

United States  
Environmental Protection  
Agency

Environmental Sciences  
Division  
P.O. Box 93478  
Las Vegas, NV 89193-3478

TS-PIC-20201151S/20301151S  
October 2002

Research and Development

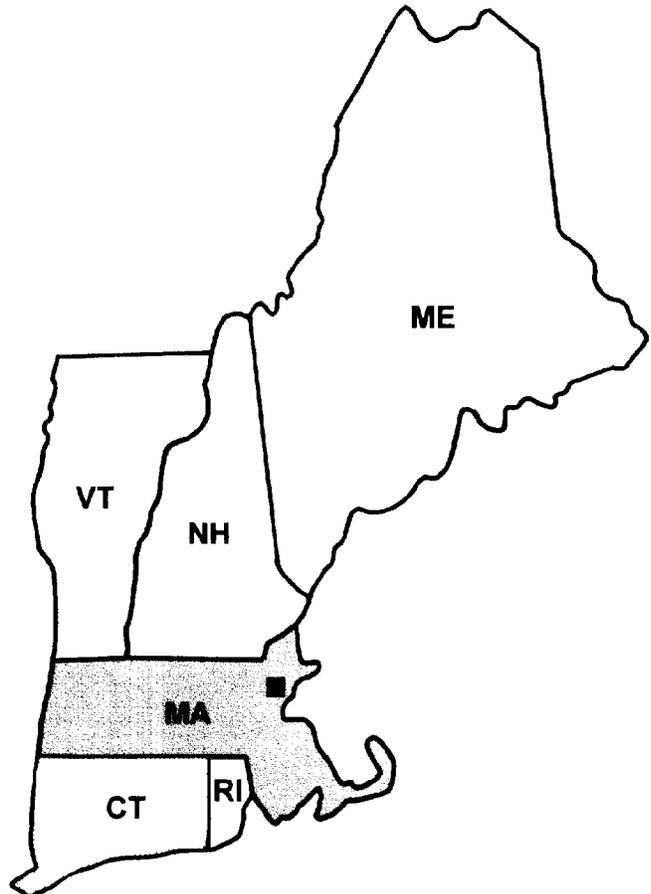


# AERIAL PHOTOGRAPHIC ANALYSIS OF ABERJONA RIVER STUDY AREA

## Middlesex County, Massachusetts

### Volume 1

EPA Region 1



TS-PIC-20201151S/20301151S  
October 2002

AERIAL PHOTOGRAPHIC ANALYSIS  
ABERJONA RIVER STUDY AREA

Middlesex County, Massachusetts

Volume 1

by

D. R. Williams  
Environmental Services  
Lockheed Martin Services  
Las Vegas, Nevada 89119

Contract No. 68-D-00-267

Work Assignment Manager

D. Garofalo  
Landscape Ecology Branch  
Environmental Sciences Division  
Las Vegas, Nevada 89193-3478

ENVIRONMENTAL SCIENCES DIVISION  
NATIONAL EXPOSURE RESEARCH LABORATORY  
OFFICE OF RESEARCH AND DEVELOPMENT  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
LAS VEGAS, NEVADA 89193-3478

NOTICE

This document has undergone a technical and quality control/assurance review and has been approved for publication by personnel of the U.S. Environmental Protection Agency, Office of Research and Development, Environmental Sciences Division, Landscape Ecology Branch at Las Vegas, Nevada. It is for internal Agency use and distribution only.

## ABSTRACT

This two-volume report presents the results of an analysis of historical aerial photographs of the Aberjona River Study Area located in Middlesex County, Massachusetts. A total of nine sets (dates) of black-and-white, color, and color infrared historical photographs spanning the years from 1938 to 1995 were analyzed to produce this report. Waste-related features and activities were characterized at a total of six facilities and one excavated area within the larger study area. Features and activities such as solid and liquid waste disposal, impoundments, standing liquid, stains, and seepage were identified and discussed. Waste-related features and activities were also noted at other locations within and adjacent to the study area.

The analysis of the study area and immediate vicinity also documents drainage networks, wetland habitat gains and losses, historical river course changes, and other observable activities and conditions of environmental significance at the site. A total of approximately 30.8 hectares (76 acres) of wetland habitat and 862.5 meters (2,829 feet) of linear wetlands were lost during the study period primarily due to residential and industrial development within and directly adjacent to the study area. Approximately 0.8 hectares (1.9 acres) of wetland habitat was gained resulting in a net loss of approximately 30.0 hectares (74.1 acres) of wetlands in the study area from 1938 to 1995. River course changes were noted at four locations and were attributable to both natural causes and development within the study area. This report provides operational remote sensing support to U.S. Environmental Protection Agency Region 1 field investigations under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The EPA, Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 1 Superfund Division in Boston, Massachusetts, and the EPA Office of Emergency and Remedial Response in Washington, D.C.

CONTENTS

VOLUME 1

	<u>Page</u>
Abstract . . . . .	iii
Introduction . . . . .	1
Methodology . . . . .	5
Photographic Analysis . . . . .	9
Glossary . . . . .	33
References . . . . .	35

TABLE

Number

1 List of sites identified within the study area . . . . .	2
2 Wetland habitat losses and gains within the Aberjona River study area, 1938-1995 . . . . .	31

VOLUME 2

FIGURES

Number

1 Study area location map, Massachusetts . . . . .	1
2 Local study area location map, Boston North, Massachusetts . . . . .	2
3 Aberjona River study area, Subarea 1, December 16, 1938 . . . . .	3
4 Aberjona River study area, Subarea 1, July 24, 1943 . . . . .	4
5 Aberjona River study area, Subarea 1, August 24, 1952 . . . . .	5
6 Aberjona River study area, Subarea 1, December 1, 1955 . . . . .	6
7 Aberjona River study area, Subarea 1, April 29, 1963 . . . . .	7
8 Aberjona River study area, Subarea 1, April 26, 1969 . . . . .	8
9 Aberjona River study area, Subarea 1, April 23, 1978 . . . . .	9
10 Aberjona River study area, Subarea 1, August 22, 1984 . . . . .	10
11 Aberjona River study area, Subarea 1, March 29, 1995 . . . . .	11

12	Aberjona River study area, Subarea 1, Site 2, December 16, 1938 . . . . .	12
13	Aberjona River study area, Subarea 1, Site 2, July 24, 1943 . . . . .	13
14	Aberjona River study area, Subarea 1, Site 2, August 24, 1952 . . . . .	14
15	Aberjona River study area, Subarea 1, Site 2, December 1, 1955 . . . . .	15
16	Aberjona River study area, Subarea 1, Site 2, April 29, 1963 . . . . .	16
17	Aberjona River study area, Subarea 1, Site 2, April 26, 1969 . . . . .	17
18	Aberjona River study area, Subarea 1, Site 2, April 23, 1978 . . . . .	18
19	Aberjona River study area, Subarea 1, Site 2, August 22, 1984 . . . . .	19
20	Aberjona River study area, Subarea 1, Site 2, March 29, 1995 . . . . .	20
21	Aberjona River study area, Subarea 2, December 16, 1938 . . . . .	21
22	Aberjona River study area, Subarea 2, July 24, 1943 . . . . .	22
23	Aberjona River study area, Subarea 2, August 24, 1952 . . . . .	23
24	Aberjona River study area, Subarea 2, December 1, 1955 . . . . .	24
25	Aberjona River study area, Subarea 2, April 29, 1963 . . . . .	25
26	Aberjona River study area, Subarea 2, April 26, 1969 . . . . .	26
27	Aberjona River study area, Subarea 2, April 23, 1978 . . . . .	27
28	Aberjona River study area, Subarea 2, August 22, 1984 . . . . .	28
29	Aberjona River study area, Subarea 2, March 29, 1995 . . . . .	29
30	Aberjona River study area, Subarea 3, December 16, 1938 . . . . .	30
31	Aberjona River study area, Subarea 3, July 24, 1943 . . . . .	31
32	Aberjona River study area, Subarea 3, August 24, 1952 . . . . .	32
33	Aberjona River study area, Subarea 3, December 1, 1955 . . . . .	33
34	Aberjona River study area, Subarea 3, April 29, 1963 . . . . .	34
35	Aberjona River study area, Subarea 3, April 26, 1969 . . . . .	35
36	Aberjona River study area, Subarea 3, April 23, 1978 . . . . .	36
37	Aberjona River study area, Subarea 3, March 29, 1995 . . . . .	37
38	Aberjona River study area, Wetlands Status and River Courses, 1938 . . . . .	38
39	Aberjona River study area, Wetlands Status and River Courses, 1995 . . . . .	39

