

4.2 Goodwives River

An IC method analysis for Connecticut's Goodwives River watershed was performed to complete a TMDL allocation. The IC method was applied to estimate existing and target % IC in the overall watershed and in each sub-watershed.

4.2.1 Watershed Description

The watershed for the Goodwives River is located within Darien and New Canaan town boundaries and is shown on Figure 4-4. The watershed is characterized by residential development, commercial, industrial, and forest as provided in Table 4-5. The drainage area is 1,223 acres (1.9 sq. miles).

Goodwives River is a part of the Goodwives River Drainage Basin. The Goodwives River Drainage Basin is 7.4 square miles. The Goodwives River is located on the Southern Coast of Connecticut and drains into Long Island Sound. According to the Goodwives River Management Plan, the mouth of Goodwives River is classified as SB/SA. The current designated uses of the Goodwives River Drainage Basin include marine fishing, shellfish and wildlife habitat, recreation, industrial and other uses including navigation, and shellfish harvesting for direct human consumption (Fuss & O'Neil, 2004).

Under the State of Connecticut Water Quality Standards, Goodwives River is listed on the Clean Water Act 303(d) for pathogens located at the mouth of the Goodwives River (CTDEP, 2004). According to Connecticut Consolidated Assessment and Listing Methodology for 305(b) and 303(d), the criteria for fecal coliforms in the use of salt water shell fishing fecal coliforms (pathogens) should have a geometric mean less than 14 colonies per 100ml and 90% of samples less than 43 colonies per 100ml (CTDEP, 2004). According to the State of Connecticut Water Quality Standards, Goodwives River is assessed as not supporting shellfishing designated use (CTDEP, 2004).

Table 4-5 Goodwives River: Major Landuse Distribution

Landuse	Percentage of Watershed
Low Intensity Residential	47%
Urban/Recreational Grasses	16%
Mixed Forest	11%
Commercial/Industrial/Transportation	8%
Deciduous Forest	8%
Woody Wetlands	5%
Evergreen Forest	3%
High Intensity Residential	2%
Other	1%

4.2.2 Available Data

The State of Connecticut provided a PDF of a report titled “Goodwives River Watershed Management Plan”, dated February 2004. This report included a figure showing the watershed boundary. Figure 4-5 provides a landuse map for the Goodwives River watershed. The watershed boundary GIS layer and landcover was obtained from the University of Connecticut Map and Geographic Information Center (MAGIC). The Connecticut Landcover Data Set was compiled from the USGS national Multi Resolution Landcover Characterization (MRLC) landcover. The MRLC landcover datasets were based on circa 1992 LandSat TM Satellite Imagery.

4.2.3 Impervious Cover and Pollutant Load Calculation

To calculate watershed impervious cover, the Goodwives River watershed was digitally intersected with the Connecticut landcover dataset, and the area of each landuse category calculated. Watershed impervious percentage was then calculated based on the assumed impervious percentages for each landuse as shown in Table 4-6. The assumed percentage of impervious cover for each landuse was derived using recommended percentages in TR-55, Urban Hydrology for Small watersheds (USDA, 1986). The results of this analysis indicate the Goodwives River watershed is 19 percent impervious. The Impervious Cover Model predicts impacted stream quality for greater than 10 percent impervious cover. Thus, the impervious cover model predicts impacted water quality in the Goodwives River.

Table 4-6 Goodwives River: Estimated Percent Impervious Cover by Landcover

Landuse	Estimated Percent Impervious Cover
Commercial/Industrial/Transportation	78.5%
High Intensity Residential	65%
Low Intensity Residential	25%
Other	0%

4.2.4 Summary and Conclusions

Goodwives River, Connecticut

Section 303(d) listed impairments: Shellfishing (pathogens)

