# French River Water Quality Investigation and Watershed Based Plan

EASTERN CONNECTICUT CONSERVATION DISTRICT

SEPTEMBER 25, 2017

# French River Watershed Based Plan

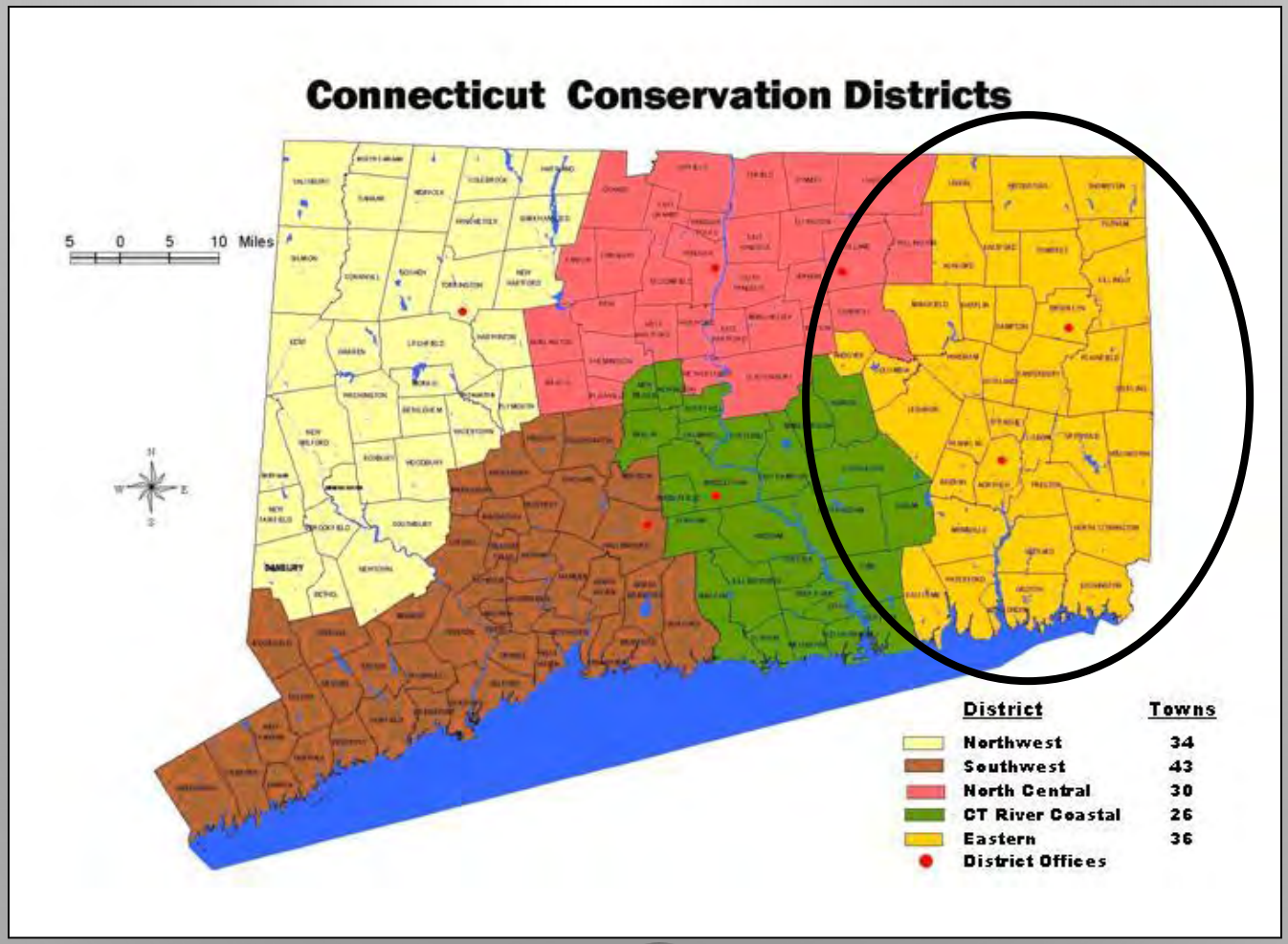
- Funded in part by an EPA clean water act §319 nonpoint source grant through the CT DEEP (60% of project costs).

- In cooperation with the Town of Thompson and The Last Green Valley Volunteer Water Quality Monitoring Program.

# The Eastern Connecticut Conservation District, Inc.

A Not-For-Profit
Natural Resource Conservation
Organization

# Connecticut's Five Conservation Districts



# Primary Activities:

1. Conduct projects, watershed management investigations and test new conservation methods.
2. Present workshops on natural resource topics.
3. Assist town land use commissions with environmental reviews of development plans.
4. Work with local citizens and towns to raise awareness of natural resource concerns.

# Discussion Outline

- Part 1 - Why is a WBP needed?
- Part 2 - What is a watershed-based plan?
- Part 3 – The water quality improvement project

# *Part 1 -*

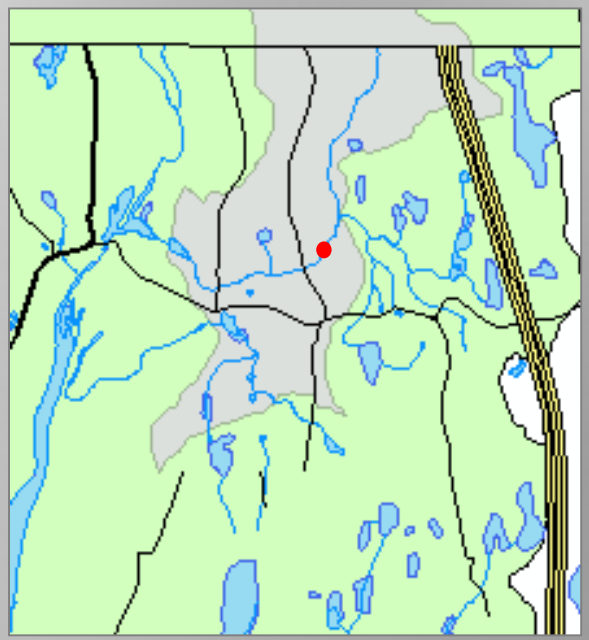
# Why is a Watershed Plan Needed for the French River?

# Clean Water Act (1972)

- Establish water quality standards.
- Classify as:
  - Drinkable
  - Fishable
  - Swimmable
- Assess State waters (305b report).
- Prepare a list of waters not meeting designated uses (303d list).

# CT DEEP Ambient Water Quality Monitoring Program 2010

CT DEEP Site 6134 – upstream of Labby Road



***Data:*** 2010 from (Station 6134) from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

**Single sample *E. coli* (colonies/100 mL) data from all monitoring stations on Long Branch Brook with annual geometric means calculated by station (notes located at the end of the table)**

| Station Name | Station Location | Date | Results | Wet/Dry | Geomean |
|---|---|---|---|---|---|
| 6134 | Labbey Road crossing | 6/14/2010 | 130 | wet | |
| 6134 | Labbey Road crossing | 6/23/2010 | 120 | wet | |
| 6134 | Labbey Road crossing | 6/28/2010 | 112† | dry | |
| 6134 | Labbey Road crossing | 7/8/2010 | 74 | dry | |
| 6134 | Labbey Road crossing | 7/13/2010 | 104† | dry | |
| 6134 | Labbey Road crossing | 7/22/2010 | 215† | dry | **143*** |
| 6134 | Labbey Road crossing | 7/29/2010 | 510 | wet | **(0%)** |
| 6134 | Labbey Road crossing | 8/5/2010 | **1000* (59%)** | wet | |
| 6134 | Labbey Road crossing | 8/11/2010 | 75 | dry | |
| 6134 | Labbey Road crossing | 8/19/2010 | 92† | dry | |
| 6134 | Labbey Road crossing | 9/15/2010 | 52 | dry | |