## INTRODUCTION

This two-volume report presents the results of an analysis of historical aerial photographs of the Aberjona River Study Area located in Middlesex County, Massachusetts (Volume 2, Figures 1 and 2). A total of nine sets (dates) of black-and-white and color historical photographs spanning the years from 1938 to 1995 were analyzed to produce this report. The years included in the report are 1938, 1943, 1952, 1955, 1963, 1969, 1978, 1984, and 1995. Volume 1 contains the narrative text and Volume 2 is the photographic enlargements and analysis overlays. The results of this analysis provide operational remote sensing support to U. S. Environmental Protection Agency (EPA) Region 1 field investigations under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Of particular interest in the analysis of this study area is the identification and discussion of waste-related features at and in the vicinity of industrial facilities and the depiction of wetland gains and losses and river course changes over time that might impact the Aberjona River study area.

### Study Area Overview

The Aberjona River Study Area is located in Middlesex County, Massachusetts, principally within the city limits of Woburn, Winchester, Arlington, and Medford. The study area contains a portion of the Aberjona River from just south of Salem Street and Cedar Street (the southern boundary of the Wells G & H Superfund site) in Woburn to the southern boundary of the Mystic Lakes. The areal extent of the entire study area is approximately 1,076 hectares (2,659 acres). Natural surface drainage flows predominately south via the river and its associated tributaries. The study area elevation ranges from approximately 15 meters (49 feet) above sea level near the northern study area boundary to approximately 3.4 meters (11 feet) at the southern end of the Mystic Lakes (USGS, 1985).

## Report Conventions

For discussion purposes the entire study area is divided into three subareas. These are Subarea 1- from south of Salem Street to the Kraft Foods - Atlantic Gelatin facility; Subarea 2 - from the Kraft Foods - Atlantic Gelatin facility to Wedge Pond, and Subarea 3 - from Wedge Pond to the southern extent of the Mystic Lakes. Several locations within Subareas 1 and 2 where environmentally significant features and related activities are present and ongoing during all or a portion of the study period are labeled as "sites". The locations of six industrial facilities and a cranberry bog are numbered separately and discussed in the analysis narrative as are other areas of concern discovered during analysis of the aerial photographs. Within the text, each site is discussed separately for the entire study period. The names of these sites and the subarea in which is located are presented in Table 1.

TABLE 1. List of sites identified within the study area.

- 
1. Cranberry Bog (Subarea 1)
  2. Kraft Foods - Atlantic Gelatin Facility (Subarea 2)
  3. Former J. H. Winn Watch Face and Dial Manufacturing Company (Subarea 2)
  4. Former J.O. Whitten (rendering operation) (Subarea 2)
  5. Former Town of Winchester Refuse Incinerator (Subarea 2)
  6. Former Beggs and Cobb Tannery (Subarea 2)
  7. Waste Disposal Area - Excavation (Subarea 2)
- 

All sites, with the exception of Site 7, were identified in the collateral information (EPA, 2002).

Due to complexity of environmentally significant features at Site 2, Kraft Foods - Atlantic Gelatin facility enlargements of this site, (Figures 12-20) follow the Subarea 1 photopages (Figures 3-11).

Other environmentally significant features or activities not classified as sites are depicted on analysis overlays of each respective 16" x 16" subarea photopage. Only those features and activities deemed environmentally significant, relative to the scope of the entire analysis, are discussed in the text.

Results and discussion of analysis and report photopages are presented in two volumes in this report. Volume 1 provides the textual discussion of individual sites and other environmentally significant features and activities and Volume 2 provides photopage enlargements with transparent overlays depicting the sites and other environmentally significant features and activities. Within Volume 2 following the waste-disposal-related photopages are photopages of the 1938 and 1995 photo enlargements (Figures 38 and 39) with analysis overlays depicting wetlands present in 1938, gain and loss of wetlands by 1995, and river course change information.

No environmentally significant activity was noted at the Cranberry Bog (Site 1) for the entire study period. The Kraft Foods - Atlantic Gelatin facility (Site 2) was operational in 1938, with a large set of impoundments and bermed channels containing a light-toned liquid material. Due to breaches in impoundments, some of this liquid material may have migrated into adjacent impoundments or onto surrounding ground surfaces. Light-toned liquid was also observed flowing from site buildings toward the Aberjona River.

At Site 3 one small deposit of solid waste was noted at the Former J. H. Winn Watch Face and Dial Manufacturing Company facility in 1943, but no other environmentally significant features were observed during the study period. At the rendering operation at the Former J. O. Whitten Property (Site 4) impoundments containing light-toned probable liquid material, scattered light-toned material, and solid waste were identified during the study period. At the Former Town of Winchester Refuse Incinerator facility (Site 5), areas of solid waste, a probable landfilling operation, and dark-toned material were evident during the study period. At the Former Beggs and Cobb Tannery (Site 6), several waste-related features such as solid waste, staining, dark-toned material, and impoundments containing dark-toned liquid material were apparent on the eastern portion of the site during the study period. At the Waste Disposal Area - Excavation (Site 7) located south of Site 2, possible solid waste, standing liquid, and staining were apparent during the study period.

A total of approximately 30.8 hectares (76 acres) of wetland habitat and 862.5 meters (2,829 feet) of linear wetlands were lost within the study area between 1938 and 1995, primarily due to residential and industrial development (see Table 2). A total of 0.8 hectares (1.9 acres) of wetland gains resulting from vegetative growth within an old excavated area and construction of a small pond are also noted during the study period. In total, a net loss of wetland habitat during the study period of 30 hectares (74.1 acres) was calculated. River course changes were noted at four locations and were attributable to both natural causes and development activities.

A Glossary, defining features or conditions identified in this report, follows the Photographic Analysis section. Sources for all maps, aerial photographs, and collateral data used in the production of this report are listed in the References section. A list of all aerial photographs that were identified and evaluated for potential application to this study can be obtained by contacting the EPA Work Assignment Manager. Historical aerial photographs used in the analysis of this study area have been digitally scanned and printed for use in this report. To cover the large study area, a series of photographs (termed "mosaics") were assembled to depict the study area for all photodates. For the 1938 and 1952 photocoverages, two different dates of photographs were used to produce each mosaic. The References section lists both photodates used in each mosaic while the dates provided in the list of Figures in the Table of Contents cite only the earliest photodate. A transparent overlay with interpretative data is affixed to each of the subarea and site-specific figures. See the Methodology section for a discussion of the scanning and printing procedures.

The U.S. Environmental Protection Agency (EPA), Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 1 Superfund Division in Boston, Massachusetts, and the EPA Office of Emergency and Remedial Response in Washington, D.C.

## METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- data identification and acquisition,
- photographic analysis and interpretation, and
- graphics and text preparation.

