

**TOTAL MAXIMUM DAILY LOAD ANALYSIS FOR
STEELE BROOK
WATERTOWN, CONNECTICUT**

**This document has been established
pursuant to the requirements of Section
303(d) of the Federal Clean Water Act**

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INTRODUCTION

Section 303(d) of the Federal Clean Water Act (CWA) requires the development of Total Maximum Daily Loads (TMDLs) for waters where required point and nonpoint source pollution controls are not stringent enough to attain or maintain compliance with State Water Quality Standards ¹(WQS). A TMDL defines the greatest amount of pollutant that a waterbody can receive without exceeding the water quality criteria that have been adopted for that pollutant in the WQS. TMDLs can also be viewed as a plan or strategy designed to reduce the current loading of pollutants in order to restore the beneficial uses designated in State WQS for that waterbody. Federal regulations require that TMDLs identify the portion of the total loading which is allocated to point source discharges (termed the Wasteload Allocation or WLA) and the portion attributed to nonpoint sources which contribute that pollutant to the waterbody (termed the Load Allocation or LA). In addition, TMDLs must include a Margin of Safety (MOS) to account for any lack of knowledge concerning the relationship between point and nonpoint pollutant allocations as well as any seasonal variability in the relationship between pollutant loading and WQS attainment.

TMDLs are established by the state following a period for public comment on the analysis. Once established, TMDLs must be submitted to the Federal Environmental Protection Agency (EPA) for approval. During the development of this TMDL, a number of alternatives were evaluated to achieve WQS in Steele Brook. This TMDL includes an implementation plan to attain WQS and a monitoring plan to confirm that the TMDL has been effectively implemented and WQS achieved.

The section of Steele Brook from the Watertown Fire District sewage treatment plant to the mouth was listed on Connecticut's *1998 List of Waterbodies Not Meeting Water Quality Standards* ² as a high priority for development of a TMDL. The heavy metal copper was identified as the critical pollutant contributing to the impairment in Steele Brook. When the 1998 303 (d) list was published, the two most significant sources of copper were the point source discharge of treated sanitary wastewater from the Watertown Fire District facility and the nonpoint discharge of contaminated groundwater from a former industrial site (Sherwood Medical) bordering the brook. During the process of developing this TMDL, it was concluded

that the Watertown Fire District could not construct and operate a treatment plant capable of consistently achieving projected water quality based copper limits in Steele Brook. Therefore, the Watertown Fire District discharge was eliminated from Steele Brook on October 4, 2000 and redirected to the City of Waterbury sewage treatment facility. Loading calculations developed for copper at three critical locations below the former Watertown Fire District discharge confirm that Water Quality Standards for copper will be achieved following the elimination of the discharge and upon completion of the ongoing groundwater remediation at the former Sherwood Medical site.

STEELE BROOK

Steele Brook is a small subregional drainage basin (17 sq.mi.) that falls within the municipal jurisdiction of Waterbury, Watertown, and Middlebury (Figure 1). Steele Brook is a high gradient stream originating in the forested area north of Watertown and flows southeasterly to its confluence with the Naugatuck River in Waterbury. The brook is designated as a Class A surface water from the headwaters to the former outfall of the Watertown Fire District sewage treatment plant immediately upstream of Pin Shop Pond. Below this point, the brook is designated as a Class B surface water.

Biological monitoring and fisheries surveys confirm that aquatic life use impairments exist below the former Watertown Fire District outfall. CTDEP's Fisheries Division has determined that several reaches of Steele Brook have sufficient habitat to support a high quality trout fishery if improvements are made to water quality. The streambed is primarily runs and pools with occasional riffle areas. Stream width in the lower portions of the brook averages 15 feet and water depths range from one to six feet in pool areas. The stream's substrate is predominantly gravel and boulder and the tree canopy is typically dense and overhanging providing a well-shaded streambed in most areas.

Steele Brook has been channelized in several places in the lower reaches and a number of low dams exist which influence sediment transport and deposition patterns in the watershed. A dam at Pin Shop Pond represents a significant impediment to fish migration.

