Factsheet: Town of Roxbury Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

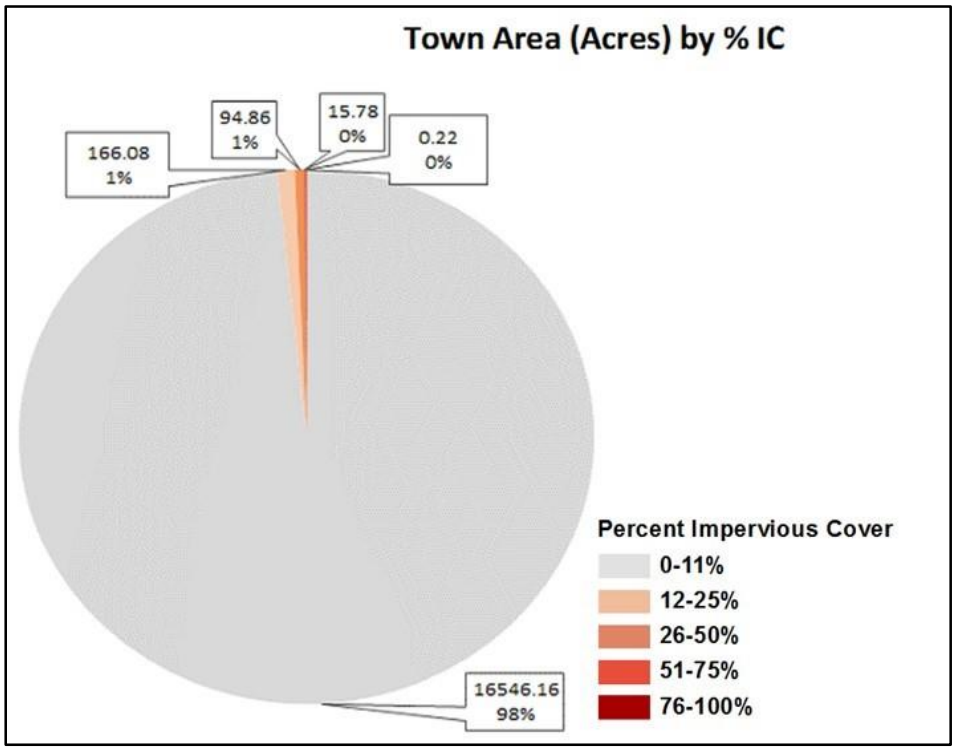
Town of Roxbury: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Roxbury



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Roxbury

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
Statewide Bacteria TMDL	Bacteria	Shepaug River / Walker Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/shepaugriver6700.pdf
TMDL Analysis For Transylvania Brook, Southbury, CT	Copper, Ammonia, Zinc & Chlorine	Transylvania Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/transylvaniabrooktmdlfinal.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential

for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater

monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

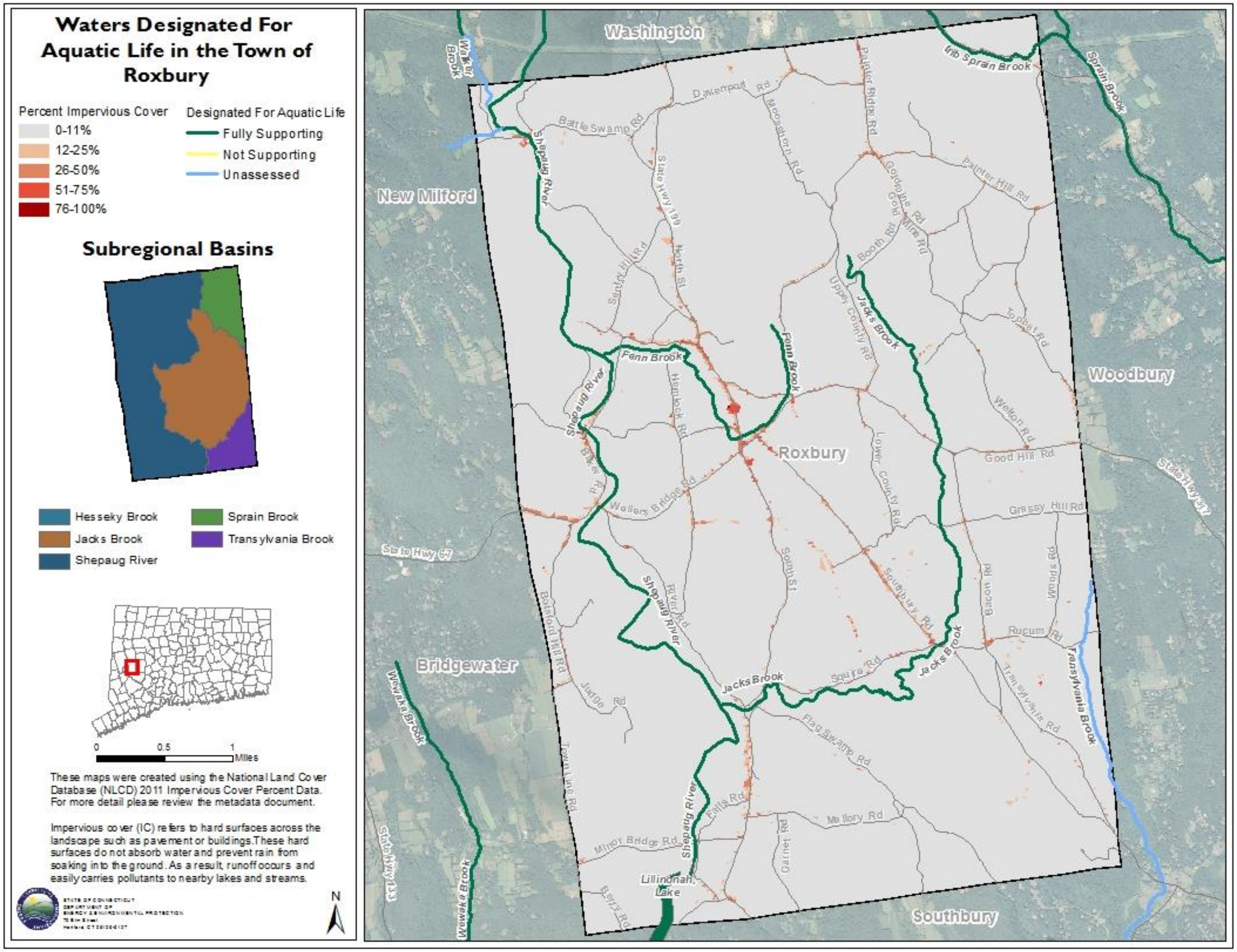
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

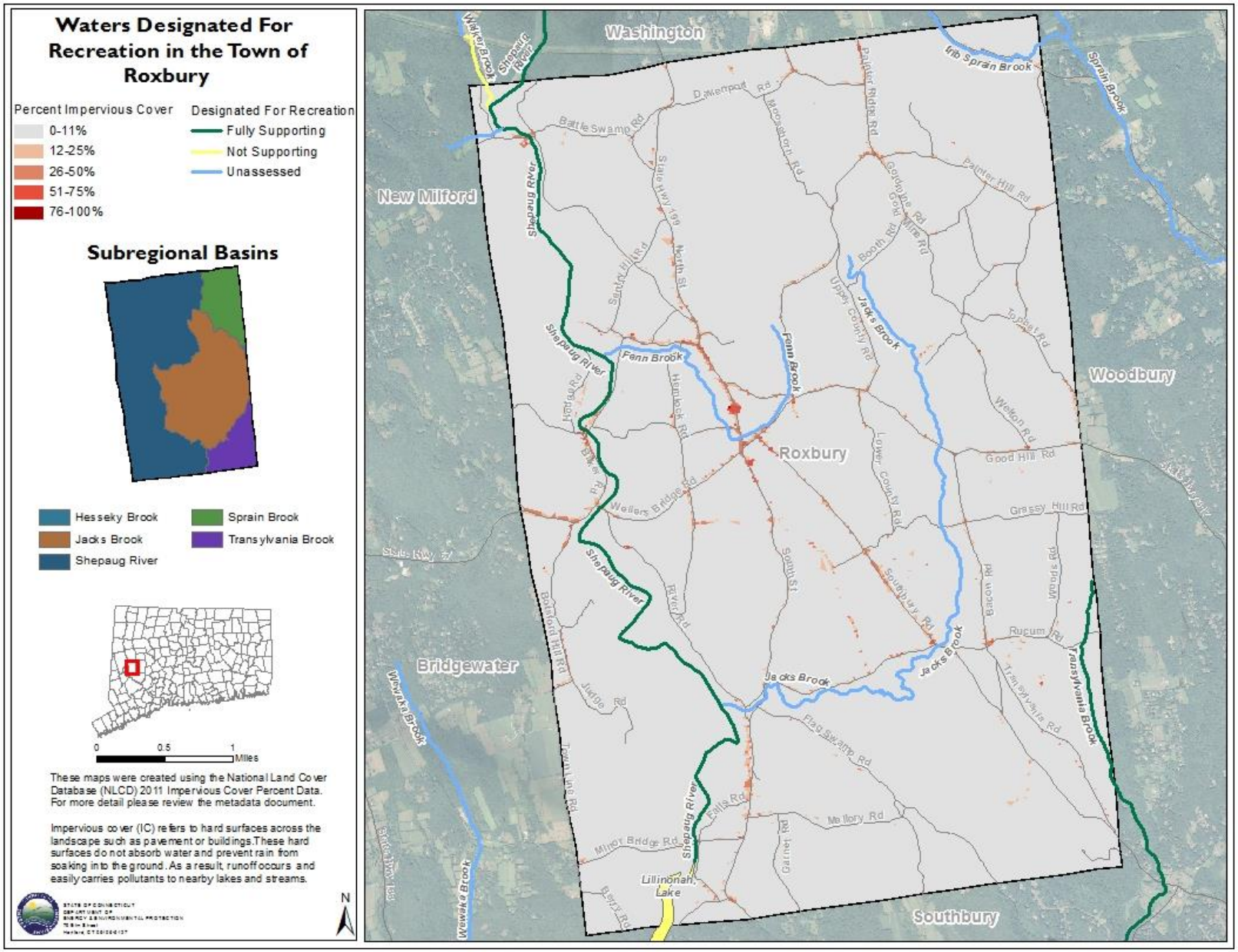
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Roxbury
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Hesseky Brook
Jacks Brook
Shepaug River
Sprain Brook
Transylvania Brook
0
0.5
1
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Washington
New Milford
Woodbury
Bridgewater
Southbury
Roxbury
Shepaug River
Fenn Brook
Jacks Brook
Sprain Brook
Trib Sprain Brook
Transylvania Brook
Walker Brook
Wewaka Brook
Lillinonah Lake
State Hwy 67
State Hwy 133
State Hwy 199
State Hwy 317
Battle Swamp Rd
Davenport Rd
Moosehorn Rd
Painter Ridge Rd
Painter Hill Rd
Booth Rd
Gold Mine Rd
Upper County Rd
Tophet Rd
Welton Rd
Good Hill Rd
Grassy Hill Rd
Rucum Rd
Bacon Rd
Woods Rd
Transylvania Rd
Southbury Rd
Squire Rd
Flag Swamp Rd
Mallory Rd
Garnet Rd
Falls Rd
Minor Bridge Rd
Berry Rd
Town Line Rd
Judge Rd
Botsford Hill Rd
River Rd
South St
Lower County Rd
Wellers Bridge Rd
Baker Rd
Hemlock Rd
North St
Sentry Hill Rd


Waters Designated For Recreation in the Town of Roxbury
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Hesseky Brook
Jacks Brook
Shepaug River
Sprain Brook
Transylvania Brook
0
0.5
1
Miles
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N
Washington
New Milford
Bridgewater
Roxbury
Woodbury
Southbury
Lillinonah, Lake
Shepaug River
Jacks Brook
Penn Brook
Transylvania Brook
Sprain Brook
Walker Brook
Weweka Brook
Wiwaxia Brook

Factsheet: Town of Salem Water Quality

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Water Quality in Connecticut

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In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

Town of Salem: Impervious Cover Data

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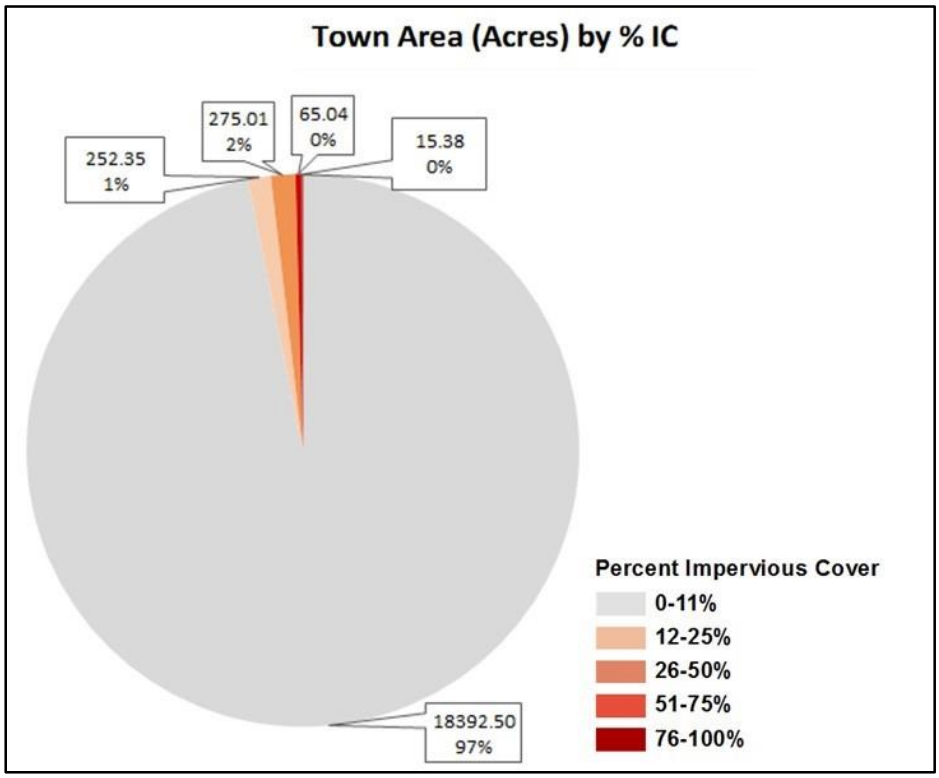
Amounts of Impervious Cover within the Town of Salem



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Salem

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
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Statewide Bacteria TMDL	Bacteria	Oxoboxo Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/oxoboxobrook3004.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

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Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

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Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

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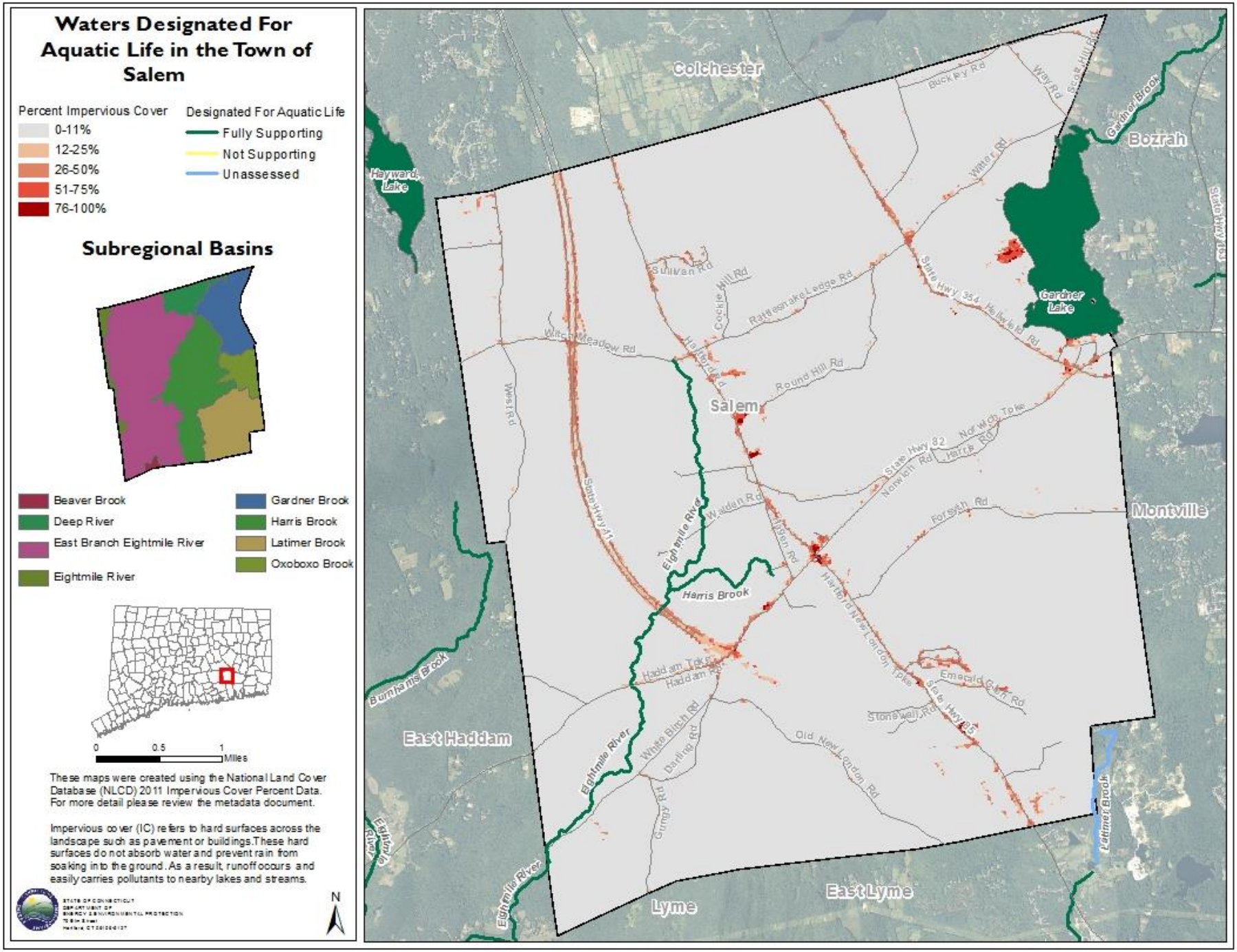
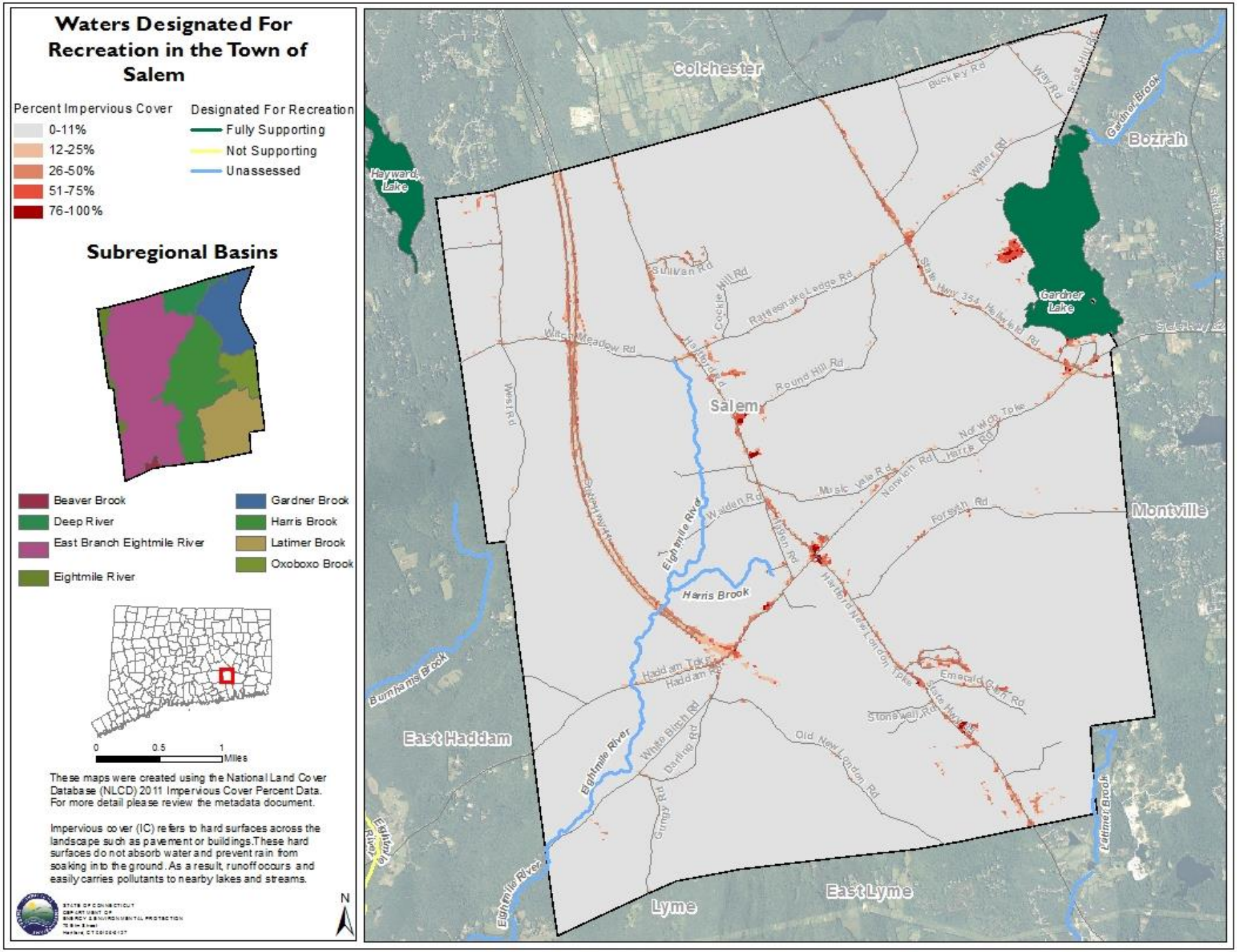
Waters Designated For Aquatic Life in the Town of Salem



Waters Designated For Recreation in the Town of Salem



Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

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Factsheet: Town of Salisbury Water Quality

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In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