These steps are described below. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands. All operational steps and processes used to perform this work (including data identification and acquisition, photographic analysis and interpretation, and graphics and text preparation) adhere to strict QA/QC guidelines and standard operating procedures (SOPs). These guidelines and procedures are documented in the Master Quality Assurance Project Plan (QAPP) prepared for Remote Sensing Services Support Contract No. 68-D-00-267 (LMS, 2002).

Data identification and acquisition included a search of government and commercial sources of historical aerial film for the study area. Photographs with optimal spatial and temporal resolution and image quality were identified for acquisition. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

To conduct this analysis, the analyst examined diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most

cases, the stereoscope is capable of various magnifications up to 60 power. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed on the diapositives. Significant findings are annotated on overlays attached to the photographic or computer-reproduced prints in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The annotations are defined in the legend that accompanies each print and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable (certain), no qualifier is used. Probable is used when a limited number of discernible characteristics allow the analyst to be reasonably sure of a particular identification. Possible is used when

only a few characteristics are discernible, and the analyst can only infer an identification.

The prints in this report have been reproduced, either by photographic or computer methods, from the original film. Reproductions are made from the original film and may be either contact (the same size) prints or enlargements, depending on the scale of the original film. Any computer-produced prints used in this report are generated from scans of the film at approximately 1,300 dots per inch (dpi) and printed at 720 dpi. Although the reproductions allow effective display of the interpretive annotations, they may have less photographic resolution than the original film. Therefore, some of the objects and features identified in the original image and described in the text may not be as clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photographs or collateral data and do not necessarily denote legal property lines or ownership.

#### Wetland Analysis

The most general type of wetland analysis involves differentiating wetland and non-wetland areas. An analyst utilizes aerial photographs, soil surveys, hydric soils data, National Wetland Survey maps, and other available data to identify wetland boundaries and drainage networks within a study area. More detailed analyses are conducted using the Cowardin Classification System (Cowardin 1979) to provide information regarding vegetation types and hydrologic regimes. Analyses of photographs from several years can be compiled to assess changes in wetland areas and measurements can be conducted to quantify results. Field checking of final products can confirm and refine mapping results and aid in compliance with jurisdictional and legal requirements. Results of wetlands analyses are presented on clear acetate overlays attached to photographs or USGS topographic maps. The areal extent of each of the wetland areas was calculated through use of a dot grid and standard mensuration methodology.



## PHOTOGRAPHIC ANALYSIS

The Aberjona River study area is located in Middlesex County Massachusetts (Figure 2), principally in the cities of Woburn, Winchester, Arlington, and Medford. The northern boundary of the study area is just south of Salem Street while the southern boundary is at the southern extent of the Mystic Lakes. Natural surface drainage in the study area flows predominately to the south through the river and its associated tributaries. The three subareas used within this report are; Subarea 1 - from south of Salem Street to the Kraft Foods - Atlantic Gelatin facility; Subarea 2 - from the Kraft Foods - Atlantic Gelatin facility to Wedge Pond, and Subarea 3 - from Wedge Pond to the southern extent of the Mystic Lakes. Analysis overlays on the photographs in Volume 2 include a small index map that indicates the subarea covered by each photograph.

Each of the three subareas (and individual sites within Subareas 1 and 2) are discussed separately for the complete study period (see Volume 1). Corresponding photopages (see Volume 2) are similarly arranged. Additional enlargements of the Kraft Foods - Atlantic Gelatin facility (Site 2) are also included (see Figures 12 to 20).

Features referenced in background or collateral material are cited in the text of this analysis. When they are first mentioned in the text, these features are denoted with an asterisk (\*). They are also marked with an asterisk each time they appear on the photographs.

### ABERJONA RIVER STUDY AREA - SUBAREA 1

#### Site 1 - Cranberry Bog

1938 (FIGURES 3 through 11) - A commercial cranberry bog, a wetland area located directly south of Salem Street and west of Washington Street, operated in the early 1900s (EPA, 2002). An excavated area is located on the western side of the bog. Although this site is annotated on all subsequent overlays for Subarea 1, this bog does not change throughout the remainder of the study period and is, therefore, not discussed again.

-

- Other Environmentally Significant Features and Activities (Subarea 1)

- In 1938 (Figure 3), five excavations are noted in the subarea. Excavations are also located at the northern study area boundary and west of the study area within a tributary leading to the Aberjona River. All of these excavations were inactive in 1938 and either remained so through 1995 or were filled.

- 1969 (FIGURE 8) - An area of staining is noted in 1969 adjacent to the tributary of the Aberjona River at the north end of the study area. A large area of fill related to future construction activities is noted north of Montvale Avenue.

- 1978 through 1995 (FIGURES 9 through 11) - Possible solid waste and possible staining are noted in the excavation at the northern boundary of the study area in 1984, but these features were no longer present in 1995. One new excavation with possible solid waste is noted to the west of Site 2 in 1978, but is no longer present in 1984. No other environmentally significant features or activities are noted within Subarea 1.

- Site 2 - Kraft Foods - Atlantic Gelatin Facility (Enlargement from Subarea 1)

- Several vertical and horizontal tanks are present at the Kraft Foods - Atlantic Gelatin facility during the study period beginning in 1943. They are annotated, but not discussed unless environmentally significant features such as spillage or staining are associated with them.

- 1938 (FIGURE 12) - An access road from Montvale Avenue leads south to the Kraft Foods - Atlantic Gelatin facility. Possible solid waste (SW) and light-toned material (LTM) are evident south and adjacent to the railroad tracks. East of the site buildings is a topographically low area where a pond and an empty, possible impoundment are located. Moist soil (MS) is noted within the possible impoundment. South of the possible impoundment is a large excavation and an associated access road. The pond receives drainage flow from a drainage channel further to the east known as Sweetwater Brook. Flow from this pond trends west along the north side

of the buildings, into an impoundment next to the Aberjona River, and eventually leads into the river.

A possible outfall (OF) and a possible holding tank (HDT) are noted adjacent to the west side of the site buildings (not annotated). A flow path trends from the possible outfall into a large series of impoundments and bermed channels located southwest of the site buildings and adjacent to the river. Two small, rectilinear probable impoundments are also noted in the immediate area. Probable light-toned liquid material (LTLM) is observed within the channels and impoundments. South of the site buildings are two areas of disturbed ground and a possible structure.

On the west side of the river is a small building with a smokestack (S) and two areas of mounded material, one of which is probably coal (C). This is the Tanner's Degreasing Company\* that operated from 1932 to 1976 (EPA, 2002). To the south is an old building foundation (BF).

1943 (FIGURE 13) - The solid waste and light-toned material along the Kraft Foods - Atlantic Gelatin facility access road adjacent to the railroad tracks in 1938 are no longer present. Dark-toned material (DTM) is noted on an adjacent agricultural field (AG). East of the site buildings, an impoundment has been constructed north of the pond. To the southeast the excavation present in 1938 is now filled with solid waste and adjacent to the waste is a possible trench (TR).

Flow from the probable outfall (the possible outfall in this area in 1938) noted in 1938 appears to be flowing via a pipeline into a holding tank (HT) and from there into the impoundments. Probable light-toned liquid material remains in the channels and impoundments on the west side of the site buildings. Many breaches in impoundment berms are noted where liquid material may have migrated to other impoundments or nearby ground surfaces. Liquid material has also been released along an access road south of the site buildings (LTLM release point) where it flowed downhill into an impoundment. East of the impoundment complex is a network of access roads, probable waste disposal areas, solid waste, and light-toned material.

West of the Aberjona River, a portion of the small building at the Tanner's Degreasing Company has been dismantled and a liquid-filled excavation is apparent. No change is noted at the old building foundation to the south.

