33.3	33.3
Woodbury Water Co.	Woodbury	302	295	258	161
Woodcreek Village Condos.	Brookfield	11.4	11.4	11.4	11.4
Woodlake Municipal Tax District	Woodbury	45.4	45.4	45.4	45.4

TABLE 3-6

WATER SYSTEMS WITH SUPPLY DEFICITS (1)

<u>UTILITY</u>	<u>1986</u>	<u>Projected Deficit</u>		<u>2030</u>
		<u>1991</u>	<u>2000</u>	
Candlewood Shores Estates	13.7	13.7	19.3	19.3
Cedar Heights, Rural Water Co.	2.4	2.5	3.1	3.5
Craigmoor, Rural Water Co.	-	-	1.1	1.8
Heritage Village Water Co.	-	-	-	237.0
New Milford Water Co.	-	-	93.0	223.0
Ridgefield Water Co.	16.0	184.0	240.0	704.0

(1) Deficit based on demand projections through 2030 compared to estimated supply source yield in late 1987.

Overall, the Integrated Report showed the calculated supply situation in the Housatonic area as of late 1987 to be quite positive. In fact, the situation improved even further from the time the draft Report was prepared, with sources adequate to meet demands through 2030 brought on line in early 1988 for all deficit systems except Craigmoor. Craigmoor's additional needs are not that great (1,800 gpd in 2030), and are proposed to be met simply through the deepening of an existing well and adherence to a water conservation program.

However, the WUCC is concerned that the water supply situation may not be as positive as the calculations indicate - especially for many of the smaller systems. Estimated yields for several of these systems are suspected to be too high, and further small system deficit situations may well be evidenced as the planning period progresses. (Some of these smaller systems also have supplies that may be vulnerable to contamination, a situation which could lead to the need for complete supply replacement.)

3.3.2 Compatibility With Land Use Plans

Recent legislation by the State of Connecticut (Public Act 85-279) requires municipal planning and zoning commissions to include consideration of existing and potential surface and groundwater source protection in their local plans and regulations. The status of water source protection actions taken by the various towns in the area is summarized in Table 3-7. Overall, the WUCC found that water supply protection measures have not been given sufficient attention in the plans of development in most of the area's communities (Brookfield is an example to the contrary), with many of the policies and regulations which have been promulgated not consistent from town to town. Zoning regulations suffer in many instances by the breadth of development that could be permitted in water resource areas, while even protective zoning may be altered through variances granted by local zoning commissions.

TABLE 3-7

INVENTORY OF ADOPTED OR PROPOSED LOCAL WATER SUPPLY PROTECTION MECHANISMS

BETHEL BRIDGEWATER BROOKFIELD DANBURY FAIRFIELD MILFORD NEWTON RIDGEFIELD ROXBURY SHERMAN SOUTHBURY WOODBURY

NEW NEW

	BETHEL	BRIDGEWATER	BROOKFIELD	DANBURY	FAIRFIELD	MILFORD	NEWTON	RIDGEFIELD	ROXBURY	SHERMAN	SOUTHBURY	WOODBURY
A. AQUIFER PROTECTION OVERLAY DISTRICT												
1. Special Management of Hazardous Materials	P	A			P						P	
2. Prohibition of Selected Land Uses	P	A			P		A				P	A
3. Various Special Standards (Fuel storage, sewage disposal, oil and grease traps, etc.)	P	A			P						P	
B. WATER SUPPLY WATERSHED OVERLAY DISTRICT												
1. Density Restriction					P						A	
2. Prohibition of Selected Land Uses												
3. Stream Setback		A			P						A	
4. Other Restrictions					P							
C. TOWNWIDE GROUNDWATER PROTECTION INITIATIVE												
1. Special Management of Hazardous Materials					A					P		
2. Prohibition of Selected Land Uses												
3. Various Special Standards (Fuel storage, sewage disposal, oil and grease traps, etc.)		P	A		P			A			P	

A = Adopted
P = Proposed

The WUCC reviewed existing and potential water resources relative to present zoning to determine areas of especially high risk to water supply. The results of this effort are shown on Plate 4 relative to five broad zoning categories, and summarized in Tables 3-8 and 3-9 for stratified drift aquifers and watersheds, respectively. Category A represents essentially no risk to water supply (open space, forest land, passive use, parks, etc.), with risk to water supply becoming increasingly greater through the categories as follows:

- . Category B - minimal risks (field crops, low density development)
- . Category C - slight to moderate risks (agricultural production, medium density development, golf courses)
- . Category D - substantial risk (institutional use, high density housing, office buildings, banks, etc.)
- . Category E - major threats to water supply (retail, commercial, industrial uses, any use with wastes other than normal domestic sewage)

The WUCC recommends that communities in the Housatonic Area which have not taken sufficient steps to protect their existing and future supplies (as identified as part of this coordinated planning process) set up an ad hoc committee to establish appropriate protection procedures, both for watersheds and for aquifers. Representatives of each community's water suppliers should be invited to participate in the development of the community's water resource protection strategies, using the water resource protection features listed in Table 3-7 as a starting point checklist. The HVCEO, as well as other regional agencies, can also provide assistance in developing these strategies, and have available a significant body of data and previous studies relating to this topic.

TABLE 3-8

RISK CATEGORIES FOR STRATIFIED DRIFT AQUIFERS⁽¹⁾

<u>AQUIFER</u>	<u>COMMUNITY</u>	<u>A%</u>	<u>B%</u>	<u>C%</u>	<u>D%</u>	<u>E%</u>
Dibbles Brook	Bethel	3	7	79	0	11
	Newtown	0	0	100	0	0
East Swamp	Bethel	0	0	56	39	5
	Danbury	0	0	31	6	63
Housatonic @ Gaylordsville	New Milford	0	25	73	0	2
	Sherman	0	0	100	0	0
Housatonic @ New Milford	New Milford	0	14	49	2	35
Lake Kenosia	Danbury	8	0	28	4	60
	Ridgefield	0	100	0	0	0
Pomperaug	Southbury	0	8	66	16	10
	Woodbury	0	0	67	26	7
Pootatuck Valley	Newtown	0	0	86	0	14
Still River, Middle	Brookfield	0	15	31	0	54
	Danbury	0	0	25	0	75
	Bethel	0	0	0	0	100
Still River, North	New Milford	0	22	21	2	55
	Brookfield	0	0	49	0	51
Still River, West	Danbury	5	0	18	22	55
Sugar Hollow	Danbury	16	0	63	1	20
	Ridgefield	0	54	6	0	40
Sympaug Brook	Bethel	0	35	25	17	23
Upper Titicus	Ridgefield	4	0	96	0	0
No major aquifers	Bridgewater New Fairfield Roxbury					

(1) Areas include secondary recharge zones

TABLE 3-9

RISK CATEGORIES FOR WATER SUPPLY WATERSHEDS

<u>COMMUNITY</u>	<u>WATERSHED</u>	<u>A%</u>	<u>B%</u>	<u>C%</u>	<u>D%</u>	<u>E%</u>
Bethel	Wolf Pit Brook (6605)	0	100	0	0	0
New Milford	Shepaug River (6700)	0	34	66	0	0
Bridgewater		0	0	100	0	0
Roxbury		0	0	99	0	1
Southbury		0	100	0	0	0
New Fairfield	Ball Pond Brook (6402)	0	79	18	0	3
Danbury		0	0	100	0	0
New Milford	West Aspetuck River (6500)	0	0	99	0	1
Woodbury	Woodbury Reservoirs (68)	0	93	7	0	0
Southbury		0	0	100	0	0
Newtown	Taunton Pond (6018)	0	76	24	0	0
New Milford	New Milford Reservoirs (6000)	0	45	55	0	0
Newtown	Saugatuck Regional Basin (72)	0	100	0	0	0
Bethel		0	100	0	0	0
Danbury		12	0	79	0	9
Ridgefield		18	66	0	0	16
New Fairfield	Margerie, East Lake and Padanaram Reservoirs (6603)	0	0	0	99	1
Danbury	Lake Kenosia (6600)	7	0	37	1	55
Ridgefield		0	0	0	0	100
Danbury	Boggs Pond, West Lake and Kohanza Reservoirs (6602)	26	0	65	8	1
Danbury	Margerie, East Lake and Padanaram Reservoirs (6603)	26	0	69	5	0

TABLE 3-9

RISK CATEGORIES FOR WATER SUPPLY WATERSHEDS
(Continued)

<u>COMMUNITY</u>	<u>WATERSHED</u>	<u>A%</u>	<u>B%</u>	<u>C%</u>	<u>D%</u>	<u>E%</u>
Danbury	Eureka Reservoir, Mountain Pond (6604) (1)	0	0	73	27	0
Danbury	Candlewood Lake (6400)	26	0	64	5	5
New Fairfield		24	49	26	0	1
Sherman		12	22	64	0	2
Brookfield		13	0	85	2	0
New Milford		35	0	65	0	0
Sherman	Croton Regional Basin (81)	43	57	0	0	0
New Fairfield		0	62	38	0	0
Danbury		0	0	98	2	0
Ridgefield		5	55	35	0	5
Ridgefield	Norwalk Regional Basin (73)	12	0	86	0	2
Ridgefield	Mill River Watershed (7404)	3	0	97	0	0
Bethel	Chestnut Ridge Reservoir Watershed (6604)	0	100	0	0	0
Bethel	Murphy's Brook Watershed (6604)	0	0	100	0	0
Newtown	Southwest Eastern Regional Basin (71)	3	0	97	0	0
Brookfield	Tranquil Valley Proposed Reservoir	0	100	0	0	0

(1) Much of this watershed is owned by the Bethel Water Department, with further development unlikely. Present ownership of other parcels in other watersheds may also limit development such that the actual risk realized is less than that associated with the zoning category.

3.3.3 Alternative Water Resources for Future Supply Needs

As noted earlier, significant quantities of water from new sources are not theoretically required to meet the needs of the Housatonic Management Area through the year 2030. However, members of the WUCC have identified a variety of water resources which they believe should be given continuing protection as potential sources. These are listed, in priority order by community, in Table 3-10.

The WUCC has recommended protection of these potential sources for the following reasons:

- . Estimated yields may change considerably following State review of individual plans, and further deficit situations may become evident.
- . Any projection of population or water consumption for a 50 year period is extremely tenuous, and could change dramatically in the future.
- . Alternative sources may be needed to replace existing sources which become contaminated or to supplement existing sources during short or long-term emergencies, and/or natural or man-made disasters.
- . Utilities may wish to develop new sources for reasons other than safe yield shortfalls, such as economics, location within the system, ability to meet peak demands, quality and quantity of water available, etc.
- . Problems could develop with individual wells which would require an unanticipated expansion of public water supplies.
- . The safe yield information is suspect for many of the smaller systems in the Housatonic area, while many of these small systems also suffer from poor management. It is likely that a number of these systems will be incorporated within the service areas of larger utilities over the planning period, thereby increasing demands over those projected herein.

TABLE 3-10

ALTERNATIVE WATER SOURCES IN PRIORITY ORDER
FOR EACH WATER UTILITY SERVING GREATER THAN 1000 PEOPLE

<u>WATER UTILITY</u>	<u>COMMUNITY SERVED</u>	<u>POTENTIAL SOURCE</u>	<u>ARRANGEMENTS REQUIRED FOR DEVELOPMENT OF SUPPLY SOURCE (1)</u>
Bethel Consolidated Water Company	Bethel		
a. Chimney Heights System		1) New well in Dibble's Brook Aquifer or East Swamp Aquifer.	1) Groundwater exploration program for both aquifers, and monitoring wells adjacent to existing Well #1.
		2) Interconnection to Danbury, or	2) Water main extension of 2750 feet; booster pumping stations needed.
		3) New standpipe.	2 and 3) Further studies should be conducted.
Berkshire Industrial Park System		1) New well in area of industrial park, or	1) Locate to minimize sodium and chlorides concentration.
		2) Interconnection with Chimney Heights system.	2) Extend water main across I-84 and reduce pressure.
Bethel Water Department		1) Well field located behind police station (East Swamp Aquifer)	1) Test wells drilled
		2) Interconnection with Danbury	2) For emergency use only; a permanent connection not required - a hydrant to hydrant connection located on Wooster Street preferred. Would require booster pump and possibly new 12" mains.

TABLE 3-10 - CONTINUED

ALTERNATIVE WATER SOURCES IN PRIORITY ORDER
FOR EACH WATER UTILITY SERVING GREATER THAN 1000 PEOPLE

WATER UTILITY	COMMUNITY SERVED	POTENTIAL SOURCE	ARRANGEMENTS REQUIRED FOR DEVELOPMENT OF SUPPLY SOURCE (1)
Bethel Water Department	Bethel	3) New Well	3) Groundwater exploration, identification and purchase of high quality well sites.
Candlewood Shores Estates	Brookfield	4) Huntington Pond	4) As part of a state park, may only be available as an emergency supply-feasibility study will be required.
Danbury Water Department	Danbury	1) Three additional wells	1) Wells are in place and operational.
		1) Raise West Lake and Margerie Reservoirs	1) Raise West Lake by 10 feet, Raise Margerie Res. by 3 feet, pump stations planned
		2) Ball Pond Brook Diversion	2) Two pumping stations would be constructed; land acquisition necessary.
		3) Lake Candlewood Diversion	3) Conflicts and constraints resolution on: Would include a pump station and intake on the shore of the lake, a discharge pipeline and an access road; storage for the diverted water would be in Margerie Reservoir Pump Station designed for three 5 MGD pumps; pipeline length of 4750 feet and diameter of 30 inches; pump rate of 1.5 MGD for an estimated 200 days per year, yielding 8.2 MGD.
Heritage Village Water Company	Southbury	1) Well #6	1) Yield N.A., well is operational.
Lake Waubeeka Association	Danbury	1) Well sites just to the north of Section Two on Parcel D. 2) 50-acre lake on Parcel D.	Both on association-owned land; need further study.

* Must be done in conjunction with Ball Pond or Candlewood Lake diversion.