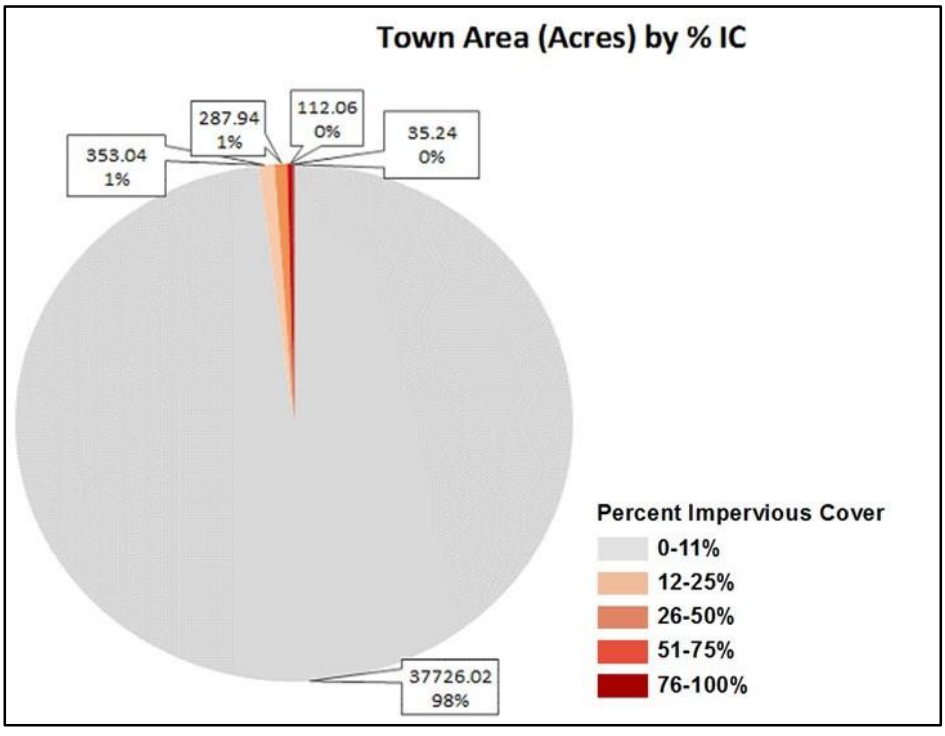
Town of Salisbury: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Salisbury



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Salisbury

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
Statewide Bacteria TMDL	Bacteria	Housatonic River	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/housatonicriver6000.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to

make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters

in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

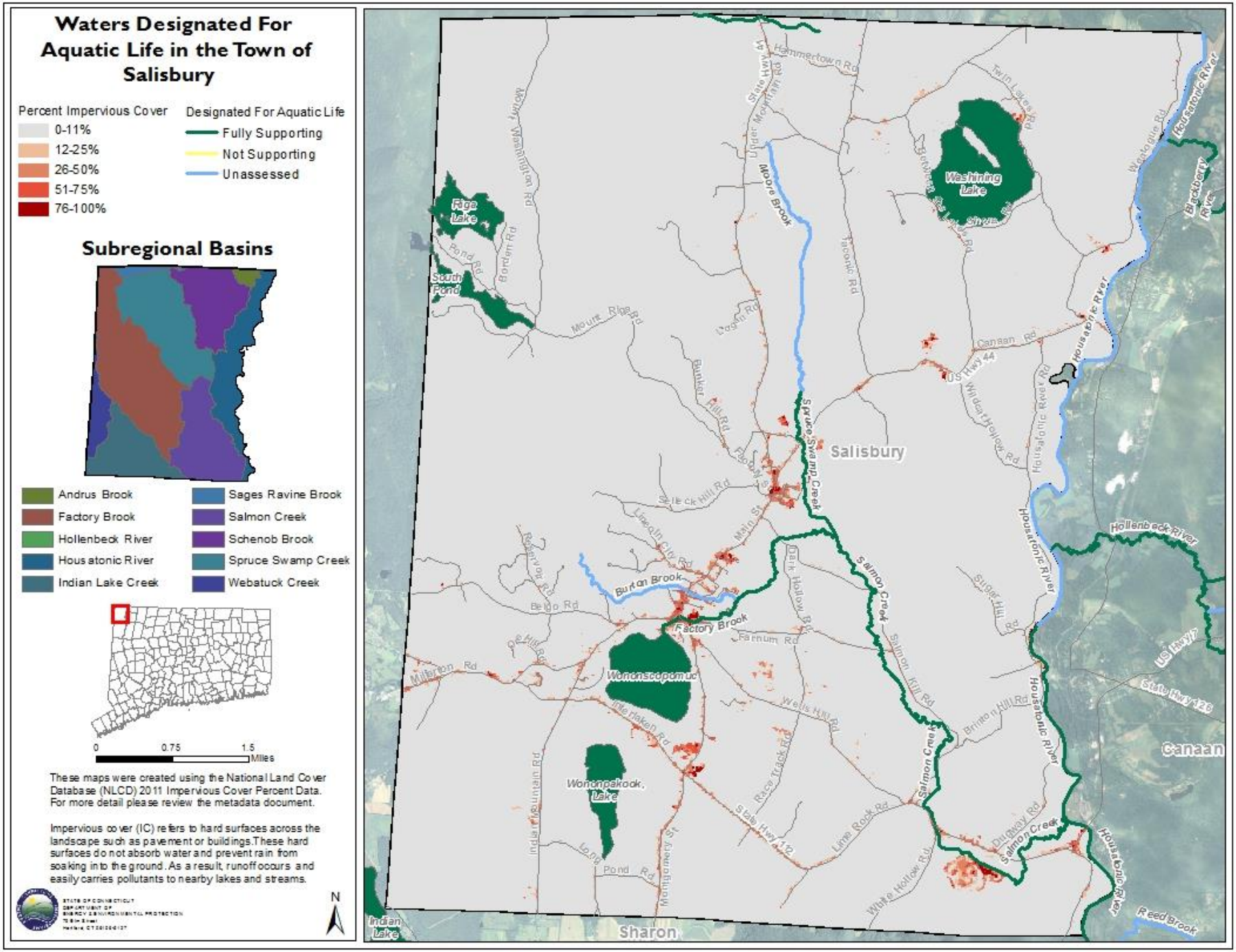
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.

Waters Designated For Aquatic Life in the Town of Salisbury



These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.

Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.

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ENERGY & ENVIRONMENTAL PROTECTION
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Waters Designated For Recreation in the Town of Salisbury

Percent Impervious Cover

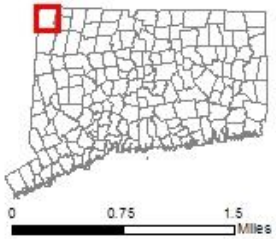
- 0-11%
- 12-25%
- 26-50%
- 51-75%
- 76-100%

Designated For Recreation

- Fully Supporting
- Not Supporting
- Unassessed

Subregional Basins

- Andrus Brook
- Factory Brook
- Hollenbeck River
- Housatonic River
- Indian Lake Creek
- Sages Ravine Brook
- Salmon Creek
- Schenob Brook
- Spruce Swamp Creek
- Webatuck Creek



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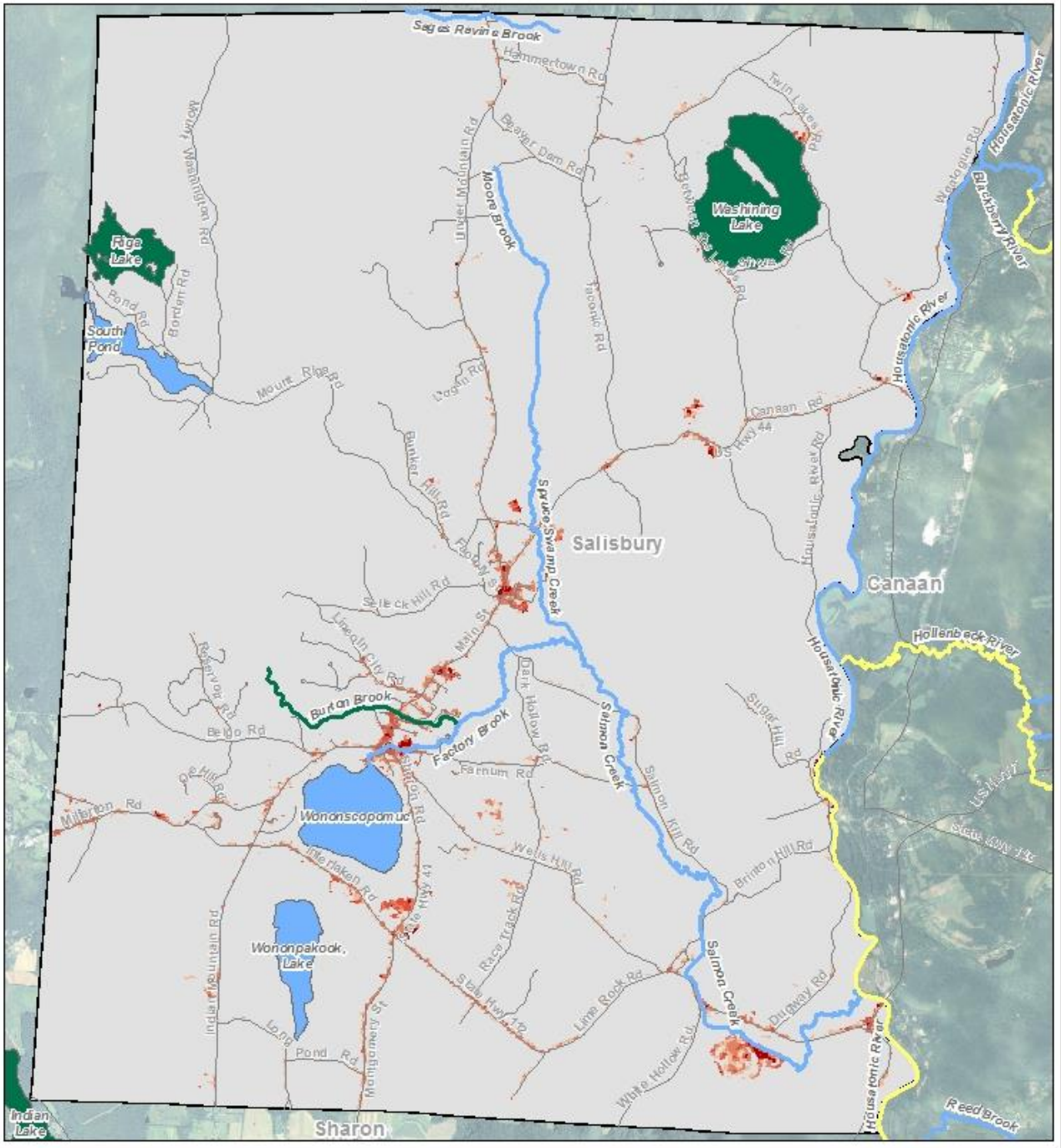

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Factsheet: Town of Scotland Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

Town of Scotland: Impervious Cover Data

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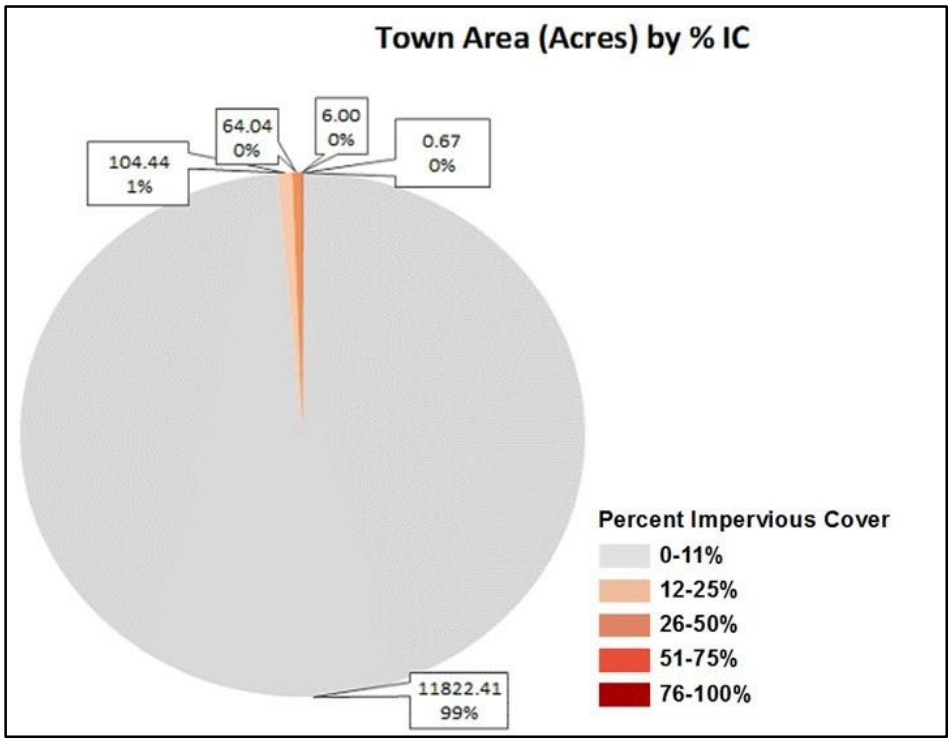
Amounts of Impervious Cover within the Town of Scotland



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Statewide Bacteria TMDL	Bacteria	Shetucket River and Obwebetuck Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/shetucketriver3800.pdf

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CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

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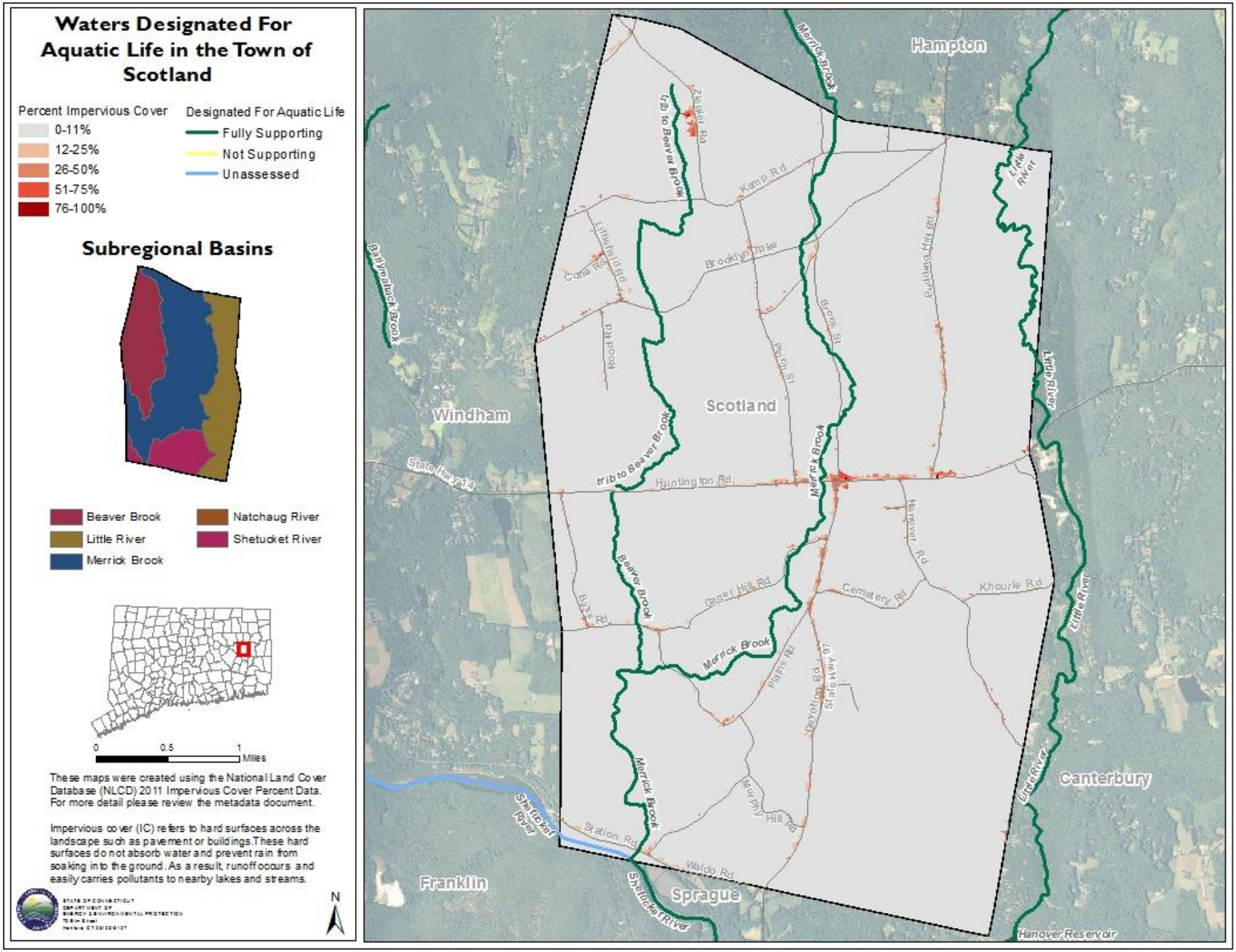

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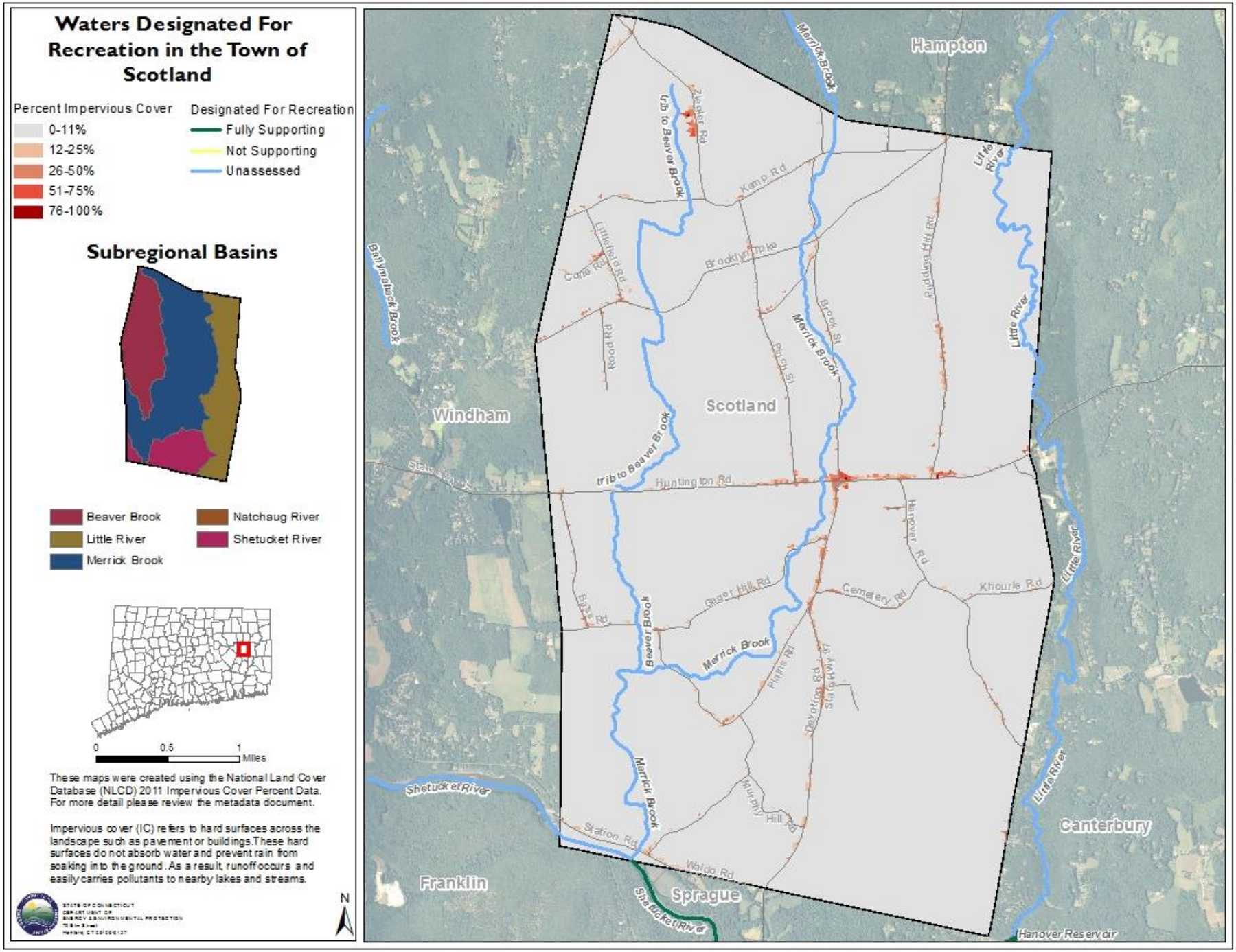

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Factsheet: Town of Sharon Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

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In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

Town of Sharon: Impervious Cover Data

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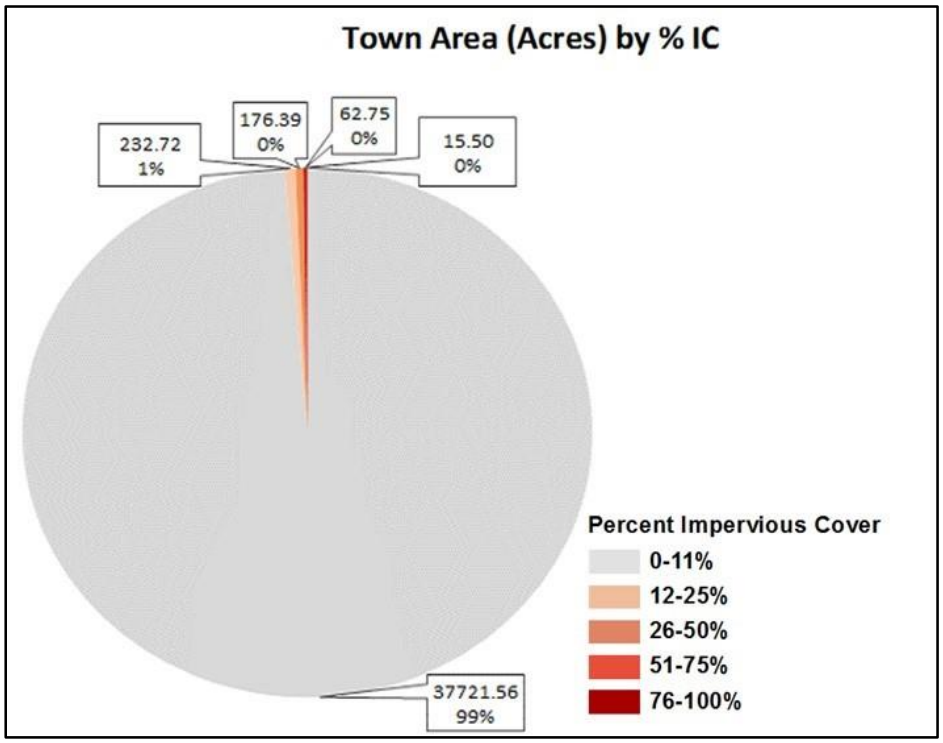
Amounts of Impervious Cover within the Town of Sharon



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TMDLs or Strategies Applicable to the Town of Sharon