1952 (FIGURE 14) - The dark-toned material noted in 1943 on the agricultural field north of the Kraft Foods - Atlantic Gelatin facility is no longer present. To the northwest a new access road trends south from Montvale Avenue. East of the facility buildings, the impoundment noted in 1943 is empty and revegetating. A probable new cooling tower is also noted east of the site buildings. To the south a large level area is noted where an accumulation of solid waste was noted in 1943.

On the west side of the site buildings the outfall and pipeline seen in 1943 are no longer present. A large clarifier has been installed at the facility since 1943 and an area of light-toned material is noted nearby. North of the clarifier, staining is noted on a paved area and staining patterns indicate flow has migrated across this area toward the tributary that flows into the Aberjona River. Several scattered deposits of light-toned material and a small liquid-filled excavation are evident at a loading area to the north and an area of staining is noted to the east. A new open storage area (OS) containing unidentified objects (UO) has been constructed at the north end of the impoundment located west of the building complex. An outfall from the impoundment to the river is evident. A flow path containing light-toned material is evident immediately southwest of the large clarifier. Adjacent to the facility buildings to the southeast are staining and two areas of stacked crates. At a loading and unloading area on the south side of the facility buildings a pipeline is present.

A new access road leads towards the south and terminates in a large, level area which has probably been created by the deposition of fill in this area. Several areas of staining are noted atop the level area. Many areas of light-toned material (partially annotated) are located along the edge and down the slope of the level area. The deposits of light-toned material on the slope of the hill below the level area indicate that the deposits were released from the top of the level area and allowed to fall down the hill. Below the slope of the hill is the

- partially vegetated (PV) and inactive former impoundment area. A large  
- ditch containing some light-toned material trends from near the top of  
- the level area towards the northwest. Possible solid waste has been  
- deposited in the extreme southwest corner of the former impoundment area.  
- East of the level area, an access road leads to an excavated area where  
- stacked possible crates (CR) are located. A flow pattern on the slope of  
- the hill below indicates liquid materials have been released from this  
- area. Along the access road to the north are unidentified objects and a  
- deposit of mounded material.

- West of the Aberjona River at a partially dismantled Tanner's  
- Degreasing Company's building, two deposits of solid waste and one  
- deposit of partially vegetated probable solid waste are evident. To the  
- south, along the river at the old building foundation, three small empty  
- impoundments have been constructed. One small area of light-toned  
- material is also present.

- 1955 (FIGURE 15) - Light-toned material is present at the end of the  
- small access road that leads south from Montvale Avenue. No change is  
- noted at the impoundment east of the facility and adjacent to the river.  
- On the western side of the Kraft Foods - Atlantic Gelatin facility, a  
- flowpath trends across a paved area from a facility building into the  
- tributary that originates east of the facility. Two areas of staining,  
- indicative of past spillage, are evident west and north of the large  
- clarifier. Two areas of light-toned material are observed on the edge of  
- the paved surface (not annotated) and some of the material has probably  
- been transported into an adjacent ditch that trends to the river. To the  
- southeast, three piles of light-toned material are located adjacent to  
- two site buildings. The impoundment complex in the southwest portion of  
- the site is now completely covered with vegetation. Striations,  
- indicative of past erosion of the surface of the hill, are noted at the  
- former impoundment area to the southwest.

- West of the river, a new building has been constructed and a  
- possible drain leads to an excavation with moist soil and a drainageway  
- continues to the river. Probable fill (FL) deposits are also present.  
- To the south, adjacent to the old building foundation, are three small  
- impoundments, two of which contain possible solid waste. Additional  
- light-toned material is evident to the south. Further south, an

additional river channel, east of the original channel (not annotated), has been dug since 1943.

1963 (FIGURE 16) - North of the Kraft Foods - Atlantic Gelatin facility a small area has been excavated which is filled with standing liquid, probably from surrounding wetlands (not annotated). To the west is an open storage area containing unidentified objects. The eastern portion of the Kraft Foods - Atlantic Gelatin facility has been used for construction of U.S. Interstate 93. The probable cooling tower located in a ponded area within the facility in 1954 is now confirmed as such. An impoundment, present in 1963 on the east side of the buildings, is no longer present due to construction of the interstate highway. A possible outfall is noted on the west side of the buildings that leads under the access road and into a large ditch that trends southwest into the former impoundment area. Standing liquid and light-toned liquid material are present at the end of this ditch. To the south of the clarifiers, a new group of process-related tanks has been installed. Further to the south a light-toned stain indicative of past spillage is noted adjacent to a site building. The rail spur located on the south side of the buildings has been extended to the south and a large, level area apparently used for loading and unloading of materials is noted adjacent to the tracks. Light- and dark-toned stains are present within this level area. Also, a large light-toned stain (LTS) indicates that light-toned liquid material has been released from the edge of the level area and has flowed downhill. To the east are stored crates, derelict tanks (DTK), scattered debris, and unidentified objects. South of this area is Site 7, an excavated area that is discussed under Subarea 2. A probable sedimentation basin is noted in the southwest corner of the enlargement.

West of the Aberjona River is a large area of fill. To the south next to the river, is an excavated area where three impoundments were observed in 1955. Possible solid waste and several vehicles are noted at this location.

1969 (FIGURE 17) - A large, prominent vertical tank has been installed south of Montvale Avenue on the east side of Hill Street. The tank does not change in appearance during the remainder of the study period, thus, will not be discussed again. A partially-filled excavation and railroad tank cars are noted to the west.

Staining, related to runoff from surrounding areas is noted on the east side of the Kraft Foods - Atlantic Gelatin facility parking lot. This staining reoccurs in subsequent photodates, but will not be annotated or discussed again. Scattered stains are evident on the west side of the large building in the northwestern part of the site and unidentified stacked objects are located to the north. Stacked crates are present south of the tributary that flows through the site. No evidence is found of the possible outfall noted next to the buildings in 1963. The large ditch has standing liquid within it and light-toned material is present adjacent to the southern portion of the ditch. A light-toned stain on an adjacent roadway, indicating past spillage, trends into the ditch. Standing light-toned liquid material is apparent next to one of the large clarifiers. Light-toned stains, indicative of spillage, are noted adjacent to the west side of a facility building. At the level area to the south, stacked crates and two small areas of staining are present. Near the end of the railspur is an area of light-toned material. A large Quonset hut has been constructed east of the level area and a large open storage area containing unidentified objects and scattered debris is also discerned.

An area of standing liquid and scattered debris (DB) and new buildings are noted on the west side of the Aberjona River. The excavation and possible solid waste noted to the south in 1963 are no longer present.

1978 (FIGURE 18) - North of the Kraft Foods - Atlantic Gelatin facility, the partially filled excavation is now completely filled and building construction is ongoing. The cooling tower on the east side of the facility in 1969 has been removed. Scattered standing liquid and crates are evident west of the large building in the northwestern part of the site. South of this building, liquid is flowing from the one of the facility buildings across a paved area (not annotated) and into the

- adjacent tributary to the Aberjona River. Staining and flowpaths were  
- noted at this paved area in 1952 and 1955. To the southwest a new  
- portion of an access road has been constructed into the northern portion  
- of the old impoundment area and mounded material and possible solid waste  
- is evident along a portion of the road. The large ditch and standing  
- liquid within it remain, but appear to be unconnected to the facility or  
- the river. Possible stains, stacked crates, light-toned staining, truck  
- trailers (TT), and light-toned material are noted on the level area to  
- the east. Two possible derelict tanks are also apparent. East of the  
- rail spur the open storage area appears to be no longer present, but  
- unidentified objects (partially annotated) are located in this area and  
- also along the sides of a portion of the access road that leads north.  
- Additional unidentified objects and a possible derelict tank are seen at  
- the end of this road. No other environmentally significant features are  
- present.