TABLE 3-10 - CONTINUED

ALTERNATIVE WATER SOURCES IN PRIORITY ORDER
FOR EACH WATER UTILITY SERVING GREATER THAN 1000 PEOPLE

WATER UTILITY	COMMUNITY SERVED	POTENTIAL SOURCE	ARRANGEMENTS REQUIRED FOR DEVELOPMENT OF SUPPLY SOURCE (1)
Topstone Hydraulic Co. Hollandale Estates Rolling Ridge Ridgefield Knolls	Danbury	None	
	Danbury	None	
	Ridgefield	None	
New Milford Water Company	New Milford	1) Indian Field Well Field	1) First well will be equipped, connected to distribution system, and placed in service early in 1988; add second well in 1991; well #3 in 2030. Main improvements in 1988 and 1990.
	Newtown	None	
Ridgefield Water Supply Company	Ridgefield	1) Beechwood Well Field	1) _____ awaiting DOHS approval.
		2) Bacchiochi Well Field (Upper Titicus Aquifer)	2) Construct well, pumping station and treatment facilities as required; install 6000 feet of water main; resolve property rights issues
		3) Little Pond	3) Approximately 300 gpm yield; may require treatment or protective pumping due to previous contamination.
		4) Sugar Hollow Aquifer	4) Control measures will be needed to prevent future degradation of water quality.
Rural Water Company	Danbury	1) Two wells drilled in 1987;	1) None known.
		2) Drill additional well (Still River Watershed)	2) 1988
a. Cedar Heights	Ridgefield	1) -	1) Install customer meters to reduce demand (1988).
		2) Deepen existing well.	2) 1989

TABLE 3-10 - CONTINUED

ALTERNATIVE WATER SOURCES IN PRIORITY ORDER
FOR EACH WATER UTILITY SERVING GREATER THAN 1000 PEOPLE

WATER UTILITY	COMMUNITY SERVED	POTENTIAL SOURCE	ARRANGEMENTS REQUIRED FOR DEVELOPMENT OF SUPPLY SOURCE (1)
Rural Water Company (Continued)			
c. Ridgefield Lakes #10, 10A, 16, 17	Ridgefield	1) New well	1) Run main to new well on corner of Rustic and Bennetts Farm Road, bring in electricity, meter, etc. (1988).
d. Ridgefield Lakes #15	Ridgefield	1) Interconnect with Ridgefield Lakes #10A, 16, 17	1) To be implemented in the event that the existing wells construction deficiency is not corrected and is abandoned (1989).
e. Brookfield Division	Brookfield	1) Drill well on existing lot or have developer drill well, or 2) Interconnect with Candlewood Acres system. 3) Interconnect with Iron Works Aqueduct system.	1) As prerequisite for extension of system (1990). 2) Buy Water (1990) 3) Buy Water (1990)
f. Ken Oaks	Danbury	1) Interconnect with Danbury	1) 1990
g. Ridgefield Lakes #5 & #14	Ridgefield	1) Interconnect with Ridgefield Lakes #15 or #7 & #18	1) Long-term (after 1992)
h. Ridgefield Lakes #7 & 18	Ridgefield	1) Drill new well on #18 property	1) Long-term (after 1992); also install new boosters.
Rural Water Company	Brookfield	-	Engineer and construct extended water system in southern Brookfield with developer contributions and/or financing backed by guaranteed revenues - long-term.

TABLE 3-10 - CONTINUED

ALTERNATIVE WATER SOURCES IN PRIORITY ORDER
FOR EACH WATER UTILITY SERVING GREATER THAN 1000 PEOPLE

WATER UTILITY	COMMUNITY SERVED	POTENTIAL SOURCE	ARRANGEMENTS REQUIRED FOR DEVELOPMENT OF SUPPLY SOURCE (1)
Rural Water Company	New Fairfield	-	Engineer and construct extended water system in New Fairfield with developer contributions and/or financing backed by guaranteed revenues - long term.
Watertown Fire District	Woodbury	1) Hart Farm Well Field Expansion (Nonevaug Aquifer)	1) Test well program; District has made attempts to purchase surrounding land - watershed protection is a priority; address concerns associated with salt storage, brass pickling lagoons, and closed mixed waste landfills.
Woodbury Water Company	Woodbury	1) Well located on company owned land at Well #2 site.	1) Develop and construct by 1990.
Woodlake Municipal Tax District	Woodbury	1) Well site on five acre parcel owned by District (Pomperaug Aquifer)	

Notes: (1) In addition to satisfying DEP Diversion Permit Requirements; specific comments by DEP on individual plans reviewed to date are included in Appendix A

3.3.4 Coordination and Cooperation Between Utilities

The Integrated Report discusses three forms of cooperation and coordination between utilities within the Management Area: interconnections, joint use facilities, and satellite management. Each of these is briefly reviewed in the following paragraphs.

3.3.4.1 Interconnections

The questionnaire sent to WUCC members requested information concerning interconnections between the various utilities. It appears from the responses that interconnections have not been widely used as a means to augment supply in individual systems. Over 100 utilities were polled and 34 responded. Of these, only ten reported interconnections or any plans for them. Despite the lack of existing interconnections, many utilities did express an interest in interconnecting or sharing facilities in response to a DOHS questionnaire. Responses for both existing and potential interconnections are summarized in Table 3-11.

Recommendations made in the Integrated Report regarding interconnections in the Management Area included the following:

- . Given the potential financial burden to smaller utilities of the area for interconnection installation, financial assistance programs are needed to foster an interconnection program for the area.
- . The State should take an active role in the overall coordination of interconnections and provide the motivation for developing accurate data and integrating this data into a viable management tool.
- . Interconnections planning for effective and equitable transfer of water, particularly under emergency conditions, must be planned by an independent body, by the WUCC or the State.

- . The WUCC endorses the philosophy and use of interconnections as appropriate. It is recommended that priority effort be directed toward the development of a consistent and reliable program of generating, confirming and updating information on interconnections, with particular emphasis on emergency links. The State should exercise the authority and, if deemed appropriate, provide the funding required to obtain accurate data.

- . It is recommended that the basic requirements for data include:
 - (a) A consistent definition of flow quantities available through an interconnection.
 - (b) Determination of actual flow quantities and the physical condition of interconnections.
 - (c) Operation of the interconnection must be specified and access to valve controls confirmed.
 - (d) The impact of operating interconnections which have not been utilized for long periods of time should be evaluated. Data on operating integrity, siltation and potential stagnant water quality problems are to be evaluated.
 - (e) In general, the inconsistencies and data voids reported in the WUCC questionnaire should be investigated.

- . Emergency interconnections, which see little or no use for extended periods, should be inspected at regular intervals, not less frequently than annually.

- . A comprehensive program of testing of interconnections should be prepared and implemented.

- . A detailed study should be undertaken as soon as possible to create a comprehensive strategic interconnection plan for the entire Management Area.

3.3.4.2 Joint Use

An examination of the questionnaires returned at the commencement of the project indicates there has been no joint use of any type within the management area to date by those responding. However, it is more than likely that some exchanges do take place in times of emergency. A good example of this is the loaning of a generator to Rural Water Co. by the Danbury Water Dept. when power was lost during an early snowstorm in October, 1987.

It is likely that such exchange of specialized equipment between area utilities will be continued for emergency conditions, but this method is very much limited to abnormal times and emergencies and is also restricted to the very specialized type of equipment concerned. The exchange or joint use of staff for such items as meter reading is also unlikely to become a major factor in view of the unskilled nature of meter reading and the preference in the circumstances for using the water utilities staff who normally work in other areas.

The greatest potential for future joint use in the Housatonic area will most likely be in the area of shared use of either a raw water source or transmission facilities for finished water. Candlewood Lake is the prime example of the proposed joint use of a water source. The City of Danbury would likely be the lead entity in developing this source, with suggestions made by various members of the WUCC to provide transmission and storage facilities which would allow the use of treated water from Candlewood Lake by utilities in at least Brookfield and New Milford (most notably the New Milford Water Company).

Another realistic joint use concept that has been advocated by the WUCC is the creation of a two-way finished water transmission main along the proposed Route 7 corridor which would link the Danbury and Bridgeport Hydraulic Company systems, thereby providing emergency backup for both systems as well as basic or supplementary source of supply for systems along the potential route.

3.3.4.2 Satellite Management

The regulations issued with Public Law 85-535 require a plan for satellite management or transfer of ownership which identifies the utilities which have both the ability and willingness to assume satellite management, the identification of public water systems willing to have such management provided by another utility and the development of a water system satellite management program. For the purposes of this report, satellite management was defined in the broadest possible sense, and included actions ranging from simple assistance in operations or meeting regulatory requirements to complete takeover of another utility. Unfortunately, the responses to the questionnaire did not indicate widespread interest in, or current use of, such management in the Housatonic Management Area. However, good examples of satellite management can be found in the Area, including the operations of R. J. Black and Son, the group of utilities operated by the Rural Water Company, and the operation of three Housatonic-area divisions by General Waterworks.

Additionally, General Waterworks presently provides satellite management services, and will pursue additional such services in their exclusive service areas. However, each potential system will be carefully scrutinized before an agreement is entered into.

Although there are not many utilities presently providing satellite management in the area, a number have expressed an interest in providing such service in the future, including the following:

<u>UTILITY</u>	<u>COMMUNITY</u>
General Waterworks Corp.	Any water company in study area subject to feasibility
New Milford Water Co. Newtown Water Co. Woodbury Water Co.	New Milford Newtown Woodbury
Rural Water Co.	Bethel, Brookfield, Danbury, New Fairfield, Ridgefield
Bridgeport Hydraulic Co. Heritage Village Water Co.	Any community in study area considered on case-by-case basis

UTILITY

COMMUNITY

R. J. Black & Sons, Inc.

Any small water company in study area subject to feasibility

Ridgefield Water Company

Considering for one new system (Bakes Property)

The WUCC regards the potential for future use of satellite management as being very great, and offers the following recommendations:

- . Small water utilities should review their future position and, coupled with their known deficiencies, if any, decide if they should be a candidate for satellite management.
- . The larger utilities which would become the managers should review the items which they can offer, both management and otherwise and who would make good satellite utilities, bearing in mind proximity, size, etc.
- . DOHS should be prepared to advise all WUCCs, particularly on provisions of the Safe Drinking Water Act Amendments and regulations as they occur from time to time, and should also act as liaison between the other departments of the State having jurisdiction. This point is particularly pertinent as to the need for the State to ensure that the various utilities are kept cognizant of current and proposed monitoring requirements of the Safe Drinking Act Amendments.

3.3.5 Minimum Design Standards

The WUCC has agreed to adopt, as a base, the minimum design standards embodied in the recently promulgated Final Regulations for issuing certificates of public convenience and necessity for small water companies. However, the WUCC has strongly emphasized the need for flexibility in applying these standards to specific situations, and has noted the desirability of maintaining individual utility standards where they have been shown to be appropriate.

3.3.6 Financial Data

No projects of areawide significance are proposed in the Areawide Supplement as necessary to meet the future water supply needs of the Housatonic Management Area. However, the WUCC did discuss the possibility of eventually constructing treated water linkages between Danbury and the Bridgeport Hydraulic Company and between Danbury and the New Milford Water Company as a means of strengthening the emergency and supply backup capabilities of a variety of the area's systems. Danbury would likely be the lead agency for financing the New Milford link (probably through the issuance of bonds), with benefiting utilities paying for services provided by Danbury on a contractual basis either in terms of their assistance with the initial funding or in a negotiated annual cost. A similar contractual system could be used to pay for the proposed Danbury-Bridgeport Hydraulic link, which is preliminarily estimated to cost on the order of \$15 million - a cost which could increase substantially if the link is not built in conjunction with the new Route 7.

Certain projects proposed in the Areawide Supplement do affect more than one supplier or customer group, such as proposed interconnections and the takeover of failing systems by other utilities. The financial implications of these proposals are generally not significant on an areawide basis. However, financial issues associated with interconnections or takeover of failing systems may be very significant to the utilities involved. Suggestions by the WUCC regarding financial assistance programs in these instances are as follows:

Interconnections

- . 100 percent grants
- . combination grants and loans
- . revolving state loan fund with low (or zero) interest which a utility borrows from and returns payment to for future use by other utilities
- . financing of small utilities' costs by larger utilities with a negotiated payback

TABLE 3-11
INTERCONNECTION STATUS

redacted
more

I. EXISTING AND PROPOSED INTERCONNECTIONS

<u>UTILITY</u>	<u>CONNECTED UTILITY</u>	<u>CAPACITY AND DIA</u>	<u>LEGAL AND FINANCIAL AGREEMENT</u>	<u>METER</u>	<u>MANAGEMENT AND COMMENTS</u>
Bethel Consolidated Water Company (Chimney Heights system)	Danbury Water Dept.	-	-	-	Proposed 2-way connection for emergency backup purposes; presently city has a moratorium on water and sewer main extensions
Rural Water Company (Ken Oaks Division)	Danbury Water Co.	-	-	-	Possibility of augmenting supply to 50 residential customers in peak periods
Danbury Water Dept.	Ken Oaks Division (Rural Water Co.), Robin Hill	-	-	-	Possibility of water sales (proposed) Existing
	Hollandale Estates (Topstone Hydraulic Co.), Briar Ridge Indian Spring Water Co.	-	-	-	Existing Existing Proposed
New Milford Water Co. (General Waterworks)	Sunny Valley Tax District Lone Oak Water Co. Millbrook Water Co. Camelot Estates Water Co. Parkwood Acres	-	-	-	Anticipates serving on a standby basis only Wholesale service, awaiting DPUC approval Uncertain, in DPUC hearing process, potential interconnection or takeover Negotiating interconnection or takeover Negotiating interconnection or takeover
Hollandale Estates (Topstone Hydraulic Co.)	Danbury Water Dept.	-	-	-	Plans to purchase water
Fairfield Hills Hospital	Newtown Water Co. to Newtown Housing for the Elderly	-	No Agreement	No Metering	
Heritage Village Water Co.	Woodbury Water Co.	-	-	-	Emergency above-ground connection between hydrants on Route 6 possible
Watertown Fire District	City of Waterbury Bureau of Water	-	-	-	er received
Bridgeport Hydraulic	Norwalk First Taxing Distri Norwalk Second Taxing District New Canaan Water Co. Stamford Water Co. Connecticut-American Water Company South Central Conn. Regional Water Authority	-	-	-	Completed in 1985 Completion expected in 1989 Completion expected in 1989 Completed in 1986
Norwalk First Taxing District	Bridgeport Hydraulic Co. Norwalk Second Taxing District	-	Yes	-	

TABLE 3-11
(continued)

INTERCONNECTION STATUS

II. UTILITIES INTERESTED IN INTERCONNECTING
WITH ANOTHER WATER COMPANY (1)

<u>TOWN</u>	<u>WATER COMPANY</u>	<u>COMMENTS</u>
Brookfield	Iron Works Aqueduct Co. Newbury Crossing Rollingwood Woodcreek Village	Open to suggestions Possibility Possibility Interconnection with a municipal system if ever available
Danbury	The Cedars Indian Springs Ta'Agen Point Siboney Terrace Snug Harbor Development Corp. Ridgefield Water Co.	Interconnect with Danbury Water Dept. for supplies in emergencies Suggest interconnection with Danbury Water Dept. Unsure Open to proposals Danbury Water Dept. and Ridgefield Water Co. exploring interconnection in Ridgebury area of Ridgefield
New Fairfield	Hollywyle Park	Possibility
New Milford	Millstone Ridge	Depends on conditions
Newtown	Bay Colony Mobile Home Park	Possibility
Ridgefield	Acre Lane, Inc. Danbury Water Dept.	Possibility-unsure Danbury Water Dept. and Ridgefield Water Co. exploring interconnection in Ridgebury area of Ridgefield
Sherman	Holiday Point Assoc.	If needed

Note: (1) Data compiled from 1986 Connecticut Department of Health
Services Planning Questionnaires for utilities serving less than
1000 people. The remaining utilities answered "No" or unknown.

Takeover of Failing Systems

- . 100 percent grants
- . combination grants and loans
- . revolving state loan fund with zero interest
- . guaranteed (State-backed) loans from local lending institutions

The WUCC has also emphasized the need for capital expenditures not covered by these suggested programs to be borne to a greater extent by the customers of the failed utility.

3.3.7 Impacts of the Plan on Other Uses of Water Resources

The Water Diversion Policy Act administered by the Connecticut Department of Environmental Protection now serves as a vehicle for insuring the compatibility of the various uses of water resources from which a diversion has been requested. A permit is required under the diversion program for any withdrawal of 50,000 gallons or more during any 24-hour period from either a surface water or groundwater source. Applications for flow diversion permits must include all physical details of the work, as well as the diversion's probable effects on the following:

- public water supplies
- water quality
- wastewater treatment needs
- flood management
- water-based recreation
- wetland habitats
- waste assimilation
- agriculture
- fish and wildlife
- low flow requirements
- groundwater
- adjacent wells
- hydropower

The Housatonic WUCC fully supports the informational and public notification requirements of the diversion regulations. The WUCC believes that these regulations are a sound vehicle for ensuring a proper balance between competing uses of proposed water sources, and

that the future water supply sources proposed herein will be shown by the diversion permitting program to be fully compatible with other water resource uses.