Size of watershed: 1.9 square miles

Percent of IC in watershed: 19%

Applicability of IC method to this watershed

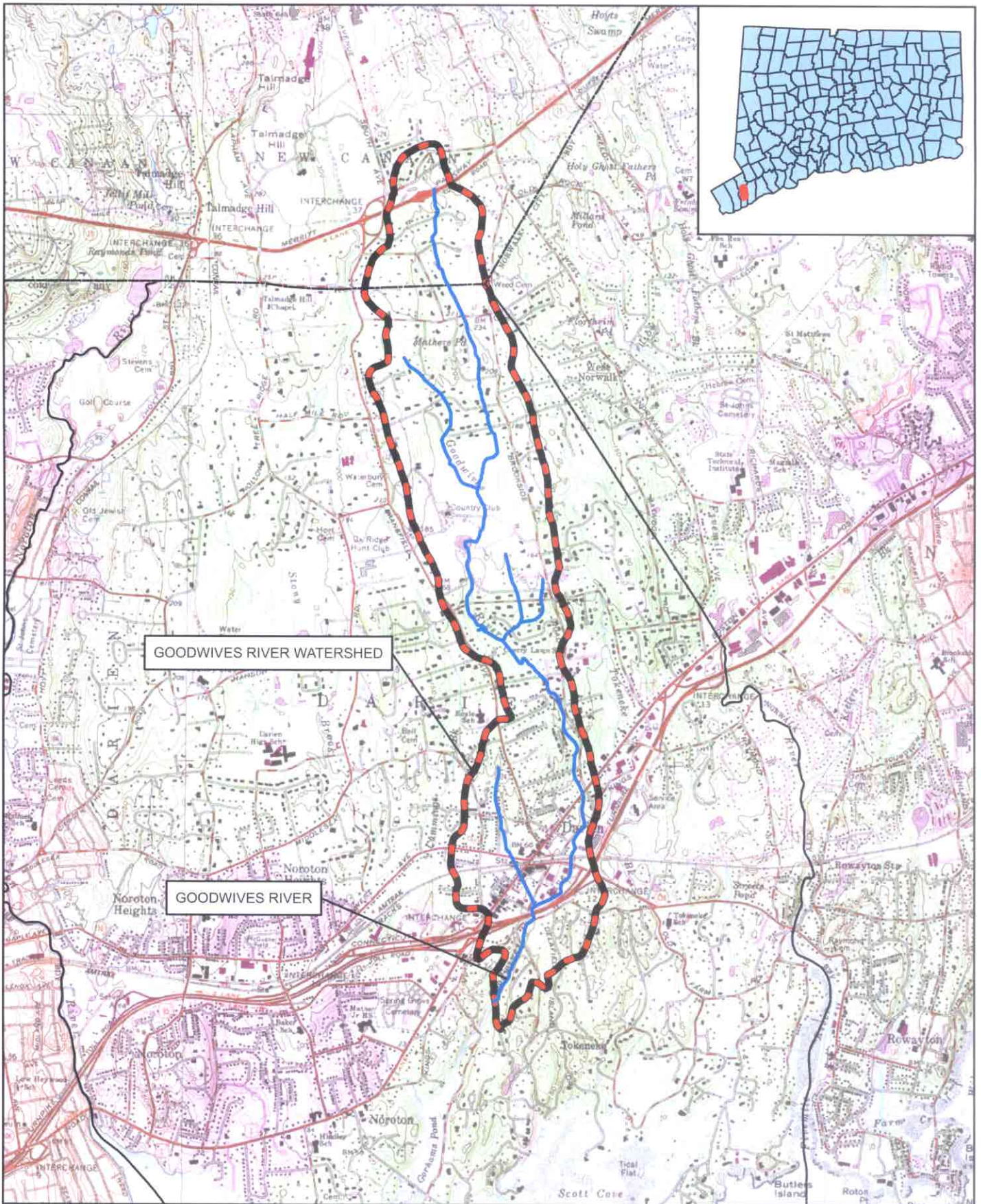
There were no problems using available data to calculate the percent IC for this watershed. It is a small watershed and the land cover map provides adequate detail on the types of development and their concentrations in the watershed.

If aquatic life impairment had been documented, the IC method could have been used to address this impairment. However, the cause of the impairment appears to be specific and known and consequently, EPA would expect a specific TMDL to be developed for pathogens (fecal coliforms). Consequently, the IC method is not the appropriate method for TMDL development in this watershed.

Table 4-7 provides estimated existing % IC and target % IC values for the Goodwives River watershed. For illustrative purposes, estimated annual stormwater runoff volume and estimated annual pollutant loads for selected parameters are also provided, using annual rainfall and estimated event mean concentration of pollutants from (Schueler, 2003). For this watershed, an annual rainfall of 44.14 inches (Hartford, NOAA.com) and a fraction of annual rainfall events that produced runoff of 0.9 (Center for Watershed Protection, 2003) were used.