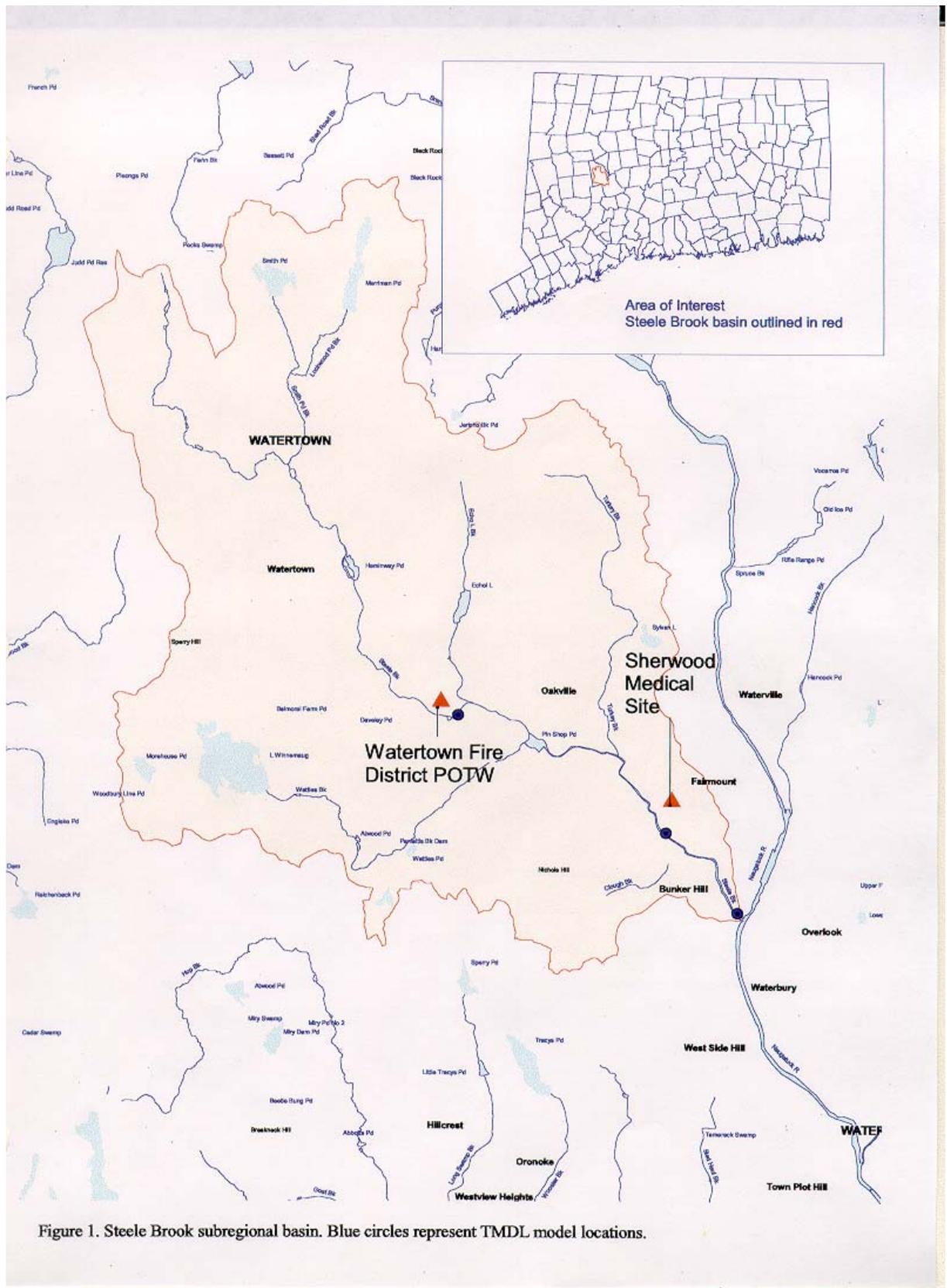


Figure 1. Steele Brook subregional basin. Blue circles represent TMDL model locations.