- On the west bank of the river is a large open storage area  
- containing unidentified objects, an area of staining, and standing liquid  
- (SL). To the south past spillage from an undetermined source trends  
- towards the river from an adjacent lot (not annotated). Further to the  
- south is another area of spillage, but this appears to be the result of  
- truck wash-outs operations.

- 1984 (FIGURE 19) - No significant features or activities are noted in the  
- eastern portion of the site; however, unidentified objects and debris are  
- being stored west of the large building in the northwestern part of the  
- site and possible crates are located nearby. Northeast of the building,  
- possible moist soil is apparent near two vertical storage tanks. A small  
- deposit of mounded material is noted on the lot south of this building.  
- Possible seepage from one of the clarifiers is also observed. Continuing  
- to the south, stacked crates, a light-toned stain, and an area of  
- probable standing liquid are observed.

- In the former impoundment area southwest of the facility, mounded  
- material is noted adjacent to a small access road. Standing liquid  
- continues to be evident to the south. The level area to the east is  
- completely revegetated. To the southeast another small open storage area  
- containing unidentified objects, areas of light-toned material, stacked

crates, and a tanker truck are apparent. East of the Quonset hut unidentified objects present along the access road in 1978 are no longer evident. To the northeast staining is noted adjacent to a small building. A large, revegetated excavation is evident to the south. Partially vegetated excavated material has apparently been deposited on the side of the adjacent hill and a fence has been installed around a portion of the material.

On the west bank of the Aberjona River, staining continues to be present at the open storage area and also within a lot to the south. No change is noted at the old building foundation.

1995 (FIGURE 20) - Possible crates are noted west of the large building in the northwestern part of the site. A large stain, indicative of spillage, is noted south of the building. Stacked crates and possible crates are located further to the south, east of the level area. The partially vegetated excavated area further to the east continues to vegetate. The three horizontal tanks at the end of the access road have been removed and one new vertical tank is present. No other environmentally significant features of activities are noted at the site.

Staining remains apparent at the open storage area on the west side of the river.

ABERJONA RIVER STUDY AREA - SUBAREA 2

Site 3 - Former J. H. Winn Watch Face and Dial Manufacturing Company

1938 (FIGURE 21) - This site consists of a single building and an access road. A small excavation is evident east of the building. A small wetland that drains to the Aberjona River is present on the west side of the site and disturbed ground is noted adjacent to the west side of the building. Additional disturbed ground, probably associated with the adjacent cemetery, is noted north and west of the site.

1943 (FIGURE 22) - The only change at this site since 1938 is the addition of a small shed at the northern corner of the main building and an enlargement of the lot (not annotated) on the north side of the building. Disturbed ground continues to be present to the north and west.

1952 (FIGURE 23) - A small deposit of solid waste is observed on the west side of the site. No other environmentally significant features or activities are discerned.

1955 (FIGURE 24) - Additional buildings (not annotated) have been constructed on the west side of the main building and a parking lot is now present on the north side of the building. The small deposit of possible solid waste evident in 1943 is now partially vegetated. Mounded earthen material continues to be present at the adjacent cemetery and, although present on subsequent photodates, will no longer be discussed.

1963 (FIGURE 25) - Additions to the main building and enlargement of the parking lot have been accomplished since 1955. Construction of the building additions on the west side of the site has resulted in partial filling of the adjacent wetland and blocked the drainageway (not annotated) that trended from the small wetland to the river.

1969 through 1995 (FIGURES 26 through 29) - No environmentally significant features or changes are observed at the site during this time period.

Site 4 - Former Rendering Operation (J. O. Whitten Property)

1938 (FIGURE 21) - A small impoundment containing light-toned probable liquid material is noted on the south side of this site and small areas of light-toned material are present next to the impoundment. The light-toned material south of the impoundment may have been caused by possible seepage from the impoundment. Possible standing liquid is noted on the east side of the site where probable dark-toned material is also visible.

West of the site is a large vertical tank. Flow from a small nearby wetland trends south into a series of impoundments on the west bank of the Aberjona River. South of the site is a large area with numerous small scattered excavations (partially annotated).

1943 (FIGURE 22) - The impoundment remains unchanged since 1938, while light-toned material and possible solid waste are evident to the north. Probable light-toned material is evident next to the facility building complex. Two areas of probable dark-toned material are noted on the east side of the site. Possible standing liquid, probably resulting from a high water table and soil saturation, is located adjacent to the dark-toned material. A smokestack is noted north of the buildings.

West of the site the series of impoundments noted in 1938 (not annotated) are not as readily apparent. No environmentally significant changes are noted at the area of scattered excavations south of the site.

1952 (FIGURE 23) - Vegetation is present within the impoundment located on the south side of the site indicating probable inactivity. Scattered light-toned material is noted east of the impoundment as well as an area of staining. A concrete-lined, liquid-filled sump is located to the north.

The impoundments west of the site are again visible. The east side of the large excavation south of the site is being filled for future development.

1955 (FIGURE 24) - The impoundment is covered with vegetation, although light-toned material is noted in one corner of it. At the end of a small access road (not annotated) is a deposit of possible solid waste. A burning unidentified object and an area of moist soil are present in the vicinity. The small sump noted on the eastern side of the site in 1952 is no longer present.

The impoundments west of the site and the remainder of the west bank of the Aberjona River down to Swanton Street are in the process of being filled. Dark-toned material is noted near the impoundments. At the excavated area south of Site 4, accumulations of debris, probable staining, and standing liquid indicate possible waste disposal activity. Northwest of the site, at the western study area boundary, a building associated with the nearby large extraction operation has been removed. Standing liquid and moist soil are apparent in the large excavation to the south.

1963 (FIGURE 25) - The impoundment is again filled with light-toned liquid material and a new impoundment also containing light-toned material is noted to the north. Adjacent to one impoundment, possible solid waste is evident. An area of light-toned material, a small ditch, and a small drainageway originating at the facility and terminating near the river are also noted on the site.

The impoundments west of the site are now completely filled. No recent excavation activity is noted south of the site; only an accumulation of debris is evident.

1969 (FIGURE 26) - The new impoundment noted at the site in 1963 has been partially filled and an accumulation of solid waste is evident at the end of a small access road. Disturbed ground is discerned near the drainageway noted in 1963 and light-toned material is present at two locations in the northern portion of the site.

East of the site is a new excavation containing possible solid waste. North of Site 4 debris and mounded material are evident in an area of recent construction. Directly west of Site 4 approximately 30 large containers and associated light-toned staining are noted; however,

it could not be determined if the containers or an adjacent building was the source of the staining. A new school has been constructed south of Site 4 where the inactive excavated area was present.

1978 (FIGURE 27) - The larger impoundment in the southern part of the site is now completely vegetated and inactive. Scattered mounded material is located in the southern portion of the site, while scattered possible light-toned material is evident in the north.

The excavation containing possible solid waste to the east of the site is no longer present. West of the site, small deposits of light-toned and dark-toned material are evident. No evidence remains of the large containers and light-toned staining noted in 1969 and the large vertical tank to the south has been dismantled.

1984 (FIGURE 28) - The main site buildings in the central portion of the site have been removed and buildings foundations are visible. Mounded material and an area of staining are noted to the north of this area.

1995 (FIGURE 29) - The building foundations on the site have been removed and vegetated mounded material, a small, empty trench and light-toned material are present at the site. The northern portion of the site remains active, but no environmentally significant features or activities are noted in this area.