**Table 4-7 Goodwives River: Estimated Existing and Target TMDL Values
for Key Parameters**

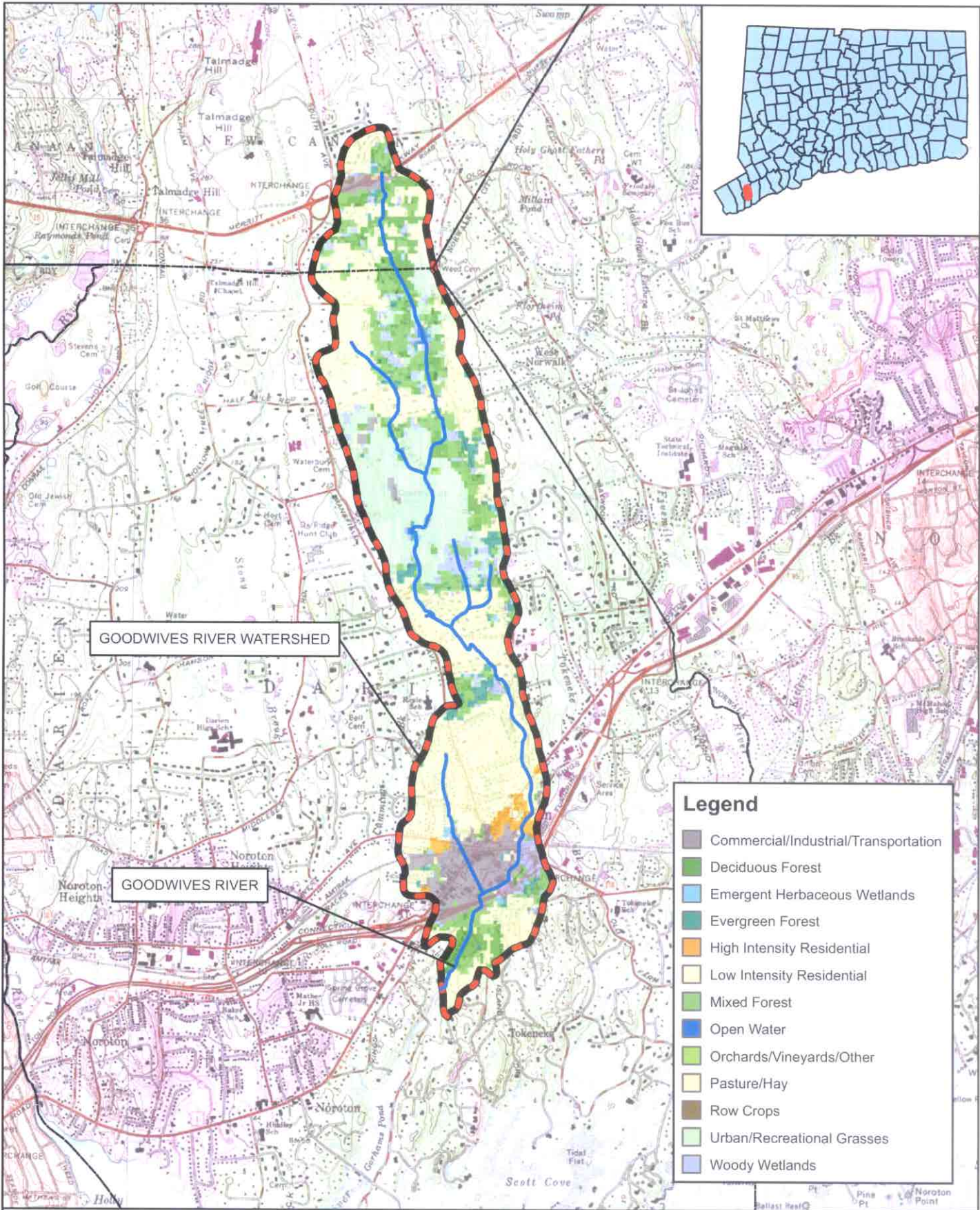
Parameter	Estimated Conditions	
	Existing	TMDL Target
Impervious Cover	19%	9%
<u>Optional:</u>		
Annual Runoff Volume	900 acre-ft	530 acre-ft
Total Suspended Solids	190,000 lbs	110,000 lbs
Total P	780 lbs	460 lbs
Soluble P	320 lbs	190 lbs
Total N	5,800 lbs	3,400 lbs
TKN	4,200 lbs	2,500 lbs
Nitrate & Nitrite	1,600 lbs	950 lbs



0 1,550 3,100 6,200
 Feet
 1 inch equals 3,001.295510 feet

GOODWIVES RIVER WITH
 WATERSHED BOUNDARY INDICATED
 DARIEN, CONNECTICUT

FIGURE
 4-4



0 1,500 3,000 6,000 Feet
1 inch equals 3,001.295510 feet

GOODWIVES RIVER LANDUSE MAP
DARIEN, CONNECTICUT

FIGURE
4-5