**Shaded cells indicate an exceedance of water quality criteria**

**†Average of two duplicate samples**

***Indicates single sample and geometric mean values used to calculate the percent reduction**

# CT Water Quality Standards

2011 Connecticut Water Quality Standards

## APPENDIX B: WATER QUALITY CRITERIA FOR BACTERIAL INDICATORS OF SANITARY QUALITY
## SEE ALSO STANDARDS # 23 AND 25

| DESIGNATED USE | CLASS | INDICATOR | CRITERIA |
|---|---|---|---|
| **Freshwater** | | | |
| **Drinking Water Supply** [1] | | | |
| Existing / Proposed | AA | Total coliform | Monthly Moving Average less than 100/100ml<br>Single Sample Maximum 500/100ml |
| Potential | A | ---- | -------- |
| **Recreation** [2][3] | | | |
| Designated Swimming [4] | AA, A, B | *Escherichia coli* | Geometric Mean less than 126/100ml<br>Single Sample Maximum 235/100ml |
| Non-designated Swimming [5] | AA, A, B | *Escherichia coli* | Geometric Mean less than 126/100ml<br>Single Sample Maximum 410/100ml |
| All Other Recreational Uses | AA, A, B | *Escherichia coli* | Geometric Mean less than 126/100ml<br>Single Sample Maximum 576/100ml |
| **Saltwater** | | | |
| **Shellfishing** [6] | | | |
| Direct Consumption | SA | Fecal coliform | Geometric Mean less than 14/100ml<br>90% of Samples less than 31/100ml |
| Indirect Consumption | SB | Fecal coliform | Geometric Mean less than 88/100ml<br>90% of Samples less than 260/100ml |
| **Recreation** | | | |
| Designated Swimming [4] | SA, SB | Enterococci | Geometric Mean less than 35/100ml<br>Single Sample Maximum 104/100ml |
| All Other Recreational Uses | SA, SB | Enterococci | Geometric Mean less than 35/100ml<br>Single Sample Maximum 500/100ml |

# 2010 State of Connecticut Integrated Water Quality Report

**Waterbody Name** French River-01 **Waterbody Segment ID** CT3300-00_01

**Location** From mouth at confluence with Quinebaug River (just DS of West Thompson Flood Control dam), US to North Grosvenordale Pond outlet dam (just US of Buckley Hill Road crossing), Thompson.

**Waterbody Segment Size** 4.61 Miles

**Impaired Designated Use** Recreation

**Cause** Escherichia coli

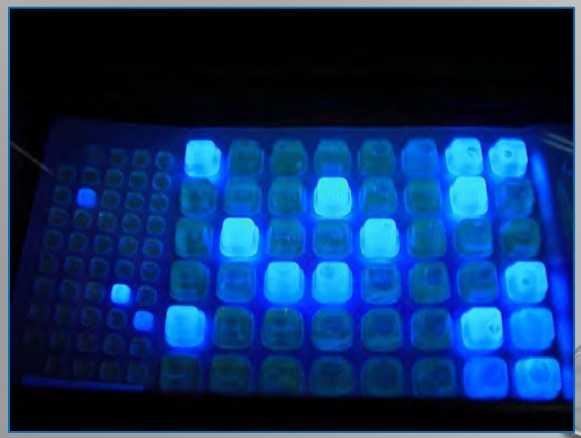
**Potential Source** Source Unknown

**Category** 5

# 2014 State of Connecticut Integrated Water Quality Report

| Waterbody Segment ID | Waterbody Name | Location | Miles | Aquatic Life | Recreation |
|---|---|---|---|---|---|
| CT3300-02_01 | Long Branch Brook (Thompson)-01 | Mouth at INLET to Langers Pond (part of French River segment 2) parallel to Wilsonville Road, US to confluence with Knowlton Brook, US of Labby Road crossing, Thompson. | 0.96 | Not Assessed | Not Supporting |

# Water Quality Study



Coliform Images Courtesy of Alisa Phillips-Griggs - FRWA

# Sampling Sites

# Sampling Sites

| Stream Name | Site # | Latitude | Longitude | Location |
|---|---|---|---|---|
| French River | FR01 | 41.943292 | -71.897819 | 500 ft US of Quinebaug River confluence |
| French River | FR02 | 41.952033 | -71.886097 | RT 12 at pull-over north of Riverside Pizza |
| French River | FR03 | 41.983142 | -71.900250 | N end of Riverside Park 100 ft DS of foot bridge |
| French River | FR04 | 41.991856 | -71.894589 | North Grosvenordale Pond outlet - begin impaired segment |
| French River | FR05 | 42.013231 | -71.886617 | Langers Pond – US Wilsonville Road |
| French River | FR06 | 42.024269 | -71.883911 | MA/CT state line - off Perryville Rd |
| Long Branch Brook | LBB01 | 42.010817 | -71.877747 | US Wagher Road |
| Long Branch Brook | LBB02 | 42.011836 | -71.871667 | US Labby Road |
| Long Branch Brook | LBB03 | 42.024311 | -71.866200 | MA/CT state line - off Labby Rd |
| Knowlton Brook | KB01 | 42.009269 | -71.861267 | DS Wilsonville Road |
| Backwater Brook | BWB0.5 | 41.983897 | -71.899989 | end of box culvert at French River canal |
| Backwater Brook | BWB01 | 41.984258 | -71.900814 | US Main Street at School St |
| Backwater Brook | BWB02 | 41.986861 | -71.902283 | off end of Floral Ave |
| Sunset Hill Brook | SHB01 | 41.966858 | -71.888022 | DS of Klondike Ave |
| Sunset Hill Brook | SHB02 | 41.969183 | -71.877956 | DS Thompson Hill Road (RT 200) |
| Stoud Brook | SB01 | 41.970656 | -71.885594 | US Thompson Hill Road (RT 200) |
| unnamed brook Marianapolis | UN01 | 41.955744 | -71.882292 | US RT 12 just south of RT 395 S on-ramp |
| Little Mountain Brook | LMB01 | 41.945006 | -71.876000 | DS Robbins Road |
| Quinatissett Brook | QB01 | 41.942406 | -71.879853 | US Ballard Road |
| Quinatissett Brook | QB02 | 41.937647 | -71.865400 | US RT 21 at Quinatissett Golf Course |
| Elliott Brook | EB01 | 41.950992 | -71.856833 | DS Chase Road |
| Elliott Brook | EB02 | 41.955036 | -71.854150 | DS Quaddick Road |
| Ross Brook | RB01 | 41.955903 | -71.856375 | DS Quaddick Road |

# Sampling Results

| Site | 6/9/15 | 6/16/15 | 6/23/15 | 6/30/15 | 7/7/15 | 7/14/15 | 7/21/15 | 7/28/15 | Geomean |
|---|---|---|---|---|---|---|---|---|---|
| FR01 | 20 | 420 | 140 | 85 | 41 | 31 | 86 | 86 | 74 |
| FR02 | 75 | 63 | 110 | 110 | 110 | 52 | 170 | 120 | 101 |
| FR03 | 130 | 51 | 200 | 31 | 20 | 31 | 74 | 75 | 47 |
| FR04 | <10 | 10 | 73 | <10 | <10 | <10 | 20 | <10 | 14 |
| FR05 | 41 | 230 | 63 | 20 | 31 | 63 | 63 | 75 | 57 |
| FR06 | 75 | 300 | 74 | 52 | 52 | 150 | 52 | 96 | 87 |
| LBB01 | 20 | 560 | 110 | 10 | <10 | 84 | 20 | 10 | 36 |
| LBB02 | 20 | 360 | 160 | 85 | 74 | 31 | <10 | 41 | 56 |
| LBB03 | <10 | 280 | 170 | 63 | 20 | 98 | 52 | 63 | 61 |
| KB01 | 84 | **880** | 98 | 85 | 31 | 63 | 20 | 110 | 83 |
| SHB01 | 96 | 320 | 53 | 31 ( | 98 | 160 | **1400** | 320 | 124 |
| SHB02 | 10 | 63 | 41 | 41 | <10 | 20 | 31 | <10 | 22 |
| SB01 | 41 | 98 | 63 | 31 | 31 | 10 | 75 | 41 | 33 |
| BWB0.5* | | | | | | | | **820** | --- |
| BWB01 | 86 | 200 | 130 | 110 | 340 | 110 | 84 | 85 | **135** |
| BWB02 | 20 | 73 | 41 | 110 | <10 | <10 | 41 | 41 | 32 |
| UN01 | 10 | 150 | 120 | 41 | 10 | 73 | 20 | 31 | 37 |
| LMB01 | 41 | 230 | 84 | 63 | 41 | 270 | 52 | **830** | 96 |
| QB01 | 160 | 410 | 330 | 220 | 110 | 370 | **790** | **1100** | **338** |
| QB02** | | | | | | **2100** | 280 | 170 | **361** |
| RB01** | | | | | | 110 | 120 | 31 | 74 |
| EB01** | | | | | | 160 | 97 | --- | 125 |
| EB02** | | | | | | 110 | 300 | 98 | **148** |
| Wet/Dry | dry | wet | dry | dry | dry | dry | wet*** | dry | dry |