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Statewide Bacteria TMDL	Bacteria	Housatonic River	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/housatonicriver6000.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to

make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters

in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

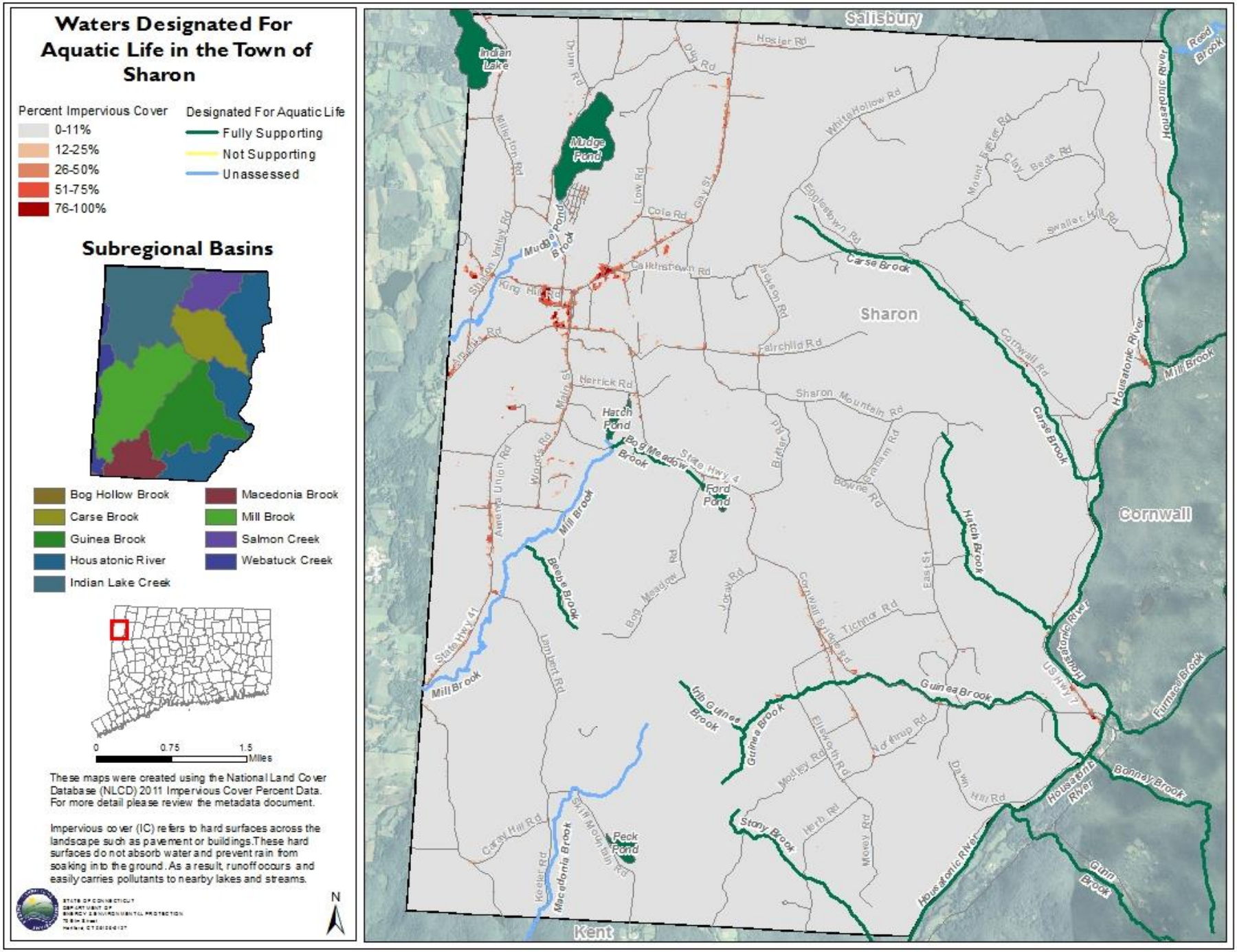
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

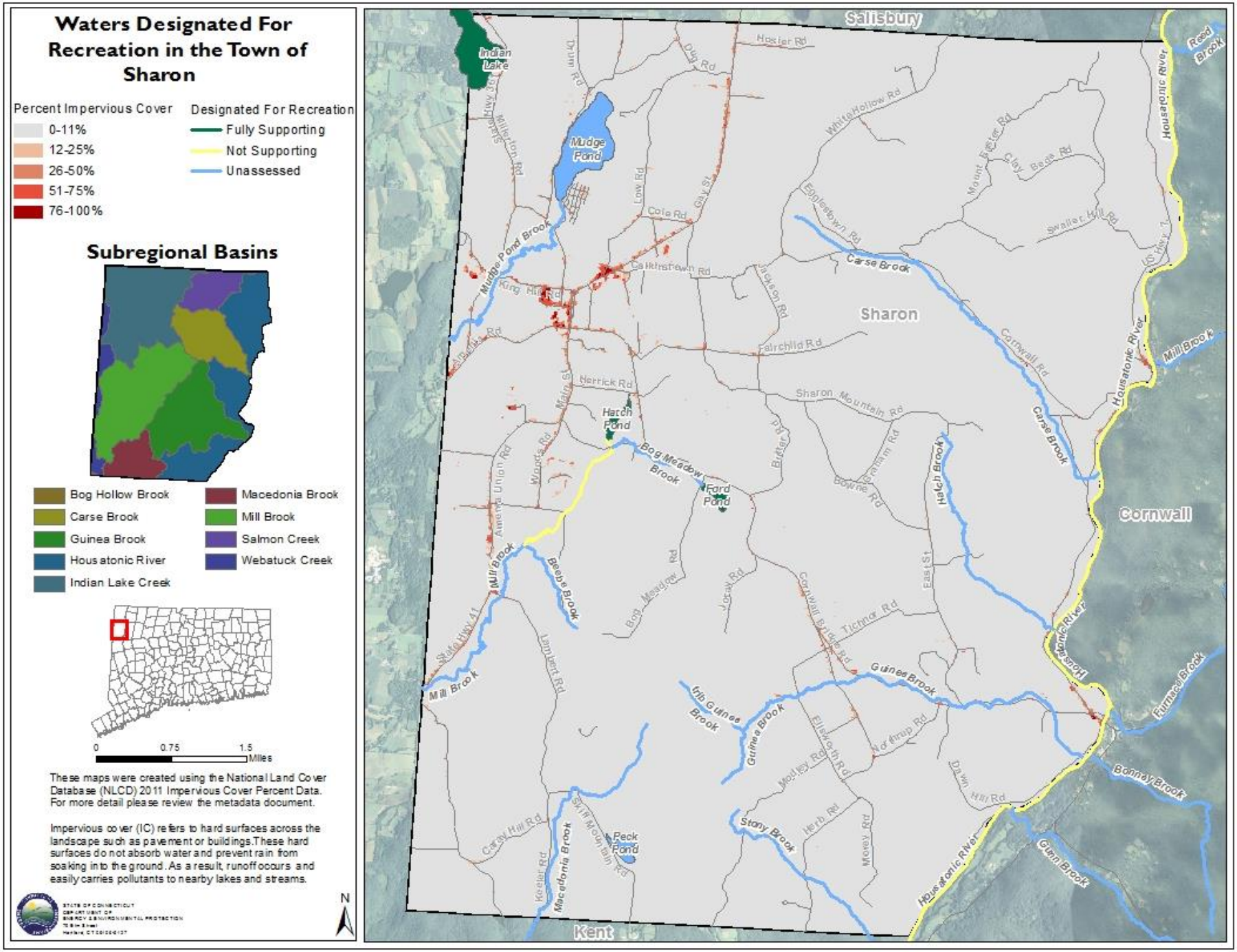
Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.

Waters Designated For Aquatic Life in the Town of Sharon



Waters Designated For Recreation in the Town of Sharon



Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

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Factsheet: Town of Sherman Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

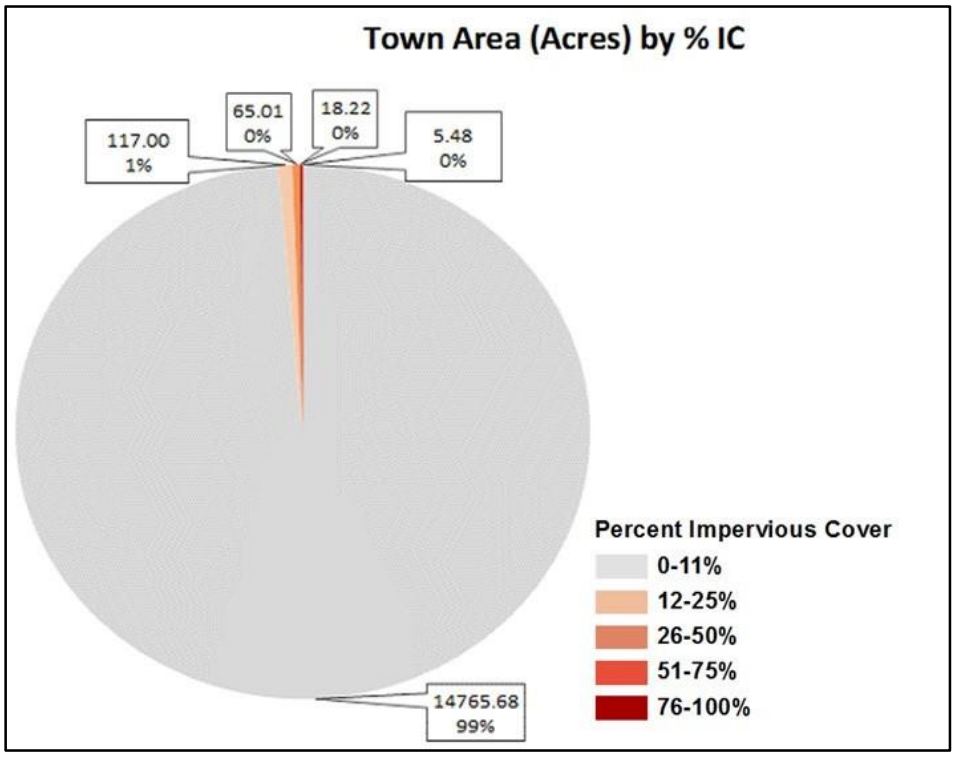
Town of Sherman: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Sherman



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Sherman

Name of TMDL or Strategy	Pollutant	Waterbody Name	Link
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
Statewide Bacteria TMDL	Bacteria	Housatonic River	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/housatonicriver6000.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

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Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

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Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

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Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

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CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

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Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

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Town Maps

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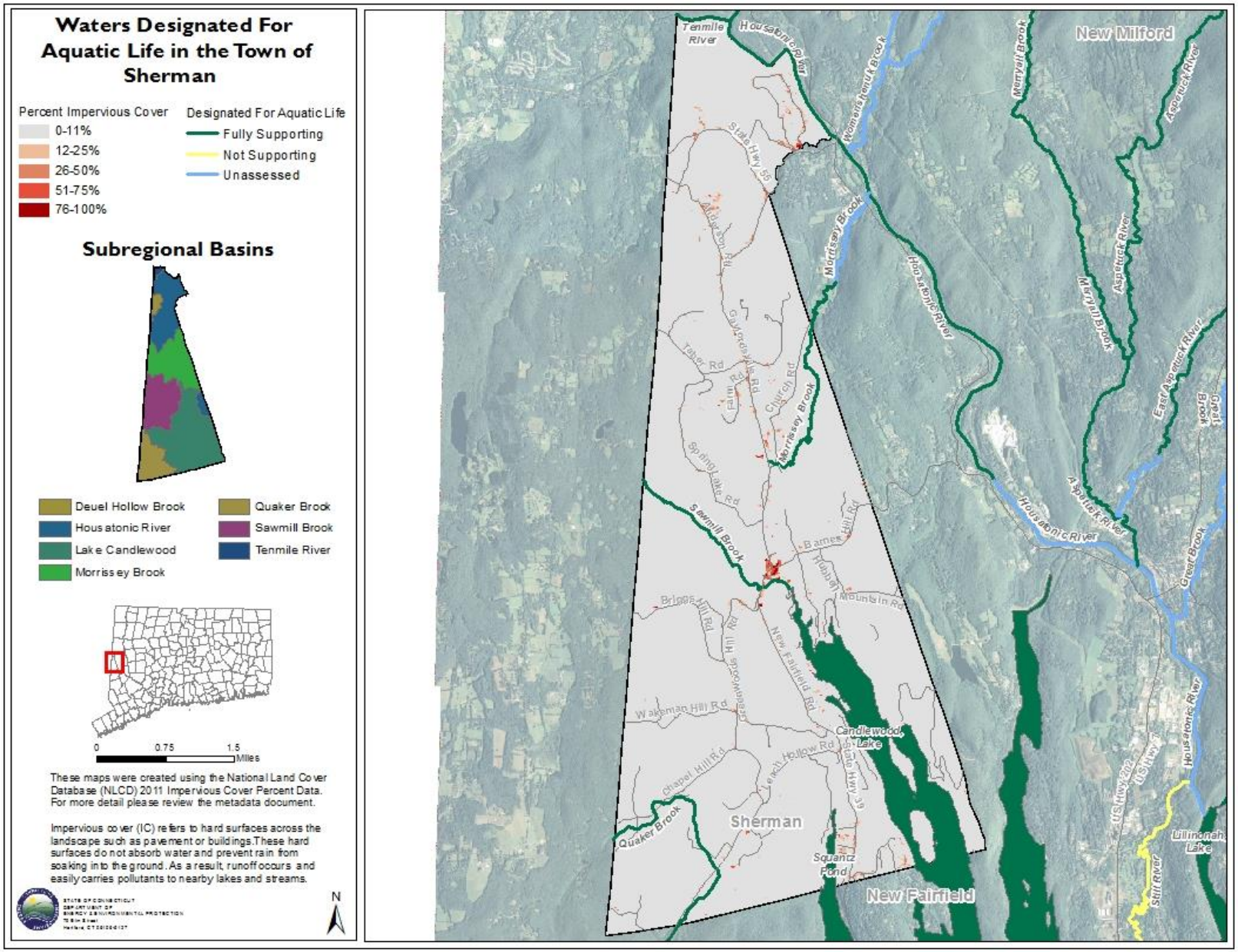
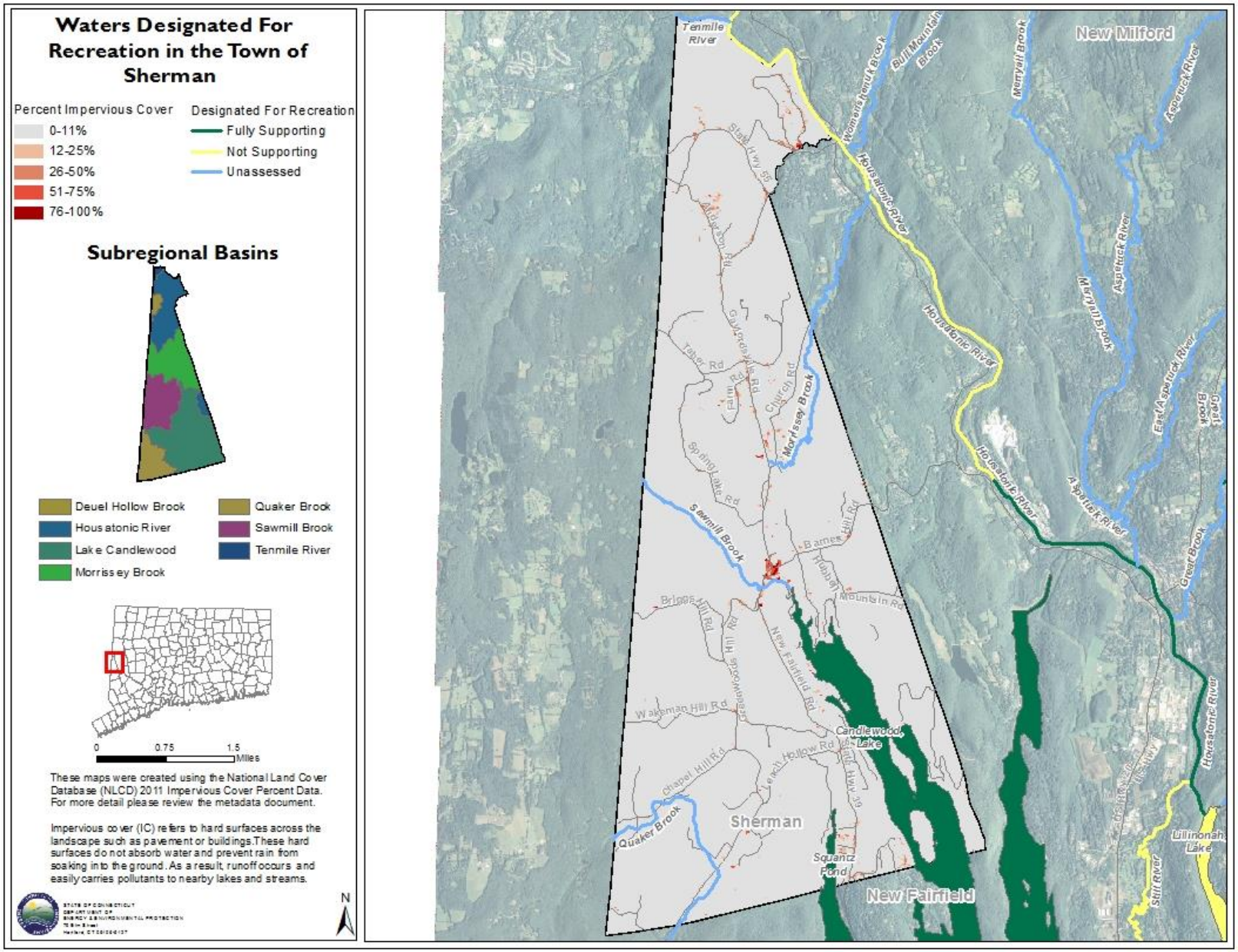

Waters Designated For Aquatic Life in the Town of Sherman
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Deuel Hollow Brook
Housatonic River
Lake Candlewood
Morrissey Brook
Quaker Brook
Sawmill Brook
Tenmile River
0
0.75
1.5
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Tenmile River
Housatonic River
New Milford
Merryall Brook
Aspetuck River
Womenshenuk Brook
State Hwy 55
Morrissey Brook
Aspetuck River
Merryall Brook
East Aspetuck River
Great Brook
Taber Rd
Church Rd
Spring Lake Rd
Sawmill Brook
Barnes Hill Rd
Mountain Rd
Briggs Hill Rd
New Fairfield Rd
Wakeman Hill Rd
Candlewood Lake
Chapel Hill Rd
Quaker Brook
Sherman
Squantz Pond
New Fairfield
US Hwy 202
US Hwy 7
Still River
Lillinonah Lake


Waters Designated For Recreation in the Town of Sherman
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
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Morrissey Brook
Quaker Brook
Sawmill Brook
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0.75
1.5
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Aspetuck River
Housatonic River
Morrissey Brook
Sawmill Brook
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Candlewood Lake
Sherman
New Fairfield
Squantz Pond
Lillinonah Lake
Still River
Housatonic River

Factsheet: Town of Stafford Water Quality

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In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

Town of Stafford: Impervious Cover Data

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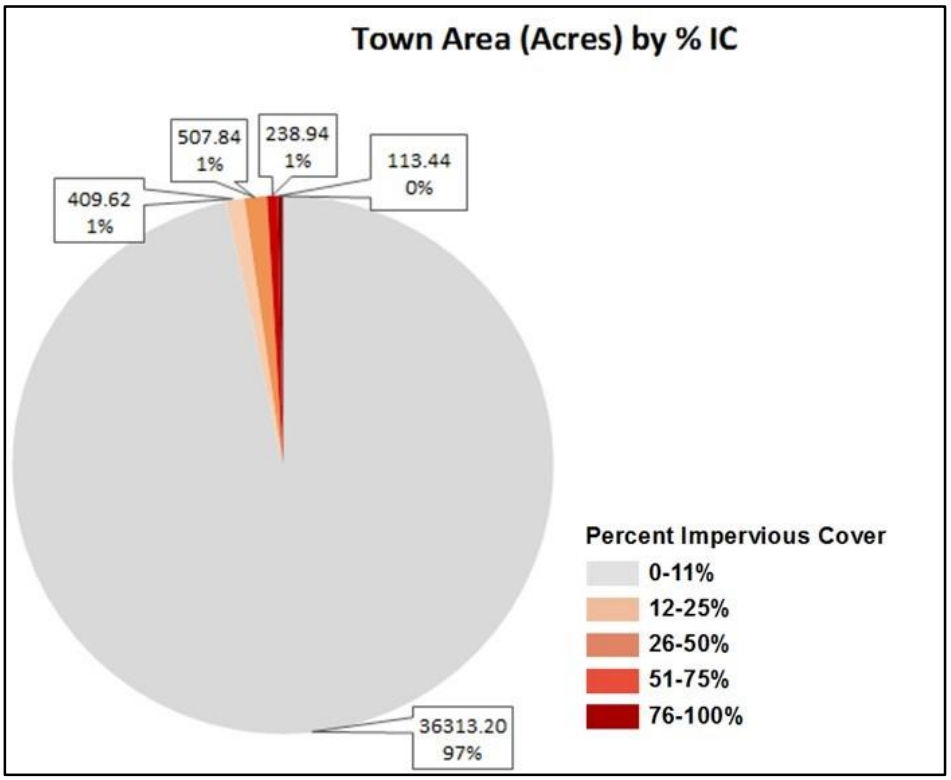
Amounts of Impervious Cover within the Town of Stafford



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TMDLs or Strategies Applicable to the Town of Stafford

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
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Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
Statewide Bacteria TMDL	Bacteria	Middle River	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/middleriver3102.pdf
Statewide Bacteria TMDL	Bacteria	Skungamaug River / Crandall Pond	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/skungamaugriver3106.pdf
Statewide Bacteria TMDL	Bacteria	Willimantic River, Eagleville Brook, and Cedar Swamp Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/willimanticriver3100.pdf
A TMDL for the Hockanum River Regional Basin	Bacteria	Hockanum River and Charters Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/hockanum_final.pdf
TMDL Analysis for the Upper Willimantic River, Stafford, CT	Copper, Lead and Zinc	Willimantic River	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/upperwillimanticrivertmdl.pdf

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Stormwater Quality Monitoring