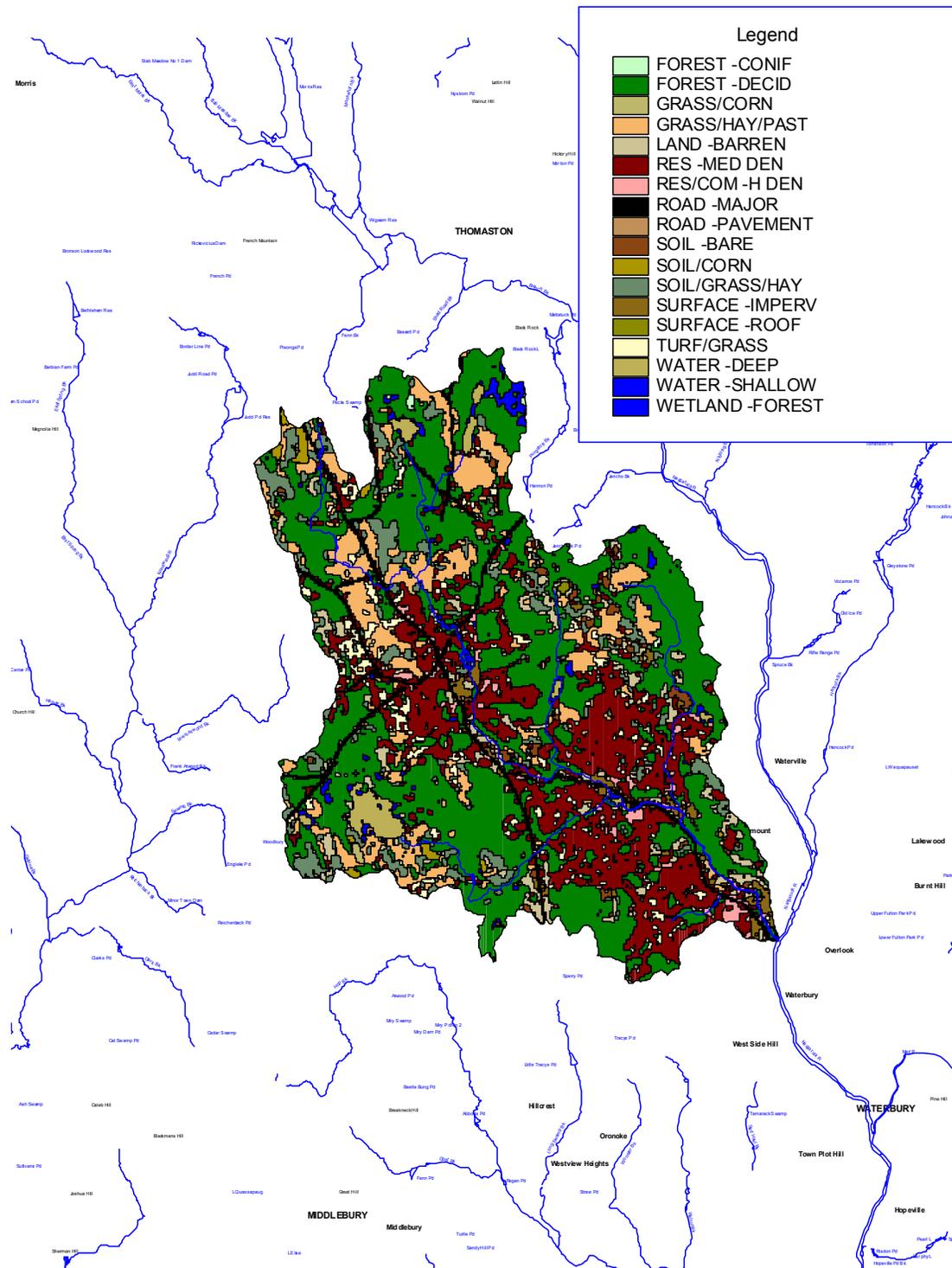


Figure 2. Landuse in Steele Brook basin.

Parts of the watershed are prone to flooding and evidence of bank erosion is notable in some areas.

Land use in the watershed ranges from heavily forested near the headwaters to highly urbanized at the mouth (Figure 2). Nonpoint sources of pollutants affecting Steele Brook are directly related to current and past land use activities. Due to the relatively undeveloped character of the upper watershed, surface runoff is not a significant contributor to total pollutant loading in this portion of the watershed. In the lower, more heavily developed, portion of the watershed stormwater runoff may contribute more significantly to nonpoint pollutant loads.

WATERTOWN FIRE DISTRICT SEWAGE TREATMENT PLANT

When the 1998 303 (d) list was published, the Watertown Fire District sewage treatment plant was a significant source of copper in Steele Brook. Recently, the Watertown Fire District discharge has been removed from Steele Brook and is therefore no longer a source of copper. From October 4, 2000, forward, sewage from the previous Watertown Fire District Service area will be treated by the City of Waterbury sewage treatment facility and ultimately discharged to the Naugatuck River. The elimination of the Watertown Fire District discharge to Steele Brook represents the last point source discharge to Steele Brook. A history of Watertown Fire District project has been summarized elsewhere³.