3.3.8 SUMMARY

3.3.8.1 Overview of the Results of the Planning Process

At the start of the coordinated water system planning process, it was clear that the Housatonic Management Area was beset with a variety of problems related to the many small, sometimes poorly run, existing utilities; the potential for conflicts among utilities in terms of future service areas; the lack of areawide land use controls for protection of water sources; the need for additional sources for certain utilities; and the relative isolation of the utilities' management and personnel from each other. Now that this planning process is nearing completion, we see improvement in a number of these areas, with a program established to address all problems in the near future.

Major accomplishments of the planning process include the following:

- The process has established a delineation of areas within which service will be provided by a single utility, thus allowing future supply needs to be clearly defined while providing municipal officials and developers with an understanding of how water service will be provided.
- Sources required to meet the projected demands of the Area have been identified in accordance with the individual plans prepared by the various utilities.
- The present status of watershed protection measures in each community in the Management Area has been defined, with suggestions made for improvements in plans of development or zoning controls where shown to be appropriate.

- Various deficiencies of the many small utilities have been catalogued, with general recommendations made (Section 3.5) for cooperation and coordination measures needed to address these problems.
- Finally, the coordinated planning process has served to bring more of a sense of common interests and concerns to the various utilities who have regularly participated. The WUCC meetings have acted as a vehicle for utility managers to get to know each other better and to informally discuss long-standing problems and potential solutions. The WUCC feels that this exchange has been a healthy one, and is reviewing ways in which the group that has been active in the process can continue to meet regularly to discuss issues of common concern.

The issue of inadequate small utilities is an extremely broad one, and is likely to continue to trouble the Housatonic Area in the near future. A review of the Assessment shows a variety of problems with these small systems, with those most frequently observed including the following:

- raw water quality problems (most often coliform or sodium)
- quantity of supply problems
- no emergency power
- single source of supply
- undersized distribution systems
- lack of adequate financial resources
- lack of adequate management
- no firefighting capability

Quality concerns are most pressing, and have been observed in at least 42 systems: 38 of which are classified as small systems. All but two of these small systems should be able to interconnect to a larger utility during the planning period, thereby allowing the abandonment of their present sources. (Perhaps as many as 21 of these systems may need

to wait for the larger system to expand before an interconnection will be financially feasible. Thus, some interim improvements may be necessary.) Others will have to provide treatment - an option which is always open for all systems in lieu of interconnecting, but one which the WUCC wishes to see minimized.

Problems in delivering an adequate supply of water at all times are next in severity to those associated with quality, with water use restrictions or safe yield shortfalls reported in the Assessment for 30 small utilities. Interconnections can play a major role in solving many of these reported problems, although some further study of the smaller systems may be necessary in order to better define actual safe yields. This latter point is emphasized by the apparent conflict in supply problems noted in DOHS files and reported in the Assessment and the lack of calculated deficits shown for small systems in Section 3.4. Interconnections can also alleviate concerns associated with single source systems - a situation which was noted for 37 small utilities in the management area.

3.3.8.2 WUCC - Recommended Solutions to Identified Problems

At one time during the preparation of this plan, the WUCC considered the publication of a list of generic solutions keyed to solving the problems in evidence at each of these smaller utilities. After discussion, the WUCC decided it was more appropriate to simply recommend that each of the problem situations be thoroughly reviewed by a water supply professional hired by the individual utility, with specific solutions offered to the specific problems of each utility. The WUCC believes that many of these solutions involve the implementation of one or more of the actions discussed in the Integrated Report (interconnections, joint use, or satellite management). The utilities in the WUCC are committed to the philosophy expounded in the Integrated Report of furthering these cooperative actions, and will lend whatever assistance is required to address the problems of these problem-plagued small utilities within the limits of reasonable technical and financial constraints.

This philosophy will form the cornerstone of the Management Area's future program to address the variety of problems identified in the Water Supply Assessment. By way of summary, these general problems, and the WUCC's proposed approach to their solution, are as follows:

1) Inconsistent Data

This problem will be eased for the larger utilities through the inclusion of their individual plans in the final Coordinated Plan. The questionnaire used in the course of preparing the Water Supply Assessment has filled some of the remaining data gaps, with the WUCC recommending that the State take an active role in filling remaining small system data gaps.

2) Need for Technical and/or Managerial Support/Information

The WUCC encourages greater use of satellite management to meet these needs, with the type of management provided ranging from simple assistance in routine operation and maintenance to system takeovers. The following utilities in the Management Area have stated their willingness to provide a variety of satellite management services on a case-by-case basis:

- New Milford Water Company (General Waterworks)
- Newtown Water Company (General Waterworks)
- Woodbury Water Company (General Waterworks)
- Rural Water Company
- Bridgeport Hydraulic Company
- Heritage Village Water Company
- R. J. Black and Son, Inc.
- Ridgefield Water Supply Company

3) Regulatory Burden

The WUCC urges the State to allow greater flexibility in terms of minimum design requirements, diversion permit requirements (especially as related to interconnections), rate relief in instances where failed utilities must be taken over, and financial assistance programs for these takeover instances or to further interconnection programs. The WUCC strongly suggests that the State devise simpler rate increase appli-

cations for all utilities regardless of size, and points out that these simpler applications can be structured so that truly pertinent issues are highlighted rather than being hidden in a mass of marginally-useful information. The WUCC agrees in general with the concept of differing State requirements for Class A utilities, but feels that the present Class A definition (greater than \$100,000 in gross annual revenues) is too inclusive, and creates undue burdens for those smaller utilities which are now categorized as Class A. The point has been made that a Class A designation is now roughly applicable to all systems of 300 or more connections. Some members of the WUCC have called for a new Class A definition which considers the number of accounts serviced by a utility and sets the Class A cutoff at a considerably higher number of accounts than is now the case. The WUCC has also noted the coming increase in regulatory burdens associated with complying with the requirements of the amendments to the Safe Drinking Water Act, and believes that satellite management in terms of operational assistance, monitoring and sampling, and meeting the reporting requirements of the Act will become increasingly common in the Management Area.

4) Irresponsible Management

The WUCC now believes that the term used in the Assessment (irresponsible management) was too harsh, with the vast majority of inadequate systems in the Area suffering more from inadequate financial, technical, or on-site managerial resources than from deliberate mismanagement. In general, this lack of on-site capabilities is due to the fact that the water system is a secondary concern of many small "utilities" that concentrate most of their efforts on overall property management. However, there are a few systems which are operated in an irresponsible manner, with full satellite management (or takeover) the WUCC-recommended solution to such instances following their identification by the State.

5) Potential Groundwater Problems

The WUCC has recommended that these problems be minimized through the use of protective zoning in aquifer (and watershed) areas. As a further safety factor, the WUCC has also identified, and recommended protection of, other potential sources which are not shown to be needed through the year 2030 given simple calculations of projected demand versus estimated source yields.

6) Regulatory Barriers to the Use of Some Supplies

The WUCC strongly recommends that State policy and law be amended to allow the use of Candlewood Lake, which is presently a Class B water body, as a source of public water supply.

7) Aging and/or Substandard Infrastructure

For larger utilities, replacement and upgrading needs are addressed in their individual plans. For smaller systems, these problems have been addressed by the WUCC in terms of their concurrence with DPUC's minimum design standards. It will remain up to the State to identify those smaller systems with substandard infrastructure and to require their replacement or upgrading.

8) Financing

Many of the utilities in the Area may continue to suffer from a poor financial base - a situation which will make it difficult to make needed system improvements, and which may lead to some form of satellite management or system takeover for the hardest-pressed smaller utilities. Financing of system upgrades, including those necessitated by the amendments to the Safe Drinking Water Act, and replacement of old or inadequate components may be difficult for many of the otherwise well-run utilities in the Area regardless of size. There is a clear need for a State program of loan guarantees,

grants, or revolving funds to allow these improvements to be made without creating an undue rate burden for present system customers.

9) Lack of Local Ordinances for Water Supply Protection

The WUCC has thoroughly addressed this problem in Section 3.3, and has identified areas requiring protection as water supply sources, areas which presently have land uses in conflict with protection goals, and steps needed to provide appropriate levels of water supply protection.

10) Competing Uses of Sources

The Coordinated Plan has found virtually no need for development of new water supply sources through the year 2030. Thus, no conflicts are anticipated. However, unanticipated demands may arise (or better data may be developed) which will show the need for development of the various potential sources identified by the WUCC in Section 3.4. Should such a situation present itself, any potential conflicts (which are also identified in Section 3.4) will be addressed through the State's diversion permit program.

11) System and Source Reliability

Again, the major utilities in the WUCC have demonstrated in their individual plans the means by which their systems and sources can satisfy the needs of their exclusive service areas through the year 2030. These improvements will be constructed to conform to the minimum design standards endorsed by the WUCC, which will also assure system and source reliability for smaller utilities as specific problems are identified by the State. (Single source systems can also be enhanced by the WUCC's commitment to an interconnection program.)

12) Lack of Coordination Between Utilities and Communities

This concern was primarily addressed to the need for utilities and communities to work together to protect existing and potential water supply resources, and has been addressed by the WUCC in the land use compatability discussion in Section 3.3.

13) Conflict of Service and Franchise Areas

The WUCC members have worked well together in establishing the exclusive service area boundaries recommended in Chapter Two, with no conflicts arising relative to one utility requesting service rights in another's franchise area.

14) Lack of Coordination Between Utilities

As noted earlier, the WUCC process itself has represented a great step in the direction of further cooperation among the larger utilities in the Housatonic Management Area. Ready agreement was reached in a variety of areas of concern, including exclusive service areas and future philosophies regarding interconnections, joint use, satellite management, and land use protection. However, most of the small utilities have not participated in the WUCC process, and concern still exists over the general lack of coordination and communication among these small utilities and between these utilities and the larger systems in the Area.

15) Lack of Adequate Incentive To Be a Satellite Manager

As discussed in the Assessment, this problem is related to satellite management in the sense of the actual takeover of a troubled utility. The issues which act to discourage such action are diverse, and are not readily subject to resolution through the WUCC. It is clear that more needs to be done to compensate a utility which takes on the responsibility of owning or operating a troubled system, starting with the need to establish the right of the acquiring utility to seek

premium rates of return on any investments necessary to bring the acquired utility up to minimum design standards and operating conditions. The State should devise a program which assures both that negative financial impacts will not accrue to the acquiring utility or its customers as a result of such a takeover, and that the acquiring utility cannot be held liable for actions taken by the previous owners/operators of the acquired system.

3.3.8.3 Ongoing Program for the Housatonic Management Area

Although the WUCC feels that the two-year Coordinated Planning Process has produced many valuable results, perhaps the greatest result is the understanding that much remains to be done. In many instances, the Areawide Supplement has proven to be more a broad plan for future action than a specific series of solutions to existing problems. The WUCC strongly believes that the programs outlined in the Areawide Supplement are critical to assuring the continued availability of adequate quantities of potable water for the Management Area, and intends to serve in a continuing role as an expediter and check-point organization for these programs. The WUCC intends to actively pursue goals set during the planning process, and will continue to assign responsibilities on a committee basis to accomplish the following:

- Lobbying for regulatory relief, particularly in terms of rate increase applications, source availability, and troubled utility takeover programs.
- Encouraging and expediting interconnections whenever financially and physically feasible.
- Working with community officials in order to assure proper zoning and development in critical aquifer recharge and watershed areas.
- Working with the State in correcting the remaining instances of irresponsible management.

- Working with the State and other WUCC members to optimize coordination and cooperation between utilities, particularly in terms of assisting in the development of satellite management programs to meet the specific needs identified for the various smaller utilities reported to exhibit system deficiencies.

The WUCC's work in these areas will be in addition to their statutory responsibilities, which include review and approval of all significant changes to the Coordinated Plan (including individual plans, exclusive service areas, etc.) and future comprehensive updates of the Areawide Supplement. These updates must be conducted at least every ten years, but are likely to be done at closer intervals due to the continuing potential for growth and change in the Housatonic Management Area.

REFERENCES

1. Hayes, John, "Urban Development and Water Quality Protection, Housatonic Valley Region," prepared for HVCEO, July, 1979.
2. Connecticut Department of Health Services, "Working Draft Watershed Protection Handbook", March 1988.
3. Connecticut Department of Environmental Protection, "Protection of High and Moderate Yield Stratified Drift Aquifers", 1987.
4. Harrison and Dickinson, Connecticut Department of Environmental Protection, "Protecting Connecticut's Groundwater", 1984.
5. Connecticut Office of Police and Management, "State Policies Plan for the Conservation and Development of Connecticut, 1987-1992", adopted June, 1987.
6. Housatonic Valley Council of Elected Officials, "Regional Water Resource Atlas", Bulletin No. 37, June 1985.
7. Aquifer Protection Task Force, "Report of the Aquifer Protection Task Force to the General Assembly," March 1988.

APPENDIX A

HOUSATONIC WATER SUPPLY
MANAGEMENT AREA

RESPONSE TO COMMENTS ON FINAL DRAFT REPORTS

A number of comments were received during the course of public review of the Water Supply Assessment, Exclusive Service Areas Report, Integrated Report, and Executive Summary for the Housatonic Water Supply Management Area. Public comments were incorporated in the versions of the Water Supply Assessment and Exclusive Service Areas Report, which were published in April and December, 1987, respectively. Only one minor additional comment was received on the Exclusive Service Areas Report, which will be incorporated into the appropriate section of the Executive Summary. Thus, the above-noted versions of the Water Supply Assessment and the Exclusive Service Areas Report are now considered to be final.

Several comments were made on the Executive Summary and Integrated Report following their publication in June, 1988. These include the following:

- State of Connecticut Department of Environmental Protection comments dated July 26, 1988
- Town of New Fairfield comments dated July 27, 1988
- State of Connecticut Office of Policy and Management comments dated August 1, 1988
- Bridgeport Hydraulic Company comments dated August 2, 1988

Each of these comments, and the manner in which they were addressed, is reviewed in the following pages, with reference made to areas of change in the draft Integrated Report or Executive Summary.

I. State of Connecticut Department of Environmental Protection
Comments dated 7/26/88

Comments related to the Executive Summary:

1. page i - With regard to interconnections, DEP is of the opinion that the WUCC should evaluate the potential for interconnections, especially near Candlewood Lake, rather than developing guidelines and philosophies. As mentioned on page 3.5.11 of the Integrated Report, "the opportunity does exist on a localized basis for small utilities to increase their system reliability with interconnections (particularly for emergency situations)." Yet the Integrated Report only provides one general "example" of interconnecting four to five systems in the Candlewood Neck area. The Housatonic WUCC should develop a comprehensive strategic interconnection plan for the region that assesses the need for and the means to interconnect all necessary systems, large and small.

Response:

The WUCC believes that the development of a comprehensive strategic plan for interconnections must be based on a detailed review of engineering and physical data pertinent to each system being considered. Such a review is well beyond the scope and budgetary capabilities of the WUCC under this present planning process. The WUCC agrees with the need for such a plan, and has added a specific recommendation in this regard on pp. 3.17 and 3.18 of the Executive Summary. In addition, the WUCC suggests that a portion of the funds which have accumulated or will accumulate in 1988 and 1989 which are designated for Coordinated Water Supply plans be set aside for this interconnections study.