West of Site 4 two buildings present in 1984 have been removed and scattered mounded material is noted. To the south a series of buildings (not annotated) are present where fill and mounded fill were located in 1984.

#### Site 5 - Former Town of Winchester Refuse Incinerator

1938 (FIGURE 21) - Two old, apparently inactive, industrial facilities occupy Site 5. An old railspur connects the buildings to the nearby railroad. A possible pipeline originates from one building and trends to the west into an open area. Vegetation at the terminus of the possible pipeline is darker indicating probable past discharge of liquids to this area. A large, empty excavated area and a smaller excavation are noted

in the northern portion of the site. An empty pit is noted adjacent to an off-site building south of the site.

East of the site is a large, vegetated excavation. On the west bank of the river, an area of disturbed ground is identified.

1943 (FIGURE 22) - One of the facility buildings has been removed since 1938. Disturbed ground, probably the result of the removal, is noted in this area. No changes are observed within the excavated areas.

Disturbed ground remains visible on the west side of the Aberjona River.

1952 (FIGURE 23) - The remaining on-site building has been removed since 1943. The southern part of the site contains solid waste and scattered staining, while the northern part has been excavated and fill is being used in conjunction with probable landfilling of wastes.

1955 (FIGURE 24) - Solid waste deposition (not annotated) appears to be ongoing at the site. Two large deposits of probable dark-toned material and several small deposits of fill (not annotated) are visible at the site.

Deposits of possible dark-toned material are noted in a large area on the west side of the Aberjona River. A small depression filled with possible light-toned material is evident to the west.

1963 (FIGURE 25) - A new access road enters the site from the south and leads to a new incinerator at the north end of the site. Possible solid waste is noted on the west side of the incinerator. The surface of the site west of the access road is level and covered with dark-toned material.

Possible staining is noted at the facility south of the site. The excavation east of the site has been partially filled. Possible solid waste and possible staining are noted on the west side of the river. The possible dark-toned material seen in 1955 is no longer present. No change is evident at the small depression further to the west.

1969 (FIGURE 26) - Probable solid waste is located to the west of the incinerator. At the southern end of the site is a large excavation containing standing liquid, solid waste, and dark-toned material. Scattered solid waste is apparent to the east. To the north a large area of dark-toned material is noted. The extreme western part of the site (not annotated) from the riverbank eastward to the topographic break has been excavated since 1963.

Possible staining is again observed at the facility south of Site 5. West of the site, scattered debris and an area of possible staining are evident on the west bank of the river where possible solid waste was noted in 1969. Runoff from the scattered debris would enter the river. Other areas of debris, scattered debris, light-toned material and one large derelict tank are located in the immediate vicinity.

1978 (FIGURE 27) - Solid waste is present west of the incinerator. West of the site access road, dark-toned material is present. Several mounds of light-toned and dark-toned material (not annotated) are also present and one small area of standing liquid is noted in the area.

Staining is noted at the facility to the south. No new waste-related features or activities are discerned on the west bank of the Aberjona River opposite Site 5.

1984 (FIGURE 28) - Solid waste is again located west of the incinerator and a small area of partially vegetated possible solid waste is located to the south. Disposal of wastes in the area west of the main access road appears to have ceased sometime between 1978 and 1984. The area (not annotated) is completely covered with vegetation except for a portion of the area adjacent to a secondary access road which is partially vegetated. Some probable staining is evident on this road and also within the partially vegetated area.

As in previous years, staining is noted at the facility south of the site. West of the site, a large area of fill and scattered areas of mounded fill (not annotated) are present where construction activities are ongoing.

1995 (FIGURE 29) - The disposal area west of the main access road appears to be active again. A large area of dark-toned material is located in this area, as are areas of mounded material, several vehicles (not annotated), and unidentified stacked objects. Buildings at the facility south of the site have been removed and two new buildings are noted.

No environmentally significant features or activities are noted west of the site.

Site 6 - Former Beggs and Cobb Tannery

1938 (FIGURE 21) - The primary waste-related features are noted in the eastern portion of the site. Three partially vegetated areas of light-toned material, a possible area of dark-toned mounded material, and disturbed ground are located immediately east of the facility buildings. East of this area is an access road (not annotated) that leads south to an area of burning probable solid waste and partially vegetated fill. Two small access roads lead from on-site buildings to this area, but it is uncertain as to whether the area is related to site operations.

On the east side of the river another large area of partially vegetated fill is evident.

1943 (FIGURE 22) - A possible coal stockpile is located within the facility complex. In the northeast portion of the site, possible dark-toned material is noted. This appears to be a topographically low area and runoff has crossed the access road east of the site and possibly flowed into the river. Solid waste, dark-toned material, and partially vegetated possible solid waste are noted to the south. At the end of the access road east of the site are areas of mixed fill, solid waste, and scattered staining. A portion of the access road is also stained. It could not be determined from the photographs what portion, if any, of these wastes originated within the site.

Solid waste is seen southwest of the site adjacent to Main Street.

1952 (FIGURE 23) - Areas of staining, probable coal, and crates are noted within the facility complex. In the northeastern portion of the site, flow path patterns (partially annotated) and staining on surrounding vegetation within the low area probably indicate release of a large quantity of dark-toned liquid material from a small building to the west and the migration of that material towards the Aberjona River. It appears as though the liquid material from this area has crossed the access road to the east and flowed into the river. To the south along the fenceline (not annotated) are two bare areas (BA) surrounded by stained vegetation. The solid waste noted southwest of the site along Main Street on the 1943 photographs (not annotated) has been graded (not annotated) and is partially vegetated. Light-toned material is located along the eastern side of a large on-site building. The mixed fill, solid waste, and staining noted southeast of the site in 1943 is partially vegetated.

On the east side of the river additional fill has been placed at the area noted in 1938.

1955 (FIGURE 24) - The staining noted in the northeastern part of the site in 1952 is no longer visible, but the flowpaths seen there in 1952 remain visible. To the south, mounded material is noted. A vegetated impoundment is located where a bare area was observed in 1952, but no evidence of staining is discerned. Stacked unidentified objects are located nearby. Further to the south, a liquid-filled impoundment is now present where the second bare area and stained vegetation were located in 1952. Light-toned material is again noted adjacent to the large nearby building. Construction activities are noted along the riverbank southeast of the site.

A small deposit of mounded material is located south of the site near Horn Pond Brook.

1963 (FIGURE 25) - Most of the facility buildings have been dismantled since 1955 and building foundations remain. A small deposit of possible solid waste is noted in the northeastern portion of the site. The liquid-filled impoundment in the southeastern portion of the site remains.

1969 through 1995 (FIGURES 26 through 29) - By 1969 an office building and an associated parking lot have been constructed at the former location of the Beggs and Cobb Tannery. A small pond is located where the former liquid-filled impoundment was noted in 1955. The area on the east side of the site, where environmentally significant features were located from 1938 through 1963, is now partially vegetated and inactive. From 1969 through 1995 no additional environmentally significant features were observed at the site.

Site 7 - Waste Disposal Area - Excavation

Site 7 was not evident for the 1938, 1943, and 1952 photodates.

1955 (FIGURE 24) - Site 7 is located directly south of Site 2 (Kraft Foods - Atlantic Gelatin facility) in Subarea 1. Earthen materials are being extracted from this site. Two operations buildings and a large crane (not annotated) are also noted at this site. Some standing liquid is noted within the excavation probably from nearby springs (not annotated). A sedimentation catch basin has been constructed to the west to receive flow from a larger, adjacent stream. A probable sedimentation catch basin is located to the west on the river.

1963 (FIGURE 25) - Excavation activities have increased within the excavation since 1955, with a small road network and numerous vehicles (not annotated) in evidence. Possible solid waste is noted at two locations within the excavation. Standing liquid remains present due to seepage from nearby springs (not annotated).