SHERWOOD MEDICAL SITE, WATERBURY

The Sherwood Medical Site, now under the ownership of American Home Products, discharges copper contaminated groundwater to Steele Brook at a point approximately mid-way between the former Watertown Fire District outfall and the confluence with the Naugatuck River (Figure 1). The site contains a former manufacturing facility that generated copper bearing wastewater during the production of hypodermic needles and hypodermic needle assemblies. Manufacture of these products at this site was discontinued in April 1982. The manufacturing process generated large quantities of acidic, copper bearing wastewater that was discharged to an underground infiltration gallery. Over the years, soils and groundwater on the site, groundwater emanating from the site, and adjacent surface waters became polluted with copper. The contaminated groundwater plume is the most significant source of copper discharged to Steele

Brook.

Sherwood Medical Industries merged into a company known as American Home Products Corporation. American Home Products Corporation is currently responsible for environmental remediation of the site. An interim plan to capture and treat groundwater prior to discharge to Steele Brook has been implemented and improvements to groundwater quality have been noted⁴. Mass loading of copper to the brook cannot be accurately estimated since the volume of groundwater escaping capture by the interim remediation system and entering Steele Brook is unknown. Additional data is needed including accurate flow data within the overburden aquifer and the volume and extent of flow in contaminated shallow bedrock. However, groundwater copper concentrations near the location where the groundwater plume intercepts the brook are substantially greater than surface water protection criteria established in Connecticut's Remediation Standard Regulations⁵. Bypass of the existing groundwater recovery well array and discharge to Steele Brook of low pH groundwater containing elevated levels of copper was confirmed by analyses of groundwater seeps and shallow monitoring wells downgradient of the recovery well array. Concentrations of dissolved copper of 10 –12 mg/l have been observed within the central portion of the contamination plume.

Additional monitoring data and development of a plan to achieve full remediation of the site consistent with the Remediation Standard Regulations is required under the terms of a Consent Order⁶ executed between the CTDEP and American Home Products, the current owners of the Sherwood Medical site. Achieving consistency with these regulations requires demonstration that the groundwater plume emanating from the site will not cause excursions above the Connecticut WQS in Steele Brook. Two interim evaluation and remediation plans^{7,8} and an engineering report/work plan⁹ describing excavation and installation of an infiltration trench to intercept contaminated groundwater were approved by the Commissioner of DEP with modifications in January 13, 2000.

APPLICABLE WATER QUALITY STANDARDS

Connecticut WQS establish the magnitude, frequency, and duration of exposure to dissolved copper which must not be exceeded in order to protect the biological integrity of freshwater environments. Separate criteria have been adopted to protect against short exposure to high concentrations and average or typical exposure concentrations. Consistency with both criteria values is evaluated on an annual basis. Adopted criteria for dissolved copper in Steele Brook are 4.8 ug/l as an annual median value with no greater than 5 percent of days in any year exceeding 14.3 ug/l.

Connecticut WQS designate the minimum daily flow for seven consecutive days that can be expected to occur once in ten years under natural conditions (7Q10) as the minimum flow to which surface water standards apply. Since it is inappropriate to apply the median copper criterion at 7Q10, the "rare" exceedance criterion of 14.3 ug/l at 7Q10 flow was applied to this TMDL analysis. Application of the rare copper criterion will also be protective of the median criterion ¹⁰.

TOTAL MAXIMUM DAILY LOAD

TMDLs were developed for three locations along Steele Brook- below the former Watertown Fire District outfall, below the Sherwood Medical facility, and at the mouth of Steele Brook (Figure 1). The TMDLs represent the maximum loading of dissolved copper that the Brook can assimilate without exceeding the criteria concentration in-stream. TMDLs were calculated by multiplying the criteria (concentration) by the streamflow (volume), to yield a mass value. Since streamflow and effluent characteristics are variable it is necessary to define a set of critical conditions to represent a reasonably expected limiting set of conditions for the resource. Critical conditions were defined as the "worst case" scenario of environmental conditions in the Steele Brook in which the pollutant load capacity expressed in a TMDL will not exceed Water Quality Criteria adopted by the State of Connecticut.

Estimating Critical Streamflow

There are no streamflow monitoring stations located on Steele Brook. It was therefore necessary to estimate natural streamflow under 7Q10 conditions using the U.S. Geological Survey method of Cervione et.al.¹¹. This procedure provides an estimate of the 7Q10 flow derived from the area of stratified drift and glacial till deposits upstream of fixed points in the watershed. Data on the area of stratified drift and glacial till deposit were obtained from the U.S. Geological Survey¹². Streamflow rates were estimated for each of the three TMDL points:

Steele Brook below WFD outfall:	11.7 sq. mi.
Stratified drift deposits =	0.63 sq. mi.
Glacial till deposits =	11.07 sq. mi.
$7Q10 = 0.67(0.63 \text{ sq.mi}) + 0.01(11.07 \text{ sq.mi.}) = \mathbf{0.53 \text{ cfs}}$	
Steele Brook below Sherwood :	16.7 sq.mi.
Stratified drift deposits =	1.01 sq. mi.
Glacial till deposits =	15.69 sq. mi.
$7Q10 = 0.67(1.01 \text{ sq.mi}) + 0.01(15.69 \text{ sq.mi.}) = \mathbf{0.83 \text{ cfs}}$	
Steele Brook at Mouth:	17.0 sq.mi.
Stratified drift deposits =	1.18 sq.mi.
Glacial till deposits =	15.82 sq.mi.
$7Q10 = 0.67(1.18 \text{ sq.mi}) + 0.01(15.82 \text{ sq.mi.}) = \mathbf{0.95 \text{ cfs.}}$	

Water diversions located upstream of the former Watertown Fire District outfall reduce flow transported to the critical downstream area during extended dry weather periods. Water is removed from the watershed for irrigation purposes by the Watertown Golf Club (registered to divert 864,000 GPD), and Crestwood Country Club (registered to divert 1,480,000 GPD). Due to the location of these diversions within the watershed and telephone interviews with diversion permit registrants indicating that actual water withdrawals do not currently equal the maximum allowed under the registration, the reduction in streamflow due to diversions upstream of the TMDL segment was estimated at 0.1 cfs.

Critical streamflow conditions were established as the naturally occurring 7Q10 minus the water diverted:

Critical Streamflow = 0.43 cfs Steele Brook below the WFD outfall (start of TMDL segment)

Critical Streamflow = 0.73 cfs Steele Brook below Sherwood

Critical Streamflow = 0.85 cfs Steele Brook at the mouth (end of TMDL segment)

TMDL CALCULATIONS:

The maximum loading capacity was calculated by multiplying the critical streamflow rate by the rare exceedance criteria for dissolved copper adopted into Connecticut's WQS (14.3 ug/l).

TMDL below WFD outfall = (0.43 cfs) (14.3 ug/l) = 15.16 g/day

TMDL below Sherwood = (0.73 cfs) (14.3 ug/l) = 25.70 g/day

TMDL at Mouth = (0.85 cfs) (14.3 ug/l) = 29.74 g/day

Once the TMDL is calculated, allocations must be made apportioning the total loading to point sources (termed the wasteload allocation or WLA) and to nonpoint sources (termed the load allocation or LA). A Margin of Safety (MOS) is also necessary to account for uncertainty in the analysis.

The TMDL can thus be expressed as a mathematical equation:

$$\text{TMDL} = \text{WLA} + \text{LA} + \text{MOS}$$

Load Allocation (LA)

The Load Allocation (LA) for the Steele Brook TMDL was separated into two components:

- 1) natural background (**Natural Background LA**) and
- 2) existing and future nonpoint sources (**Existing and Future Nonpoint LA**).

The sum of (Natural Background LA) plus (Existing and Future Nonpoint LA) is equal to the Load Allocation.

Natural Background LA

The Natural Background LA assumes nonpoint loading from "natural" sources can be estimated by multiplying the critical streamflow by an estimated critical concentration of dissolved copper. It is important to note that "Natural Background" used in this context does not refer to water draining a pristine condition, but rather a condition that is considered the normal

use of the land. This is consistent with Connecticut's Water Quality Standard #8 that states *"Conditions which exist in the water, in part due to normal uses of the land, may be considered natural"*. It would not be considered normal use of the land if designated uses were not met. As such, the Natural Background may contain some inputs from anthropogenic sources, but not in sufficient quantities that would result in the loss of an existing designated use. The term Natural Background is used to maintain consistency with EPA guidance.

Estimated copper concentrations in Steele Brook were assumed to be comparable to those observed in the Mattabesset River which drains a similarly developed watershed (Figure 3) and is impacted by no point source discharges. Water quality data for the period 1996-1998 was used to establish background copper concentrations¹³. Overall, copper concentrations ranged from 1.0 ug/l to 5.0 ug/l. Highest values were observed during periods when flow significantly exceeded 7Q10 conditions. Ninety-five percent of all values were below 3.9 ug/l. Dissolved copper concentrations during the summer months ranged between 1.9 and 3.0 ug/l. The mean of all data (n = 24) was 2.4 ug/l. The mean of samples collected during the summer months (n=9) was also 2.4 ug/l. The maximum summer value reported was 3.0 ug/l. Estimated copper concentrations were established as the summer mean concentration (2.4 ug/l) since this value was considered to be the most likely copper concentration to occur during summer low flow periods.