2. page iii - first full paragraph - The Housatonic WUCC has not demonstrated the need for use of Class B waters. Consequently, it is premature for the Housatonic WUCC to recommend that state agencies relax existing policy and allow for the potable use of Class B waters.

Response:

Upon review, it is apparent that too broad a position was taken in the draft documents regarding recommendations for use of Class B waters. The WUCC's intent is to recommend that Candlewood Lake be considered as suitable for use as a potable water source - not necessarily all Class B waters. We believe this recommendation is valid whether or not a clear need has been demonstrated for this source prior

to 2030 in terms of a simple balance between supply and demand, and that other considerations must be taken into account in terms of the economics and engineering realities involved in linking different portions of Danbury's water system versus new source development. These points have now been incorporated in both the Executive Summary and the Integrated Report (see changes to pp. iii and 3.28 in the Executive Summary and to p. 3.9.6 of the Integrated Report).

3. page iv - second bullet - With presumably many small systems experiencing difficulties meeting demand during peak periods or during below normal ground water conditions, developing a comprehensive plan with specific recommendations for interconnecting troubled systems is a more appropriate goal than "encouraging and expediting interconnections wherever financially and physically feasible."

Response:

See response to Comment No. 1.

4. page 2.1 - Exclusive Service Areas - Note that an evaluation of the ability of a water utility to provide a pure and adequate supply of water to the existing and exclusive service area is being conducted as part of the review and approval of the individual water supply plans. Consequently, exclusive service area boundaries may be modified based on this evaluation. The report should reflect this possibility.

Response:

Text has been added to p. 2.1 to address this comment.

5. page 3.7 - top of page - The WUCC should develop specific recommendations and a strategic plan that fosters cooperation. If the potential for cooperation exists, then there is real opportunity for each system to agree to pursue specific measures that would result in a more coordinated approach to managing and operating systems in the Housatonic Water Supply Management Area.

Response:

The WUCC believes that the philosophies, conclusions, and recommendations espoused in Section 3.5 of the Integrated Report, and discussed in pp. 3.16 through 3.20 of the Executive Summary, lay the groundwork for moving toward greater cooperation among utilities. The WUCC believes that the evolution of a strategic plan for cooperation will be an

7/26/88 CT DEP Comments (Cont'd.)

ongoing effort, and the development of such a program has been specifically identified as an ongoing responsibility of the WUCC (see p. 3.32 of the Executive Summary).

6. page 3.10 - top of page - Include the fact that conflicts may also be associated with ground water sources (i.e., flow and quality impacts on adjacent streams and impacts on other wells in the same aquifer).

Response:

Text has been added to p. 3.10 to address this comment.

7. Table 3-10 - Danbury, Ball Pond Brook Diversion - Add under Arrangements required... "Change in State Policy and Law regarding Class B water use."

Response:

Ball Pond Brook is presently Class B with a goal of A. Thus, we do not believe such a change in State policy or law is required, presuming steps are continuing in an effort to meet this classification goal.

8. page 3.22 - Section 3.37, first sentence - Change "water diversion regulations" to "Water Diversion Policy Act".

Response:

Changed as per comment.

9. page 3.28 - #6 - Lacking any demonstrated need, this recommendation to permit the use of Class B waters for potable purposes is premature and inappropriate.

Response:

See response to Comment #2 above.

Comments related to the Integrated Report:

1. page 3.1.2 - second paragraph, Exclusive Service Areas - Note that an evaluation of the ability of a water utility to provide a pure and adequate supply of water to the existing and exclusive service area is being conducted as part of the review and approval of the individual water supply plans. Consequently,

exclusive service area boundaries may be modified based on this evaluation. The report should reflect this possibility.

Response:

Appropriate text changes have been made to p. 3.1.2.

2. page 3.1.3 - Section 3.1.2, first paragraph, last sentence - The ability to provide an adequate supply of water to existing and exclusive water services areas is under evaluation as a part of individual water supply plan approvals and this evaluation may also influence the content of this report as well as chapter 2, Exclusive Service Areas. This point should be made.

Response:

Appropriate text changes have been made to p. 3.1.3.

3. pages 3.4.3 to 3.4.5 - Class B Waters - According to Section 3.2 and the first paragraph of Section 3.4.2, the "Housatonic Water Supply Management Area does not need large quantities of additional supply to meet the needs presently projected through the year 2030." Only one system, the Craigmoor Division of the Rural Water company, is projected to experience a water deficit. Danbury, the largest system in the water supply management area, apparently has enough supply to satisfy projected needs. Consequently it is inappropriate to consider Class B waters such as Ball Pond and Candlewood Lake as potential sources of supply when there is no demonstrated need for water and other, more desirable options exist. Recommending a modification of water quality classifications to allow for the potable use of Class B waters is premature and unwarranted.

At a minimum, the entire discussion of Class B waters should be preceded by a very clear statement indicating that the WUCC projects that the region will not need to consider the use of either Ball Pond or Candlewood Lake at least until 2030 because existing sources are sufficient to satisfy projected needs.

Response:

Some changes have been made to p. 3.4.6 to indicate that not all of the anticipated supply improvements have come on line as of September, 1988. The Class B discussion has been clarified to indicate it is specific to Candlewood Lake, with the need for this source (or Ball Pond Brook) dependent on the outcome of detailed engineering studies as

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to the best means by which supply can be supplemented to the Margerie portion of the Danbury system.

4. Table 3.4.3 - Danbury, Ball Pond Brook Diversion - Add under Arrangements Required... "Change in State Policy and Law regarding Class B water use."

Response:

See response to Comment No. 7.

5. page 3.5.2 - second paragraph - A comprehensive feasibility study of interconnections for utilities around Candlewood Lake is needed.

Response:

Such a study is now a recommendation of the WUCC and is included on p. 3.5.23 of the Integrated Report.

6. page 3.5.11 - See Executive Summary comment #1.

Response:

See response to Comment No. 1.

7. page 3.4.1 - Alternative Water Resources for Future Supply Needs - To assist the Housatonic WUCC evaluate water quality, water quantity, habitat and land use constraints and conflicts associated with potential sources of supply, DEP has attached preliminary draft comments on individual water supply plans that relate to source development. These constraints should be summarized and appear in Table 3.4.1 under "Items To Be Addressed Prior to Use of Potential Source" as well as in Table 3.4.2 under "Arrangements Required for Development of Supply Source."

Response:

The additional constraints and conflicts noted by DEP have been included in this Appendix, with a reference provided in footnotes to Tables 3.4.1 and 3.4.2. The WUCC felt it inappropriate at this time to include these comments in the main text or tables of the report, since not all individual plans have as yet been reviewed by DEP.

II. Town of New Fairfield Comments dated July 27, 1988

1. ADEQUACY OF PRESENT SUPPLIES

From a regional viewpoint, it is satisfying that the Draft Executive Summary of the Housatonic Water Supply Management Area finds so little need for new supplies, while showing the necessity to protect existing future resources.

Response:

None required.

2. SUPPLY PROTECTION PRIORITIES

The draft summary bears out substantially the opinions New Fairfield has expressed to WUCC several times during the course of your study. Analysis of numerous portions of the draft bears out New Fairfield's position that Candlewood Lake, designation Class B, is greatly to be preferred over Ball Pond Brook, also Class B, as a potential future water resource for Danbury.

We concur, and always have, that Danbury's completion and utilization of the West Lake Diversion, adding 800-900,000 gpd to Danbury's yield, is number one on any priority list. At the same time, we think omission of obvious other sources within Danbury from tables and priority consideration is an error.

Those internal sources ought to be higher in priority than either Candlewood Lake or Ball Pond Brook, if only because the majority of them are currently being used to a small part of capacity and are class AA, while one unutilized one has only to be tapped to be AA, and another was used in the past.

Were Danbury to complete the West Lake project, that alone would restore the SURPLUS shown in Table 3-3 to the level of year 2000, from that shown in the Table for year 2030!

The draft text speaks of intended interconnections of the Danbury Water Department (DWD) with Bridgeport Hydraulic, which now serves some Danbury customers. If they develop the Sugar Hollow Aquifer jointly, either 500,000 gpd (Army Corps figure) or 1,000,000 gpd, DWD, figure would be added.

Even the smaller Sugar Hollow Yield, 500 gpm, plus West Lake, would return the year 2030 surplus to within 1,000,000 gpd of the 1991 projected level, while any approach to the DWD figure would, of course, far exceed the present projected 1991 level, carrying it nearly all the way back to 1986 levels!

7/27/88 N. Fairfield Comments (Cont'd.)

However, another source comes up to 522,000 AA gallons per day. There are seven (7) functioning Danbury residential developments with a surplus, year 2030, projected for unutilized capacity 50 years from now. Each of these units has a surplus over 30,000 gpd, of which the three (3) largest are 205,000, 85,400, and 60.6. Likewise, there are quite a few with a median yield above 25,000-28,000.

WUCC and State policy make clear that 50 years from now a large number of these presently private utilities will be integrated into DWD within Danbury.

Thus far, we have not referred to any wells that Danbury lists among unused supplies; nor has mention been made of the formerly used booster reservoir that existed on the city-owned 528 acre Tarrywile Tract, formerly called the Parks property.

Looking only to its own internal resources, Danbury would have no trouble bringing year 2030 surplus back to 1986 levels, and then some. CLEARLY, IT IS COMPLETELY PREMATURE FOR DANBURY TO MAKE ANY ATTEMPT FOR DECADES AHEAD, TO DIVERT BALL POND BROOK, IF EVER. Certainly, such an application ought not to be considered prior to Danbury application to complete the West Lake Diversion and to utilize sources mentioned above.

Response:

This comment raises several points, with responses to each point as follows:

- Paragraph 1 - The classification of Candlewood Lake is Class B, while that of Ball Pond Brook is Class B with a goal of A.
- Paragraphs 2 and 4 - Although West Lake improvements are needed, such improvements will not improve the supply situation in the Margerie portion of Danbury's system.
- Paragraphs 3, 7, and 8 - The comments apparently all refer to the reported estimated yields for small systems which may someday be interconnected with Danbury. However, the WUCC has noted the serious concerns with the estimated yields for those small systems, and the difficulties involved in incorporating their sources into a larger system (see p. 3.2.6 of the Integrated Report). This point is also made on p. 3.4.7 as a key reason why sources in addition to those shown to be needed by a simple balance of estimated yields and system demands should continue to be

protected as potential potable resources. Overall, the WUCC does not believe it is prudent to assume that any large system in the Management Area will have its supply capabilities enhanced through interconnection with small systems.

- Paragraphs 5 and 6 - The interconnection referred to with Bridgeport Hydraulic (which does not serve any Danbury customers) is noted in the Integrated Report as a concept worthy of pursuing - it is premature to say that it is "intended." In any case, if such an interconnection were established, it would provide an economical means of transferring water and strengthening not only Bridgeport Hydraulic and Danbury's systems, but also that of the Ridgefield Water Supply Company. Given this shared use by three major systems, the projected increment associated with the Sugar Hollow Aquifer would have a fairly small impact on overall safe yields available to each system. However, response to emergency conditions would be greatly enhanced for all three.

- Paragraph 9 - Danbury has on line, or available for use, all existing supplies which can feasibly be utilized. The Parks Pond noted in the comment has been previously investigated, and rejected for development for the following reasons:
 - minimal safe yield
 - need for remote treatment facilities
 - outside of present distribution system

3. DANBURY'S "HUB" DESIRE

Through Mr. Buckley, Danbury has stated its desire to be "the hub" of water supply for all public utilities within the Housatonic Region. Mr. Buckley previously has described this "hub" idea as his "vision".

The desire to implement such ideas or visions may underlie the study group comment on page iii "... Utilities may wish to develop new sources for reasons other than safe yield shortfalls, such as economics, location within the system..".

The study group comments on page ii "...The WUCC recommends that the State encourage these sorts of cooperative actions by simplifying or modifying several existing requirements. These recommendations include greatly simplifying (or eliminating) diversion permit requirements for interconnections..."

It must be made clear and specific that simplifying, modifying, or eliminating diversion permit requirements applies only to INTERCONNECTION OF DISTRIBUTION LINES BETWEEN PUBLIC WATER UTILITIES. It must be made clear it has no application to diversion permit requirements that exist for use of new sources of water.

Response:

The statement on Page iii is not directly related to Danbury, but has been included to demonstrate the WUCC's concern that future water supply be more than just a question of balancing supply and demand numbers, but also be reflective of the economic realities which face water utilities in terms of source location and transmission and treatment needs. Please also note the portion of the response to the previous comment, which noted the inefficiencies involved in incorporating the water sources of a number of small systems as they are taken over by, or interconnected with, a larger system. The statement on Pg. ii relative to diversion requirements is specific to interconnections between public water supply utilities.

4. DANBURY VS. NEW MILFORD

Included in your summary is the statement that Danbury in the future would treat Candlewood water, to supply the New Milford Water Company's future deficit.

The configuration of Candlewood is such that it conceivably can be tapped at some point in any of the five lake communities. Completion of Super Route 7, (surely somewhere around year 2000), accompanied by development of an industrial complex of over 300 acres in the Boardman Zone of New Milford, may well put an entirely different aspect on Danbury's "outlook" of New Milford Water Company needs.

Either for its own economics, or for earlier environmental orders from EPA or the State, the New Milford Water Company may provide its own water treatment plant. In that case, it would prefer the far shorter line tapping the Lake close to its plant, and any need to provide profits for DWD.

Response:

The New Milford Water Company has demonstrated the means by which it will satisfy projected demands through 2030 without a link to the Danbury system. Such a link is discussed in the Integrated Report and Executive Summary only as a positive means to strengthen emergency and backup capabilities of both systems, and should be kept as a

7/27/88 N. Fairfield Comments (Cont'd.)

possible project for future consideration regardless of supply development.

5. PRIORITY CHANGES

Your priority list (West Lake Diversion completion - #1) places Ball Pond Brook number 2. Candlewood number 3. We believe the last two priorities should be reversed and should be below Danbury internal supplies mentioned in section 2 of this letter.

Possibly because the Executive Summary Draft limits itself to supply, it has not taken into account a highly important environmental consideration that would place Candlewood higher in priority than Ball Pond Brook. That consideration is the Still River which needs more volume of water to be upgraded. Candlewood can safely yield a much greater volume than Ball Pond Brook.

Response:

The priorities are listed in the order shown due to the State's present classification of Ball Pond Brook as Class B with a goal of A and of Candlewood Lake as Class B. Thus, if a source were needed and if Ball Pond Brook had reached its goal of Class A, it would have to be developed before Candlewood Lake. Please note that the WUCC is recommending a change in the State's posture in this regard, as discussed in the response to DEP's comment 2 above. Diversion of water, other than indirectly via water use and waste discharge, is not considered in this effort.

6. DANBURY'S NON-POTABLE WATER NEEDS

More water has to enter the Still River, whether it first goes through the DWD, or whether there is a direct diversion from the lake to the Still River, from the Hayestown area. June 30th, 1988, there was a direct observation made by a member of the Selectmen's Advisory Committee of water conditions in the river on Main Street, near the junction with White Street.

Much of the river bed was dry, above water. Other above water parts were damp. The only flow seen at that point was a trickle a few inches deep in a flow only two to three feet wide. Clearly, with that kind of situation, or anything approaching it, the State can never meet its mandate to make the Still River swimmable and fishable. Neither can the new expanded sewer plant

7/27/88 N. Fairfield Comments (Cont'd.)

operate satisfactorily, no matter what level of available technology it uses.