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Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS

can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish

to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

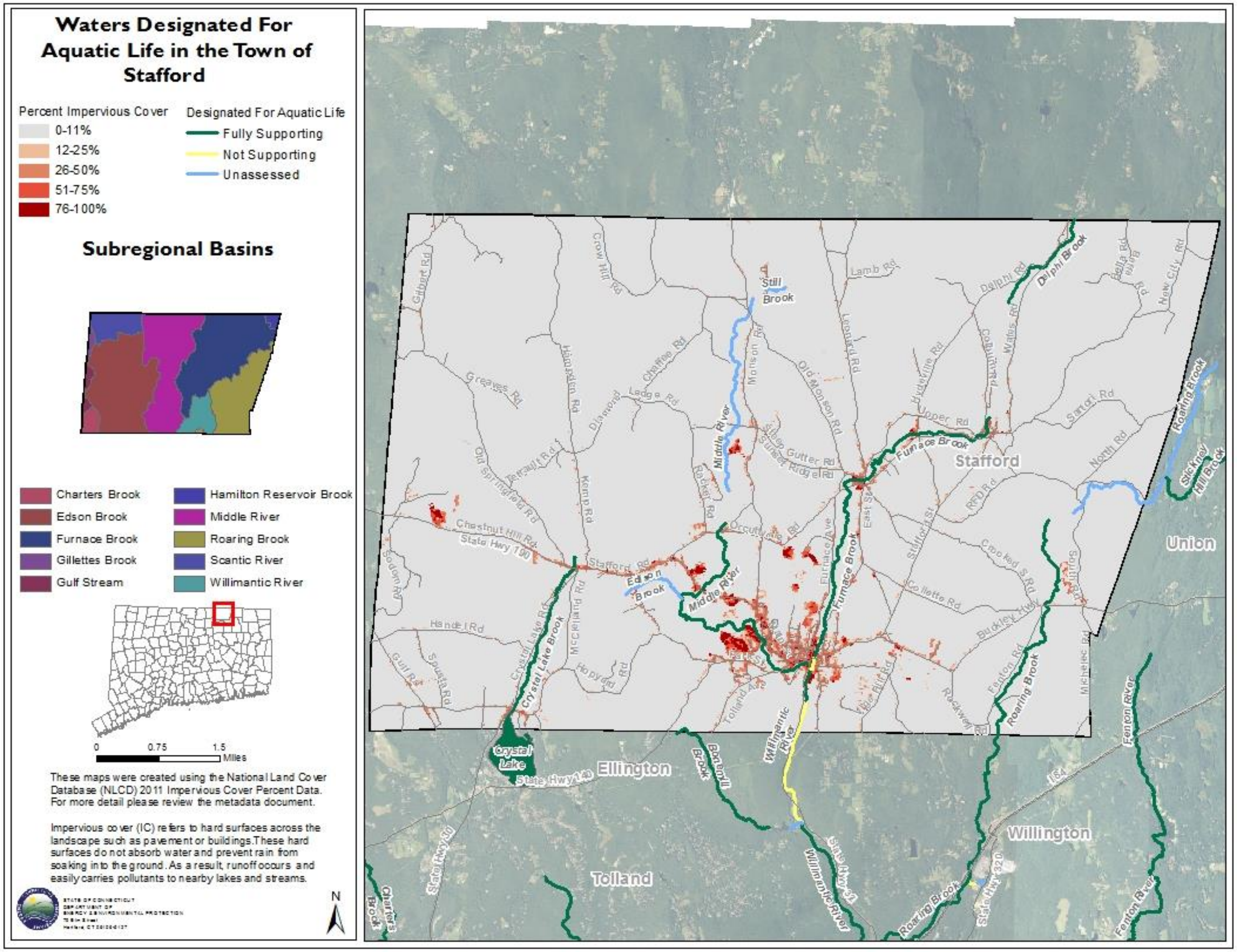
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

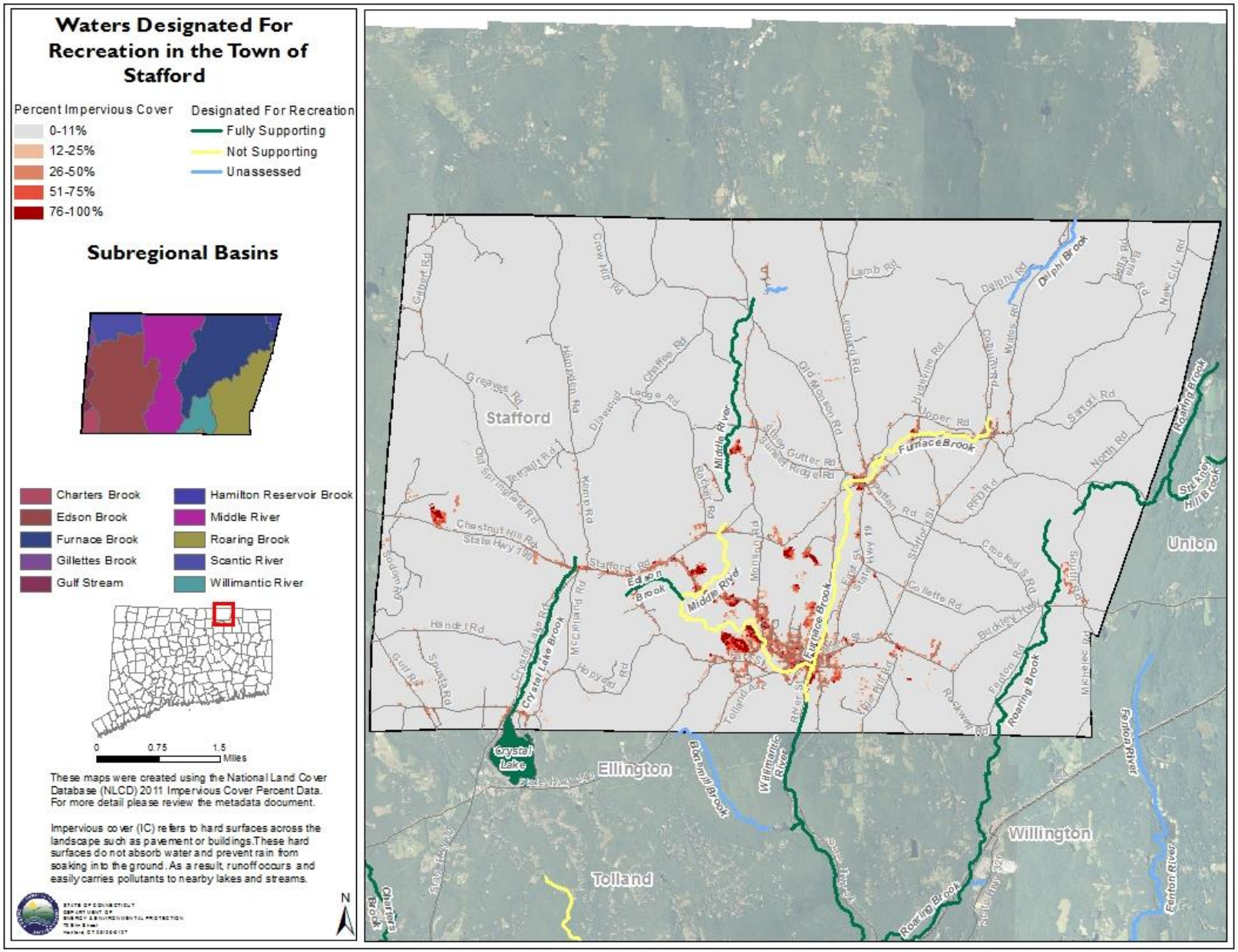
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Stafford
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Charters Brook
Edson Brook
Furnace Brook
Gillettes Brook
Gulf Stream
Hamilton Reservoir Brook
Middle River
Roaring Brook
Scantic River
Willimantic River
0 0.75 1.5 Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Stafford
Union
Ellington
Willington
Tolland
Crystal Lake
Still Brook
Middle River
Furnace Brook
Edson Brook
Delphi Brook
Roaring Brook
Stickney Hill Brook
Crystal Lake Brook
Willimantic River
Fenton River
Charters Brook
Gilbert Rd
Crow Hill Rd
Lamb Rd
Greaves Rd
Chestnut Hill Rd
State Hwy 190
State Hwy 140
Stafford Rd
Orcutt Ave
Furnace Ave
East St
Leonard Rd
Old Monson Rd
Monson Rd
Upper Rd
Sanori Rd
North Rd
Crooked S Rd
Buckley Hwy
Fenton Rd
Rockwell Rd
Handel Rd
Gulf Rd
Spousta Rd
McClelland Rd
Hopyard Rd
Tolland Ave
Kemp Rd
Old Springfield Rd
Ledge Rd
Chaffee Rd
Hoyt Rd
I 84
State Hwy 32
State Hwy 320
State Hwy 30


Waters Designated For Recreation in the Town of Stafford
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Charters Brook
Edson Brook
Furnace Brook
Gillettes Brook
Gulf Stream
Hamilton Reservoir Brook
Middle River
Roaring Brook
Scantic River
Willimantic River
0
0.75
1.5
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Stafford
Union
Ellington
Tolland
Willington
Crystal Lake
Furnace Brook
Middle River
Roaring Brook
Edson Brook
Crystal Lake Brook
Dilphi Brook
Stickney Hill Brook
Blackmuff Brook
Willimantic River
Fenton River

Connecticut Department of
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ENVIRONMENTAL
PROTECTION

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Factsheet: Town of Sterling Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

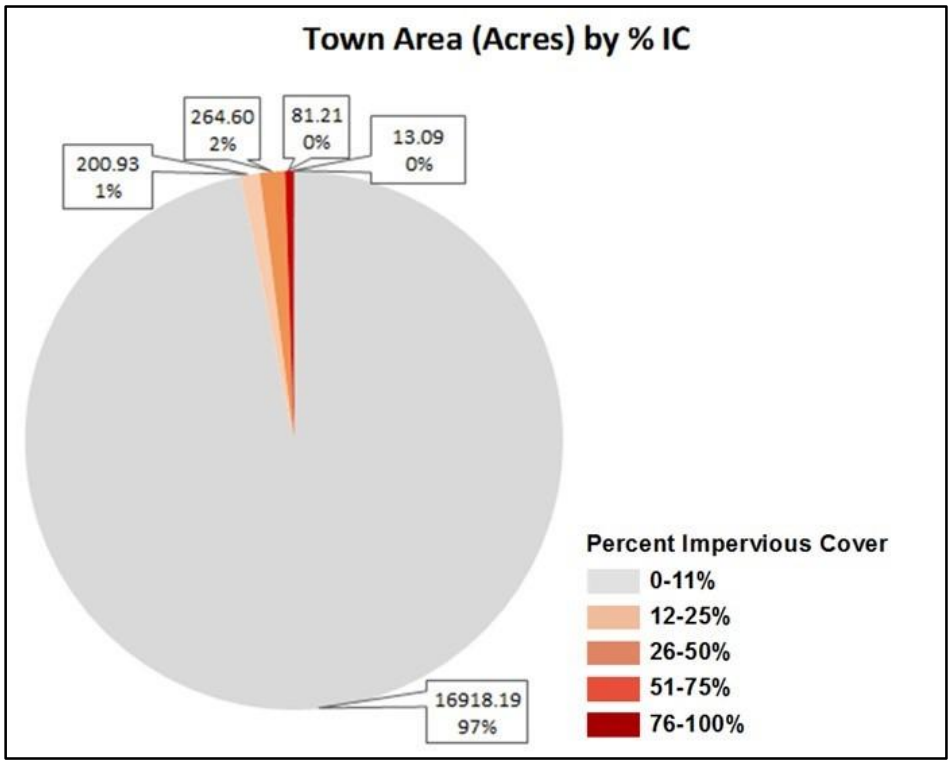
Town of Sterling: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Sterling



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Sterling

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters

in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

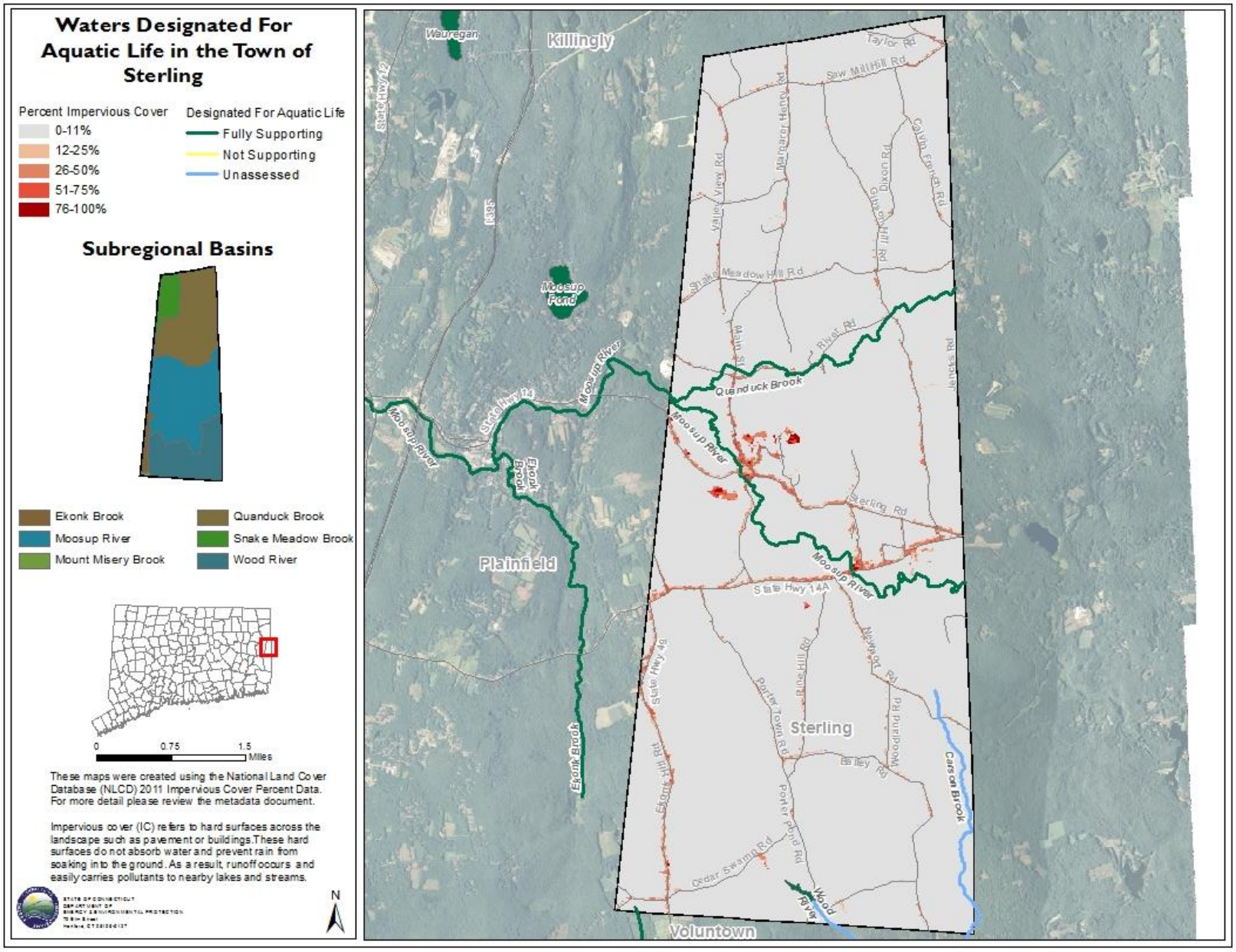
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

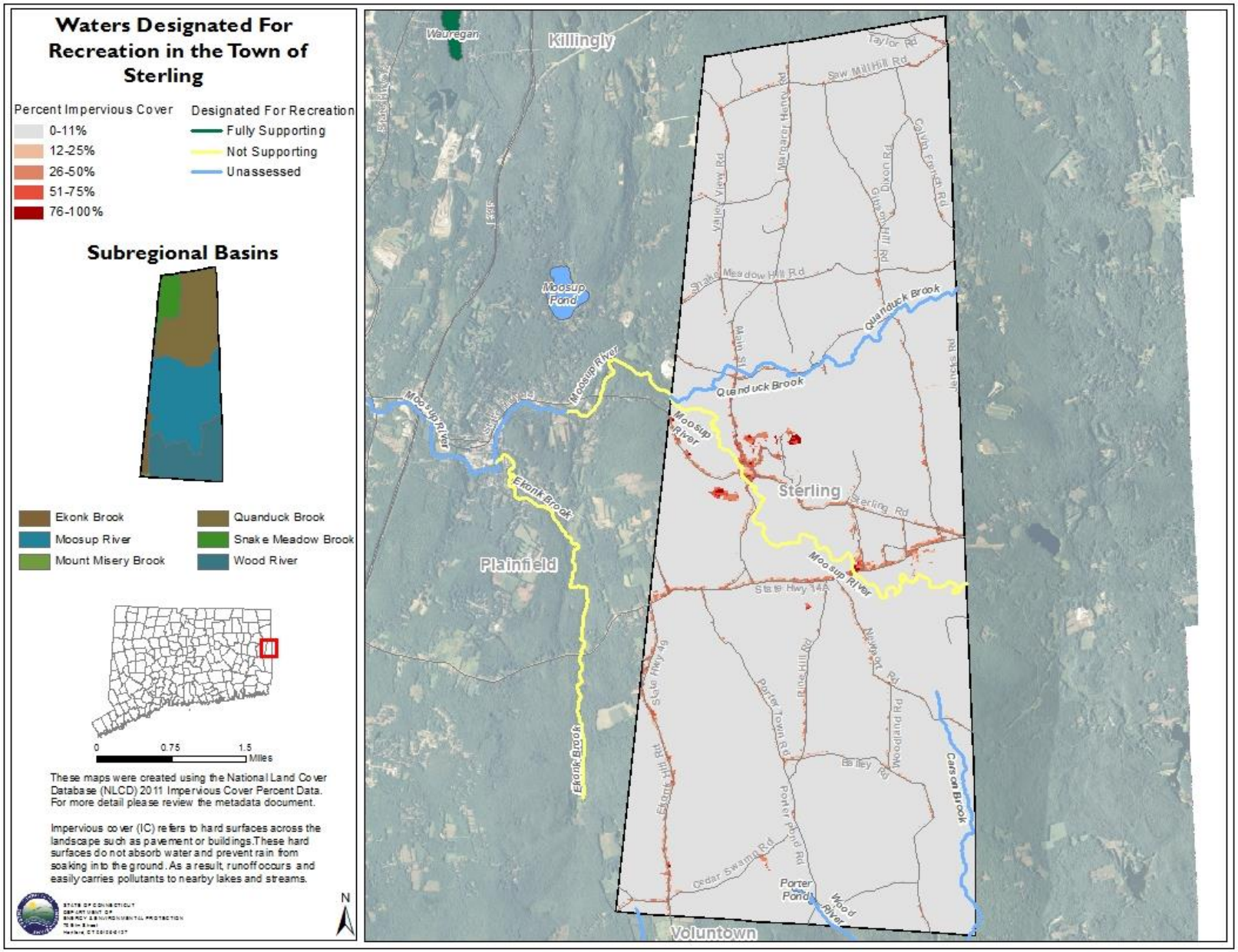
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Sterling
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Ekonk Brook
Moosup River
Mount Misery Brook
Quanduck Brook
Snake Meadow Brook
Wood River
0
0.75
1.5
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings.These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Wauregan
Killingly
Moosup Pond
Plainfield
Sterling
Voluntown
Quanduck Brook
Moosup River
Ekonk Brook
Cars on Brook
Wood River
Taylor Rd
Saw Mill Hill Rd
Snake Meadow Hill Rd
River Rd
Sterling Rd
State Hwy 14A
State Hwy 49
Newport Rd
Bailey Rd
Cedar Swamp Rd


Waters Designated For Recreation in the Town of Sterling
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Ekonk Brook
Moosup River
Mount Misery Brook
Quanduck Brook
Snake Meadow Brook
Wood River
0
0.75
1.5
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
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N
Wauregan
Killingly
Moosup Pond
Quanduck Brook
Moosup River
Ekonk Brook
Sterling
Plainfield
Voluntown
Porter Pond
Wood River
Cars on Brook

Connecticut Department of
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ENVIRONMENTAL
PROTECTION

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Factsheet: City of Torrington Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

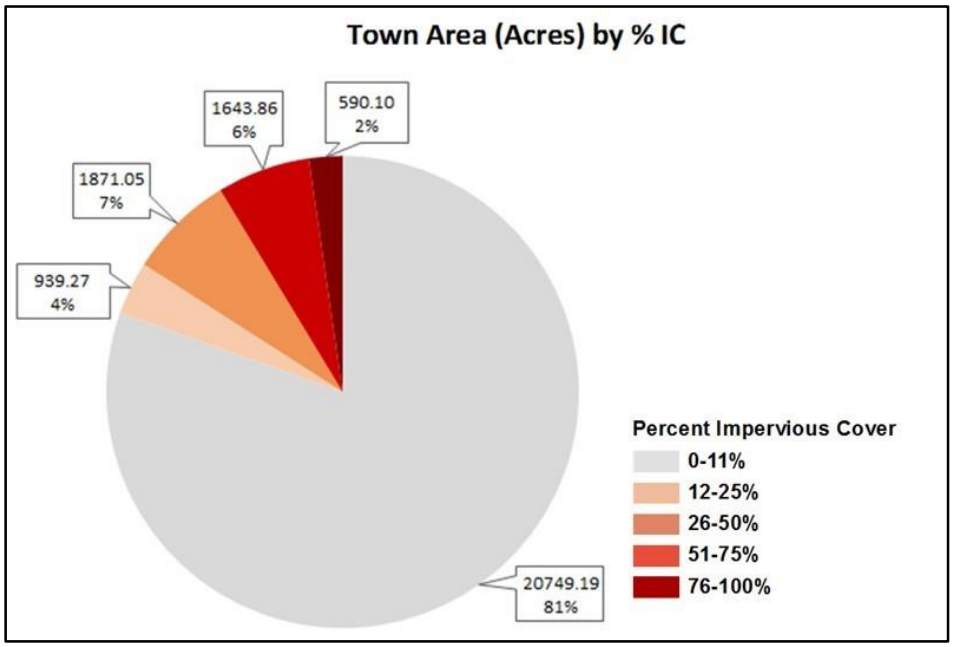
City of Torrington: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the City of Torrington



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the City of Torrington

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
A TMDL Analysis for Recreational Uses of the Naugatuck River Regional Basin	Bacteria	Naugatuck River / Steele Brook / Great Brook / Mad River / Hop Brook / Long Meadow Pond Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/naugatucktmdl_final.pdf
TMDL Analysis for the Upper Naugatuck River, Thomaston, CT	Multiple Pollutants	Upper Naugatuck River	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/naugtmdl.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS

can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish

to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

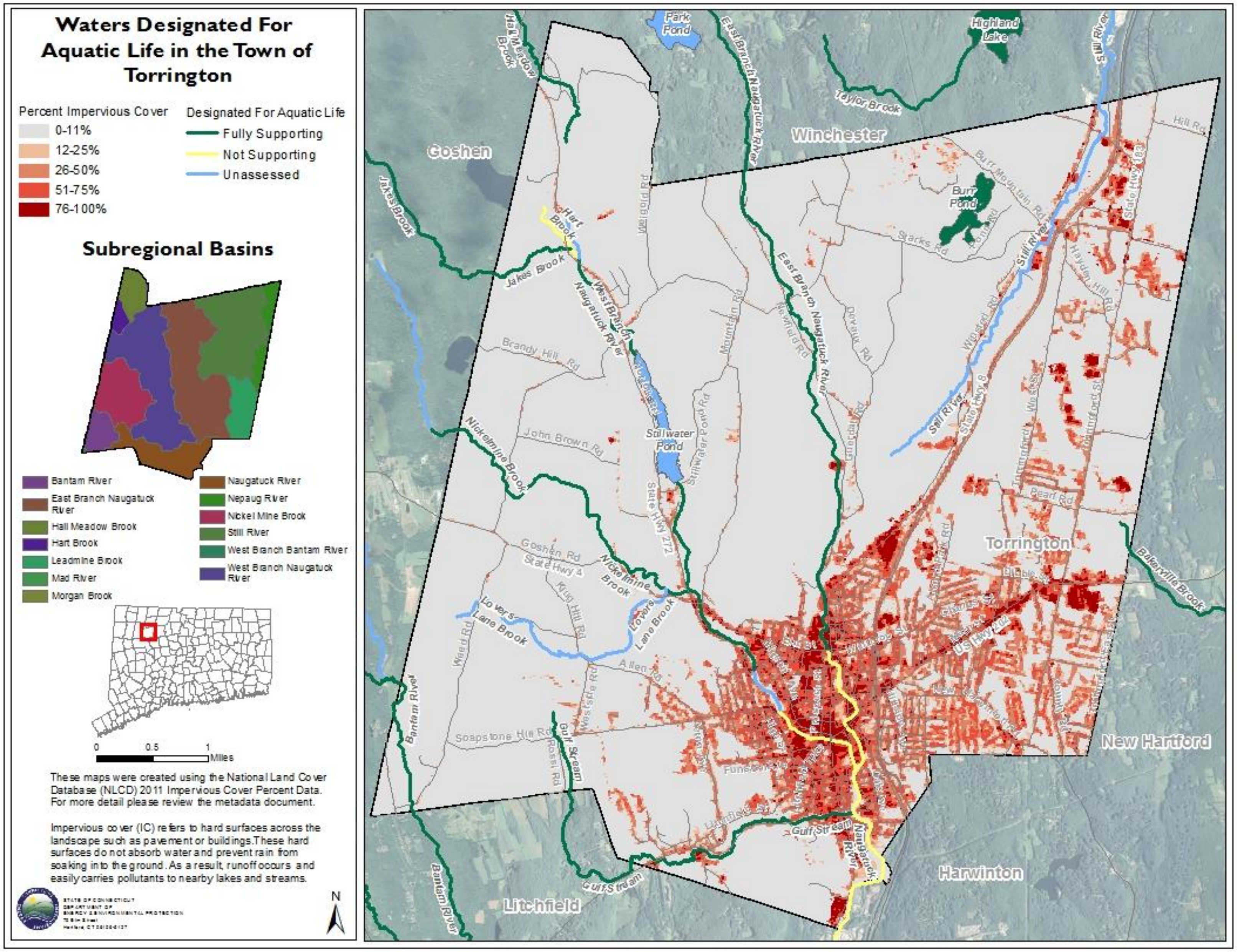
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