The Natural Background LA was calculated by as follows:

Natural Background LA= (critical streamflow) (2.4 ug/l)

Natural Background LA below WFD Outfall = (0.43 cfs) (2.4 ug/l) = 2.54 g/day

Natural Background LA below Sherwood = (0.73 cfs) (2.4 ug/l) = 4.31 g/day

Natural Background LA at Mouth = (0.85cfs) (2.4 ug/l) = 4.99 g/day.

Existing and Future Nonpoint LA

A portion of TMDL was allocated to the Existing and Future Nonpoint LA only if there was a known existing contribution, beyond that which is considered the normal use of the land, located upstream of the model point. If no known sources existed, any portion of the TMDL remaining over the Natural Background LA was allocated to the Margin of Safety.



Land Use Category	Steele Brook		Mattabesett River	
	Sq Miles	Percentage	Sq Miles	Percentage
Developed	4.52	26.53	10.52	27.10
Undeveloped	12.52	73.47	28.30	72.90
Total	17.04	100.00	38.82	100.00

Land Use Categories were grouped as follows:
■ Developed = Res-Med Den, Res/Com-H Den, Road-Major, Road-Pavement, Surface-Imperv, Surface-Roof
■ Undeveloped = Coniferous, Deciduous Forest, Grass/Corn, Grass/Hay/Pasture, Land-Barren, Soil-Bare, Soil-Corn, Soil/Grass/Hay, Turf/Grass, Water-Deep, Water-Shallow, Wetland-Forest, Wetland-Nonfor

Figure 3. Comparison of landuse between Steele Brook subregional basin and the Mattabesett River subregional basin. Data were generated from a statewide datalayer comprised of a polygon shapefile of landuse and landcover in Connecticut. The Connecticut Land Use Land Cover Data Layer is a representation of LANDSAT Thematic Mapper Satellite Imagery information. The 1990 Landuse Landcover data sources were used, and the minimum mapping unit was 1 hectare. Compiled by the University of Connecticut in raster format (ERDAS), the inventory was later converted to vector format.

For the TMDL model point below the former Watertown Fire District outfall, there are no existing or anticipated future nonpoint sources beyond that which is associated with normal use of the land. Therefore, no allocation was made to Existing and Future Nonpoint LA. The former Sherwood Medical facility is the only known nonpoint source that would contribute to the Existing and Future Nonpoint LA category. For the TMDL model point below the former Sherwood Medical site, 100% of the Existing and Future Nonpoint LA category was allocated to the former Sherwood Medical facility.

The Existing and Future Nonpoint LA was calculated as follows:

Existing and Future Nonpoint LA = TMDL - Natural Background LA.

Existing and Future Nonpoint LA below WFD Outfall = 0.0 g/day

Existing and Future Nonpoint LA below Sherwood = 21.39 g/day

Existing and Future Nonpoint LA at Mouth = 21.39 g/day

Wasteload Allocation (WLA)

The Wasteload Allocation was set equal to zero since there are no point source discharges in Steele Brook. No capacity is provided in the TMDL to accommodate future point source discharges to Steele Brook.

Wasteload Allocation below WFD outfall = 0.0 g/day

Wasteload Allocation below Sherwood = 0.0 g/day

Wasteload Allocation at Mouth = 0.0 g/day

Margin of Safety (MOS)

The explicit or numerical Margin of Safety was calculated by subtracting the sum of the LA (Natural Background plus Existing and Future Nonpoint LA) and WLA from the TMDL.

MOS below WFD outfall = TMDL - LA - WLA = 12.62 g/day

MOS below Sherwood = TMDL - LA -WLA = 0.0 g/day

MOS at Mouth = TMDL - LA - WLA = 3.36 g/day

The TMDL also includes an implicit MOS built into the analysis. The TMDL was developed using a steady-state model under critical, worst case conditions. The modeled critical conditions, by definition represent flow conditions that have a low probability of occurrence. The model also assumes that all copper is present in a dissolved, readily bioavailable form. This is a conservative approach because some portion of the copper present will be adsorbed to particulate material and therefore not readily available to cause toxicity to aquatic organisms. This reduction is also assigned to the implicit MOS.

The TMDL analysis is predicated on the assumption that nonpoint loadings from residential and commercial land uses will remain constant at current levels or decrease slightly as a result of implementing the Department's Stormwater Management Program. With the exception of groundwater discharged at the Sherwood Medical Site, reductions in the nonpoint loadings of copper are not necessary to achieve consistency with WQS. The magnitude of the reduction in copper loading that will be achieved following implementation of the Department's Stormwater Management Program is uncertain and has been assigned to the implicit Margin of Safety in the TMDL.