1969 (FIGURE 26) - Two areas of possible solid waste are noted at the site as well as an area of possible staining. Standing liquid continues to be observed within the excavated area. Fill and probable solid waste have been deposited next to the sedimentation catch basin west of Site 7.

1978 (FIGURE 27) - Most of the area within the excavation is vegetated (not annotated) and apparently inactive; however, possible solid waste, possible liquid waste, and standing liquid are noted.

1984 (FIGURE 28) - Activity at the excavation has been renewed since 1978 indicated by the presence of a new operations building along with deposits of dark-toned material, an area of possible liquid waste, staining, and scattered mounded material (not annotated).

1995 (FIGURE 29) - A large area of staining indicating spillage, scattered mounded material, and possible staining are evident at the site.

Other Environmentally Significant Features and Activities (Subarea 2)

1938 through 1963 (FIGURES 21 through 25) - A large extraction operation located west of Site 3 is active during this time frame.

1969 (FIGURE 26) - The extraction operation west of Site 3 has ceased and numerous industrial and commercial buildings have been constructed within the large excavations; however, possible solid waste, possible solid waste within a pit, and an open storage area containing possible solid waste are noted within this large area. Northwest of Site 3 are two areas of possible solid waste.

1978 (FIGURE 27) - Additional buildings have been constructed in this old extraction area and debris is located adjacent to one of these buildings. Northwest of Site 3 possible and probable solid waste and possible discarded containers (CN) are also noted in this area.

1984 (FIGURE 28) - Northwest of Site 3 a bare area along an access road is noted where deposits of probable and possible solid waste and possible discarded containers were seen in 1978. A small, empty pit and areas of fill (not annotated) are noted within the bare area. Possible solid waste is located to the southwest on a small hill. Possible drums and possible staining are located further to the south.

1995 (FIGURE 29) - A new, large extraction operation is present northwest of Site 3 where the large bare area was located in 1984.

ABERJONA RIVER STUDY AREA - SUBAREA 3

No numbered sites are located in Subarea 3 and very few environmentally significant features or activities are observed within the area during the study period.

1938 (FIGURE 30) - Possible excavations are noted at a cemetery east of Lower Mystic Lake.

1943 (FIGURE 31) - Excavations are observed within the cemetery east of Lower Mystic Lake and also to the south of Upper Mystic Lake. A possible and a probable waste disposal area (WDA) are noted adjacent to a cemetery at the southern end of Lower Mystic Lake.

1952 (FIGURE 32) - Excavations noted at the cemetery east of Lower Mystic lake are no longer apparent. At the possible waste disposal area at the southern end of Lower Mystic Lake, what appears to be a mixture of solid waste and fill has been spread to the north onto an adjacent wetland. The probable waste disposal area seen to the northeast in 1943 is no longer present.

1955 (FIGURE 33) - Small excavations dug and areas of fill removed since 1952 are evident at the cemetery east of Lower Mystic Lake. No substantive change is observed at the area where the mixture of fill and possible solid waste is located on the southern end of Lower Mystic Lake.

1963 (FIGURE 34) - At the cemetery east of Lower Mystic Lake are areas of probable mounded material and fill. Additional fill has been added to the partially filled area south of Lower Mystic Lake.

1969 (FIGURE 35) - Fill material and two other areas of possible solid waste are evident at the cemetery east of Lower Mystic lake. No environmentally significant change has occurred at the fill material south of Lower Mystic Lake.

1978 (FIGURE 36) - Two small areas of mounded material are apparent at the cemetery east of Lower Mystic Lake, but no changes are discerned at the fill material south of this lake.

1995 (FIGURE 37) - Photographs are not available for Subarea 3 for 1984; however, examination of the 1995 imagery of the area reveals no substantive changes in environmentally significant features or activities since 1978.

Areas of fill and of mounded material are located at the cemetery east of Lower Mystic Lake. No other environmentally significant features or activities are observed in Subarea 3.

## ABERJONA RIVER WETLANDS (1938 AND 1995)

### Introduction and Results

A delineation of wetlands along the Aberjona River and identification of subsequent wetland losses during the study period of 1938 to 1995 was conducted. Additionally, any significant changes in the course of the river were determined.

Open water bodies (OW) along the course of the river or those directly adjacent to it were identified as wetlands. Water bodies not adjacent to the river and with no apparent direct connection to it were not identified or classified as such.

The type of wetland analysis used in this project involves the differentiation of wetland and non-wetland areas. The analyst used aerial photographs, soil surveys, hydric soils data, National Wetland Inventory maps, and other available data to identify wetland boundaries and drainage networks within the study area. Within the Aberjona River study area, the 1938 set of aerial photographs was used to map existent wetlands for that year. Small, linear wetlands present along drainageways are depicted with a series of dots to denote their location. In certain undeveloped areas where the wetland/upland boundary was unclear, the 1955 and 1963 aerial photographs were examined to aid in delineation of this boundary. All data were transferred with a Zoom Transfer Scope (ZTS) to respective analysis overlays of the 1938 and 1995 photoenlargements (Figures 38 and 39, respectively). To map the loss in wetland habitat between 1938 and 1995, wetlands present in 1938 were compared to wetlands present on each subsequent photodate. See the Methodology section for additional discussion on wetland analysis procedures.

Wetland areas depicted on the 1938 wetland analysis overlay (Figure 38) were prevalent along the Aberjona River in the northern portion of the study area; however, within the southern portion of the study area, few wetlands other than open water bodies were observed due to residential, commercial, industrial, and transportation-related development prior to 1938.

Wetlands present in 1995 and wetland gains and losses since 1938 are depicted on the 1995 Wetlands Status Overlay (Figure 39). These areas of loss are delineated with dashed lines. Linear wetlands lost during the study period are delineated with bracketed dotted lines on the analysis overlay. Each wetland loss area is assigned a symbol (e.g., WL-1, WL-2, WL-3). Table 2 lists the inclusive photodates when the loss of each wetland area occurred and possible causes of wetland loss.

Table 2. Wetland habitat losses and gains within the Aberjona River study area, 1938-1995.

Wetland Area	Time Period of Wetland Loss/Gain	Possible Causes of Wetland Loss/Gain
WL-1	1955-1963	Industrial development
WL-2	1955-1963	I-93 construction
WL-3	1955-1963	Residential development
WL-4	1955-1963	Residential development
WL-5	1955-1963	I-93 construction
WL-6	1955-1963	I-93 construction
WL-7	1963-1969	Industrial development
WL-8	1969-1978	Industrial development
WL-9	1969-1978	Industrial development
WL-10	1963-1969	Residential development
WL-11	1978-1984	Deposition of fill
WL-12	1955-1978	Two small areas-industrial development
WL-13	1963-1969	Industrial development
WL-14	1955-1963	Construction-site 2
WLG-1#	1943-1955	Revegetation of an excavated area
WL-15	1969-1978	Residential/industrial development
WL-16	1963-1969	Industrial development
WL-17	1969-1978	Industrial development
WL-18	1955-1963	Construction-site 3
WL-19	1969-1978	Industrial development
WL-20	1969-1978	Industrial development
WL-21	1963-1969	Industrial development
WL-22	1969-1978	Industrial development
WL-23	1969-1978	Deposition of fill
WL-24	1969-1878	Deposition of fill
WL-25	1963-1969	Fill deposition; park construction
WL-26	1952-1955	Fill deposition; park construction
WL-27	1955-1963	Residential development
WL-28	1955-1963	Residential development
WL-29	1955-1963	Residential development
WL-30	1952-1955	Residential development
WL-31	1955-1963	Industrial Development
WLG-2#	1963-1969	Construction of a pond
WL-32	1938-1943	Deposition of fill
WL-33	1978-2000*	Deposition of fill

\* No photocoverage of the southern portion of the study area was available for 1984.