Wasting potable water instead of completing the West Lake diversion project is no answer; diversion of Candlewood water from the Hayestown area does not run into state Class B prohibitions-- although we certainly favor having the state eliminate those antiquated prohibitions.

It seems evident enough that total absence of any need whatsoever for Danbury to divert Ball Pond Brook waters outweighs anything else. It is noteworthy that so far (July 17) in the drought of 1988, DWD has not found it necessary to issue a single restriction on usage.

Response:

See previous responses.

7. HEALTH ASPECTS

Nevertheless, in addition to the need to supply water to the Still River, there are reasons to favor priority of Candlewood Lake over the Brook, in the event the State lifts its ban on Class B water. There are health reasons.

P.C.B.'s:

Both the lake and the brook, happily, fall far below EPA standards for PCBs. However, the Housatonic River Study, conducted by Dr. Charles R. Fink, showed no PCB sediments at the Rocky River intake that sends water from the river up to the lake. The same study, however, placed PCB sediment content in Ball Pond low, though it was at a level seven times greater than the next of the seven entrophic lakes studied. Dr. Fink pointed out that the source of the PCB found in the sediments in Ball Pond was unknown and hard to explain. Whether that content continues, or increases, is unknown, as is the source. On the other hand, the Housatonic PCB situation is well known, and on the way to elimination.

BLUE-GREEN ALGAE:

Dr. Norvell's Ball Pond study showed heavy blue-green algae growth that could only be handled by massive alum treatment every five years. DEP expressed much worry over this situation, both in an inter-department memo and in response to HRRS inquiry, if potable water were to be needed for a waste treatment plant. Thus, untreated Ball Pond waters would infuse blue-green algae

7/27/88 N. Fairfield Comments (Cont'd.)

into Danbury's interconnected DWD system; treated water would infuse chemicals on a large scale. The lake waters have far lower detriment in either case.

Response:

Danbury has conducted a continuing monitoring program of the water in Ball Pond Brook. This program has never shown the presence of PCBs.

Danbury is presently studying the question of blue-green algae in Ball Pond. Although conclusive results are not yet available, it appears that the algae are only a problem in water bodies which are deep enough to become stratified. Margerie Reservoir is not subject to stratification, and the algae should not present a problem if Ball Pond waters are diverted to Margerie Reservoir.

8. RISK HAZARDS

This chapter of the Draft Executive Summary lists categories of hazards, some neutral or benign, and two, categories D and E, which are harmful, in evaluating various water resources.

Table 3-8 evaluates Ball Pond Brook. In New Fairfield, it lists 96 under category D, and 4 under Category E. In Danbury, it lists 100 under D, zero under E.

Table 3-9 evaluates Candlewood Lake. New Fairfield shows zero under D and zero under E. Danbury shows 7 under Category D and 4 under E. This is still another consideration for the #2 and #3 priorities of Ball Pond Brook and Candlewood Lake to be reversed. In addition to many other advantages, Candlewood Lake has negligible risk hazards as compared with the Brook.

Response:

After review, it was found that Table 3-9 (which evaluates both Candlewood Lake and Ball Pond Brook) was in error. These errors have been corrected, and the table now shows similar land use risks associated with either resource.

III. State of Connecticut Office of Policy and Management Comments
dated August 1, 1988

1. In Table 3.2.3 and Table 3.2.4, the data provided for Bethel Consolidated Water Co. is footnoted as being for the years 1990, 2005 and 2035, while every other utility has data provided for the years 1991, 2000 and 2030. The figures for the Bethel Consolidated Water Co. should be adjusted to be consistent with the other utility figures.

Response:

The values shown are consistent with those shown in Bethel Consolidated's individual plan.

2. The meaning and implication to the potential water supply sources of Table 3.4.1 and priority water supply sources of Table 3.4.2 is unclear. Public Act 88-324 looks to the areawide planning process to identify the groundwater resources for which either the utility or DEP should be undertaking future level A and level B mapping. It is not clear which, if any, of the sources discussed are so identified by this areawide plan.

The need for clarity as to which groundwater resources are most important and in need of further definition relative to aquifer protection areas is important, as the State Policies Plan for the Conservation and Development of Connecticut has designated some of the generalized areas shown as stratified drift aquifers as appropriate for urban development. Such a designation would be in conflict with water supply source protection. Identification of needed aquifers and the related areas that would need to be protected is required so as to decide either:

- a) to modify state, regional and local plans and regulations that influence land uses so they promote groundwater protection, or
- b) to determine if the existing land uses and/or needs for economic development and affordable housing make such groundwater protection unmanageable or incompatible. As a result, alternative water sources should be considered.

Response:

It is the WUCC's intent that all resources listed in Table 3.4.2 be considered as potential future potable supply sources that may be implemented prior to 2030 for one reason or another, as noted on Page 3.4.6.

The WUCC believes that all sources listed in Table 3.4.1 should be protected to the greatest extent possible as current or potential sources either pre- or post-2030. This does not necessarily preclude urban designations, but will require that such urban development be done in recognition of the fact that aquifer protection is a goal for the area, with prohibitions against clearly detrimental (Category E) land use.

3. The WUCC recommends that all of the alternative water supply sources listed in Table 3.4.2 continue to be protected as potential supplies. It would be more appropriate for the WUCC to look to the protection of potential sources of supply which only have a water quality goal of GA or GAA, rather than to also include sources which have a goal of B. In this regard, it would be more appropriate for the WUCC to include in Table 3.4.2 such potentials as the West Aspetuck River Diversion, the Shepaug River diversion, the Wolf Pit Brook Diversion and the Pootatuck Aquifer, rather than Candlewood Lake.

Response:

The utilities in the WUCC feel strongly that, should additional sources be required, both Ball Pond Brook (Class B with a goal of A) and Candlewood Lake (Class B) be given a higher priority than the sources listed in the comment due to economic and system implementation considerations.

Exclusive Service Areas

1. In Section 2.3 it should also be stated that not all portions of an exclusive service area will develop to a density requiring public water supply. An exclusive service area is where a specific water utility is responsible for the planning and provision of public water supply if the need should arise.

Response:

This comment has been incorporated in the text of Section 2.2 of the Executive Summary.

2. I had previously examined the exclusive service areas proposed by the water utilities in the Housatonic Water Supply Management area against the categories on the Locational Guide Map of the State Policies Plan for the Conservation and Development of

7/27/88 CT OPM Comments (Cont'd.)

Connecticut 1987 - 1992 (C & D Plan). Portions of the south central, east central and northeastern areas of the Town of Bethel are in the Long Term Urban Potential category and have not been assigned to an exclusive service area. The present exclusive service area in the Town of Bethel would provide for very little expansion in the public water supply service area to accommodate future growth in the community.

It is realized that the Areawide Supplement does recognize this situation and does discuss this difference. However, I again urge the WUCC to reconsider the exclusive service area boundaries within the Town of Bethel in order to achieve greater consistency between areawide water supply planning and areawide land use planning by regional and state agencies. Both the C & D Plan and the planning work of the Housatonic Valley Council of Elected Officials recognize approximately the same area of Bethel as having a potential for growth to occur to a density where it can be expected that services, such as public water supply, may need to be provided in the future.

Response:

The Bethel-area water utilities believe that their exclusive service area boundaries are consistent with the present planning of local officials, and do not feel it is necessary to expand these exclusive service areas at this time. The WUCC suggests that this topic be reviewed as appropriate at future reconvenings of the Council, particularly if local plans are changed.

Executive Summary

Table 3-3 and Table 3-4 - same comment regarding Bethel Consolidated Water Co. as in item #1 under comments on the Integrated Report.

Response:

See previous response.

IV. Bridgeport Hydraulic Company Comments dated August 2, 1988

The only major comment concerns Section 3.2.2.2 in the Integrated Report regarding consumption. It is not clear in the tables and text if the term "consumption" should be "average daily demand". The text does indicate that the larger utilities have included non-revenue usage in the consumption figures. For clarity, BHC would suggest the use of the term average daily demand when comparisons are made to safe yield. Consumption should refer to customer usage. Additionally, there does not appear to be any mention of peak demand which can result in significant short-term transmission problems during hot spells as we have witnessed this summer in Connecticut.

Response:

Appropriate text has been added in Section 3.2.2 in response to these comments regarding consumption and to Section 3.2.4 regarding peak demands.

DRAFT COMMENTS: HOUSATONIC WUCC

INTEGRATED REPORT AND EXECUTIVE SUMMARY, MAY 1988

Chapter 3.8:

The following information has been provided by DEP to DOHS as part of the Individual Water Supply Plans Review Process. Since, for the most part, this information has not yet been forwarded to the utilities, it is being provided here so that the potential conflicts can be reflected in Section 3.8: Impacts of the Plan on Other Uses of Water Resources.

Comments reflect information available at the time of review. Detailed analysis of these and any other potential conflicts will be required as part of DEP's Diversion Permitting Process.

BETHEL CONSOLIDATED WATER COMPANY:

East Swamp Aquifer:

Water Quality Conflicts:

East Swamp is a tributary to Limekiln Brook, which presently receives treated wastewater from Danbury's Sewage Treatment Plant (STP). By 1991, the Town of Bethel's STP will be abandoned and Bethel's flow will be redirected to the Danbury facility. This regional facility must meet stringent limits to assure Limekiln Brook and the Still River will meet Connecticut's Water Quality Standards. The limits are established by the assimilative capacity of the receiving stream and to a certain extent, the available dilution. Additional reductions in streamflow in Limekiln Brook will mean additional levels of treatment at the regional facility. Presently, construction costs for this new facility have been estimated at \$45 million. Therefore, there is little potential for establishing new diversions which would further reduce flows during seasonal low flow events in the Limekiln Brook Watershed.

Habitat Conflicts:

According to the Natural Diversity Data Base, there are records of the Bog Turtle, Clemmys mühlenbergi, from the Limekiln Brook Subregional Drainage Basin (1983). This species is being considered for Federal listing. "It inhabits open-canopied swamps, tussocky marshes and wet meadows traversed by clear slow-moving streams with muddy bottoms" (Rare and Endangered Species of Connecticut and Their Habitats, Connecticut Geological and Natural History Survey, 1976). The East Swamp Regional Drainage Basin also has great potential for supporting this species.

There is concern about any activities that will affect the hydrology (including the water level) of Limekiln Brook, East Swamp and associated wetlands. Changes in the hydrology of the area could create significant habitat modifications which may render the area unsuitable for Bog Turtles. Any proposed activities that will affect the hydrology of this area should address this consideration.

It is recommended that the Department of Environmental Protection be contacted before these areas undergo exploration as alternative sources of ground water supply. At such time, the Natural Resources Center will be able to provide additional information regarding specific concerns.

BETHEL WATER DEPARTMENT:

Potential well sites and the possible creation of a lake in the East Swamp for recharge of the aquifer:

Habitat Conflicts:

Again, according to the Natural Diversity Data Base, specimens of Clemmys mühlenbergii, the Bog Turtle, have been collected from the Limekiln Brook area. The Bog Turtle is proposed for Federal Endangered and Threatened Species Listing (Federal Register, December 30, 1982). This species is also included on the Connecticut Species of Special Concern--Animal List (Connecticut Geological and Natural History Survey, October 1985). At present the status of this Bog Turtle population is not known.

There is concern about any activities that will affect the hydrology (including the water level) of Limekiln Brook, East Swamp and associated wetlands. Changes in the hydrology of the area could create significant habitat modifications which may render the area unsuitable for Bog Turtles. Any proposed activities that will affect the hydrology of this area should address this consideration.

It is recommended that the Department of Environmental Protection be contacted before these areas undergo exploration as alternative sources of ground water supply. At such time, the Natural Resources Center will be able to provide additional information regarding specific concerns.

Other Conflicts:

Additional concerns regarding future sources for the Bethel Water Department are outlined in DEP staff memo's included as Attachment 1.

LAKE WAUBEEKA:

Potential Well sites located on Parcel D:

Habitat Conflicts:

According to the Natural Diversity Data Base, their records indicate the presence of a Bog community at the southern end of Sugar Hollow Pond in Danbury. Bogs are considered critical habitat in Connecticut due to their limited distribution in the state. These habitats are very sensitive to changes in water levels.

NEWTOWN WATER COMPANY:

Proposed increased use of the South Main Street well field derived from the Pootatuck River Aquifer:

Water Quality Conflicts:

Based on modeling and experience in the Pootatuck River Basin, there are concerns involving the maintenance of water quality within this river. Information regarding the potential impact of the Company's wells on base flows during critical dry periods should be developed in order to properly evaluate the potential for water use conflicts in this area.

RIDGEFIELD WATER SUPPLY COMPANY:

Great Swamp Aquifer:

Water quality conflicts:

Use of this aquifer could have an impact on stream dilution available for the Ridgefield Publicly Owned Treatment Works (STP) discharge to the Norwalk River. The Water Compliance Unit has recently set effluent limits for the STP based on a 7Q10 streamflow of 0.5 cfs from the Great Swamp drainage area. The small amount of dilution available has resulted in extremely stringent effluent standards (NH₃ as N - 1.6 mg/l) requiring high levels of advanced treatment. The hypothetical well yield of the Great Swamp aquifer of 0.5 mgd or 0.6 cfs could virtually dry up the river during low flow conditions leaving sewage effluent as the major source of streamflow to the Outpost Inn Pond.

Due to the resource use conflicts in utilizing the Great Swamp aquifer, the water company should give high priority to investigating the Upper Titicus aquifer and the Sugar Hollow aquifer. Source protection measures for these two aquifers should be considered immediately.

CANDLEWOOD SHORES ESTATES:

DEP has not had the opportunity to conduct a detailed review of Individual Water Supply Plans for this water system.

DANBURY WATER DEPARTMENT:

Water Quality Conflicts:

As noted previously, a regional advanced wastewater treatment plant is scheduled to be built for the Danbury-Bethel area to address existing problems with attaining water quality goals for the Still River. Any proposed new source development for the Danbury system which may modify base flows in the Still River would raise serious concerns regarding resource use conflicts.

Significant increases in water use within the Danbury system, and the resulting increases in wastewater loads would also have to be evaluated in relation to the assimilative capacity of the Still River.

Other Conflicts:

Additional resource concerns are highlighted in correspondence included as Attachment 1. as noted in this correspondence, resource use options are limited and potential impacts associated with the proposed uses must be studied with regard to competing and conflicting uses.

HERITAGE VILLAGE WATER COMPANY:

Based on modeling and experience in the Pomperaug River Basin, there are concerns involving potential resource conflicts within this river basin. Information regarding the potential impact of the Company's wells on base flows during critical dry periods should be developed in order to properly evaluate the water supply situation in this area. A detailed analysis of the potential impacts of the proposed wells on the Pomperaug River and competing water uses will be required under the Diversion Permitting process for proposed new sources of supply.

Due to the potential resource conflicts in utilizing water from the Pomperaug River and adjacent aquifer, DEP cannot fully evaluate the cumulative impact the HVWCo wells will have upon the river system without evaluating the Woodbury, Woodlake, and any other water companies drawing water from the Pomperaug River watershed. DEP has not yet had the opportunity to review the Individual Water Supply Plan for the Woodbury Water Company.