SEASONAL ANALYSIS

Criteria for dissolved copper do not vary seasonally but remain in effect at all times of the year. The TMDL addresses seasonality by establishing critical streamflow conditions based on potential occurrence of low streamflows during any season of the year. Typically critical low streamflow occurs during the summer months in Connecticut streams, however short duration 7Q10 equivalent low flows may occur during any season. By basing the WLA and LA on critical annual conditions, the TMDL is protective of all seasonal conditions.

TMDL SUMMARY

<i>Location</i>	<i>TMDL</i>	<i>WLA</i>	<i>Natural Background LA</i>	<i>Existing and Future Nonpoint LA</i>	<i>MOS</i>
Steele Brook below WFD outfall	15.16 g/d	0.00 g/d	2.54 g/d	0.00 g/d	12.62 g/d
Steele Brook below Sherwood	25.70 g/d	0.00 g/d	4.31 g/d	21.39 g/d	0.00 g/d
Steele Brook At Mouth	29.74 g/d	0.00 g/d	4.99 g/d	21.39 g/d	3.36 g/d

TMDLs at the three model locations represent the maximum loading that will not exceed Connecticut's Water Quality Standards for copper. No portion of the TMDLs have been designated to Wasteload Allocation since all point source discharges have been eliminated in Steele Brook. The portion of each TMDL allocated to Natural Background LA represents a "natural" measured level that is present in a watershed with similar landuse characteristics (Mattabesset River). The portion of each TMDL allocated to the Existing and Future LA represents nonpoint source inputs beyond that which is considered the normal use of the land. At TMDL model locations below the former Sherwood Medical facility, allocations were provided to the Existing and Future LA to account for the inputs of copper from this facility. The numerical Margin of Safety increases below the former Sherwood site as the drainage basin area and streamflow increases.

TMDL IMPLEMENTATION PLAN

A TMDL can also be viewed as a critical element of a plan or strategy to attain WQS in an impaired waterbody. Through this TMDL analysis it was determined that the only way to achieve copper WQS in Steele Brook was by the elimination of the Watertown Fire District sewage treatment plant to Steele Brook and remediation of the contaminated groundwater at the Sherwood Medical Facility site. The Watertown Fire District discharge was removed from Steele Brook on October 4, 2000. The Remediation of the Sherwood Medical site is underway and will be fully implemented under the clean up requirements in a Consent Order between American

Home Products and CTDEP.

MONITORING PLAN

American Home Products is required to monitor ground water quality during remediation of the Sherwood Medical Site under the terms of the Consent Order⁶. Monitoring to determine attainment of WQS and restoration of designated uses in Steele Brook will be performed by CTDEP consistent with the Rotating Basin Ambient Monitoring Plan¹⁴. CTDEP will also continue to provide assessment updates on Steele Brook consistent with the State's obligations under Section 305(b) of the Federal Clean Water Act.

DEP Fisheries Division has strongly supported the elimination of the Watertown Fire District discharge as a condition of restoring a recreational trout fishery in Steele Brook¹⁵. It can be expected that healthy populations of sensitive aquatic organisms can become established in Steele Brook following elimination of the discharge. The Bureau of Water Management will continue to work closely with the Fisheries Division to document the fish population in Steele Brook.

Following improvements in water quality, Steele Brook can also provide a refuge and source of recruitment to reestablish populations of sensitive aquatic life in the Naugatuck River. Abandonment of the Watertown Fire District facility also increases the potential for removal of the Pin Shop Pond dam, a long-standing obstruction to up and down-stream fish migration. In its present state the Pond has served as equalization basin to temper day-to-night flow fluctuations from the WFD discharge.

REASONABLE ASSURANCE

Removal of the Watertown Fire District POTW discharge has eliminated all point sources of copper to Steele Brook. Removal of the Watertown Fire District discharge can allow upgrading the Surface Water Classification from Class B to Class A. Upgrading of the Water Quality Classification to Class A would preclude the permitting of new point source loadings to Steele Brook. Water quality reclassification will be pursued separately when the Department is updating the water quality classifications for the Housatonic River Basin.