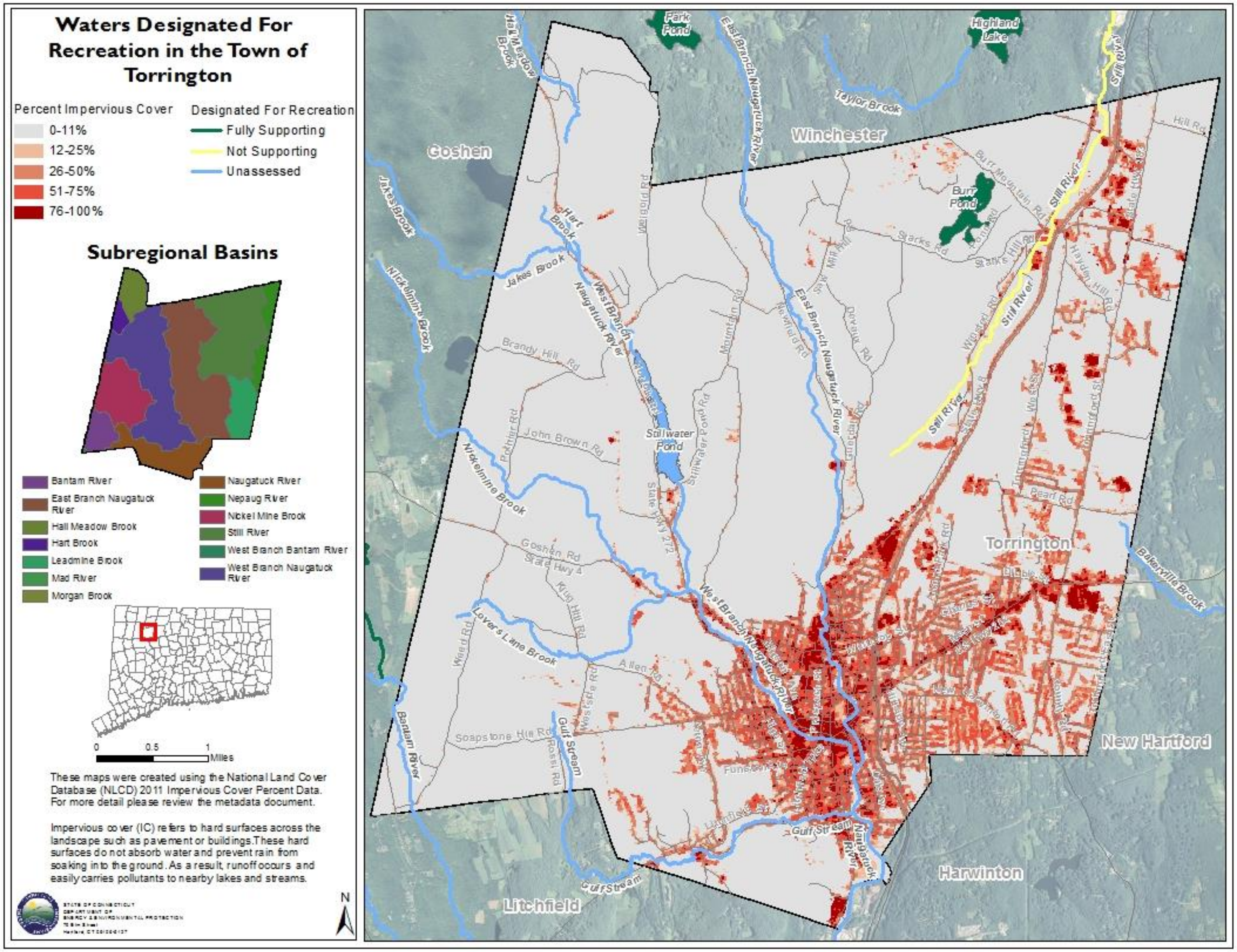
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Torrington
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Bantam River
East Branch Naugatuck River
Hall Meadow Brook
Hart Brook
Leadmine Brook
Mad River
Morgan Brook
Naugatuck River
Nepaug River
Nickel Mine Brook
Still River
West Branch Bantam River
West Branch Naugatuck River
0
0.5
1
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Goshen
Winchester
Torrington
New Hartford
Harwinton
Litchfield
Park Pond
Highland Lake
Burr Pond
Stillwater Pond
Taylor Brook
Jakes Brook
Hart Brook
Nickelmine Brook
Lovers Lane Brook
Gulf Stream
Bantam River
Bakerville Brook
Still River
East Branch Naugatuck River
West Branch Naugatuck River
Naugatuck River
Brandy Hill Rd
John Brown Rd
Goshen Rd
State Hwy 4
Allen Rd
Soapstone Hill Rd
State Hwy 272
State Hwy 183
Pearl Rd
Hill Rd


Waters Designated For Recreation in the Town of Torrington
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Bantam River
East Branch Naugatuck River
Hall Meadow Brook
Hart Brook
Leadmine Brook
Mad River
Morgan Brook
Naugatuck River
Nepaug River
Nickel Mine Brook
Still River
West Branch Bantam River
West Branch Naugatuck River
0 0.5 1 Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Goshen
Winchester
Torrington
New Hartford
Harwinton
Litchfield
Park Pond
Highland Lake
Burr Pond
Stillwater Pond
Still River
Taylor Brook
East Branch Naugatuck River
West Branch Naugatuck River
Naugatuck River
Hall Meadow Brook
Hart Brook
Jakes Brook
Nickelmine Brook
Lovers Lane Brook
Gulf Stream
Bantam River
Bakerville Brook

Factsheet: Town of Union Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

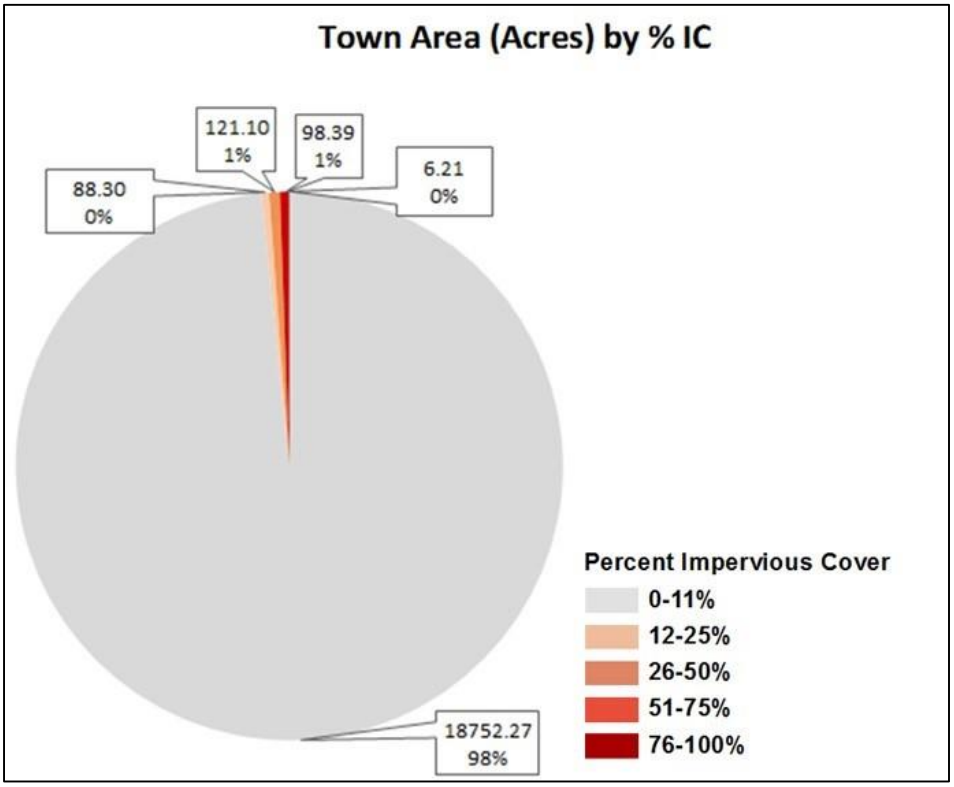
Town of Union: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Union



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Union

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters

in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

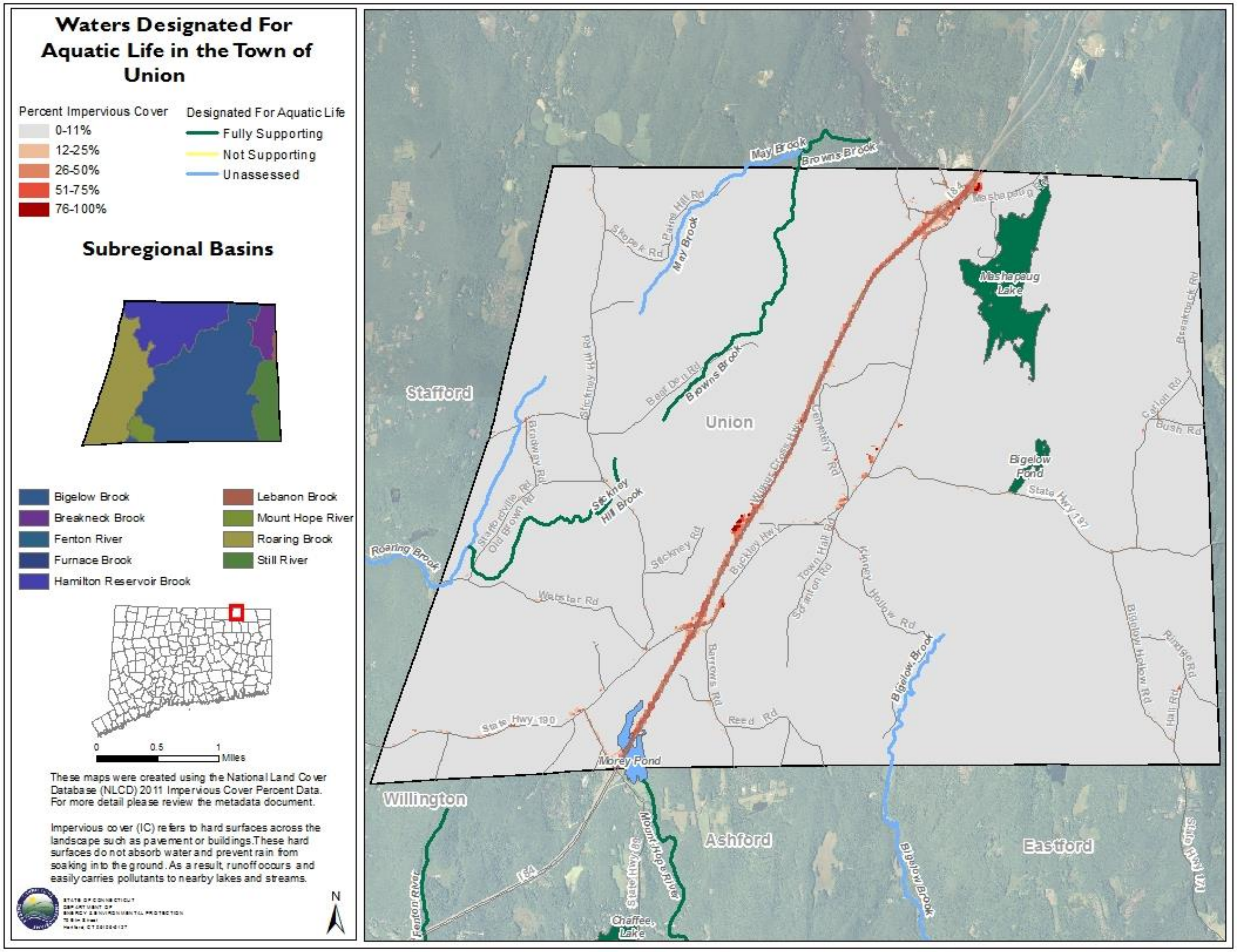
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

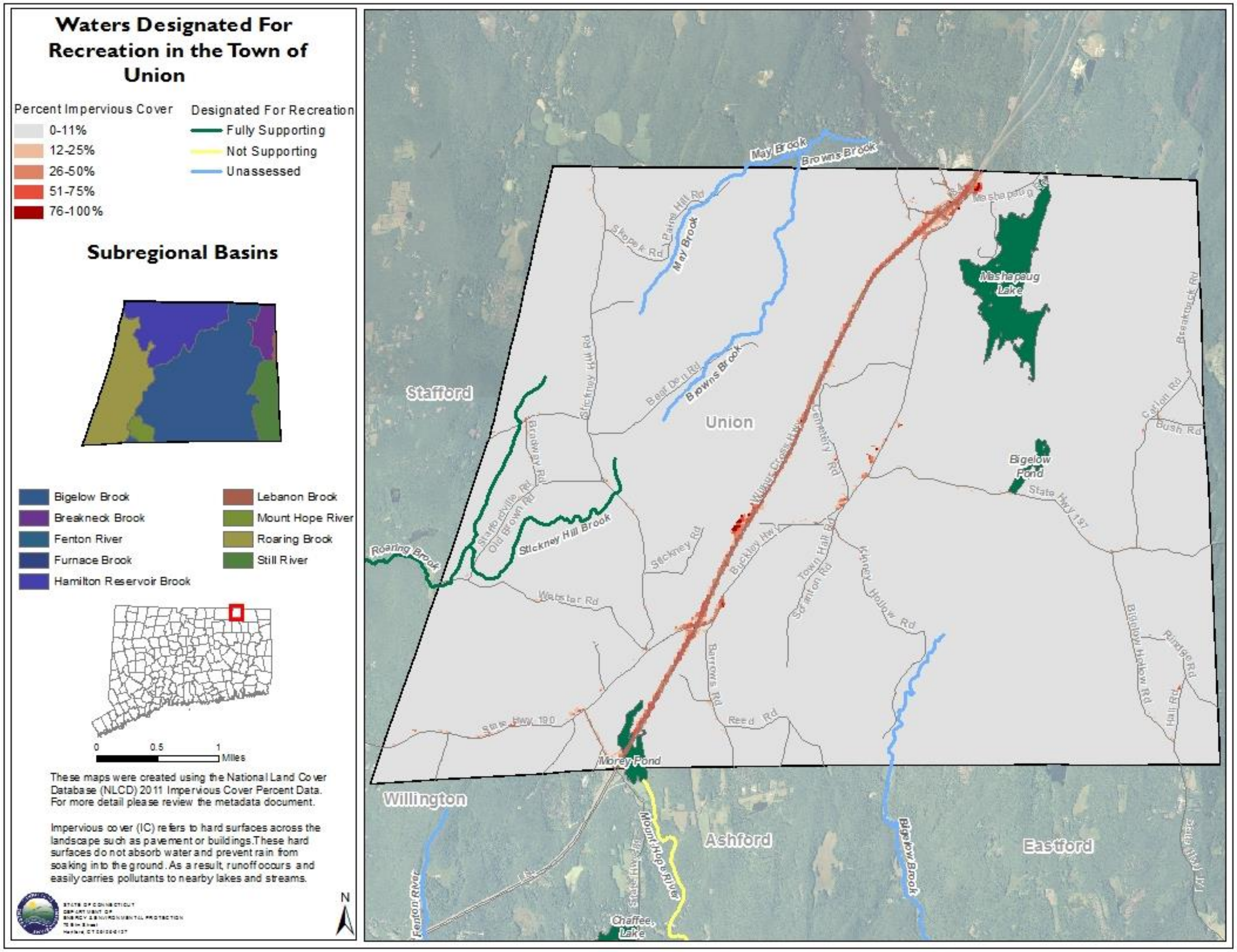
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Union
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Bigelow Brook
Breakneck Brook
Fenton River
Furnace Brook
Hamilton Reservoir Brook
Lebanon Brook
Mount Hope River
Roaring Brook
Still River
0
0.5
1
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Stafford
Union
Willington
Ashford
Eastford
May Brook
Browns Brook
Mashapaug Lake
Bigelow Pond
Roaring Brook
Stickney Hill Brook
Morey Pond
Bigelow Brook
Fenton River
Mount Hope River
Chaffee Lake
Wales Cross Hwy
State Hwy 190
State Hwy 197
State Hwy 171
Webster Rd
Reed Rd
Buckley Hwy
Town Hall Rd
Kinney Hollow Rd
Bigelow Hollow Rd
Stickney Rd
Bear Den Rd
Skopek Rd
Paine Hill Rd
Cemetery Rd
Barrows Rd
Mashapaug Rd
Breakneck Rd
Carlson Rd
Bush Rd
Hall Rd
Old Brown Rd
Staffordville Rd
84


Waters Designated For Recreation in the Town of Union
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Bigelow Brook
Breakneck Brook
Fenton River
Furnace Brook
Hamilton Reservoir Brook
Lebanon Brook
Mount Hope River
Roaring Brook
Still River
0
0.5
1
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
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N
May Brook
Browns Brook
Mashapaug Lake
Stafford
Union
Bigelow Pond
Roaring Brook
Stickney Hill Brook
Morey Pond
Willington
Ashford
Eastford
Mount Hope River
Fenton River
Bigelow Brook
Chaffee Lake
Wales Cross Hwy
State Hwy 190
State Hwy 197
Buckley Hwy
Kinney Hollow Rd
Town Hall Rd
Stickney Hill Rd
Webster Rd
Bear Den Rd
Reed Rd
Barrows Rd
Bigelow Hollow Rd
Breakneck Rd
Bush Rd
Skopek Rd
Paine Hill Rd
Old Brown Rd
Cemetery Rd

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

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Factsheet: Town of Voluntown Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

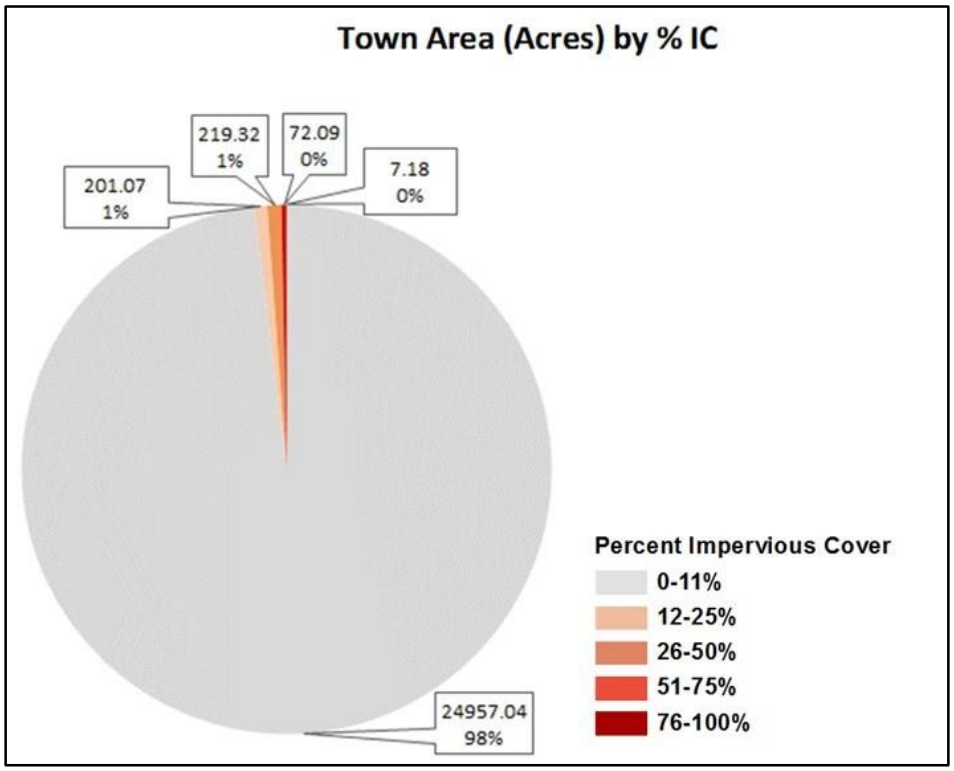
Town of Voluntown: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Voluntown