Other conflicts:

According to the Natural Diversity Data Base, there are several areas of concern associated with potential sources of supply for the Ridgefield Water Supply Company:

Great Swamp: Great Swamp is a Natural Areas Inventory Site. According to a 1982 field investigation, this calcareous swamp reportedly has some areas of suitable Bog Turtle habitat. To date, no turtles have been collected or observed here. It is none the less a large swamp and provides habitat for many species of birds (Places to Look for Birds, DEP 1972). The swamp is described as a Red Maple swamp with some dense shrubs areas. The presence of Purple Loosestrife indicates some disturbance.

Pumping Station Swamp: Pumping Station Swamp is a Natural Areas Inventory Site. It is a calcareous swamp dominated by Red Maple. Bog Turtles are a Connecticut "Species of Special Concern" and appear on the Federal List of species proposed to be listed as endangered or threatened. Field investigations conducted in 1985 indicate that suitable habitat still exists, though no turtles were seen.

North Street and Route 116 area: The Bog Turtle was collected from this area in the 1970's.

Rippowam Ledges: The ledges here are a breeding locality for the Slimy Salamander, Plethodon glutinosus. Only three populations are currently known to exist in Connecticut. As it uses the ledges along side the wetland, immediate conflicts are not foreseen.

RURAL WATER COMPANY:

Insufficient locational information was provided in this utility's water supply plan. As a result, a detailed review of potential conflicts associated with proposed sources was not possible.

WATERTOWN FIRE DISTRICT:

Additional Wells at the Hart Farm Wellfield (should additional supply be needed in the 50 year planning period):

Instream Flow Conflicts:

There is a potential resource issue associated with the diversion of low flows in the Nonewaug River to the Hart Farm Wellfield, which will require detailed analysis through the Diversion Permitting Process.

WOODLAKE MUNICIPAL TAX DISTRICT:

Refer to earlier comment (Heritage Village) regarding potential resource conflicts in the Pomperaug area.

WOODBURY WATER COMPANY:

Refer to earlier comment (Heritage Village) regarding potential resource conflicts in the Pomperaug area.

UTILITY CONFLICTS:

Bethel Consolidated, Bethel Water Department and Ridgefield Water Supply Company:

These utilities have all proposed additional sources in the Great Swamp area. Significant resource/use conflicts have also been noted in this area. The Coordinated Planning Process should address this issue.

Heritage Village Water Company, Woodlake Municipal Tax District, and the Woodbury Water Company:

These utilities have all proposed additional sources in the Pomperaug area. Potential resource/use conflicts have also been noted. The Coordinated Planning Process should address this issue.

STATE OF CONNECTICUT
INTERDEPARTMENTAL MESSAGE

February 23, 1988

Principal

TO: Carolyn Hughes, ~~Senior~~ Environmental Analyst
DEP/Natural Resources Unit, 165 Capitol Avenue, Hartford, CT 06106

FROM: Tom Morrissey, Principal Sanitary Engineer *T. MORRISSEY*
DEP/Water Compliance Unit, 122 Washington Street, Hartford, CT 06106

SUBJ: Bethel Water Company
Comprehensive Water Supply Plan

The Water Compliance Unit has completed a review of the Bethel Water Supply Plan, August 26, 1987. This review focused on the adequacy of Bethel's water supply system safe yield and its relationship to future water supply needs.

Surface Supplies

Surface water reservoirs, according to FGA estimates, have the potential to provide up to ~~30%~~ or approximately 25% of Bethel's total water supply during a critical dry event. Unfortunately, FGA did not follow the guidelines for estimating the safe yield of surface water reservoirs as outlined in the Standard Methodology for the Calculation of Safe Yield or in the Individual Water Supply Plan Guidance Handbook. FGA should develop a mass curve analysis for these reservoirs which incorporates hydrologic data from 1950's and 1960's. Since there would be little or no stratified drift in these watersheds, I would suggest using data from the USGS Hubbard Brook Gauging Station. In addition to the mass curve analysis, the return frequency of the critical dry period for these watersheds should be calculated and adjusted if the critical period does not correspond to the 1 in 100 year event.

Groundwater Supplies

Ground water supplies comprised 75% of the total safe yield of the Bethel Water Supply System. This water is derived solely from the East Swamp Aquifer. FGA contends that the water available from the East Swamp Aquifer during a critical dry period exceeds the projected ~~safe yield~~ of these wells. The critical dry period was defined as ~~36~~ month period from 1964 through 1966. The projected 7Q10 low flow for East Swamp Brook as it flows into Limekiln Brook is 1.5 MGD while the 30Q2 flow from East Swamp Brook is approximately 2.7 MGD. These flows correlate to a 1 in 10 and a 1 in 2 year drought event respectively, and are not much larger than the estimated safe yield of Bethel's Wells. It is very unlikely the the yield from East Swamp

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12

13

aquifer during a 1 in 100 year drought exceeds the estimated ~~of these wells~~. FGA suggests that some portion of groundwater extracted from East Swamp Aquifer will be returned to the aquifer via Sympaug Brook. Maps of stratified drift deposits suggest there might be a connection comprised of stratified drift deposits tying the two aquifers together. However, for the purpose of establishing a safe yield for Bethel's Wells, Bethel would have to document that connection and determine the important hydrogeological characteristics of the deposits in the connection in order to calculate the potential contribution from the Sympaug Basin. Regardless, the Bethel Sewage Treatment Plant which does discharge to Sympaug Brook is scheduled to be abandoned and Bethel's sewage shall be diverted to Danbury's POTW. This will significantly reduce the flow in Sympaug Brook during low flow events.

Hydrologic and hydrogeologic information regarding East Swamp Aquifer was taken from Connecticut Water Resources Bulletin #21. Hydraulic conductivity used in FGA's analysis was 150 feet per day which is extremely high for stratified drift deposits in Connecticut. This information may or may not be applicable to the conditions which exist in East Swamp and since these wells do represent 75% of Bethel's water supply, a long term pump test should be performed to establish specific information for this area. The pump test should be designed to provide data regarding aquifer storage properties, hydraulic conductivity, water table contours, drawdown levels, and most importantly, induced infiltration from East Swamp Brook.

Future Sources

Bethel has identified several locations for potential new source development, again, East Swamp seems to provide the best opportunity. This underscores the need to establish specific information regarding aquifer/streamflow relationships. Unfortunately, East Swamp is tributary to Limekiln Brook which presently receives treated waste from Danbury's POTW. By 1991, Bethel's POTW will be abandoned and Bethel's flow will be redirected to the Danbury facility. This regional facility must meet stringent limits to assure Limekiln Brook and the Still River will meet Connecticut's Water Quality Standards. The limits are established by the assimilative capacity of the receiving stream and to a certain extent, the available dilution. Additional reductions in streamflow in Limekiln Brook will mean additional levels of treatment at the regional facility. Presently, construction costs for this new facility has been estimated to be 45 million dollars. Therefore, there is little potential for establishing new diversions in the Limekiln Brook Watershed which would further reduce flows during seasonal low flow events.

Attached, please find a memo regarding water resource conflicts within the Danbury Water Supply Planning Area where we foresee the potential for significant water resource conflict. As part of the revised safe yield analysis, FGA should provide all the calculations and data used in their analysis. This would include actual flow records, precipitation data, well logs, pump test data, etc. This not only provides documentation for the analysis but it will expand our understanding of the existing and potential water resources in the area.



STATE OF CONNECTICUT
INTERDEPARTMENTAL MESSAGE

November 6, 1987

TO: Caroline Hughes, PEA
DEP/Natural Resource Center, 165 Capitol Avenue, Hartford CT 06106

FROM: Thomas Morrissey, PSE *T.M.*
DEP/Water Compliance Unit, 122 Washington Street, Hartford CT 06106

SUBJ: Danbury Area Water Supply Plans

As an addendum to the comments the WCU has passed on to you regarding the Bethal and Danbury Water Supply Plans, we would like to offer the following general comment.

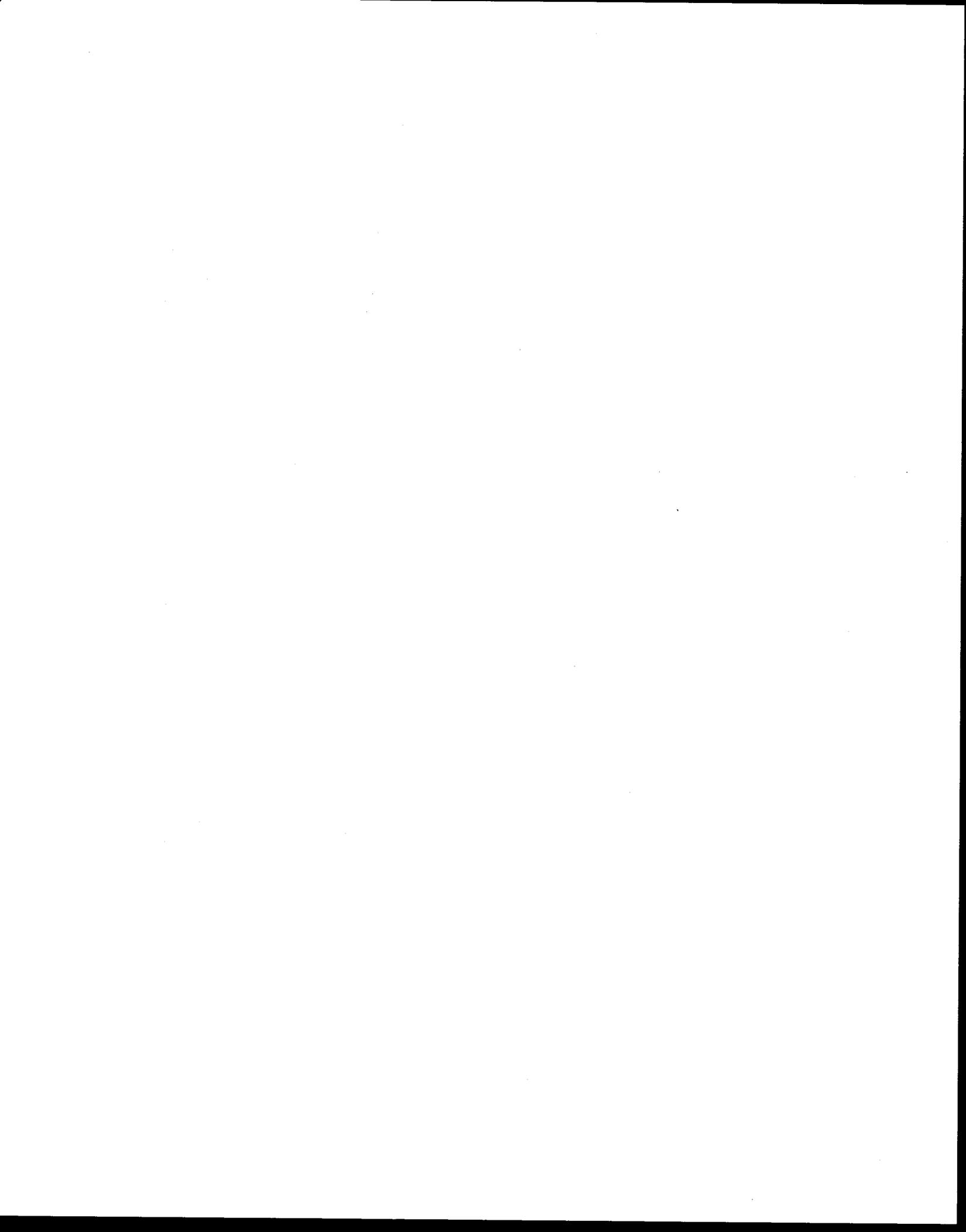
The Still River and Candlewood Lake are the major water resources in the greater Danbury Area. Both waterbodies are currently rated as Class B water resources although Candlewood Lake is managed as if it were a Class A resource. Most of the tributaries in the headwaters of the Still River are currently utilized for water supplies by the City of Danbury. The main stem of the Still River receives wastes from publicly owned treatment works (POTWs) in Bethal and Danbury and water quality in the Still has been severely degraded by the assimilation of wastes discharged from these facilities. Recently, the WCU has implemented a clean-up program which will improve water quality in the Still River to its adopted goal of Class B. Cost estimates for the construction of a new regional treatment facility are extremely high running from 25 to 35 million dollars. In addition to these treatment facilities, there are numerous industrial discharges and several sanitary landfills which also discharge waste to the Still River system. An essential component of the DEP clean-up program is the maintenance of a base flow throughout the entire Still River system. This flow, otherwise known as 7Q10 low flow, is comprised of water from stratified drift aquifers adjacent to the river and flows from its major tributaries.

As part of the Individual Water Supply Planning Process, water utilities must identify sources of supply to meet their potential demand for a fifty year planning horizon. Several utilities, including Danbury and Bethal, have identified tributaries to the Still River and Candlewood Lake as their future water supply sources. Due to the existing water quality in the Still River and the proposed plan to clean-up the main stem of the river, we should carefully consider any proposals which will undermine this effort and associated expense.

Candlewood Lake because of its classification can not be diverted directly for use as a water supply. Danbury has submitted some preliminary proposals to divert water from Ball Pond Brook which is a tributary to Candlewood Lake. These proposals, because of the potential impact to aquatic habitats and Margerie Reservoir, have not been favorably received.



As in the Quinnipiac River Basin, water use conflicts associated with water supply needs, aquatic habitat and waste assimilation exist in the Still River and Candlewood Lake Watersheds. These conflicts must be carefully considered as we review the individual water supply plans in this area. I have enclosed several memos regarding some of the conflicts outlined above.





STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

230 Plymouth Road
Hartford, CT 06791
July 10, 1987



BALL POND
DIVERSION

RECEIVED

JUL 17 1987

WATER COMPLIANCE
Dept. of Environmental Protection

Richard W. Nixon
Chairman, Selectman's Advisory Committee
34 Short Woods Road
New Fairfield, CT 06812

Dear Mr. Nixon:

Don Mysling (Technical Assistance Biologist) and I were pleased to meet with you and Mr. Fred Benedikt on July 8, 1987 to discuss the proposed diversion of Ball Pond Brook, New Fairfield. As I understand, the City of Danbury proposes to divert up to 3.9 MGD of surface water from the brook to Marjorie Reservoir. No water would be diverted during late spring - summer (May 15 - Sept. 3).

Ball Pond Brook is a valuable trout stream which is stocked by the Dept. of Environmental Protection each spring. Candlewood Lake is one of the most important fisheries resources in our state. During summer hot spells, trout in Candlewood Lake are able to survive by holding in cold, oxygenated water at the mouth of Ball Pond Brook.