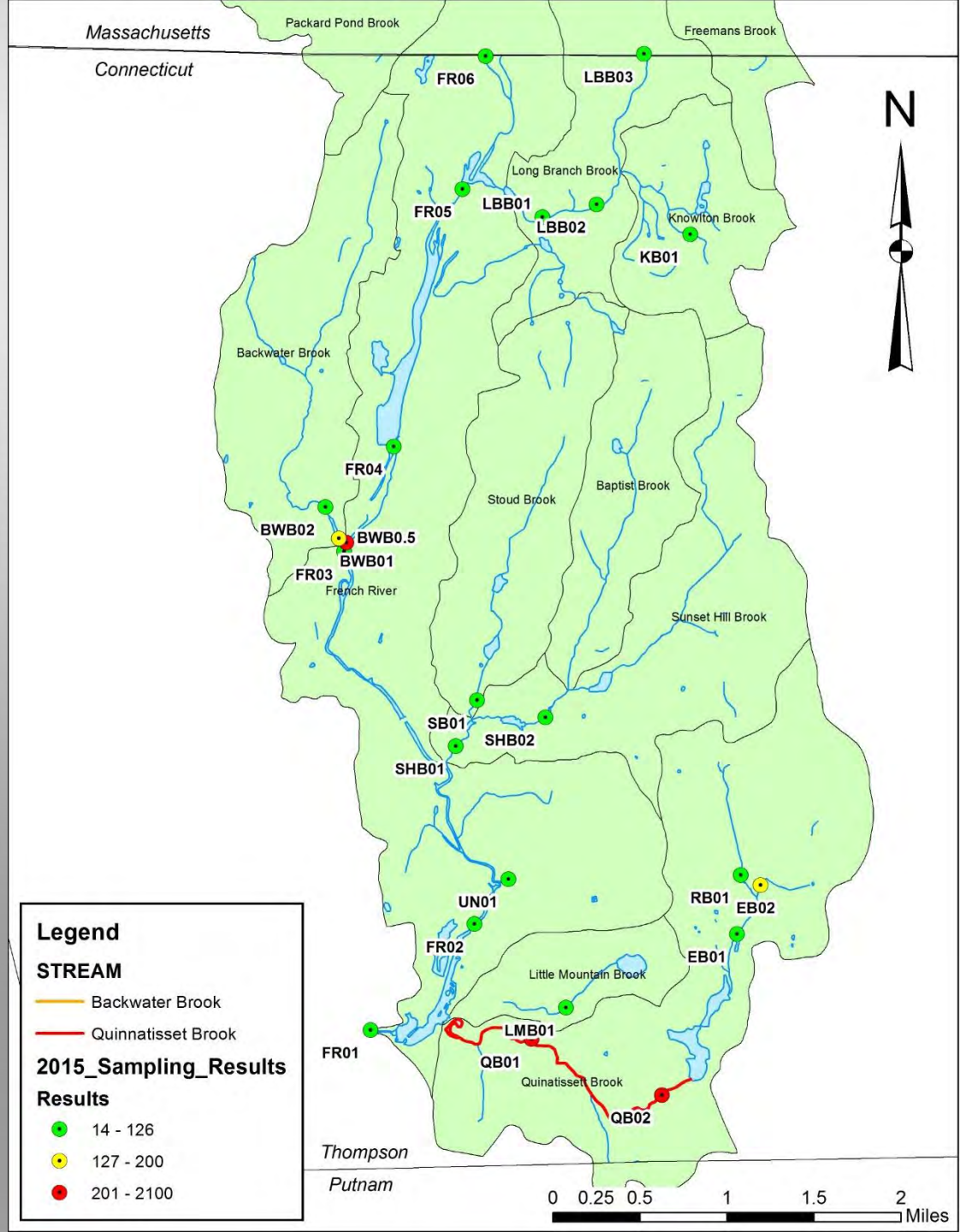
**Bold text indicates exceedance of existing water quality standard.**

*** Single sample collected at Backwater Brook culvert outfall**

**** Sites added to bracket water quality observations at QB01**

*****Rain began midway through sampling**

# Sampling Results



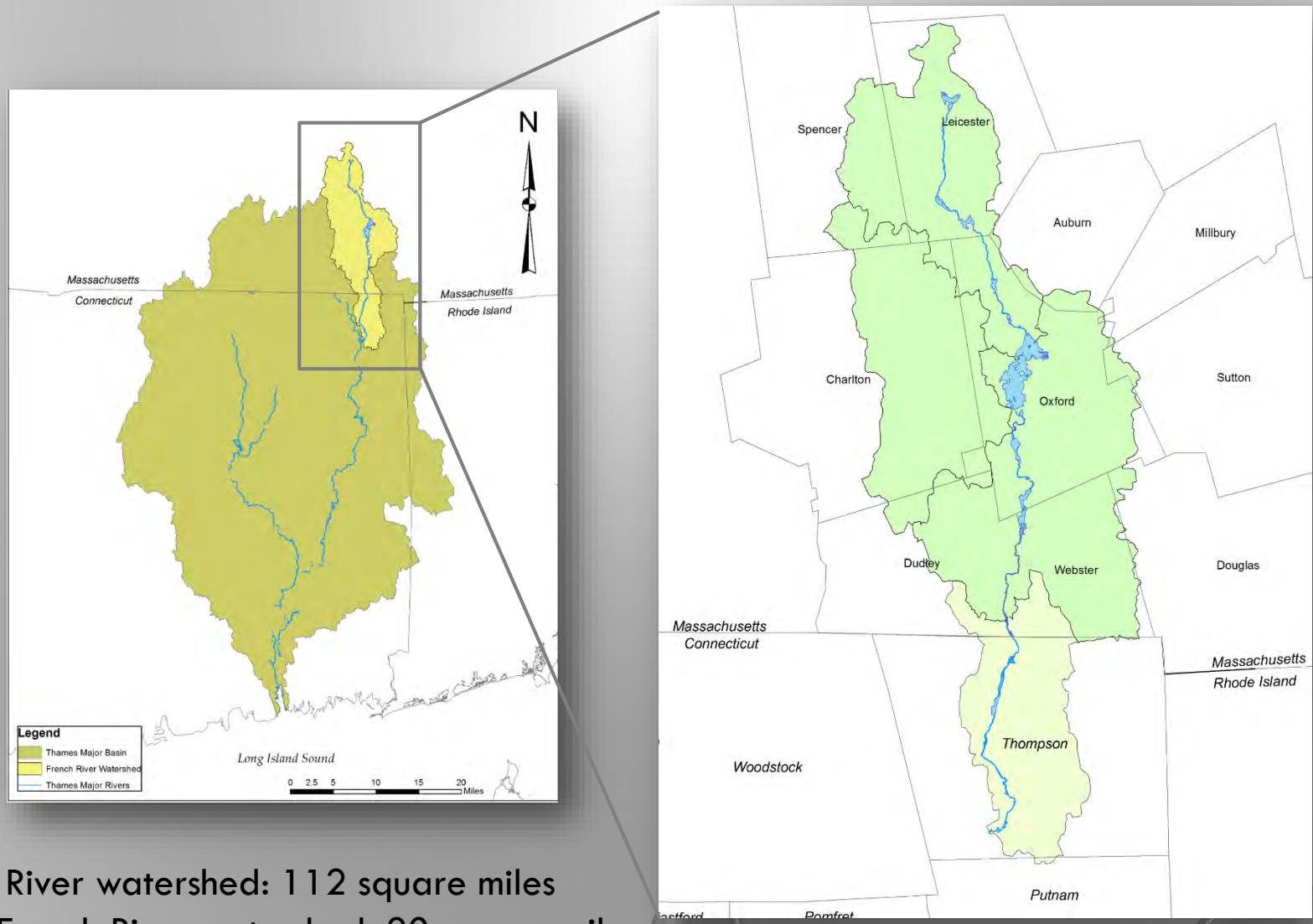
# Part 2 –

# What is a Watershed Plan?

A watershed plan is a blueprint that uses a hydrologically defined approach to:

- Identify water quality problems in a watershed
- Identify pollutant sources, loads and reductions
- Provide management recommendations to improve water quality
- Establish a framework to move forward and evaluate the plan goals, objectives and success.