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Voluntown

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters

in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

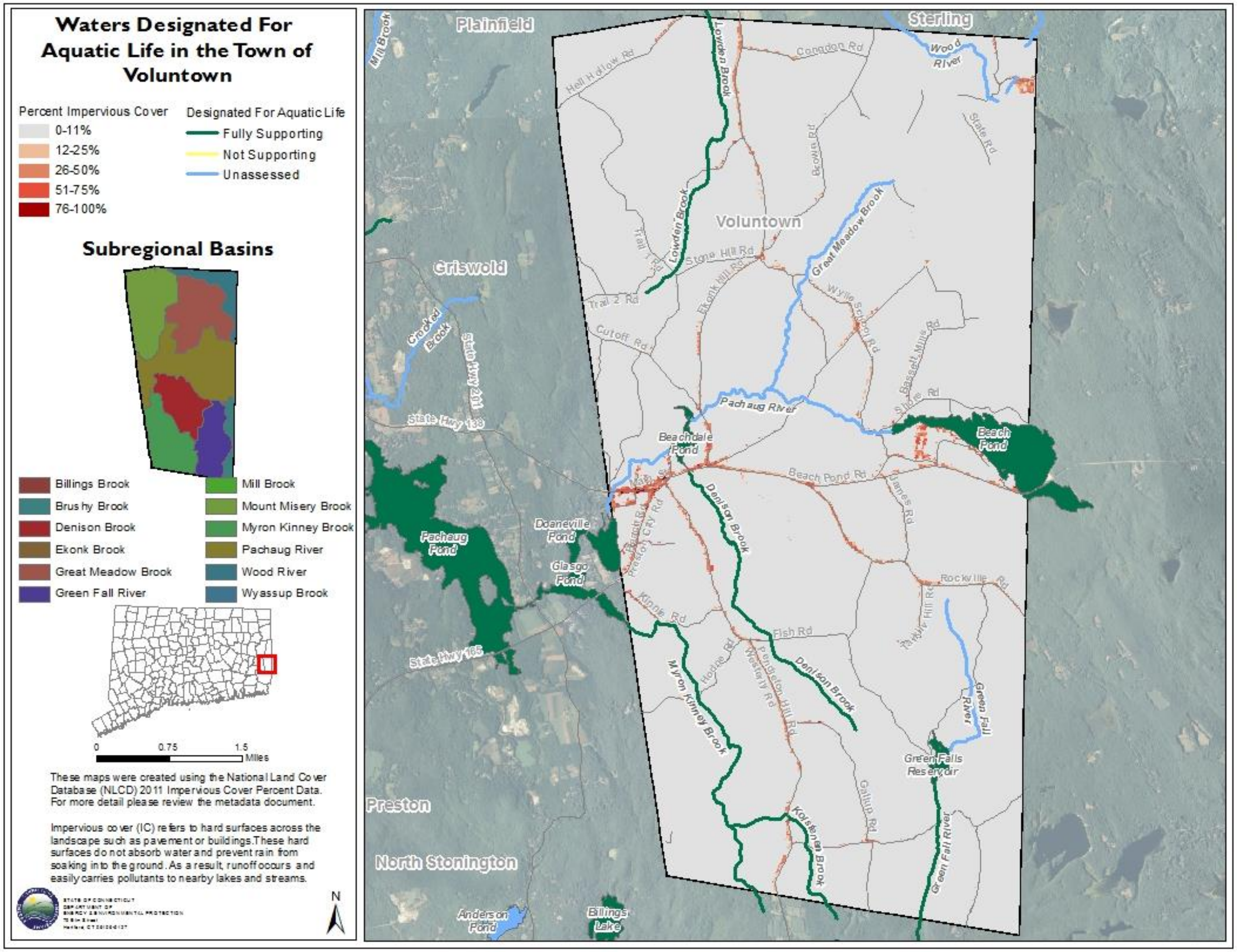
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

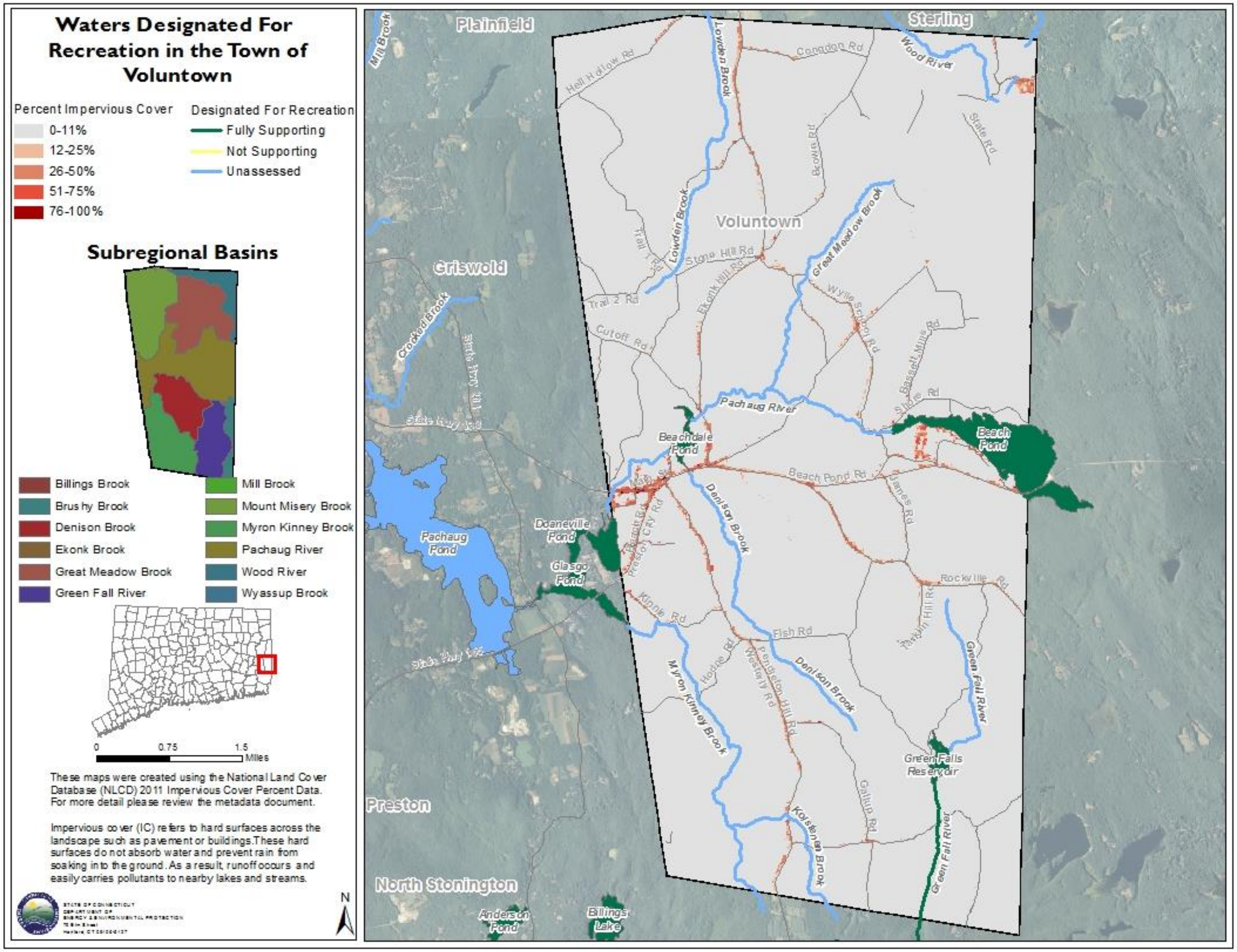
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Voluntown
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Billings Brook
Brushy Brook
Denison Brook
Ekonk Brook
Great Meadow Brook
Green Fall River
Mill Brook
Mount Misery Brook
Myron Kinney Brook
Pachaug River
Wood River
Wyassup Brook
0 0.75 1.5 Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Plainfield
Sterling
Griswold
Voluntown
Preston
North Stonington
Mill Brook
Lowden Brook
Great Meadow Brook
Pachaug River
Wood River
Beach Pond
Beachdale Pond
Pachaug Pond
Doaneville Pond
Glasgo Pond
Denison Brook
Myron Kinney Brook
Green Fall River
Green Falls Reservoir
Anderson Pond
Billings Lake
Crooked Brook
State Hwy 201
State Hwy 138
State Hwy 165
Hell Hollow Rd
Congdon Rd
Brown Rd
State Rd
Stone Hill Rd
Trail 2 Rd
Cutoff Rd
Ekonk Hill Rd
Wylie School Rd
Bassett Mill Rd
Shore Rd
Beach Pond Rd
James Rd
Rockville Rd
Kinnie Rd
Fish Rd
Gallup Rd
Pendleton Hill Rd
Westerly Rd


Waters Designated For Recreation in the Town of Voluntown
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Billings Brook
Brushy Brook
Denison Brook
Ekonk Brook
Great Meadow Brook
Green Fall River
Mill Brook
Mount Misery Brook
Myron Kinney Brook
Pachaug River
Wood River
Wyassup Brook
0
0.75
1.5
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Plainfield
Sterling
Griswold
Voluntown
Preston
North Stonington
Pachaug Pond
Beachdale Pond
Beach Pond
Doaneville Pond
Glasgo Pond
Green Falls Reservoir
Anderson Pond
Billings Lake
Pachaug River
Lowden Brook
Great Meadow Brook
Denison Brook
Myron Kinney Brook
Kolstedan Brook
Green Fall River
Wood River
Crooked Brook
Mill Brook
Congdon Rd
Hell Hollow Rd
Stone Hill Rd
Trail 2 Rd
Cutoff Rd
Beach Pond Rd
Rockville Rd
Fish Rd
Kinne Rd
Gallup Rd
State Rd
Shore Rd
James Rd
Wylie School Rd
Pendleton Hill Rd
Westerly Rd
Hope Rd

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Factsheet: Town of Warren Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

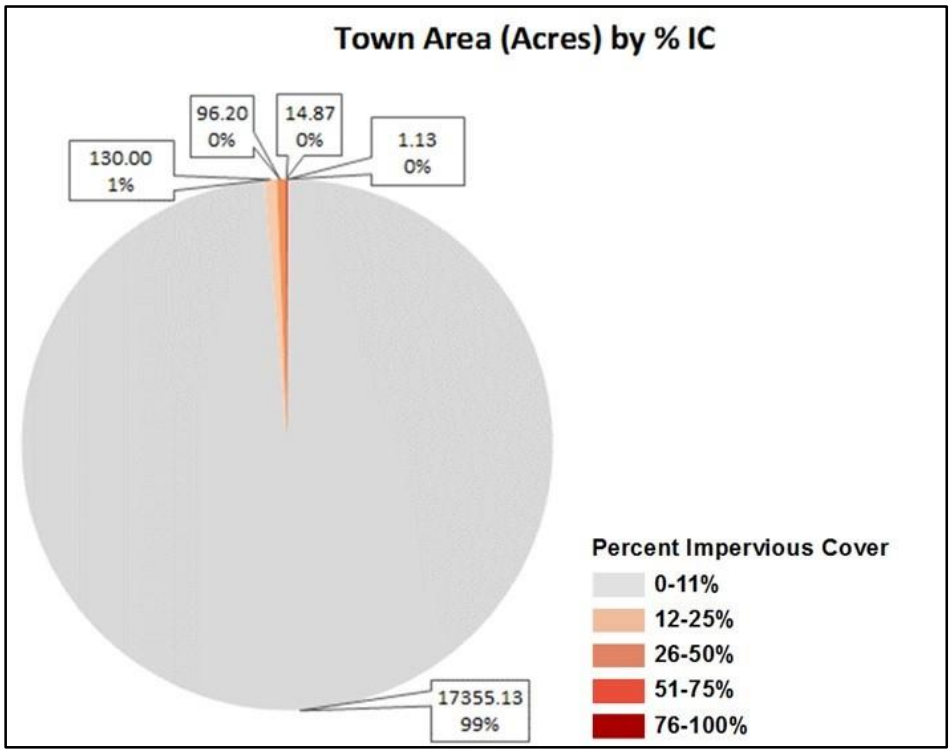
Town of Warren: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Warren



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Warren

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
Statewide Bacteria TMDL	Bacteria	Housatonic River	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/housatonicriver6000.pdf
Statewide Bacteria TMDL	Bacteria	Shepaug River / Walker Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/shepaugriver6700.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement

for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

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Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a

fixed statewide criterion for turbidity, lower results are better for the health of the surface waters in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

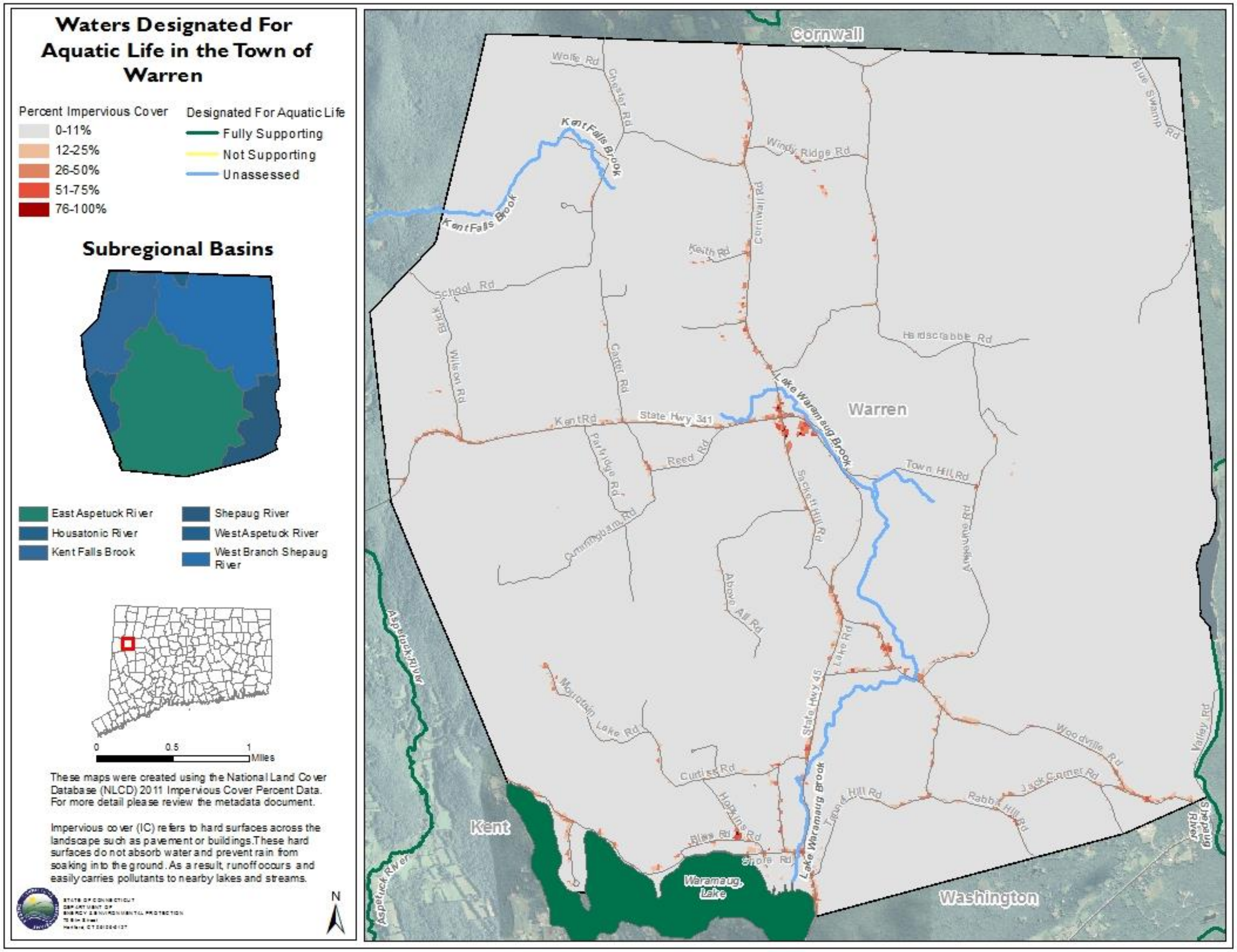
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

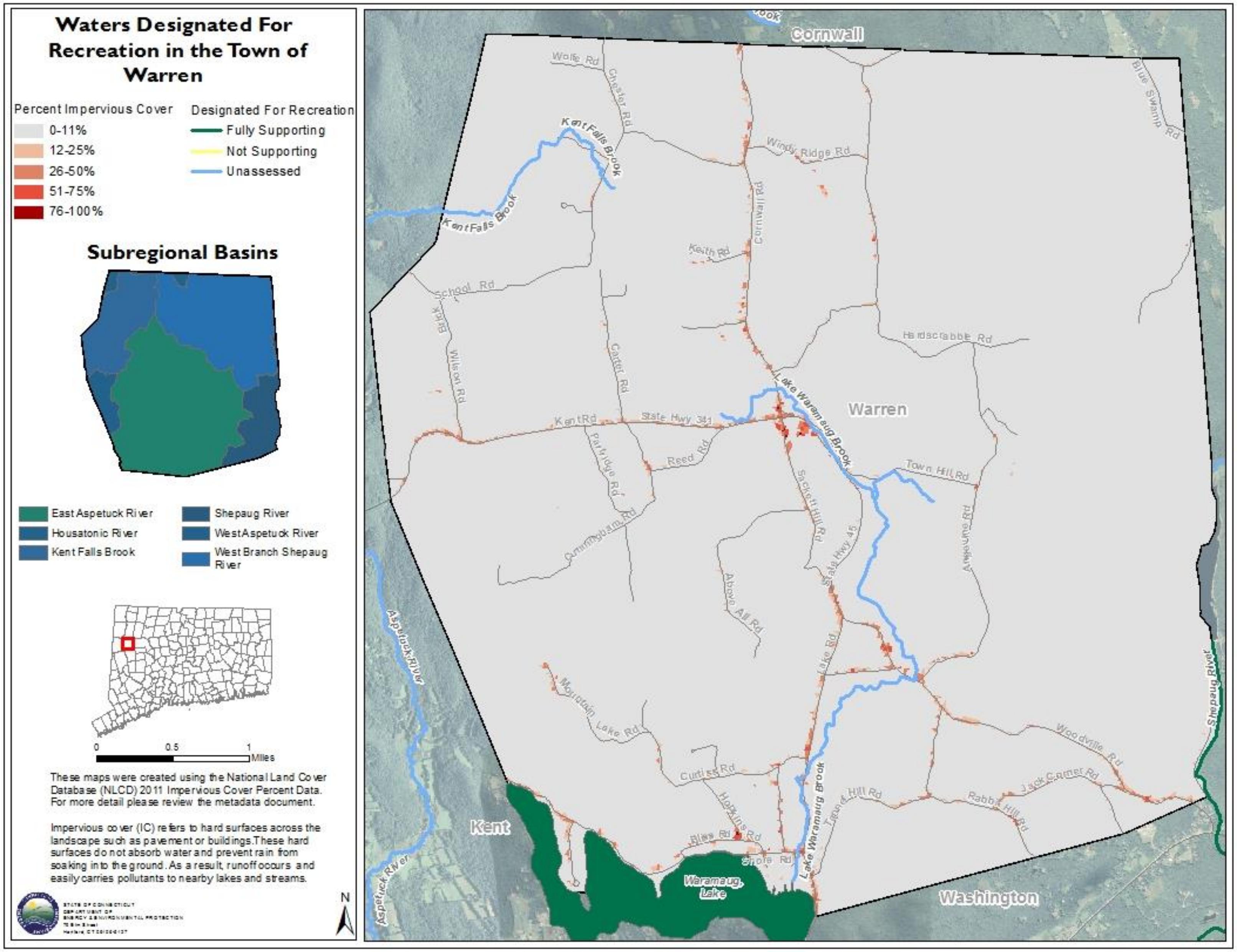
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Warren
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
East Aspetuck River
Housatonic River
Kent Falls Brook
Shepaug River
West Aspetuck River
West Branch Shepaug River
0
0.5
1
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Cornwall
Wolfe Rd
Chester Rd
Kent Falls Brook
Windy Ridge Rd
Blue Swamp Rd
Cornwall Rd
Keith Rd
School Rd
Wilson Rd
Carter Rd
Hardscrabble Rd
Lake Waramaug Brook
Warren
Kent Rd
State Hwy 341
Partridge Rd
Reed Rd
Town Hill Rd
Sackett Hill Rd
Cunningham Rd
Above All Rd
Aspetuck River
Mountain Lake Rd
State Hwy 45
Lake Rd
Woodville Rd
Valley Rd
Curtiss Rd
Hopkins Rd
Bliss Rd
Shore Rd
Jack Corner Rd
Rabbit Hill Rd
Kent
Waramaug Lake
Washington
Shepaug River


Waters Designated For Recreation in the Town of Warren
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
East Aspetuck River
Housatonic River
Kent Falls Brook
Shepaug River
West Aspetuck River
West Branch Shepaug River
0
0.5
1
Miles
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Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Cornwall
Warren
Kent
Washington
Waramaug Lake
Kent Falls Brook
Lake Waramaug Brook
Aspetuck River
Shepaug River
Wolfe Rd
Chester Rd
Blue Swamp Rd
Windy Ridge Rd
Cornwall Rd
Keith Rd
School Rd
Brick
Wilson Rd
Carter Rd
Hardscrabble Rd
Kent Rd
State Hwy 341
Partridge Rd
Reed Rd
Town Hill Rd
Sackett Hill Rd
Cunningham Rd
State Hwy 45
Above All Rd
Lake Rd
Mountain Lake Rd
Curtiss Rd
Hopkins Rd
Bliss Rd
Shore Rd
Woodville Rd
Jack Corner Rd
Rabbit Hill Rd

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PROTECTION

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Factsheet: Town of Washington Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

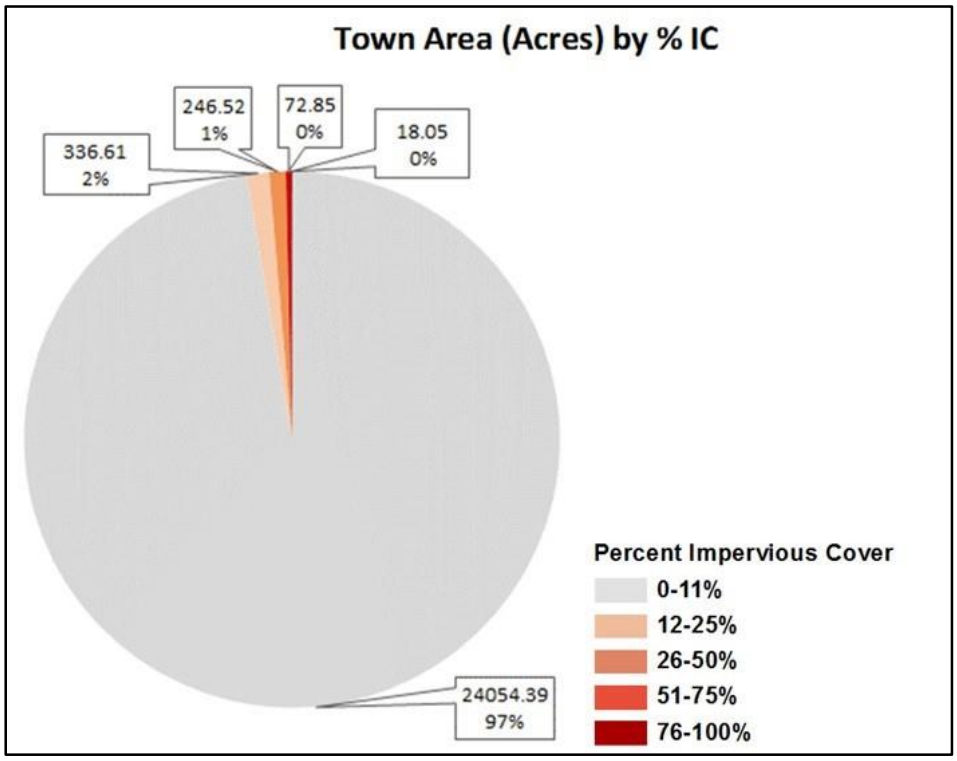
Town of Washington: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Washington



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Washington

Name of TMDL or Strategy	Pollutant	Waterbody Name	Link
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound and contributing watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
Statewide Bacteria TMDL	Bacteria	Naugatuck River / Hockanum Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/naugatuckriverhockanumbrook6900.pdf
Statewide Bacteria TMDL	Bacteria	Shepaug River / Walker Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/shepaugriver6700.pdf
Statewide Bacteria TMDL	Bacteria	Weekeepeemee	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/weekeepeemeeriver6804.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorous