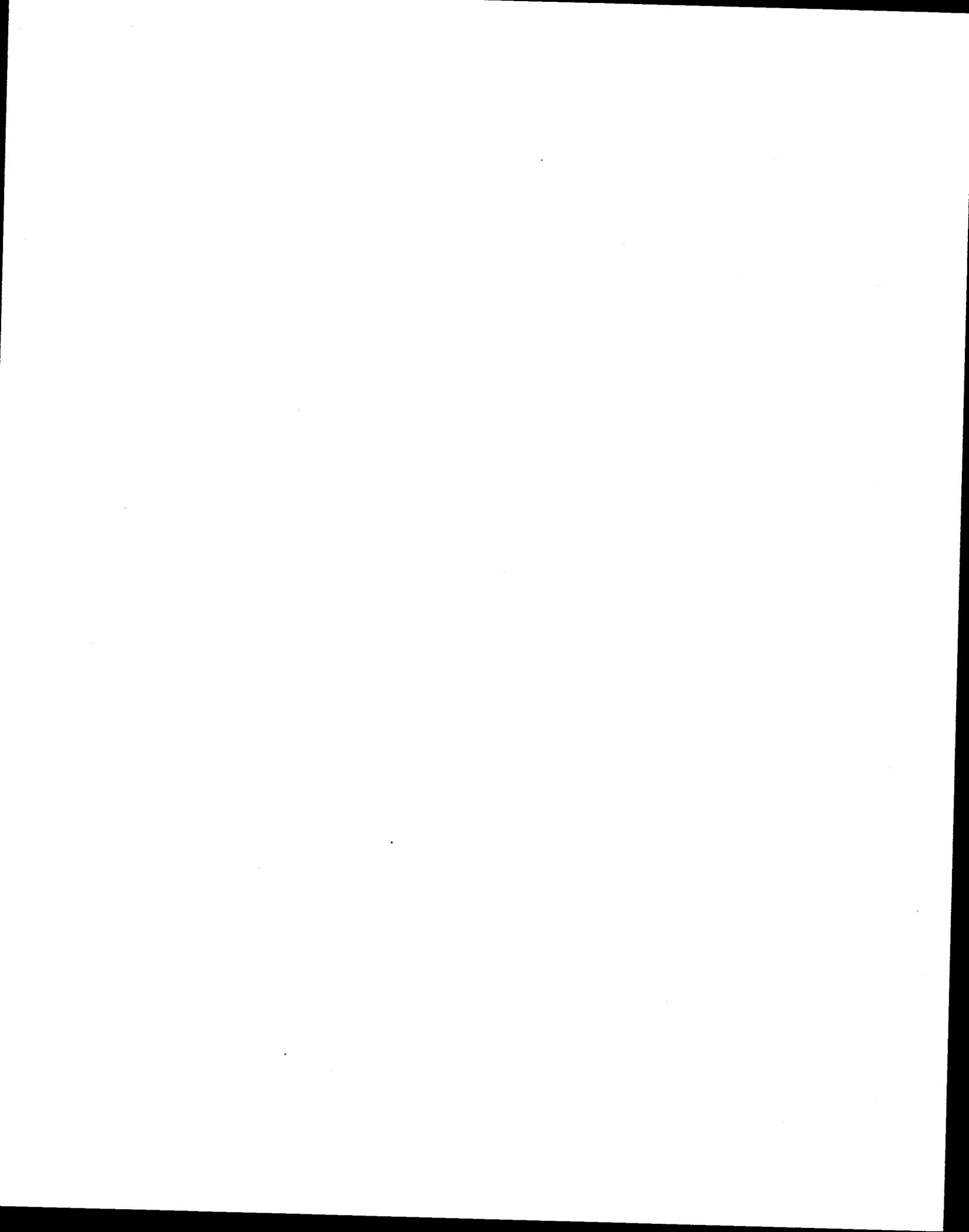
Without detailed information regarding this project, I can only speculate on what, if any, impacts may occur. However, impacts to fisheries could include:

- 1) reduced over-winter survival of yearling-adult trout.
- 2) reduced survival of wild brook and brown trout eggs, buried in gravel redds through the winter.
- 3) blocking upstream spawning movements of trout and other species, if a dam is built.
- 4) increased nutrient loading to Candlewood Lake, if nutrient-rich Housatonic River water must be used to replace Ball Pond Brook water.

The above impacts could be very serious. But, until an environmental assessment of the project is carried out, it will not be possible to clearly define the nature and extent of all potential effects. We will sample Ball Pond Brook this summer to assess the existing fish population. However, additional information should be obtained on 1) fish habitat characterization under various flow regimes (low flow study), 2) nutrient levels of Ball

Phone:

165 Capitol Avenue • Hartford, Connecticut 06106



Mr. Nixon - Page 2

Pond Brook vs. the Housatonic River at C L & P's Rocky River plant, and 3) the relative contribution of Ball Pond Brook's discharge to Candlewood Lake's volume.

Thank you for meeting with us at the D.E.P. Western District Hdqts. Please feel free to contact me or Don Mysling should you need additional information.

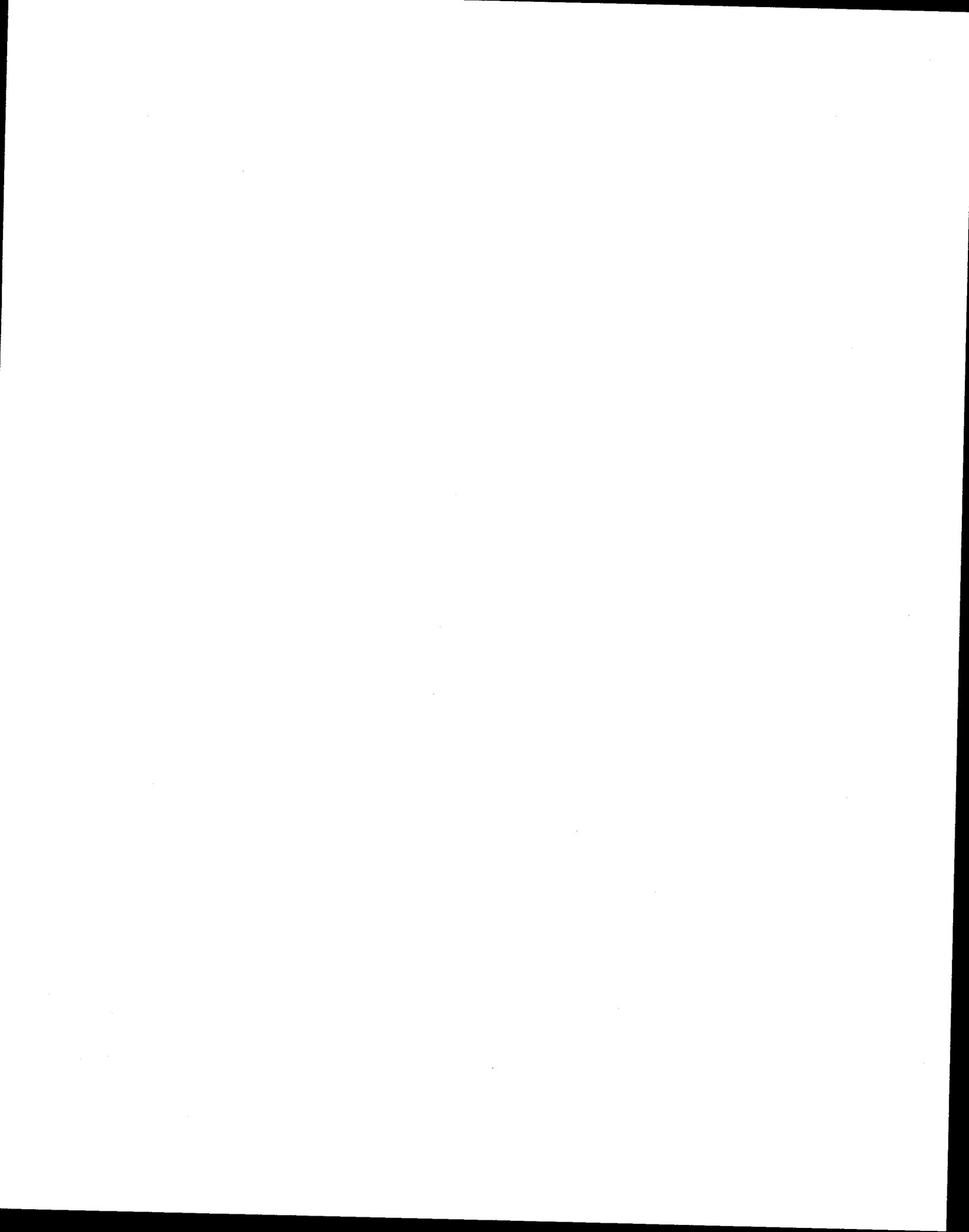
Sincerely,



Robert D. Orciari
District Fisheries Supervisor

RDO:md

cc: A. Cantele, Western District
J. Moulton, Fisheries
T. Morrissey, Water Compliance
R. Gilmore, Water Resources





STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



March 26, 1987

William Buckley, P.E.
Director of Public Works
City of Danbury
155 Deer Hill Avenue
Danbury, CT. 06810

Dear Mr. Buckley:

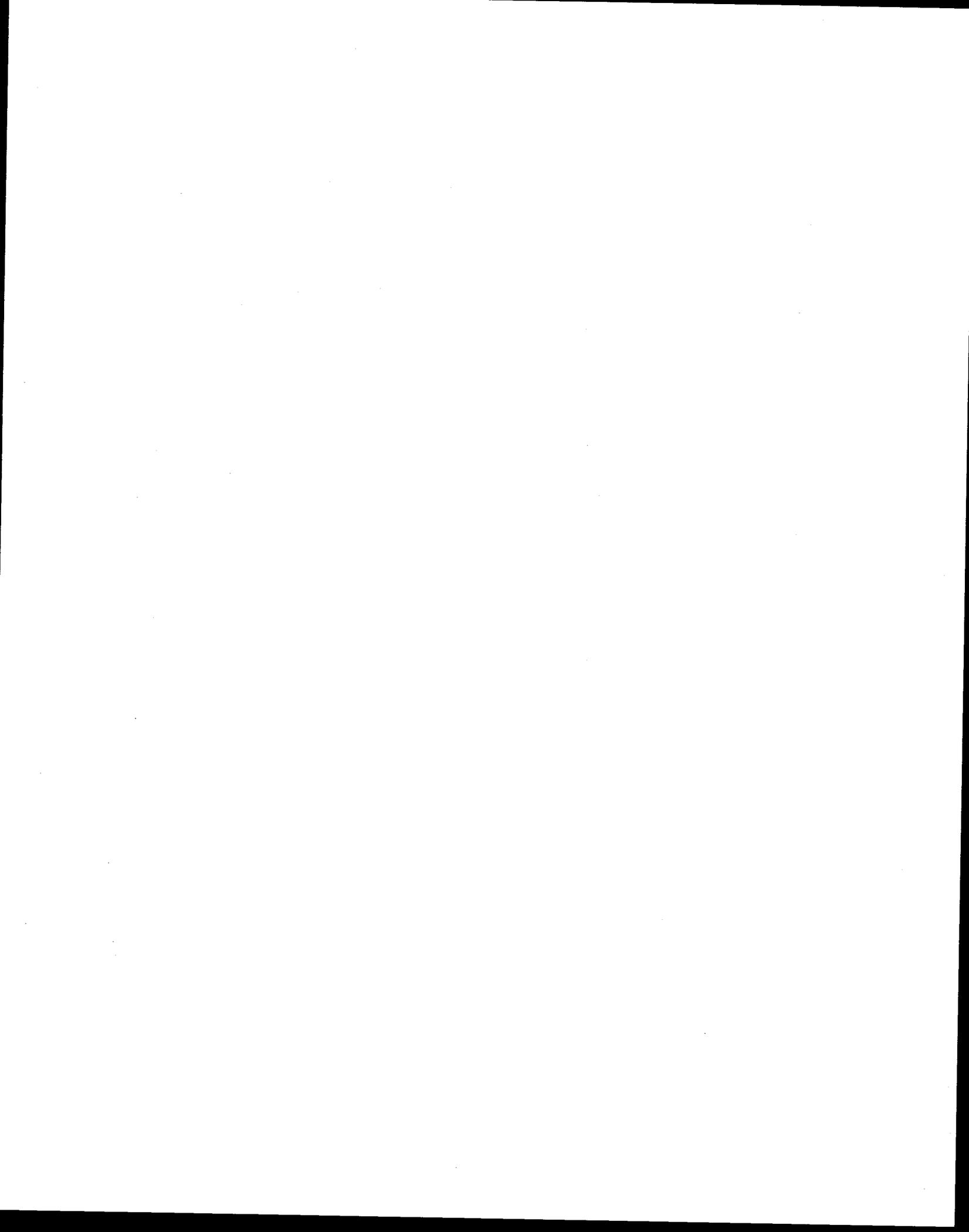
The Water Compliance Unit of Connecticut Department of Environmental Protection (DEP) has evaluated alternatives to upgrade the Danbury publicly owned treatment works (POTW) as proposed by the City of Danbury and their consultant Greiner Engineering Sciences. Planning for this project began in 1978 when DEP issued an order to Danbury to improve treatment efficiencies at their POTW. Danbury commissioned Greiner Engineering Sciences (formerly Cahn Engineers) to begin studying this problem. This work resulted in the completion of a preliminary facilities plan in March, 1983. After several revisions including review by the Environmental Protection Agency's (EPA) advanced waste treatment review committee, DEP approved the plan in September, 1985. The study recommended upgrading the Danbury POTW to eliminate water quality violations in the Still River as a result of the Danbury discharge. In January, 1986, DEP contacted Danbury officials to advise them of changes in the EPA's national ammonia toxicity criteria and how these changes would affect the proposed ammonia limits for the new regional POTW. In July, 1986, Danbury requested time and money to update the existing facilities plan and in February, 1987, Danbury proposed a number of alternatives to be investigated as part of that update. The Department concurred on investigating the following alternatives:

- a. Breakpoint chlorination;
- b. RBC's;
- c. Activated sludge;
- d. Fluidized Bed Reactor; and,
- e. Replacing stone media in the trickling filter with plastic media;

The Department does not support further study of the following alternatives:

- 1) A direct discharge of effluent from Danbury's POTW to either Lake Lillinonah or Lake Zoar; or,
- 2) Providing more dilution water for the Danbury discharge by transferring water from Candlewood Lake through Marjorie Reservoir down Padanaram Brook into the river just above the discharge or by pumping water directly from Lake Lillinonah through a pipeline discharging to the Still River in the vicinity of the Limekiln Brook.