# French River Watershed




French River watershed: 112 square miles

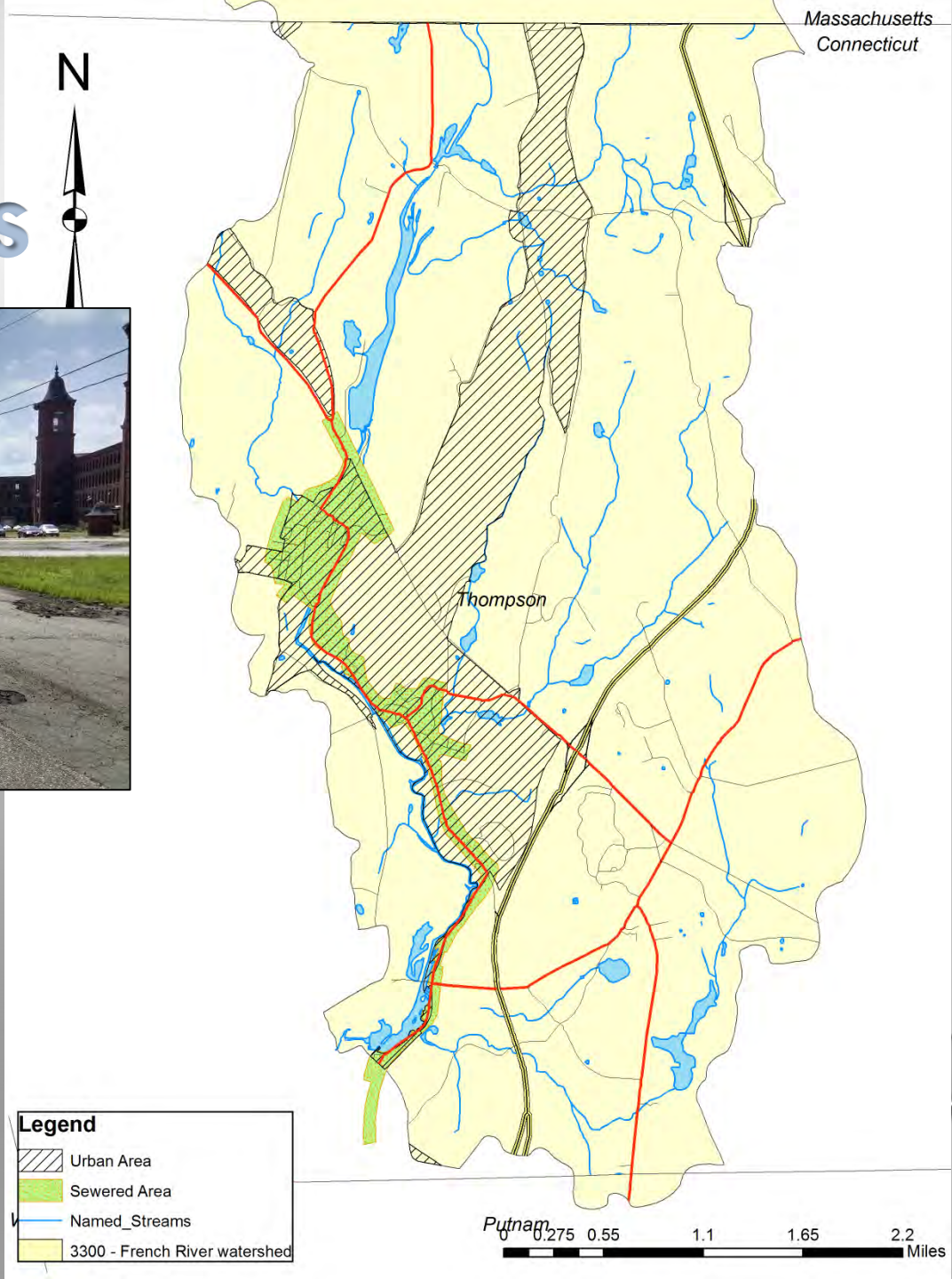
Lower French River watershed: 20 square miles

# Pollutant Sources

# NPS Sources

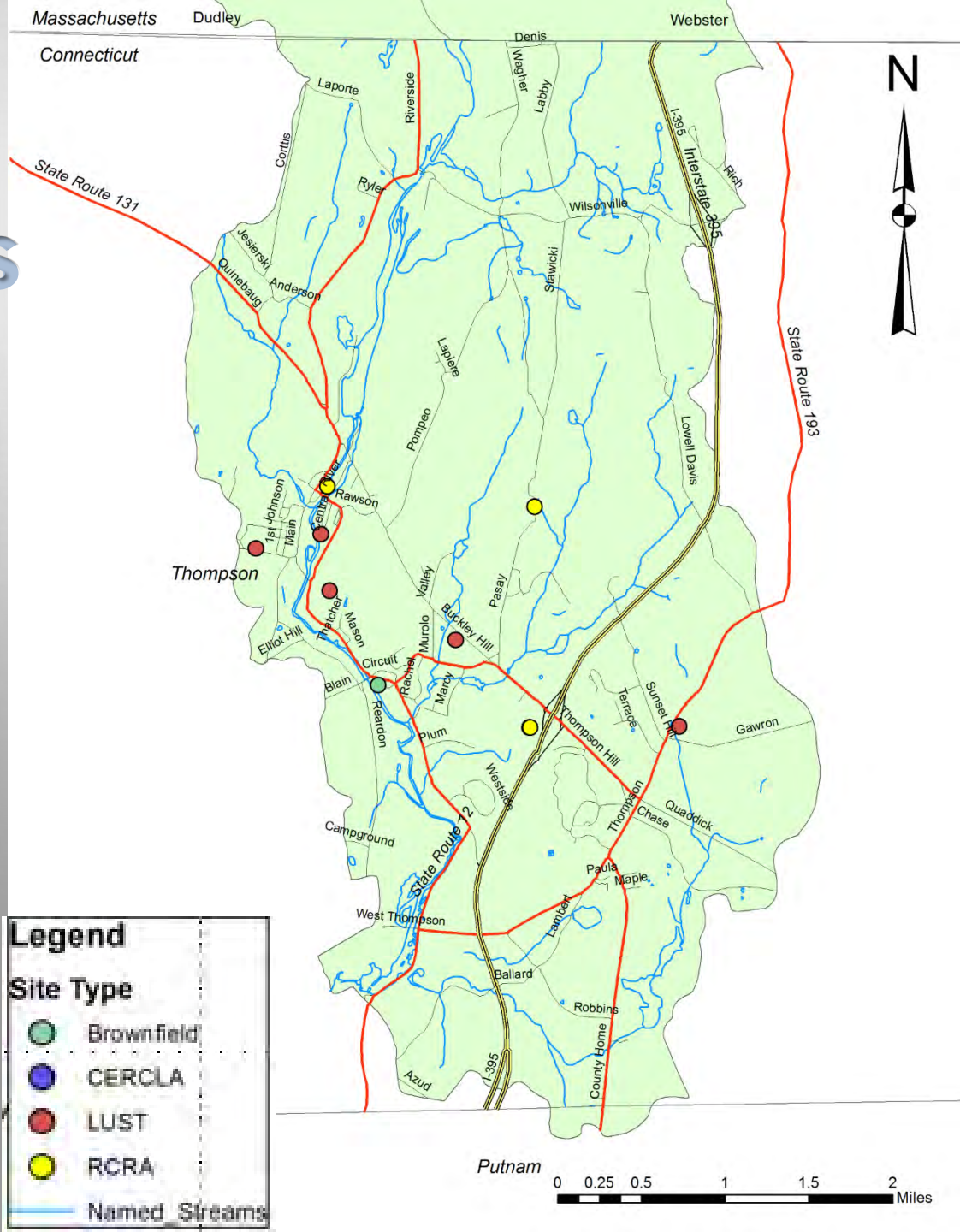
| Possible Source | Location | Pollutant(s) | Receiving Waterbody |
|---|---|---|---|
| Impervious Cover/ Stormwater Runoff/ Outfalls | North Grosvenordale/ Grosvenordale UAs | Sediment, bacteria, fertilizer/herbicides/ pesticides, industrial chemicals, automotive chemicals/metals | French River |
| Sanitary Sewers | Route 12/Main Street | Bacteria, nutrients, pharmaceuticals, household chemicals | French River |
| Septic Systems | Marianapolis, Thompson Hill, Quinatissett Golf Club | Bacteria, nutrients, pharmaceuticals, household chemicals | Unnamed stream, Elliott Brook, Quinatissett Brook |
| Agriculture/ Livestock/ Poultry | Chase Road, County Home Road, Robbins Road, Ballard Road | Bacteria, nutrients, chemical fertilizers, herbicides/pesticides, vehicular chemicals | Ross Brook, Elliott Brook, Quinatissett Brook |
| Pets | Main Street, River Street, Riverwalk, Riverside Park | Bacteria, nutrients | French River, Backwater Brook |
| Waterfowl | Duhamel Pond | Bacteria, nutrients | Backwater Brook |