American Home Products is undertaking final remediation of groundwater contamination

at the Sherwood Medical Site. Reasonable assurance that remediation will be accomplished is provided by DEP's Remediation Standard Regulations which provide clear authority for DEP to mandate remediation of groundwater pollution and establishes criteria for designating a site as fully remediated. Remediation of groundwater at the Sherwood medical site is mandated by Section 133(k) of the Regulations of Connecticut State Agencies. These regulations establish requirements for site clean-up and protection of surface waters from impairment due to contaminated groundwater discharge. The regulations require that groundwater be remediated to levels consistent with a surface water protection criteria for copper. The interim agreement for remediation of the site includes provisions for intercepting the majority of contaminated groundwater prior to discharge to the Brook by means of an array of interceptor wells. It is anticipated that this system will continue in operation until such time as copper concentrations in groundwater leaving the site approach natural background levels.

Since the Watertown Fire District discharge has been eliminated, water quality in the Brook is influenced primarily by nonpoint runoff associated with land use practices that differ little from those in many unimpaired watersheds. Monitoring data from other similarly developed watersheds indicate a high probability that criteria for dissolved copper will not be exceeded solely as a result of nonpoint runoff.

PROVISIONS FOR REVISING THE TMDL

The Department reserves the authority to modify the TMDL as needed to account for new information made available during the implementation of the TMDL. Any new source of copper (e.g. new stormwater NPDES Permit) that may affect TMDL calculations will be carefully considered by the Department and if necessary, revisions will be made to the TMDL. DEP will provide an opportunity for public participation prior to any modification of the TMDL and any modifications will be subject to the review and approval of the U.S. EPA as required by Federal law.

Biological monitoring of Steele Brook performed by the DEP in accordance with the monitoring plan and any monitoring performed by other parties in accordance with an approved quality controlled plan will be evaluated as this data becomes available. In the event that monitoring of Steele Brook indicates that aquatic life uses are not fully supported following

implementation of the TMDL, the Department will review all readily available data and assess the need to modify the TMDL. The Department may propose other modifications to the TMDL analysis if the review indicates such a modification is warranted and consistent with the anti-degradation provisions in Connecticut Water Quality Standards. Steele Brook will continue to be listed in *Connecticut Waterbodies Not Meeting Water Quality Standards* ² until such time as monitoring data confirms that aquatic life uses are fully supported.

PUBLIC PARTICIPATION PROCESS

The Department has made reasonable efforts to involve the Watertown Fire District, American Home Products, and the public in the development of this TMDL. This TMDL analysis has been modified from earlier draft versions to reflect comments received from reviewers. A formal 30-day Public Notice soliciting comments from the public on the TMDL was published in the legal classified section of the Waterbury Republican-American on November 7, 2000 ¹⁶. A response to comments was provided as part of the submittal letter to EPA for final review and approval.

DOCUMENTATION

- (1) DEP. Connecticut Water Quality Standards. Adopted 1997.
- (2) Connecticut Waterbodies Not Meeting Water Quality Standards 1998. DEP Water Management Bureau, April 1998.
- (3) DEP. Alternatives Analysis Wasteload Allocation Watertown Fire District. March 2000.
- (4) Fluor Daniel GTI. Copper Source Area Investigation and Remediation Technology Selection Work Plan / Sherwood Medical Company in Waterbury Connecticut. June 1996.
- (5) Remediation Standard Regulations. Section 133(k) Regulations of Connecticut State Agencies.
- (6) Consent Order #SRD-119, State of Connecticut v. American Home Products. February, 2000.
- (7) American Home Products. Bedrock Evaluation and Supplemental Investigation Plan. Approved January 2000.
- (8) American Home Products. Interim Remedial Action Enhancement Work Plan. Approved January, 2000.
- (9) Engineering Report Excavation and Infiltration Trench Installation Work Plan. Approved January, 2000.
- (10) DEP. Steele Brook TMDL Support Document. August 2000.
- (11) Cervione, M.A., R. Melvin, and K. Cyr., A Method of Estimating the 7-Day, 10-Year

- Low Flow of Streams in Connecticut. Connecticut Water Resources Bull. No.34. 1982.
- (12) Nosal, T. 1997. Gazetteer of drainage areas of Connecticut. DEP Water Res. Bull. 45, Hartford, CT.
 - (13) U.S. Geological Survey. Water Resources Data for Connecticut, annual published reports 1996 –1998.
 - (14) DEP. Ambient Monitoring Strategy for Rivers and Streams Rotating Basin Approach. Water Management Bureau. March 1999.
 - (15) DEP Memorandum, Don Mysling, DEP Fisheries Division to Bill Hogan. February, 1999. Analysis Wasteload Allocation Watertown Fire District.
 - (16) November 7, 2000. Public Notice. Waterbury Republican-American.