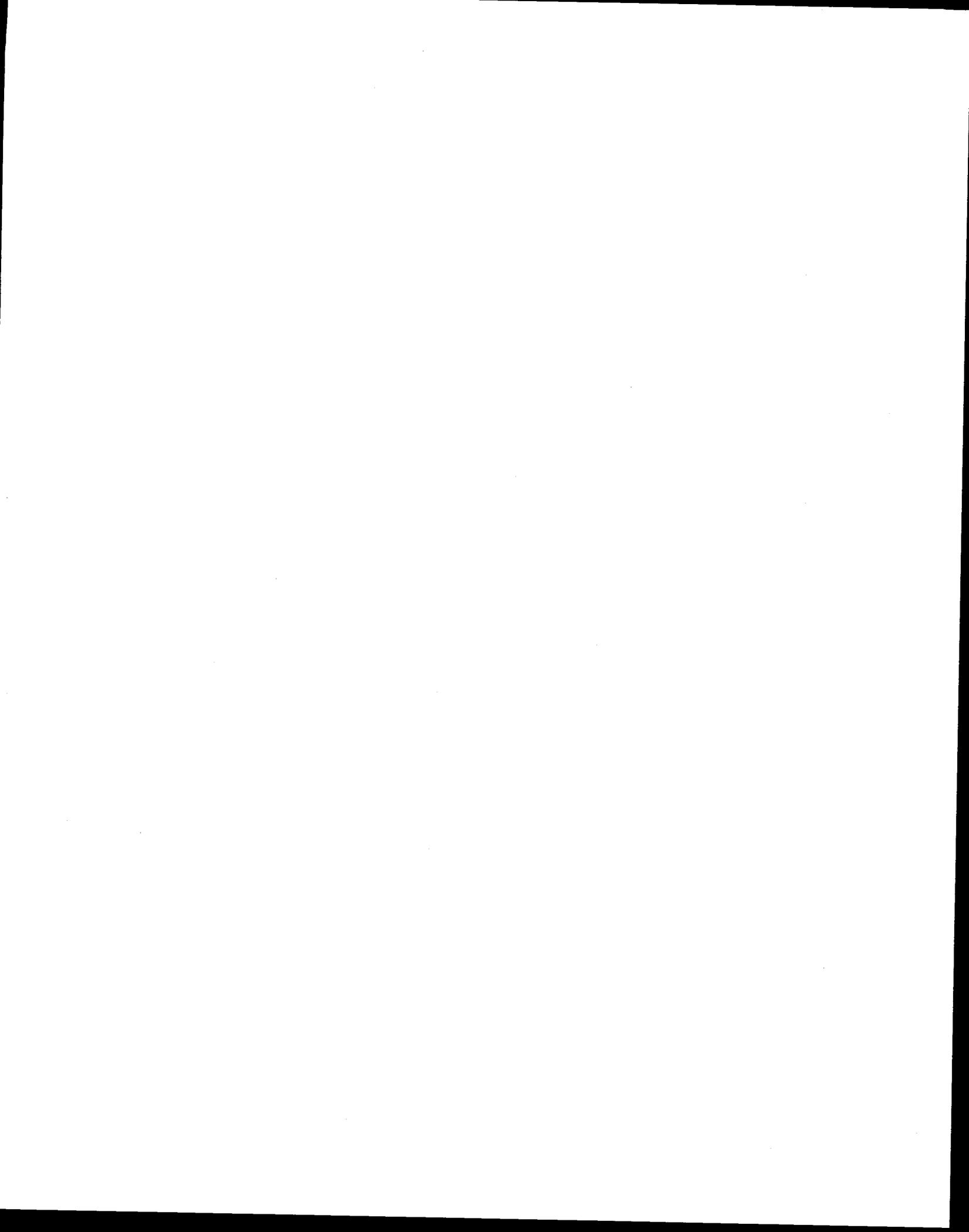
Pbooc:



The following is a brief outline of DEP's position on why these alternatives are not technically and environmentally feasible.

A direct discharge of treated sewage to Lake Lillinonah was one alternative investigated by the approved facilities plan and was found to be non-feasible due to high costs. Cost estimates for constructing the gravity outfall to Lake Lillinonah were 15% more expensive than the advanced waste treatment facility alternative. The potential environmental and political constraints associated with constructing miles of pipeline through wetlands in Brookfield and New Milford were discussed but not incorporated as part of the cost estimate. A direct discharge to Lake Zoar would require pumping to transport the Danbury effluent along a pipeline right-of-way through Newtown. While Danbury's consultant did not explicitly show cost estimates in the report, this proposal was rejected due to high construction costs and potential delays related to the procurement of . miles of easement through Newtown. Again, political constraints, legal fees, state and federal inland wetland permits, diversion permits and the Environmental Impact Reports associated with these proposals were not investigated or included as part of the cost estimate outlined in the facilities plan.

The direct discharge proposals are based upon the assumption that Danbury will maintain secondary treatment levels at the POTW and the costs of obtaining the appropriate permits, developing the right-of-way and constructing a sewer outfall to the Housatonic River would be less than the costs associated with upgrading the POTW to advanced waste treatment levels. DEP has, on several occasions, advised Danbury officials on the fallacious nature of this assumption. The Still River assimilates organic wastes because of the turbulent advective movement the stream provides. Turbulence in the water column affects waste assimilation processes by transporting pollutants to organisms which oxidize the organic portion of the wastes for energy and by facilitating the rate at which oxygen is entrained in the water column. The concentration of dissolved oxygen is a major factor in determining the type and diversity of aquatic life the river will support. Unlike most riverine systems, Lake Lillinonah and Lake Zoar are impoundments created by construction of the Shepaug and Stevenson Dams, respectively, and are used primarily for hydropower production. During low flow periods, water elevations in the impoundments are controlled to maximize power production. As inflow diminishes, the frequency of power generation decreases and the advective component of transport characteristic of rivers, approaches zero. Table 1 is a summary of the daily power generation records (net MegaWatt Hours) at the Shepaug Station from April 1980 through March 1981. During the period from August 16 to August 24, Northeast Utilities (NEU) produced very little power and the flow releases from the impoundments were minimal. Table 2 is a listing of the daily flow records from the Housatonic River above Lake Lillinonah at Gaylordsville. Inflow to the lake averaged 87 cubic feet per second (cfs) from August 18 to 23. Daily evaporation from the surface of the lake would effectively reduce inflow by approximately 20 cfs or roughly negate the additional inflow from the Still River. Impoundment elevations for this period of time declined from 199.00 feet above mean sea level to 197.3 feet MSL. These data indicate that flow through the impoundments was very limited during this low flow period effectively reducing turbulent mixing in the lake necessary for the assimilation of organic wastes.



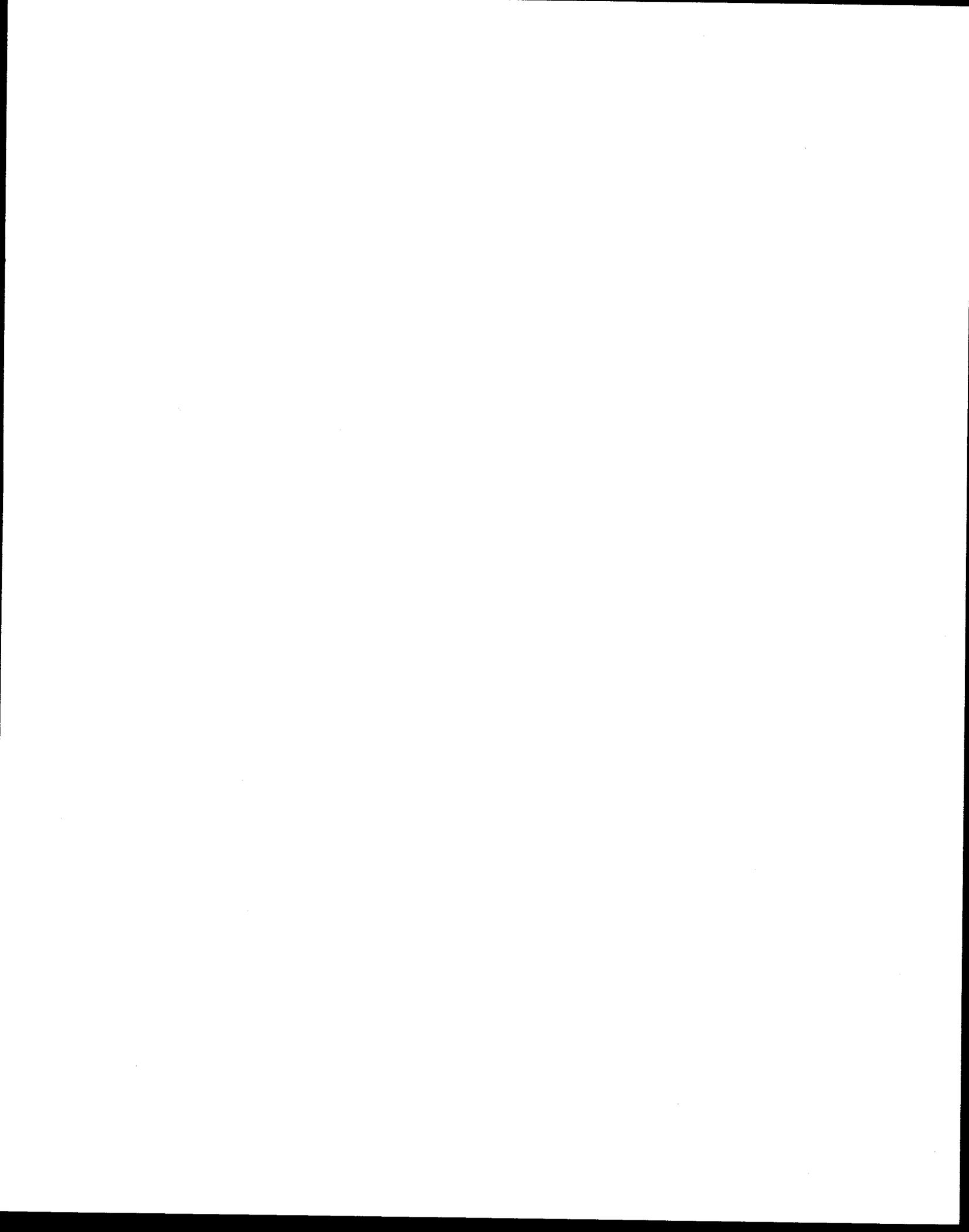
Nevertheless, assuming that optimum conditions for waste assimilation exists in the Housatonic lakes and this system was a turbulent river flowing at 87 cfs into which a 12.5 MGD effluent stream is discharged and is completely mixed instantaneously, the ammonia concentration in that effluent would have to be 5.0 mg/l NH_3 as N or less to avoid chronic ammonia toxicity. Unfortunately, Lake Lillinonah and Lake Zoar are not free flowing rivers. They do not provide turbulent mixing or transport typical of a riverine system. In addition, these impoundments are extremely important recreational resources which would require even higher levels of protection than normally provided in river systems designated for waste assimilation. Therefore, secondary treatment efficiencies would not adequately protect the Housatonic Lakes from water quality impairment. Advanced waste treatment followed by sand filter polishing would probably provide a level of protection consistent with the existing use of those resources.

The indirect impacts associated with moving the Danbury discharge must also be considered. Presently there are eleven industries which discharge directly to the Still River, ten are in Danbury. Diverting the Danbury discharge from the Still River would probably result in revisions to their present discharge limits. Aquatic habitat in the Still River below Limekiln Brook would also be impaired by this diversion.

The two pumping proposals outlined in Alternative 2 are similar in that Danbury proposes to augment Still River flow in lieu of providing the level of treatment necessary to improve Still River water quality to minimum acceptable levels. Clearly, this proposal is not consistent with the EPA national policy which states that low flow augmentation can not be used in place of best available treatment technology (BAT). BAT would include advanced waste treatment. EPA recently applied this policy during the wasteload allocation study for the French River which is located in northeastern Connecticut. In addition to providing advanced waste treatment (effluent ammonia limits of 2.0 mg/l NH_3 as N) at the Dudley-Webster regional POTW, Massachusetts must provide an additional 22 cfs for low flow augmentation. EPA would not consider higher flows to offset the AWT effluent limits.

Even if Danbury was successful in overcoming EPA's national policy and proceeded with these alternatives, an additional 44 cfs would be needed to meet instream ammonia toxicity criteria assuming the effluent ammonia limit remained at 3.5 mg/l NH_3 as N, the limit recommended by the existing facilities plan. 170 cfs would be needed to dilute the discharge if their limit was relaxed to 10 mg/l NH_3 as N and if Danbury maintained secondary treatment levels approximately 300 cfs would be needed to effectively dilute their effluent to minimum protection levels.

Taking water via pipeline from Lake Zoar would involve the same political, environmental and cost constraints addressed in the Lake Zoar direct discharge discussion. In addition to those problems, Danbury would need to construct a pumping system capable of lifting at least 44 cfs against a head of approximately 100 feet, the pipeline would have to convey twice as much water as the direct discharge scenario and would require reinforced pipe capable of withstanding stresses associated with pressurized piping systems. These costs would be in addition to those associated with providing advanced waste treatment.



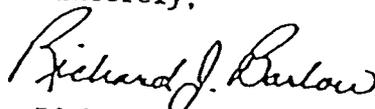
Transferring water from Lake Candlewood (a class B resource) through Marjorie Reservoir (a class AA drinking water resource) down Padanaram Brook (a class A and B/A resource) would degrade the quality of water in the resources below Candlewood Reservoir. In Connecticut use of Class B waters for drinking water purposes is not allowed pursuant to Connecticut General Statute 22a-417. Public Health Code Regulations and state policy. Even if Danbury were to overcome the potential problems associated with contaminating their primary water supply reservoir, significant quantities of water would have to be diverted in order to maintain a secondary treatment facility. 300 cfs through Marjorie Reservoir and down Padanaram Brook would result in significant changes to these resources.

Institutional conflicts with this proposal are massive. NEU would have to seek a modification of their existing hydropower license from the Federal Energy Regulatory Commission (FERC). FERC requires an extensive environmental impact report subject to review and approval of federal, state and local agencies. As part of this process, FERC is required to grant intervenor status to all parties who request it, this would force FERC to consider any and all spurious requests regarding the operation of Lake Candlewood - Rocky River Hydropower facility. NEU personnel have indicated this proposal would cost their company thousands of dollars in known expenses and could mean millions of dollars in unknown expenses (i.e. loss of generation, further limitations on facility operation, etc.).

Clearly, these proposals lack credibility. DEP has advised Danbury officials of these concerns on several occasions and we hope this will help you to understand the basic engineering principles underlying our reservations. Pursuing these alternatives will only postpone the implementation of improvements at the Danbury POTW necessary to overcome the severe water quality problems which have persisted in the Still River since the initial order was written in 1978.

Should you have any questions please contact me at 566-2588 or -3245 so that I may arrange for the appropriate members of my staff to respond.

Sincerely,



Richard J. Barlow
Director
Water Compliance Unit

RJB:TM:jdc

cc: Robert Kleffman, Grenier Engineering



STATE OF CONNECTICUT
INTERDEPARTMENTAL MESSAGE

TO: Denis Cunningham, Assistant Director
DEP/Water Resources Unit, 165 Capitol Ave., Hartford, CT.

FROM: Thomas Morrissey, Scientific Programmer *T.M.*
DEP/Water Compliance Unit, 122 Washington Str., Hartford, CT.

SUBJ: PROPOSED BALL POND DIVERSION

I have reviewed the preliminary diversion application from the City of Danbury to divert up to 3.9 million gallons per day (MGD) from Ball Pond Brook below Ball Pond in New Fairfield, Ct. The application failed to address the following concerns:

- 1) Ball Pond Brook is one of two natural stream tributaries to Lake Candlewood and is a very important fisheries habitat. The final application should assess the impact this diversion would have during high, average and low flow conditions in the stream itself and in Candlewood Lake.
- 2) A Phase I Diagnostic/Feasibility Study of Ball Pond was completed by the Water Compliance Unit in 1979 with an EPA 314 Clean Lakes Grant. During the one year study, it was observed that Ball Pond supports a significant population of the blue green algae, Osceillatoria rubescens. This algae strongly influences the pond's water chemistry, especially its dissolved oxygen and nutrient characteristics and may be introduced into Margerie Reservoir potentially effecting the quality of that water as a water supply source. The DEP/WCU has made specific recommendations to the town of New Fairfield regarding methods to minimize this problem, subsequent to conducting feasibility studies on alum treatments. To date, no action has been taken on these recommendations.
- 3) It may be wise for Danbury's consultant to evaluate the Safe Yield of this system using several gaging stations and in particular Hubbard Brook. This would act as a sensitivity analysis of their initial evaluation.
- 4) Given the importance of Ball Pond Brook as a resource and the seasonal nature of the algae blooms, Danbury should evaluate a resource management approach to minimize impacts this diversion may have upon the brook and Margerie Reservoir.



STATE OF CONNECTICUT
INTERDEPARTMENTAL MESSAGE

TO: Denis Cunningham, Assistant Director
DEP/Water Resources Unit, 165 Capitol Ave., Hartford, CT.

FROM: Thomas Morrissey, Scientific Programmer ^{TEH.}
DEP/Water Compliance Unit, 122 Washington Str., Hartford, CT.

SUBJ: PROPOSED BALL POND DIVERSION

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