# These polygons represent gains in wetland habitat during the study period.

Aberjona Rivercourse Changes

From 1938 to 1995 several changes in the course of the Aberjona River were observed and recorded on the 1995 Surface Drainage and Aberjona River Course Overlay (Figure 39). Dotted lines represent the river course as it was in 1938. Within the northern segment of the Aberjona River at Annotation 1, the river was rechannelized sometime between 1969 and 1978 due to construction of several buildings in the area. At Annotation 2 in 1938, the river flowed along the western side of an open area that appears to be a recreational park. Between 1963 and 1969 this portion of the river had been channeled through an apparent large underground culvert and the area filled and graded to increase the size of the park. Another smaller river course change that occurred between 1952 and 1955 is noted at Annotation 3 on the river course overlay. The change was caused by building construction and filling of adjacent land. To the south at Annotation 4 in 1938 the river flowed to the east of its 1995 location. To increase the size of this recreational area, the river was channelized sometime between 1943 and 1952 and now flows along the east side of the north/south oriented railroad tracks.

## GLOSSARY

Access Road (AR) - A paved or unpaved route of vehicular access.

Berm/Dike - An embankment of either natural or man-made materials that impounds liquids, solids or other materials, or controls flood waters.

Building (B) - A relatively permanent, essentially boxlike construction having a roof.

Channelized Drainage - A man-made or altered drainage route.

Dark- (DT), Medium- (MT), or Light-Toned (LT) - Tones of features in question are compared with the darkest and lightest tones of gray (if using B&W photography) on the print.

Debris (DB) - The remains of anything that can be identified as being broken down, destroyed, demolished, or dismantled.

Disturbed Ground (DG) - A rough area where the ground surface has been dug up or overturned.

Excavation Area (EX) - An area where earth or other material is being removed in order to alter the ground level (e.g., building construction).

Extraction Area - An area where earth or other material is being removed for specific use elsewhere (e.g., quarry, sand and gravel pits, etc.).

Fill (FL) - Earth, stones, or other material that is used to build up the level of an area of ground.

Fill Area (FA) - An area where material is being deposited to fill a depression; or area where materials have been added, altering the elevation of the ground surface.

Impoundment (IM) - A liquid containment area that appears to be related to activity on a site but does not appear to be used for waste storage, disposal and/or treatment.

Material (M) - Raw or waste materials on or in the vicinity of the site.

Mounded Material (MM) - Piles of raw or waste materials on or in the vicinity of the site.

Open Storage Area (OS) - An area of open-air (outdoor) storage of containerized, raw or waste materials, within industrial or manufacturing sites.

Outfall (OF) - The place where an effluent is discharged into the environment.

Solid Waste (SW) - Any garbage, refuse, or sludge from a waste treatment, water supply treatment plant, or air pollution control facility, and other discarded material, including solid or semi-solid material resulting from industrial, commercial, mining, and agricultural operations, and from community activities; does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges.

Spillage (SP) - Any unplanned discharge or release of solid, semi-solid, or liquid material (aka liquid discharge).

Stain (ST) - A residue or discoloration resulting from a spill, discharge, or removed/dispersed materials.

Standing Liquid (SL) - A small, shallow, temporary collection of liquid, not necessarily waste. Not to include liquid contained in impoundments, trenches, pits, etc.

Tanks - Vertical tanks (VT), horizontal tanks (HT), pressure tanks (PT), tank farms, and solid waste management units. A large receptacle, container, or structure for holding liquid or gas.

Trench (TR) - A long, narrow excavation unrelated to drainage.

Waste Disposal Area (WDA) - An area where waste materials are discarded.

Wetlands (WL) - Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

REFERENCES

MAPS

Source <sup>a</sup>	Figure	Name	Scale	Date
USGS	1	United States	1:2,500,000	1972
USGS	2	Boston North, MA	1:25,000	1985

COLLATERAL INFORMATION

EPA. 2002. Collateral information supplied by EPA Region 1 as Attachment to remote sensing services request form. 7pp.  
 LMS (Lockheed Martin Services). 2002. Master Quality Assurance Project Plan. Prepared for EPA Environmental Sciences Division. Contract 68-D-00-267. Las Vegas, Nevada.

AERIAL PHOTOGRAPHS

Photo source <sup>a</sup>	Figure <sup>b</sup>	Date of acquisition	Original scale	Film type <sup>c</sup>	Mission I.D.	Source frame #	EPIC ID #
KVT	3,12,21, 30,38	12-16-38	1:24,000	B&W	GSF	176-178,	067,068 208,209
KVT	30,38	04-10-39	1:24,000	B&W	GSF	13	-
EPIC	4,13,22, 31	07-24-43	1:24,500	B&W	MB	1038-40 1014,1015	81715-81717, 19607-19608
KVT	5,14,23, 32	08-24-52	1:20,000	B&W	DPQ	16-19	63194-63197
KVT	-	10-12-52	1:20,000	B&W	DPQ	103-105	63199-63201
USGS	6,15,24, 33	12-01-55	1:24,000	B&W	VKF	119,120, 96,97, 82,83	61451,71814, 61449,61500, 61446,61447
AVPT	-	1962/1963	1:18,000	B&W	-	-	-
USGS	7,16,25, 34	04/29/63	1:24,000	B&W	VAQZ	78-81	1458,60721, 058,61453
NOS	-	05/12/65	1:30,000	B&W	-	-	-

(continued)

AERIAL PHOTOGRAPHS (continued)

Photo source <sup>a</sup>	Figure <sup>b</sup>	Date of acquisition	Original scale	Film type <sup>c</sup>	Mission I.D.	Source frame #	EPIC ID #
USGS	8,17,26, 35	04/26/69	1:24,000	B&W	VCEM	13,14	19289,19291
		04/09/69	1:24,000	B&W	VCEM	97,98, 121,122	61458-462
ASCS	-	10/29/70	1:40,000	B&W	-	-	-
ASCS	-	07-03-71	1:40,000	B&W	-	-	-
USGS	9,18,27, 36	04-23-78	1:28,000	B&W	SWJS	101-104	061-063, 61466,61467
USDA	-	09-19-80	1:40,000	B&W	-	-	-
EPIC	10,19,28	08-22-84	1:22,000	CC	84/159	1798-1800	-
UMASS	-	07-24-85	1:58,000	CIR	4390	-	-
EPIC	-	00-00-91	1:36,000	B&W	-	-	-
	-	00-00-91	1:40,000	CIR	-	-	-
ASCS	11,20,29, 37,39	03-29-95	1:40,000	B&W	NAPP	18-20,21,22	60714,60715, 63213-63215

- <sup>a</sup>ASCS U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Salt Lake City, Utah  
AVPT Aerial Viewpoint, Inc., Spring, Texas  
EPIC U.S. Environmental Protection Agency, Environmental Photographic Interpretation Center, Warrenton, Virginia  
KVT King Visual Technology, Hyattsville, Maryland  
NOS National Oceanic Service, Coast and Geodetic Survey, Washington, D.C.  
UMASS University of Massachusetts, Amherst, Massachusetts  
USDA U.S. Department of Agriculture, Salt Lake City, Utah  
USGS U.S. Department of Interior, U.S. Geological Survey, Washington, D.C.
- <sup>b</sup>Photographs listed with no figure number were analyzed, but not placed in this report because no significant environmental features or changes had occurred since the previous photographs.
- <sup>c</sup>B&W Black-and-white  
CC Conventional Color  
CIR Color Infrared