# NPS Sources


N
Massachusetts
Connecticut
Thompson
Putnam
Legend
Urban Area
Sewered Area
Named_Streams
3300 - French River watershed
0 0.275 0.55 1.1 1.65 2.2
Miles

# Point Sources

- Stormwater permits (industrial, commercial, construction, MS4)
- AFOs/CAFOs
- Hazardous waste sites
- Brownfields
- Underground storage tanks (UST)
- Winter road maintenance practices
- Land clearing/timber harvests



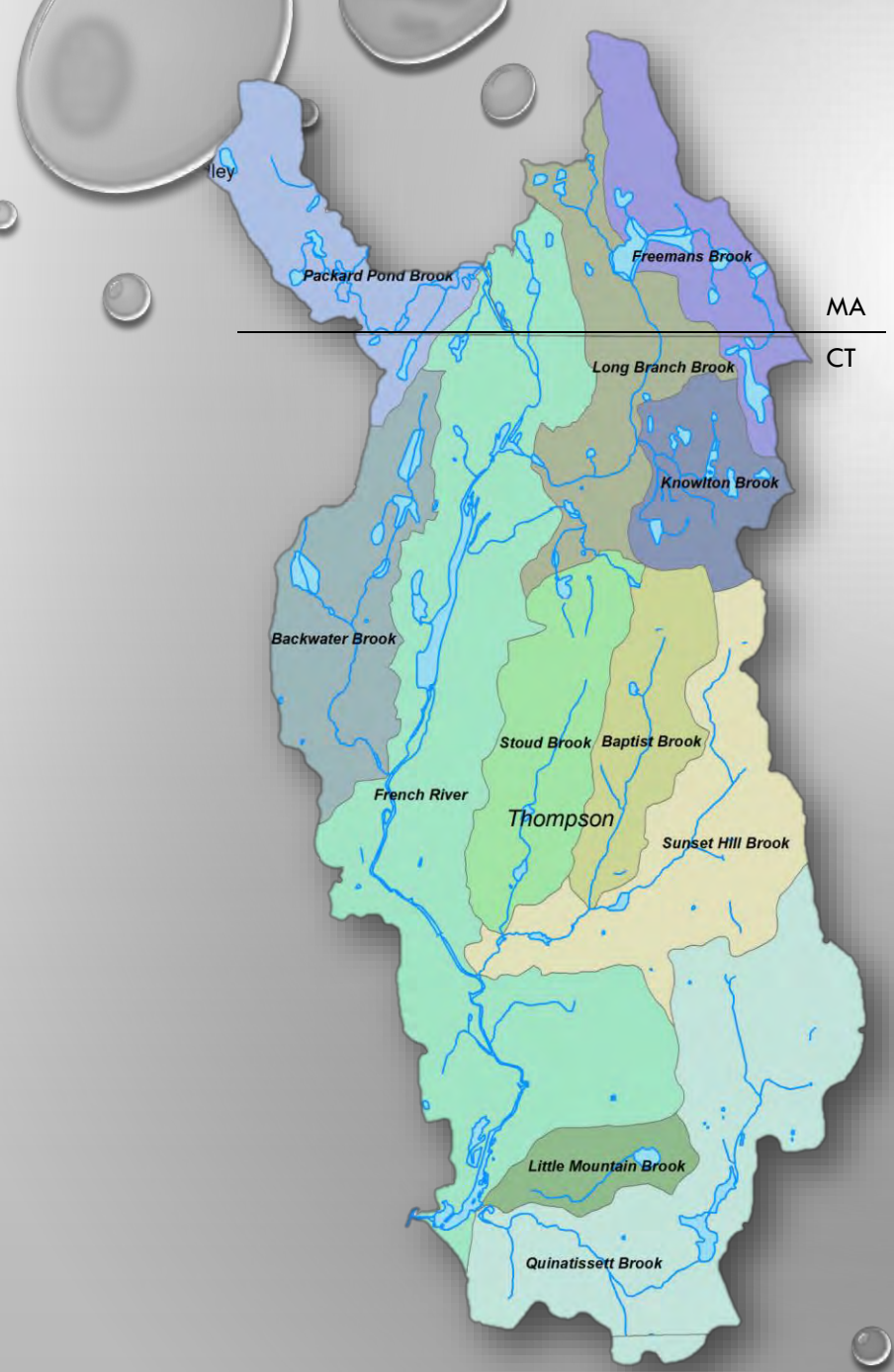
# Pollutant Loads

# Watershed Treatment Model

- Desktop (excel) program developed by the Center For Watershed Protection (CWP)
- Based on the Simple Method (Schueler, 1987)
- Estimates annual pollutant loads based on:
  - Watershed area
  - Land cover types and % coverage
  - Annual rainfall
  - Runoff coefficients
  - Pollutant concentrations (in mg/l)

- WTM incorporates additional elements into the simple method model, such as:
  - Existing structural and behavioral management practices that may reduce existing pollutant loading,
  - The effects of use of future management practices on pollutant loading, and
  - Effects of future development in the subject watershed on existing loading levels.