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae

growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

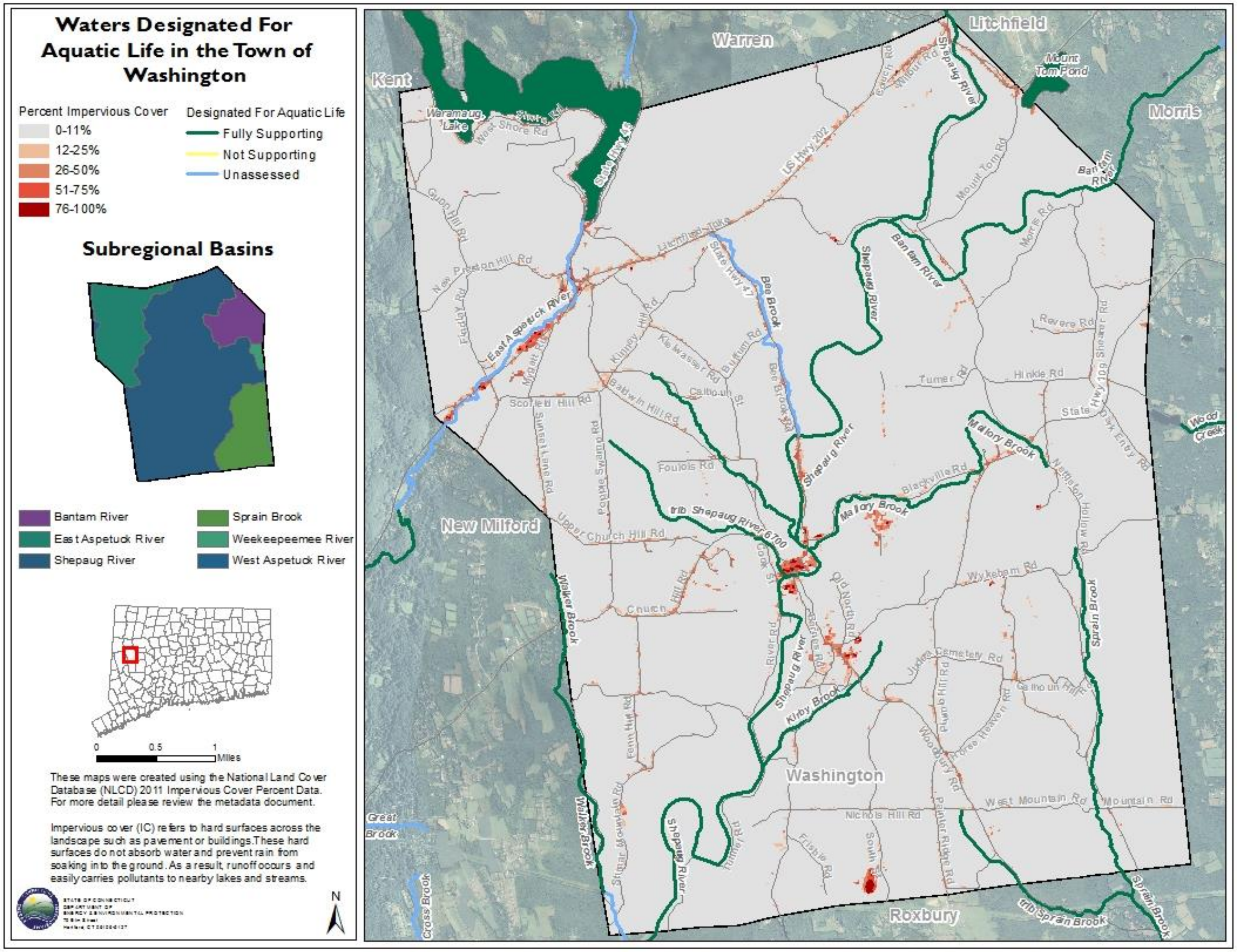
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

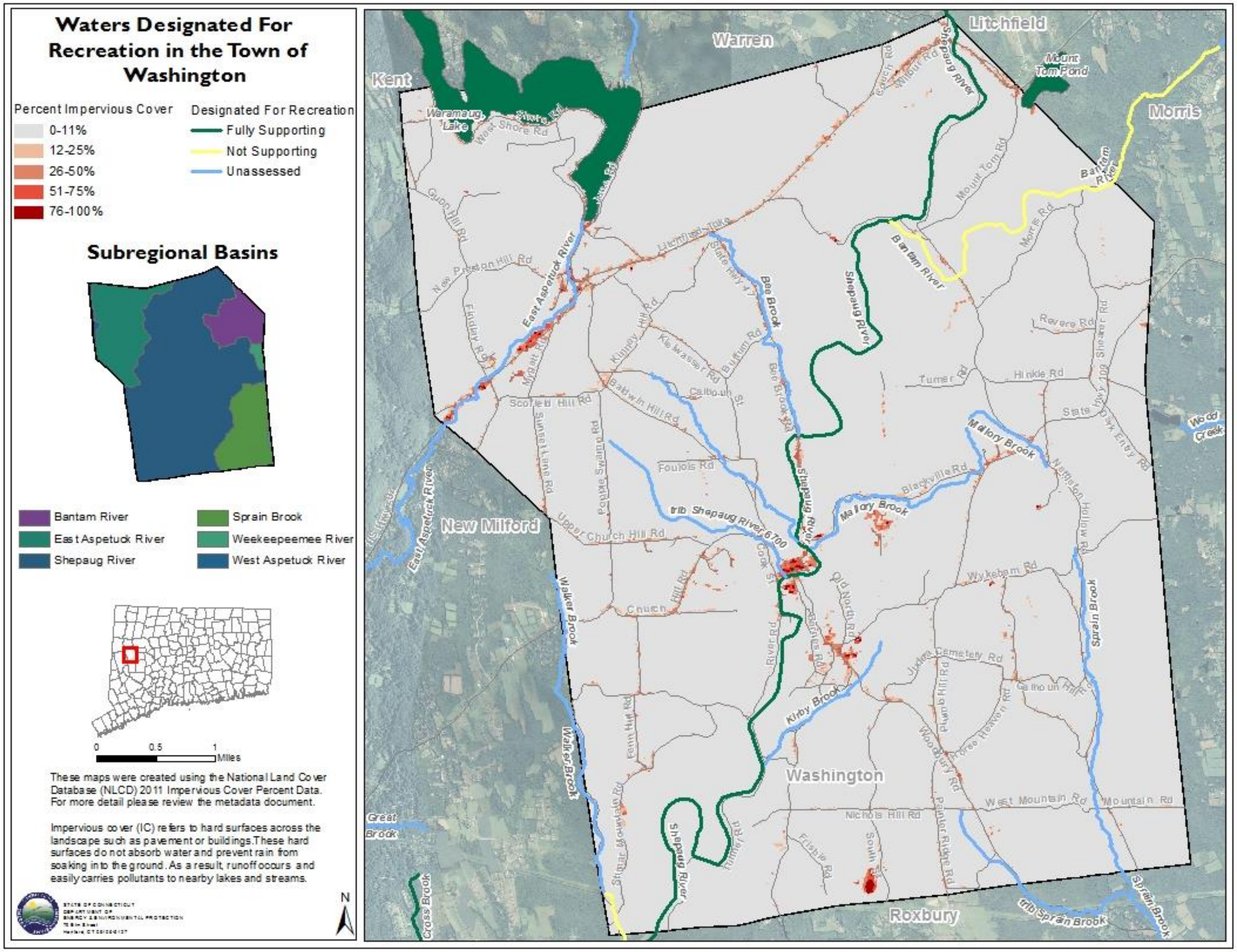
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Washington
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Bantam River
East Aspetuck River
Shepaug River
Sprain Brook
Weekeepeemee River
West Aspetuck River
0
0.5
1
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Litchfield
Warren
Kent
Morris
New Milford
Roxbury
Washington
Waramaug Lake
Mount Tom Pond
East Aspetuck River
Bee Brook
Shepaug River
Bantam River
Mallory Brook
trib Shepaug River 6700
Kirby Brook
Walker Brook
Sprain Brook
trib Sprain Brook
Great Brook
Cross Brook
Wood Creek


Waters Designated For Recreation in the Town of Washington
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
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Waramaug Lake
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Bee Brook
Mallory Brook
trib Shepaug River 6700
Walker Brook
Kirby Brook
Sprain Brook
trib Sprain Brook
Great Brook
Cross Brook
Wood Creek
Litchfield Tpke
New Preston Hill Rd
Scofield Hill Rd
Baldwin Hill Rd
Foulois Rd
Upper Church Hill Rd
Blackville Rd
Wykeham Rd
Old North Rd
Nichols Hill Rd
West Mountain Rd
Mountain Rd
Revere Rd
Turner Rd
Hinkle Rd
Mount Tom Rd
Calhoun St
Calhoun Hill
Cemetery Rd
Frisbie Rd
Painter Ridge Rd
Woodbury Rd
Roxbury Rd
Baldwin Hill Rd
Romford Rd

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

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Factsheet: Town of Winchester Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

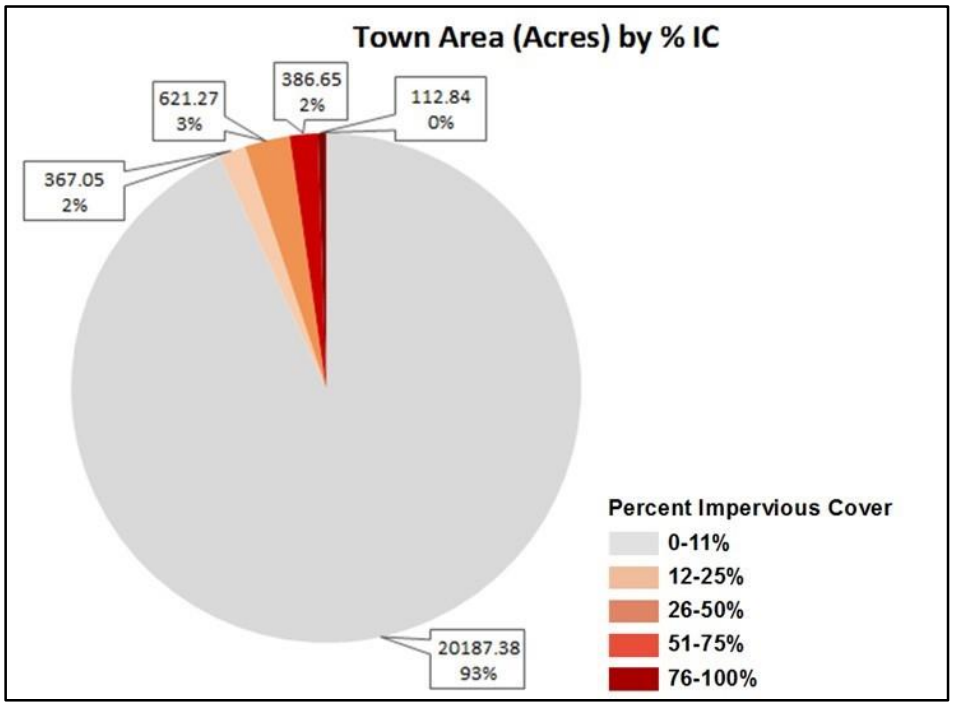
Town of Winchester: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Winchester



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Winchester

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound & Contributing Watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
A TMDL Analysis for Recreational Uses of the Naugatuck River Regional Basin	Bacteria	Naugatuck River / Steele Brook / Great Brook / Mad River / Hop Brook / Long Meadow Pond Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/naugatucktmdl_final.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

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Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae

growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

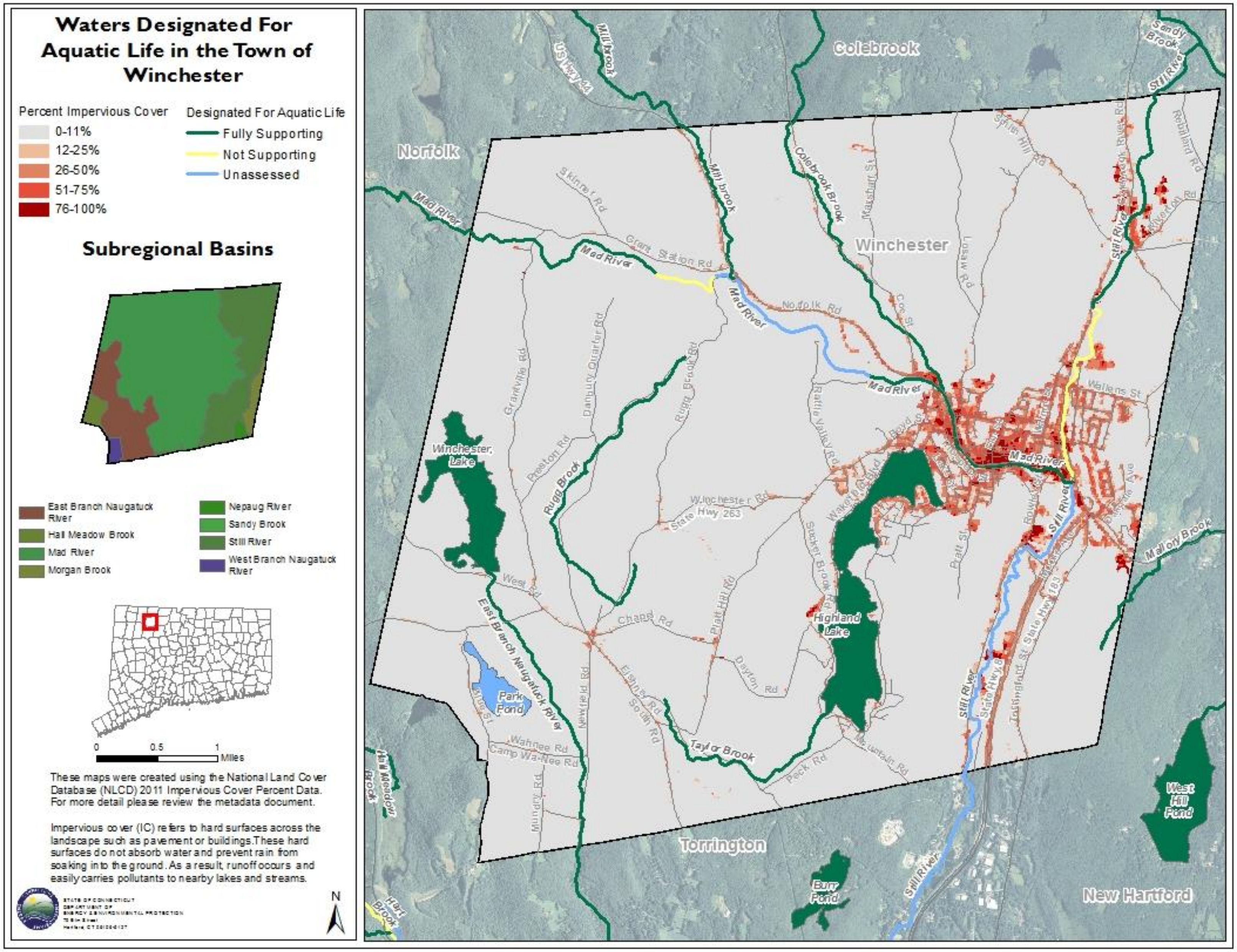
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Winchester
Percent Impervious Cover
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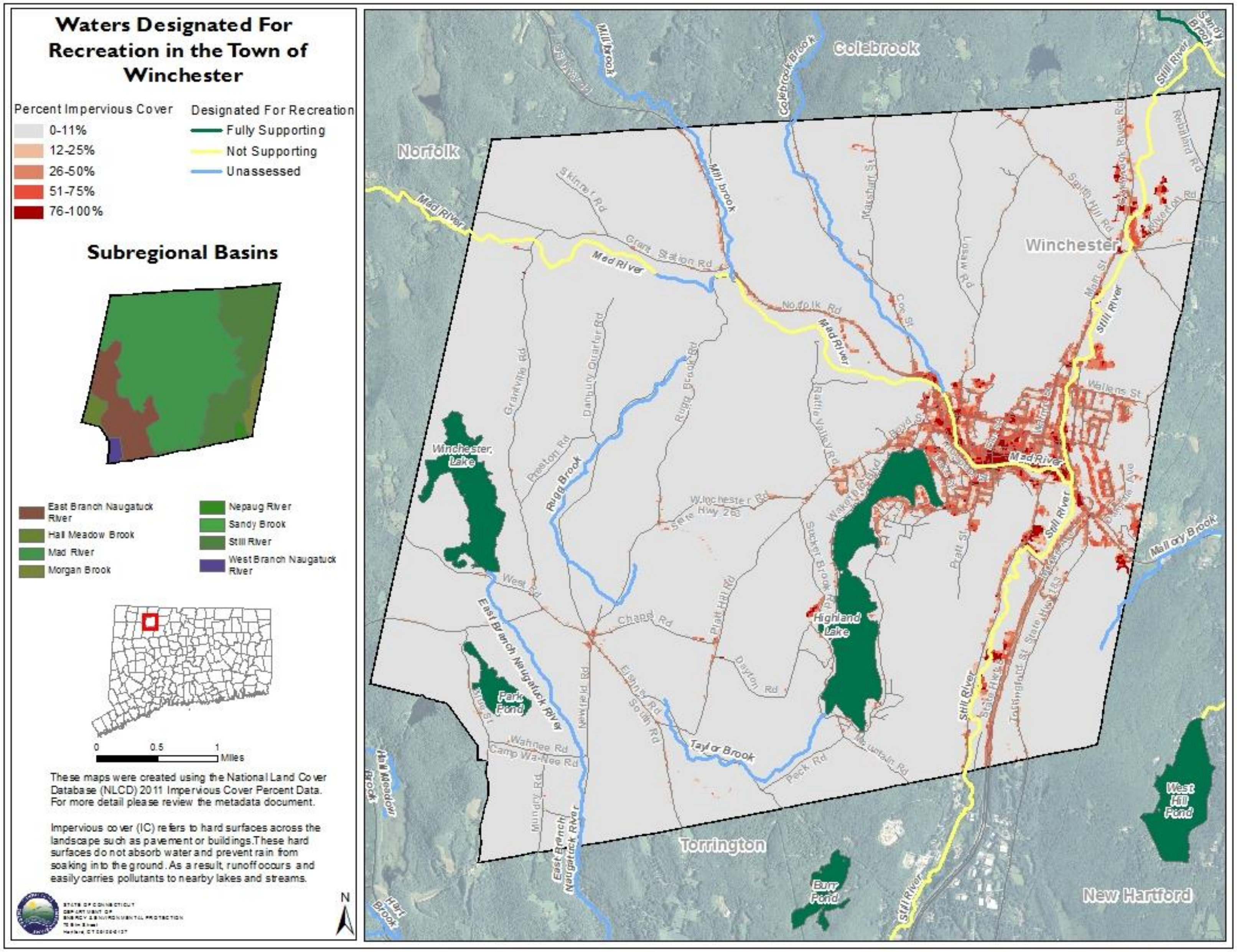
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
East Branch Naugatuck River
Hall Meadow Brook
Mad River
Morgan Brook
Nepaug River
Sandy Brook
Still River
West Branch Naugatuck River
0
0.5
1
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Colebrook
Norfolk
Winchester
Torrington
New Hartford
Mad River
Mill brook
Colebrook Brook
Still River
Sandy Brook
Rugg Brook
Taylor Brook
East Branch Naugatuck River
Mallory Brook
Hall Meadow Brook
Winchester Lake
Highland Lake
Park Pond
Burr Pond
West Hill Pond
Grant Station Rd
Norfolk Rd
Winchester Rd
State Hwy 263
Chapel Rd
Platt Hill Rd
Wallens St
Boyd St
Pratt St
West Rd
Wahnee Rd
Camp Wa-Nee Rd
Peck Rd
Dayton Rd
Skinner Rd
Granville Rd
Danbury Quarter Rd
Preston Rd
Rugg Brook Rd
Rattle Valley Rd
Marshall St
Losaw Rd
Newfield Rd
Mountain Rd


Waters Designated For Recreation in the Town of Winchester
Percent Impervious Cover
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12-25%
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Colebrook
Norfolk
Winchester
Torrington
New Hartford
Winchester Lake
Highland Lake
Park Pond
Burr Pond
West Hill Pond
Mad River
Still River
Mill brook
Colebrook Brook
Sandy Brook
Rugg Brook
Taylor Brook
Mallory Brook
East Branch Naugatuck River
Hall Meadow Brook
Hart Brook
Grant Station Rd
Norfolk Rd
Skinner Rd
Marshall St
Losaw Rd
Granville Rd
Danbury Quarter Rd
Preston Rd
Rugg Brook Rd
Rattle Valley Rd
Winchester Rd
State Hwy 263
West Rd
Chapel Rd
Platt Hill Rd
Dayton Rd
Newfield Rd
Eleanor Rd
South Rd
Peck Rd
Wahnee Rd
Camp Wa-Nee Rd
Mountain Rd
Pratt St
Boyd St
Wakefield Blvd
Walnut St
Wallens St
Main St
Smith Hill Rd
Rebalard Rd
Torringford St
State Hwy 183
State Hwy 8
Coe St

Factsheet: Town of Windham Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

To find more detailed information on water quality in your town, please see the Integrated Water Quality Report (IWQR) on the CT DEEP website at http://www.ct.gov/dep/iwqr. Information on water quality within your town is also presented on the maps included in this fact sheet.

Impacts of Impervious Cover on Water Quality

Impervious cover (IC) refers to hard surfaces across the landscape such as roads, sidewalks, parking lots and roofs. Studies have focused on the amount of hard surfaces to evaluate the impacts of stormwater runoff from these hard surfaces on water quality and found that IC affects both the quantity and quality of stormwater. IC forces rain to run off the land, carrying pollutants quickly and directly to lakes and streams instead of soaking into the ground and being filtered by the soil. For more information on impervious cover, please see the CT DEEP web page (link) and EPA's web page (EPA IC Link).

In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

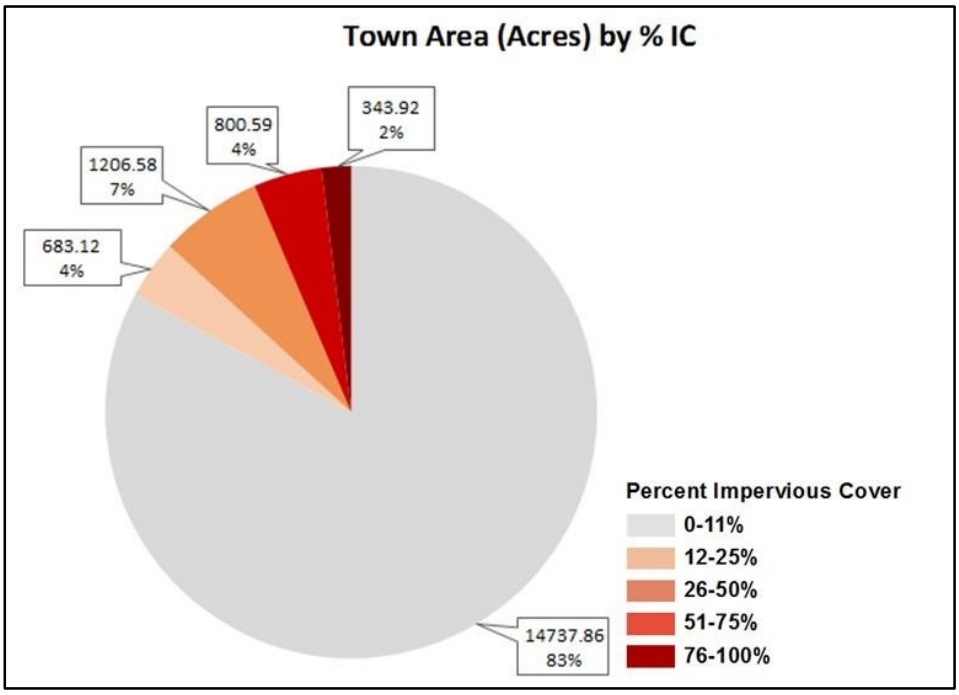
Town of Windham: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

Towns should aim to make stormwater improvements in areas with IC greater than 12% in an effort to reduce the amount of stormwater pollution reaching surface waters which will protect and improve water quality.