# Subwatersheds for Modeling



# Pollutant Loads by Land Use Type*

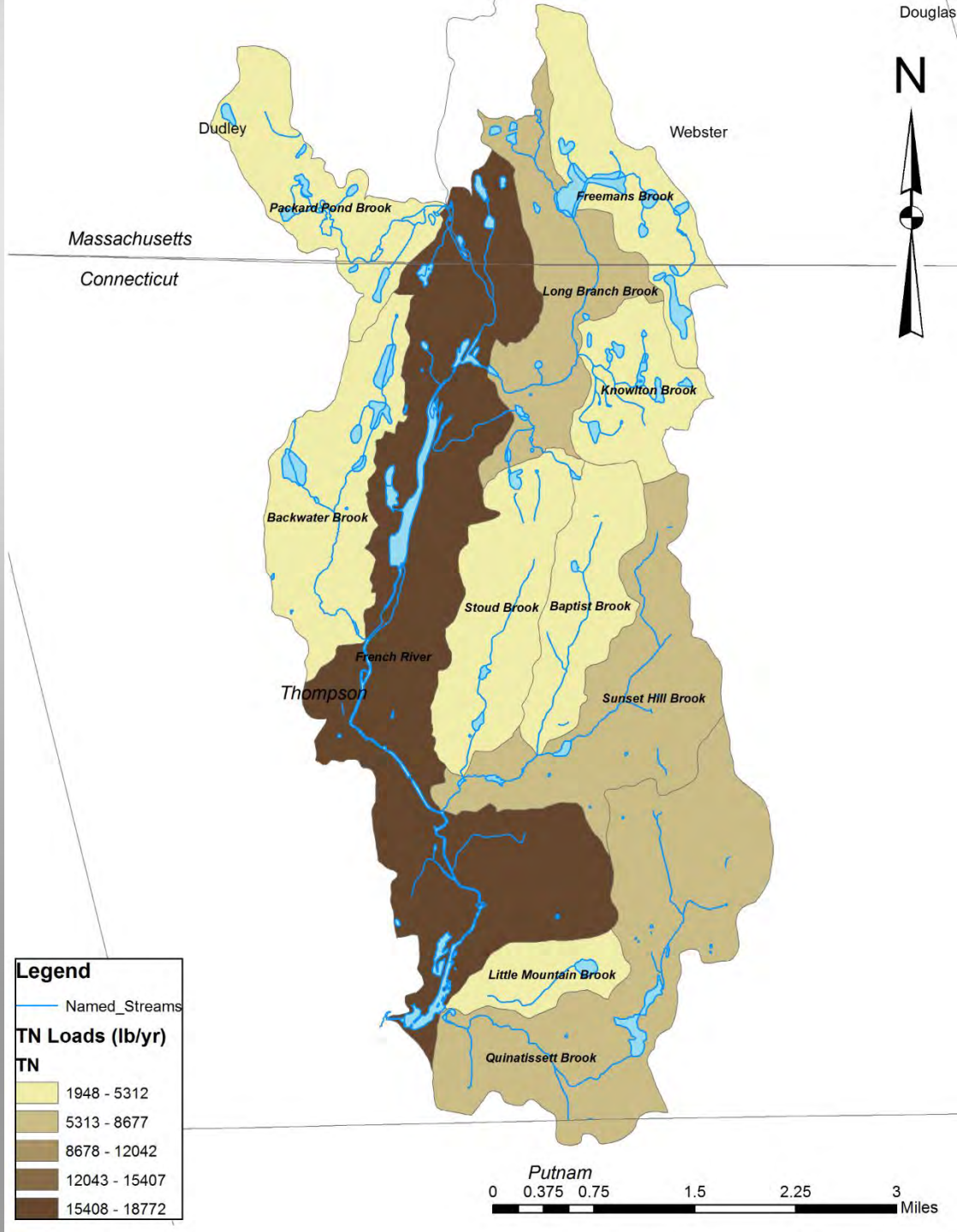
| NPS Pollutant Source | TN (lb/yr) | TP (lb/yr) | TSS (lb/yr) | Fecal Coliform (billion/yr) | Runoff Volume (ac-ft/yr) | TN (% of load) | TP (% of load) | TSS (% of load) | Fecal Coliform (% of load) |
|---|---|---|---|---|---|---|---|---|---|
| LDR (<1du/acre) | 3,713 | 548 | 86,633 | 161,157 | 652 | 7 | 10 | 4 | 14 |
| MDR (1-4 du/acre) | 2,384 | 352 | 55,628 | 103,479 | 419 | 4 | 6 | 3 | 9 |
| HDR (>4 du/acre) | 494 | 73 | 11,517 | 21,425 | 87 | 1 | 1 | 1 | 2 |
| Multi-family | 178 | 26 | 4,160 | 7,739 | 31 | 0 | 0 | 0 | 1 |
| Commercial | 668 | 70 | 13,685 | 29,010 | 117 | 1 | 1 | 1 | 3 |
| **Roadway** | **15,821** | **1,720** | **921,760** | **627,006** | **2,536** | **28** | **31** | **42** | **56** |
| Industrial | 439 | 50 | 16,155 | 18,179 | 74 | 1 | 1 | 1 | 2 |
| **Forest** | **23,762** | **1,901** | **950,490** | **114,059** | **1,164** | **42** | **34** | **43** | **10** |
| Rural | 1,201 | 183 | 26,100 | 10,179 | 33 | 2 | 3 | 1 | 1 |
| Pasture/Hay | 2,625 | 399 | 57,060 | 22,253 | 72 | 5 | 7 | 3 | 2 |
| Cropland | 165 | 25 | 3,590 | 1,400 | 4 | 0 | 0 | 0 | 0 |
| Open Water | 5,492 | 215 | 66,511 | 0 | 0 | 10 | 4 | 3 | 0 |
| ***Land Use Total*** | ***56,942*** | ***5,562*** | ***2,213,289*** | ***1,115,886*** | ***5,189*** | ***100*** | ***100*** | ***100*** | ***100*** |
| **Secondary NPS Sources** | | | | | | | | | |
| Septic Systems | 1,773 | 295 | 11,818 | 5,218 | 0 | 53 | 49 | 2 | 37 |
| Stream Channel Erosion | 0 | 0 | 703,188 | 0 | 0 | 0 | 0 | 98 | 0 |
| Hobby Farms/ Livestock | 1,550 | 306 | 0 | 8,740 | 0 | 47 | 51 | 0 | 63 |
| **Secondary Source Total** | **3,323** | **602** | **715,007** | **13,958** | **0** | 100 | 100 | 100 | 100 |
| **Load Reductions from Existing Practices** | -1,084 | -1,107 | 63,231 | 52,016 | -42 | - | - | - | - |
| ***Total All Sources*** | ***61,349*** | ***7,271*** | ***2,865,065*** | ***1,077,827*** | ***5,036*** | - | - | - | - |

# Pollutant Loads by Subwatershed*

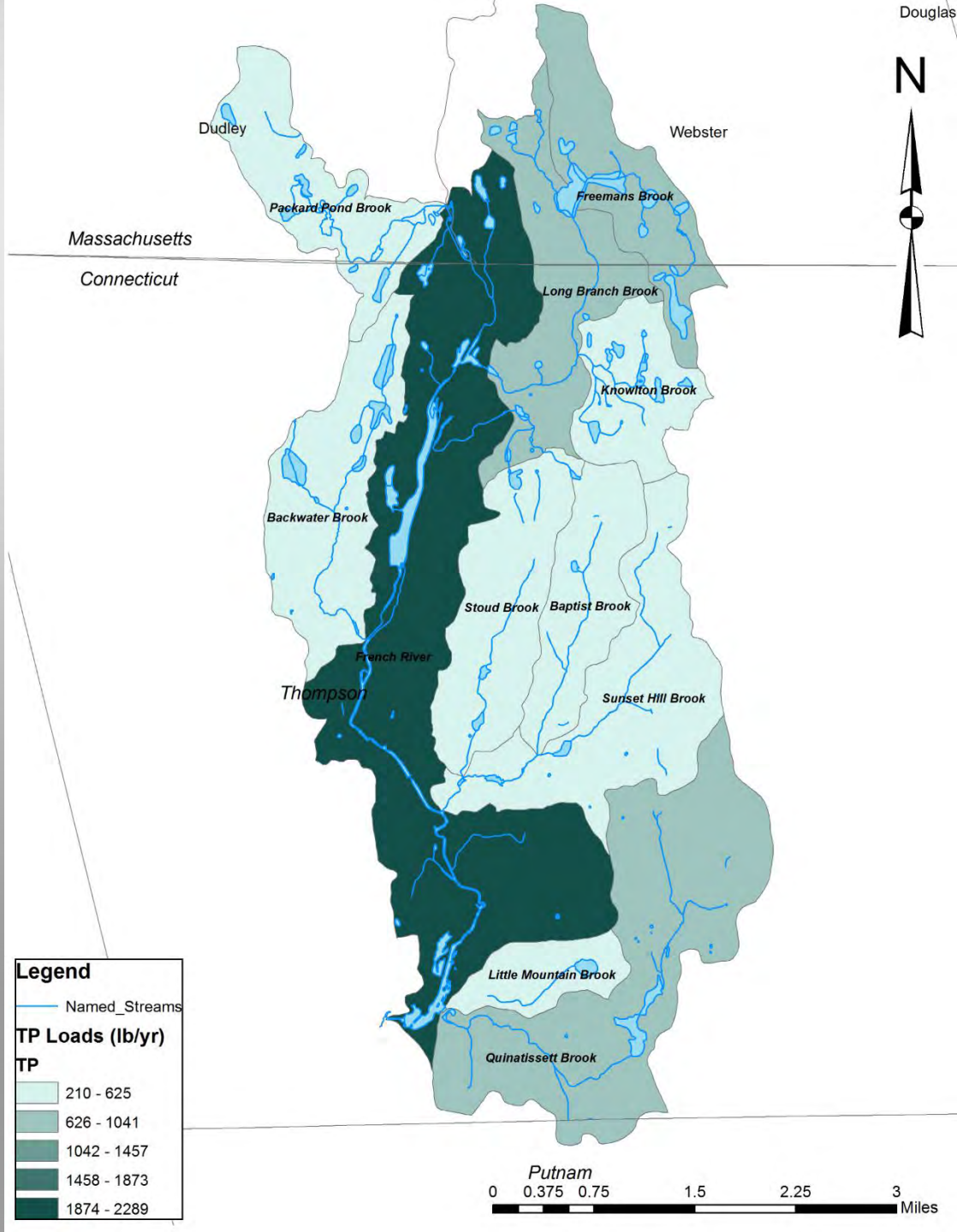
| Local Watershed | Existing Pollutant Loads (lbs/year) | | | | Existing Pollutant Yields (lbs/ac/year) | | | |
|---|---|---|---|---|---|---|---|---|
| | TN | TP | TSS | Fecal Coliform (billion/yr) | TN | TP | TSS | Fecal Coliform (% of load) |
| French River (3,519 acres) | 18,772 | 2,289 | 879,990 | 377,231 | **5** | **1** | 250 | **107** |
| Packard Pond Brook* (835 acres) | 4,586 | 607 | 208,601 | 96,311 | 5 | 1 | 250 | 115 |
| Long Branch Brook (979 acres) | 5,366 | 670 | 248,998 | 105,189 | **5** | **1** | **254** | **107** |
| Freeman's Brook* (799 acres)* | 4,819 | 661 | 222,157 | 123,527 | 6 | 1 | 278 | 155 |
| Knowlton Brook (575 acres) | 2,464 | 271 | 129,126 | 42,103 | 4 | 0 | 225 | 73 |
| Backwater Brook (1,053 acres) | 3,836 | 395 | 203,918 | 57,541 | 4 | 0 | 194 | 55 |
| Sunset Hill Brook (1,283 acres) | 5,353 | 593 | 263,755 | 83,624 | 4 | 0 | 206 | 65 |
| Baptist Brook (688 acres) | 2,465 | 210 | 107,846 | 19,191 | 4 | 0 | 157 | 28 |
| Stoud Brook (934 acres) | 3,070 | 310 | 141,018 | 27,909 | 3 | 0 | 151 | 30 |
| Little Mountain Brook (340 acres) | 1,948 | 251 | 92,578 | 38,673 | **6** | **1** | **272** | **114** |
| Quinatissett Brook (1,953 acres) | 8,668 | 1,014 | 367,078 | 106,530 | 4 | **1** | 188 | 55 |
| ***Total (12,958 acres)*** | ***61,349*** | ***7,271*** | ***2,865,065*** | ***1,077,827*** | ***5*** | ***1*** | ***221*** | ***83*** |

* Watersheds discharge to the French River in Massachusetts

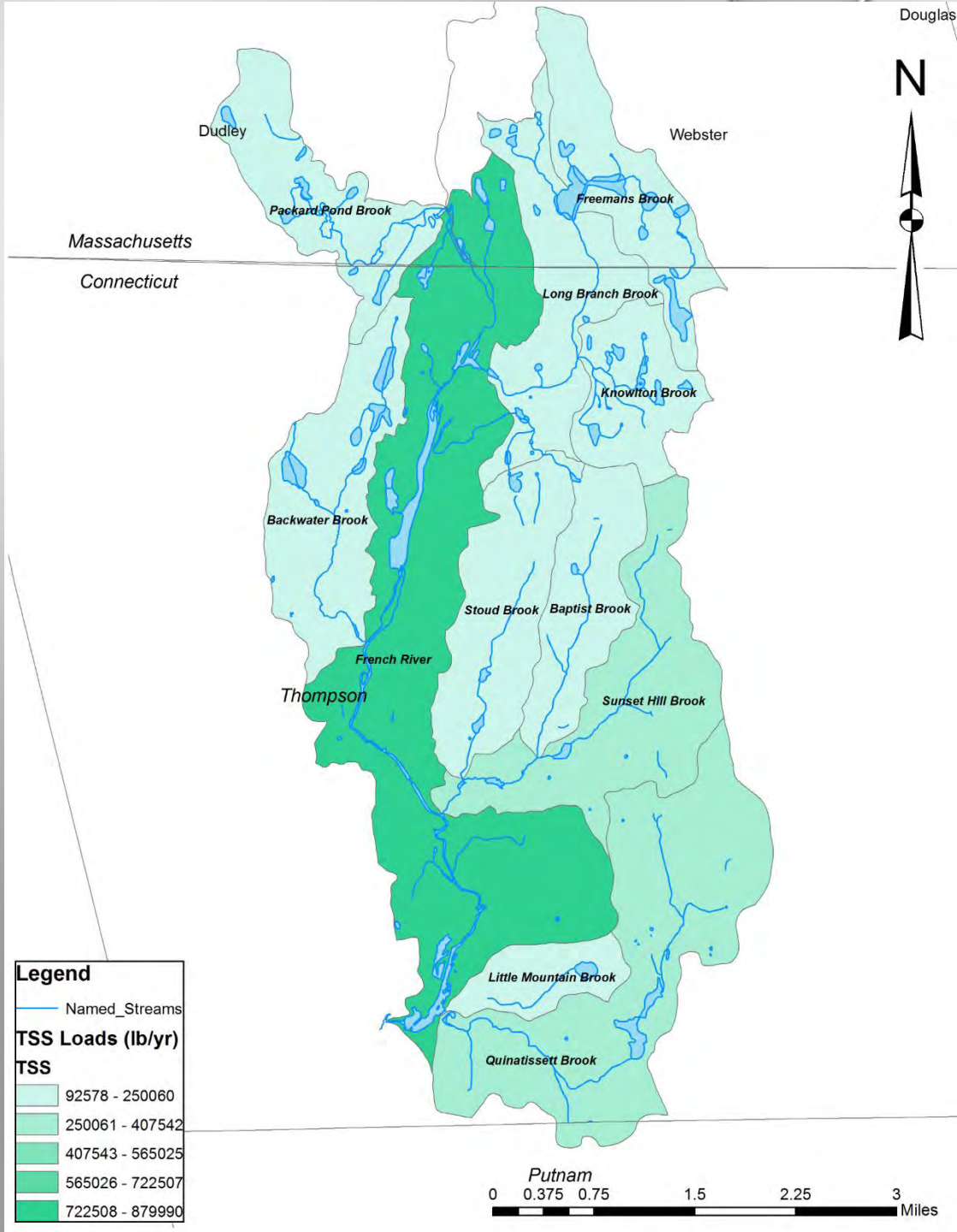
# Total Nitrogen Load*



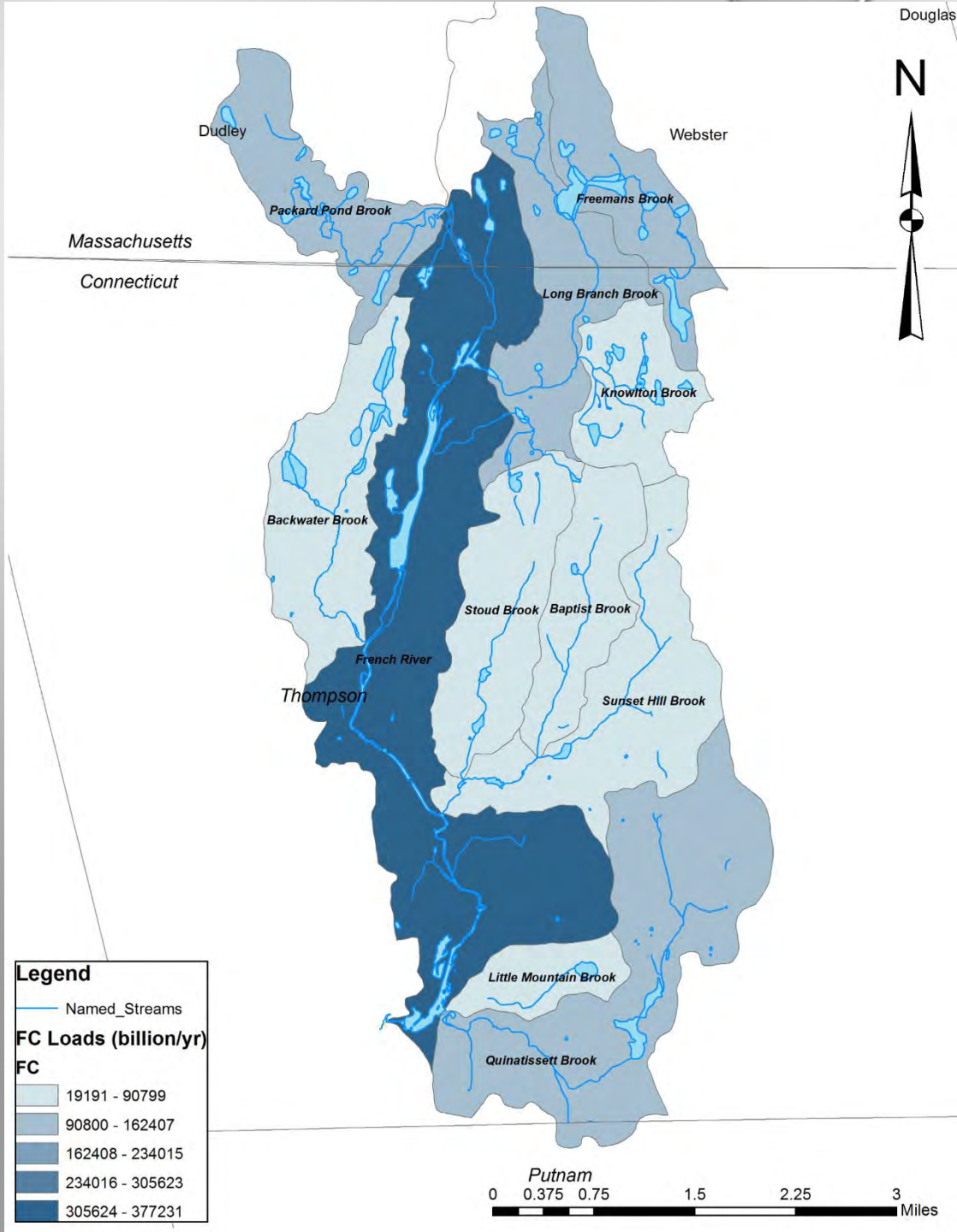
# Total Phosphorus Load*



# Total Suspended Sediment Load*



# Fecal Coliform Load



# Load Reductions

# Bacteria Load Reductions

| Site | Site Description | Geomean | % Load Reduction Required |
|---|---|---|---|
| FR01 | French River 500 ft upstream of Quinebaug River confluence | 74 | 0 |
| FR02 | French River at Rt 12 near Riverside Pizza | 101 | 0 |
| FR03 | French River at Riverside Park 100 ft downstream of the footbridge | 47 | 0 |
| FR04 | French River upstream of outlet at North Grosvenordale Pond | 14 | 0 |
| FR05 | French River upstream of Wilsonville Road bridge | 57 | 0 |
| FR06 | French River at the CT/MA state line | 87 | 0 |
| LBB01 | Long Branch Brook upstream of Wagher Road | 36 | 0 |
| LBB02 | Long Branch Brook upstream of Labby Road | 56 | 0 |
| LBB03 | Long Branch Brook at the CT/MA state line | 61 | 0 |
| KB01 | Knowlton Brook downstream of Wilsonville Road | 83 | 0 |
| SHB01 | Sunset Hill Brook downstream of Klondike Avenue | 124 | 0 |
| SHB02 | Sunset Hill Brook downstream of Thompson Hill Road (RT 200) | 22 | 0 |
| SB01 | Stoud Brook upstream of Thompson Hill Road (RT 200) | 33 | 0 |
| BWB0.5* | **Backwater Brook culvert outfall at the French River canal** | **820*** | **30%** |
| BWB01 | **Backwater Brook downstream of Phelps Pond outlet** | **135** | **7%** |
| BWB02 | Backwater Brook upstream of Phelps Pond off Floral Avenue | 32 | 0 |
| UN01 | Unnamed stream upstream of Route 12 by I-395 SB on-ramp | 37 | 0 |
| LMB01 | Little Mountain Brook downstream of Robbins Road | 96 | 0 |
| QB01 | **Quinatissett Brook downstream of Ballard Road** | **338** | **63%** |
| QB02** | **Quinatissett Brook downstream of Reams Pond outlet** | **361** | **65%** |
| RB01** | Ross Brook downstream of Quaddick Road | 74 | 0 |
| EB01** | Elliott Brook downstream of Quaddick Road | 125 | 0 |
| EB02** | **Elliott Brook downstream of Chase Road** | **148** | **15%** |
| * Reduction based on single sample limit (576 cfu/100ml) | | | |
| **Only three samples were taken at these sites and do not constitute a reliable sample set. | | | |

# NPS Load Reductions

| Sub-watershed | Existing TN (lb/year) | Pre-developed TN (lb/year) | % Reduction TN (lb/year) | Existing TP (lb/year) | Pre-developed TP (lb/year) | % Reduction TP (lb/year) | Existing TSS (lb/year) | Pre-developed TSS (lb/year) | % Reduction TSS (lb/year) |
|---|---|---|---|---|---|---|---|---|---|
| French River Local | 18,772 | 10,295 | 82 | 2,289 | 747 | 206 | 879,990 | 468,560 | 88 |
| Packard Pond Brook* | 4,586 | 2,446 | 87 | 607 | 177 | 242 | 208,601 | 111,187 | 88 |
| Long Branch Brook | 5,366 | 2,512 | **114** | 670 | 198 | 239 | 248,998 | 127,784 | 95 |
| Freeman's Brook* | 4,819 | 2,103 | **129** | 661 | 163 | **306** | 222,157 | 104,608 | **112** |
| Knowlton Brook | 2,464 | 1,524 | 62 | 271 | 118 | 130 | 129,126 | 75,451 | 71 |
| Backwater Brook | 3,836 | 2,703 | 42 | 395 | 213 | 86 | 203,918 | 137,393 | 48 |
| Sunset Hill Brook | 5,353 | 3,323 | 61 | 593 | 260 | 128 | 263,755 | 167,636 | 57 |
| Baptist Brook | 2,465 | 2,020 | 22 | 210 | 146 | 44 | 107,846 | 91,653 | 18 |
| Stoud Brook | 3,070 | 2,464 | 25 | 310 | 191 | 63 | 141,018 | 122,423 | 15 |
| Little Mountain Brook | 1,948 | 935 | 108 | 251 | 70 | **257** | 92,578 | 44,836 | **106** |
| Quinatissett Brook | 8,668 | 5,219 | 66 | 1,014 | 400 | 153 | 367,078 | 256,402 | 43 |

* Watersheds discharge to the French River in Massachusetts.

% Reduction = $(T2 - T1/T1)$ x 100

# Goals, Objectives and Recommended Best Management Practices (BMPs)

# Watershed Plan Goals

- Protect water quality in the French River watershed where it is good
- Improve water quality in the impaired stream segments

# Watershed Plan Objectives

- **Objective 1 - Create a team or coalition to implement the watershed plan.**
- Objective 2 - Raise public awareness of water quality status and threats.
- **Objective 3 – Promote land-use regulations and practices that are protective of water quality.**
- **Objective 4 - Reduce effective impervious cover in the MS4 Urban Area.**
- **Objective 5 - Protect and preserve high quality tributaries and undeveloped headwater areas from existing pollutant sources and future threats related to new development.**
- **Objective 6 - Improve and protect water quality in the French River and impaired tributaries.**
- Objective 7 –Promote good housekeeping practices.

# Land Use Regulations and Policy Review

- Adopt land-use planning recommendations proposed in plans of conservation and development and open space plan.
- Adopt and/or update farm-friendly land-use regulations
- Review and strengthen existing land-use regulations pertaining to erosion and sediment control and stormwater management.
- Incorporate language to encourage or require the use of Green Infrastructure (GI) and Low Impact Development (LID) practices into site plan design and development.
- Identify and evaluate any existing or perceived institutional barriers to GI and LID.
- Adopt regulatory language necessary to implement MS4 General Permit.

# Reduce Effective Impervious Cover in the MS4 Urban Area*

- Identify priority stormwater catchments in urban areas.
- Encourage or require LID/GI practices on new and redeveloped parcels in the urban area.
- Install BMPs on high IC parcels to reduce stormwater runoff and NPS.
- Conduct IC outreach and education.

* See slide 21 for the Thompson MS4 urban area.

# Protect and Preserve High Quality Tributaries and Undeveloped Headwater Areas

- Support recommendations in the plan of conservation and development and the conservation and open space plan.
- Promote the use of regulatory and non-regulatory tools to preserve open space.
- Provide regulatory protections for vegetated riparian zones.
- Promote the use of lid to reduce stormwater runoff and improve water quality.
- Encourage the use of forestry BMPs to protect stream crossings and prevent soil erosion
- Conduct outreach to promote the benefits of open space.

# Improve and Protect Water Quality in the French River and Impaired Tributaries

- Conduct water quality monitoring.
- Conduct water quality improvement projects.
- Implement MS4 SWMP.
- Reduce pet and nuisance waterfowl waste.
- Restore impacted riparian areas to the best extent practicable.
- Conduct NPS education and outreach campaigns.

# *Part 3 -*

# Thompson Public Library Stormwater Improvement Project

# Thompson Public Library
# Water Quality Improvement Project

# GRASS RAIN GARDEN

# PERENNIAL RAIN GARDEN

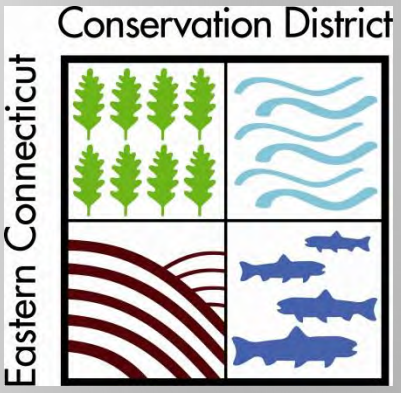
# DOWNSPOUT PLANTER

# STORMDRAIN FILTERS

# TREE FILTER

# Next Steps

1. Identify and reach out to prospective watershed management team members.
2. Identify a meeting space, establish a meeting schedule.
3. Review watershed management plan.
4. Identify and prioritize short, medium and long-term goals.
5. Select one or two short term implementation projects.

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