For more information on areas of impervious cover within your town, please see the maps at the end of this factsheet.

Amounts of Impervious Cover within the Town of Windham



Pollution Reduction

Waterbodies often can handle a certain amount of pollutants and still maintain good water quality. However, impaired waterbodies have too much pollution impacting their water quality and therefore the streams do not support all uses for the waterbody. Total Maximum Daily Loads (TMDLs) are pollution reduction budgets developed for impaired waterbodies in order to meet water quality. If the pollution budget is achieved through the recommended pollution reduction measures, then the waterbody is expected to meet water quality. CT DEEP also supports impaired waters restoration through watershed based plans (see link) which provides more specific non-point source pollution control measures. The following TMDLs or pollution reduction strategies have been developed and apply to areas within your town.

TMDLs or Strategies Applicable to the Town of Windham

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound & Contributing Watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
Northeast Regional Mercury TMDL	Mercury	All CT Inland waters	http://www.ct.gov/deep/lib/deep/water/tmdl/tmdl_final/ne_hg_tmdl.pdf
Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
Statewide Bacteria TMDL	Bacteria	Shetucket River and Obwebetuck Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/shetucketriver3800.pdf
Statewide Bacteria TMDL	Bacteria	Willimantic River, Eagleville Brook, and Cedar Swamp Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/willimanticriver3100.pdf

For more information on these TMDLs or strategies please go to our website http://www.ct.gov/deep/tmdl .

Stormwater Quality Monitoring

Although your town may not be required to monitor stormwater outfalls under the draft MS4 permit, regular monitoring for targeted pollutants in stormwater provides an indication of potential for water quality impacts and helps identify sources and unlawful discharges. Annual monitoring of twelve chemical parameters at 6 locations from different areas of town has been a requirement for towns covered by the current MS4 permit since 2004. CT DEEP uses that information to evaluate the quality of stormwater and the potential for impacts to surface waters as well as to make sure that stormwater is managed properly. A few parameters currently monitored by MS4 towns are described below.

Bacteria

Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

Bacteria is measured as the number of colony forming units, or CFU, per 100 ml of water. To support recreational uses of surface waters, the CT DEEP Water Quality Standards indicate that the average amount of *E. coli* found in a freshwater water body should be less than 126 CFU/100 mL and that a single sample tested for *E. coli* should be less than 235 CFU/100 mL at a designated swimming area and less than 410 CFU/100 mL in other areas. Monitoring for *E. coli* is currently required in the MS4 permit.

Enterococci is another bacteria used to indicate the presence of fecal material in salt water environments. For recreation in salt water the Water Quality Standards indicate that average amount of Enterococci should be less than 35 CFU/100 mL in a designated swimming area and that a single sample tested for Enterococci should be less than 104 CFU/100 mL and in all other areas less than 500 CFU/100 mL. These targets have been included in the statewide bacteria TMDLs. In the Draft MS4 permit, Tier 1 MS4s with *E. coli* results higher than 235 CFU/100 mL at a designated swimming area or greater than 410 CFU/100 mL in other areas requires a follow-up investigation. Individual stormwater sample results that exceed the applicable single sample maximum value for bacteria could impact water quality, so the associated outfalls should be evaluated for additional stormwater management.

Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

Currently, there is not a water quality based target for TSS in stormwater but TSS is a general indicator of water quality and, lower amounts of TSS are better. The average MS4 stormwater result reported for TSS by all towns covered by this permit is 48 mg/L. If future stormwater monitoring completed by your town finds areas that have elevated TSS, these may be places to consider additional stormwater management efforts.

Total Nitrogen

Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

The TMDL for Long Island Sound requires a 10% reduction of nitrogen in stormwater discharges to prevent low oxygen conditions in Long Island Sound. Each town should be working to reduce the amount of nitrogen in their stormwater to address this issue. Under the current draft MS4 permit, any Tier 1 MS4s with a result for total nitrogen greater than 2.5 mg/L will require a follow-up investigation. If you find areas within your town, which have elevated nitrogen, these locations may be places to consider additional stormwater management activities.

Total Phosphorus

Phosphorus is an important nutrient necessary for growth in plants and animals in freshwater. Too much phosphorus in the water can throw off the balance of aquatic ecosystems causing excessive growth of water plants and algae blooms, which reduces the amount of oxygen in the water potentially harming the fish. Sometimes these algae blooms can contain toxic forms of algae which are harmful to people and animals that come into contact with it. Sources of high phosphorus can be unlawful discharges, fertilizers, litter, leaves, erosion and animal waste.

CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

Turbidity measures the clarity of the stormwater sample. It measures how much material (soil, algae, pollution, microbes etc.) is suspended in the sample. High turbidity lowers the water quality of a surface water by blocking sunlight for the plants and makes food harder for the fish to find and may be an indication of a higher amounts of other pollution in the water. Surface waters with high turbidity are visually less appealing for recreational use. High turbidity can be caused by erosion, failing septic systems, decaying plants or animals, and excessive algae

growth. Turbidity is reported in Nephelometric Turbidity Units (NTU), which is related to how easily light passes through the water sample.

The Water Quality Standards have a criterion that indicates turbidity should not to exceed 5 NTU above ambient levels. In the draft MS4 permit, any Tier 1 MS4 with a turbidity result greater than 5 NTU over in-stream conditions will require a follow-up investigation. While there is not a fixed statewide criterion for turbidity, lower results are better for the health of the surface waters in town. If you find areas within your town with higher levels of turbidity in stormwater, these would be good places to develop additional stormwater controls.

Town Maps

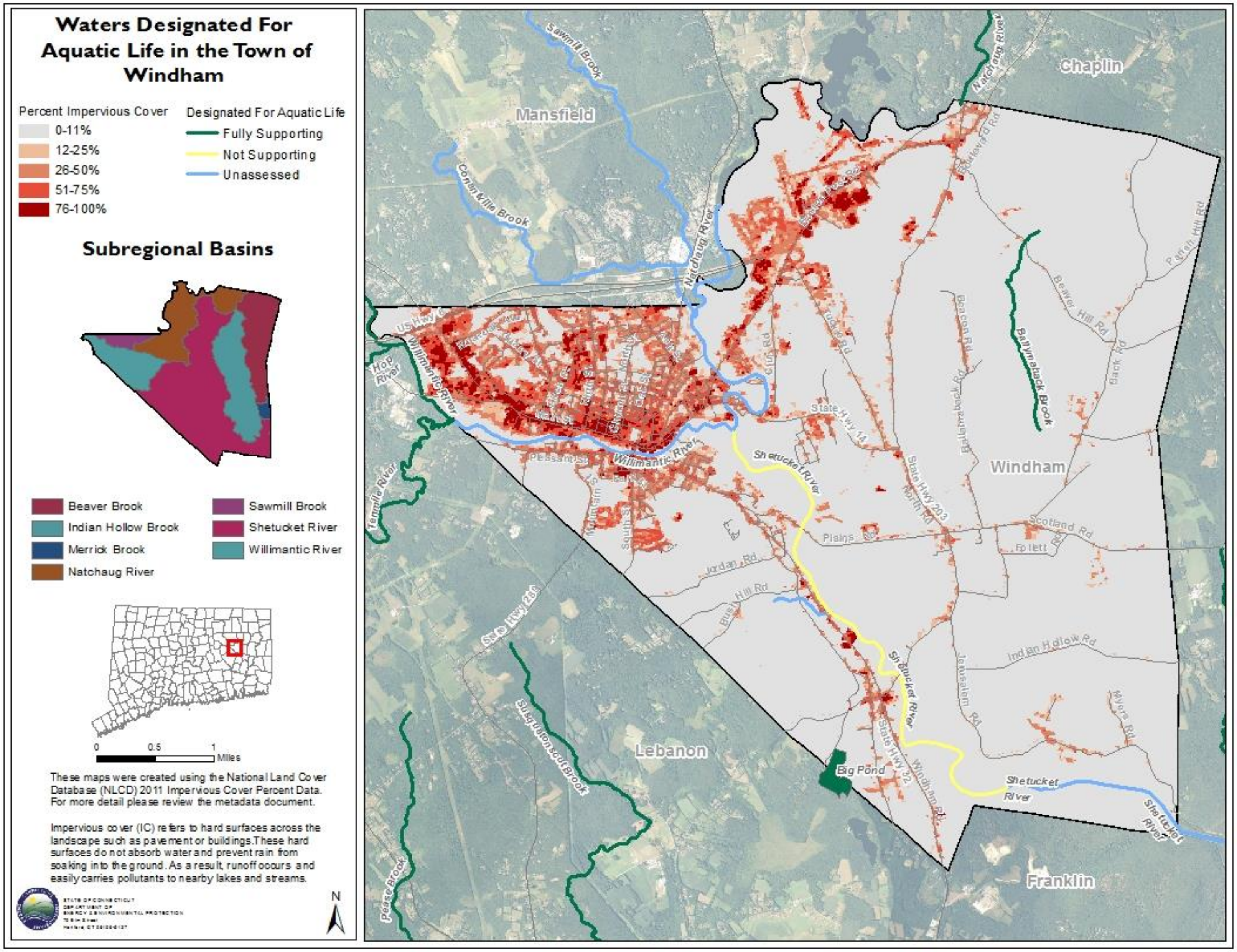
The following maps were created to show the impervious cover (IC) in your town as well as the water quality in the rivers, streams, lakes and estuaries in and around your town.

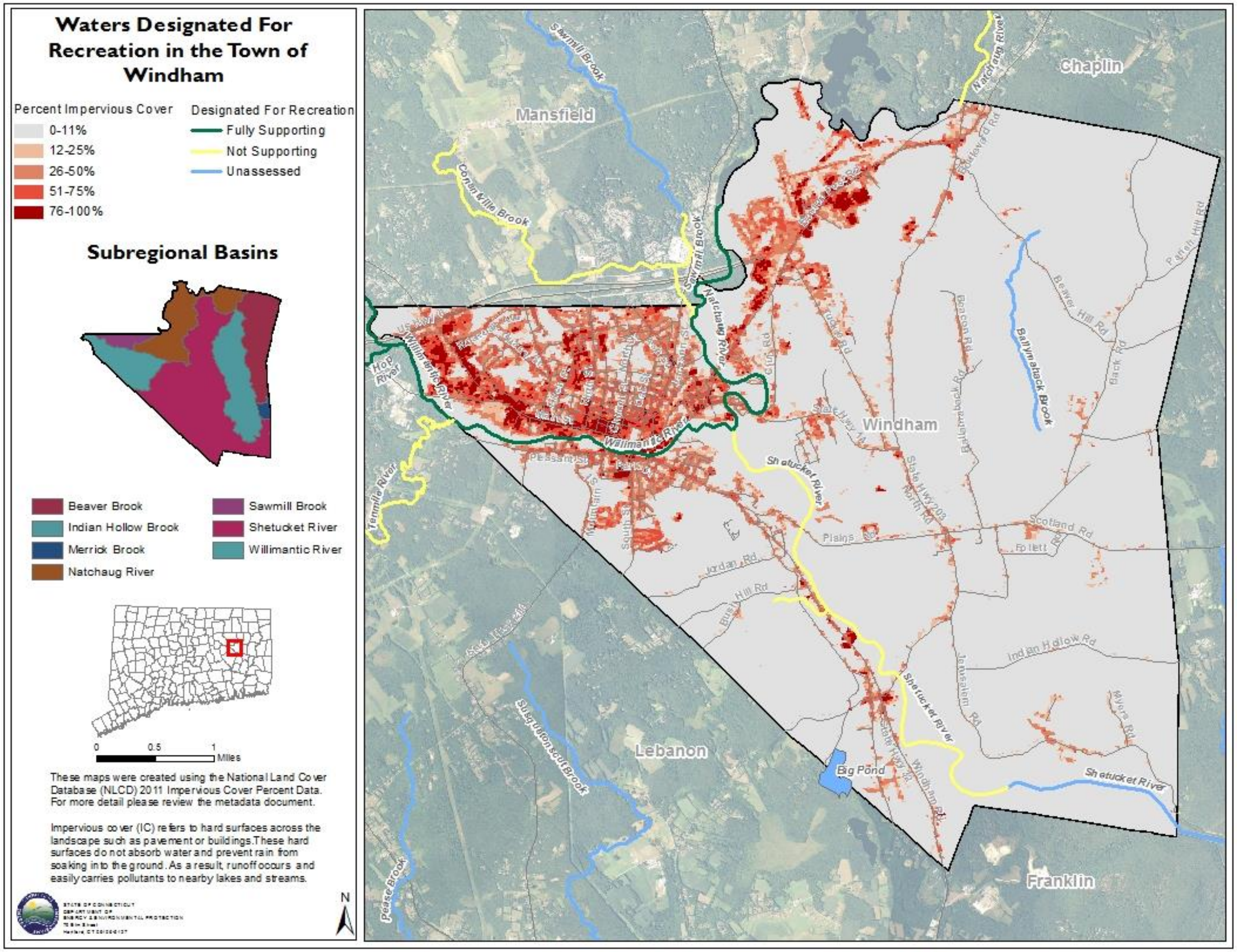
Impervious Cover on the Town Maps

IC is shown in red on the maps. Dark red areas indicate a higher percentage of IC, lighter red areas have less IC, while the grey areas indicate very little or no IC.

Water Quality on the Town Maps

Separate maps are provided for the different uses of the waterbodies such as Aquatic Life Uses, Recreation, and Shellfishing (in coastal towns). The waterbodies are colored to show the health of the waterbody. Green means that the waterbody meets the water quality requirements to fully support the specified use. Yellow means that water quality is poor and that the specified use is not met. Blue means that there is not enough information to know whether or not water quality is good or bad to support the specified use. Additionally, a small map is provided on the left side of each larger map to show which watersheds are within your town.


Waters Designated For Aquatic Life in the Town of Windham
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Aquatic Life
Fully Supporting
Not Supporting
Unassessed
Subregional Basins
Beaver Brook
Indian Hollow Brook
Merrick Brook
Natchaug River
Sawmill Brook
Shetucket River
Willimantic River
0
0.5
1
Miles
These maps were created using the National Land Cover Database (NLCD) 2011 Impervious Cover Percent Data. For more detail please review the metadata document.
Impervious cover (IC) refers to hard surfaces across the landscape such as pavement or buildings. These hard surfaces do not absorb water and prevent rain from soaking into the ground. As a result, runoff occurs and easily carries pollutants to nearby lakes and streams.
N
Mansfield
Chaplin
Windham
Lebanon
Franklin
Sawmill Brook
Conantville Brook
Natchaug River
Willimantic River
Hop River
Tenmile River
Shetucket River
Ballymahack Brook
Susquetonscut Brook
Pease Brook
Big Pond
State Hwy 14
State Hwy 203
State Hwy 32
State Hwy 289
Scotland Rd
Plains Rd
Jordan Rd
Bush Hill Rd
Indian Hollow Rd
Jerusalem Rd
Beacon Rd
Back Rd
Beaver Hill Rd
Parish Hill Rd
Myers Rd
Windham Rd
Pleasant St
Club Rd
Follett


Waters Designated For Recreation in the Town of Windham
Percent Impervious Cover
0-11%
12-25%
26-50%
51-75%
76-100%
Designated For Recreation
Fully Supporting
Not Supporting
Unassessed
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Jordan Rd
Beaver Hill Rd
Back Rd
Beacon Rd
Plains Rd
Pleasant St

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

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Factsheet: Town of Woodstock Water Quality

This document was created for each town that will be covered by the proposed Small Municipal Separate Storm Sewer System (MS4) General Permit. In addition to the 113 towns covered by the current MS4 permit, the new permit would add 8 new towns to this list as "Tier 1" MS4s. All other towns in the state (49 towns) are proposed to be designated as "Tier 2" MS4s with reduced requirements for compliance. What follows is information on how stormwater can affect water quality in streams, rivers and Long Island Sound. This factsheet is intended to help you interpret any stormwater monitoring results that you may have or may collect and assist you in compliance with the MS4 program.

Water Quality in Connecticut

Surface waters are important resources that support numerous uses, including water supply, recreation, fishing, shellfishing and sustaining aquatic life. Water quality conditions needed to support these uses are identified within the Connecticut Water Quality Standards (WQS). In order to protect and restore these uses, we need acceptable environmental conditions (physical, chemical and biological) to be present within surface waters.

To assess and track water quality conditions, CT DEEP conducts monitoring across the State. The data is synthesized into a biennial state water quality report called the Integrated Water Quality Report. Currently, specific water quality monitoring in the state encompasses about 50% of rivers, 47% of lakes, and 100% of estuary/coastline. In addition, CT DEEP may have information about certain land uses or discharges which could indicate a potential for water quality to be impacted, even if the waterbody has not been fully monitored and assessed.

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In general, the higher the percentage of IC in a watershed, the poorer the surface water quality. Research in Connecticut strongly suggests that aquatic life will be harmed when the IC within a watershed exceeds 12%. Stormwater pollution from IC is a likely cause of impairment for these waterbodies.

Town of Woodstock: Impervious Cover Data

This chart shows the amount of area within your town that contains IC. Data is grouped by acres and percent IC. While all levels of IC can contribute stormwater to streams, it is important to note that land with IC greater than 12% in town is likely to be contributing enough stormwater to streams to have a negative impact on water quality.

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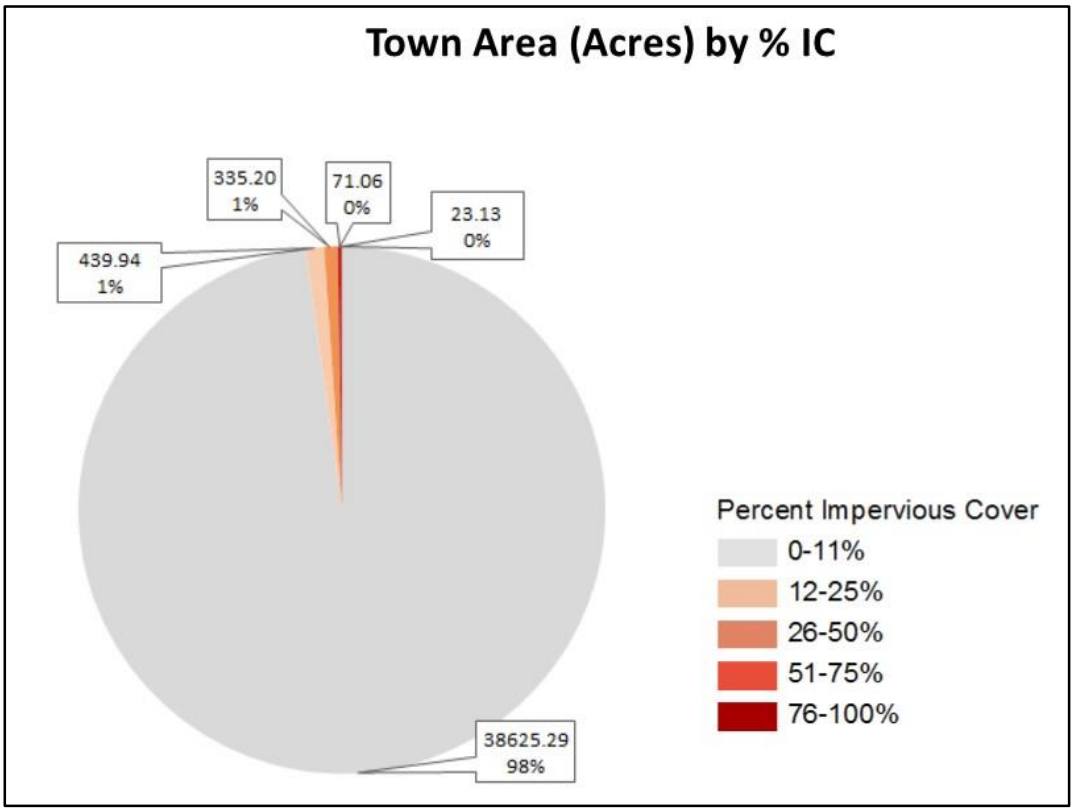
Amounts of Impervious Cover within the Town of Woodstock



Pollution Reduction

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TMDLs or Strategies Applicable to the Town of Woodstock

Name of TMDL or Strategy	**Pollutant**	**Waterbody Name**	**Link**
A TMDL Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound	Nitrogen	Long Island Sound & Contributing Watersheds	http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf
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Interim Phosphorus Reduction Strategy	Phosphorus	Certain CT Inland waters	http://www.ct.gov/deep/lib/deep/water/water_quality_standards/p/interimmgntphosstrat_042614.pdf
Statewide Bacteria TMDL	Bacteria	Little River / Muddy Brook / Peckham Brook	http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/littleriver3708.pdf

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Stormwater Quality Monitoring

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Escherichia coli (*E. coli*) is a bacteria that lives in the intestines of humans and other warm-blooded animals and is used to indicate the presence of fecal matter in surface waters. Some strains of *E. coli* and other pathogens found in fecal material cause serious illness in people coming in contact with it. For this reason, high amounts of bacteria will cause authorities to close beaches for swimming.

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Total Suspended Solids

Total Suspended Solids (TSS) is a measurement of the amount of solids (including sand and silt) found in the stormwater sample. High concentrations of TSS can lower water quality in the receiving stream by transporting various pollutants to the waterbody where they can directly affect aquatic life or affect aquatic life by absorbing light, reducing photosynthesis, and by making the water warmer. TSS can also clog fish gills and smother fish eggs and suffocate the organisms that fish eat. TSS comes from erosion and is found in agricultural, urban and industrial runoff. TSS can be reduced by protecting land from erosion and allowing stormwater time to settle before discharging to surface waters.

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Nitrogen is an important nutrient in marine and estuarine waters such as Long Island Sound, as well as a concern in fresh water lakes and rivers. High amounts of nitrogen can lead to excessive growth of water plants and algae, which then reduces the amount of oxygen available to living things in these waters. Unlawful discharges, animal waste, failing septic systems, leaves, litter and fertilizers are common sources of high nitrogen in stormwater. Responsible use of fertilizers, maintaining septic systems and proper disposal of pet waste will help reduce nitrogen in stormwater.

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CT DEEP is actively working with many towns to reduce the amount of phosphorus reaching Connecticut's streams and rivers. Under the current draft MS4 permit, any Tier 1 MS4 with a total phosphorus result greater than 0.3 mg/L will require a follow-up investigation. If you find areas of your town that have elevated levels of phosphorus in the stormwater, these locations are good places to develop additional stormwater controls.

Turbidity

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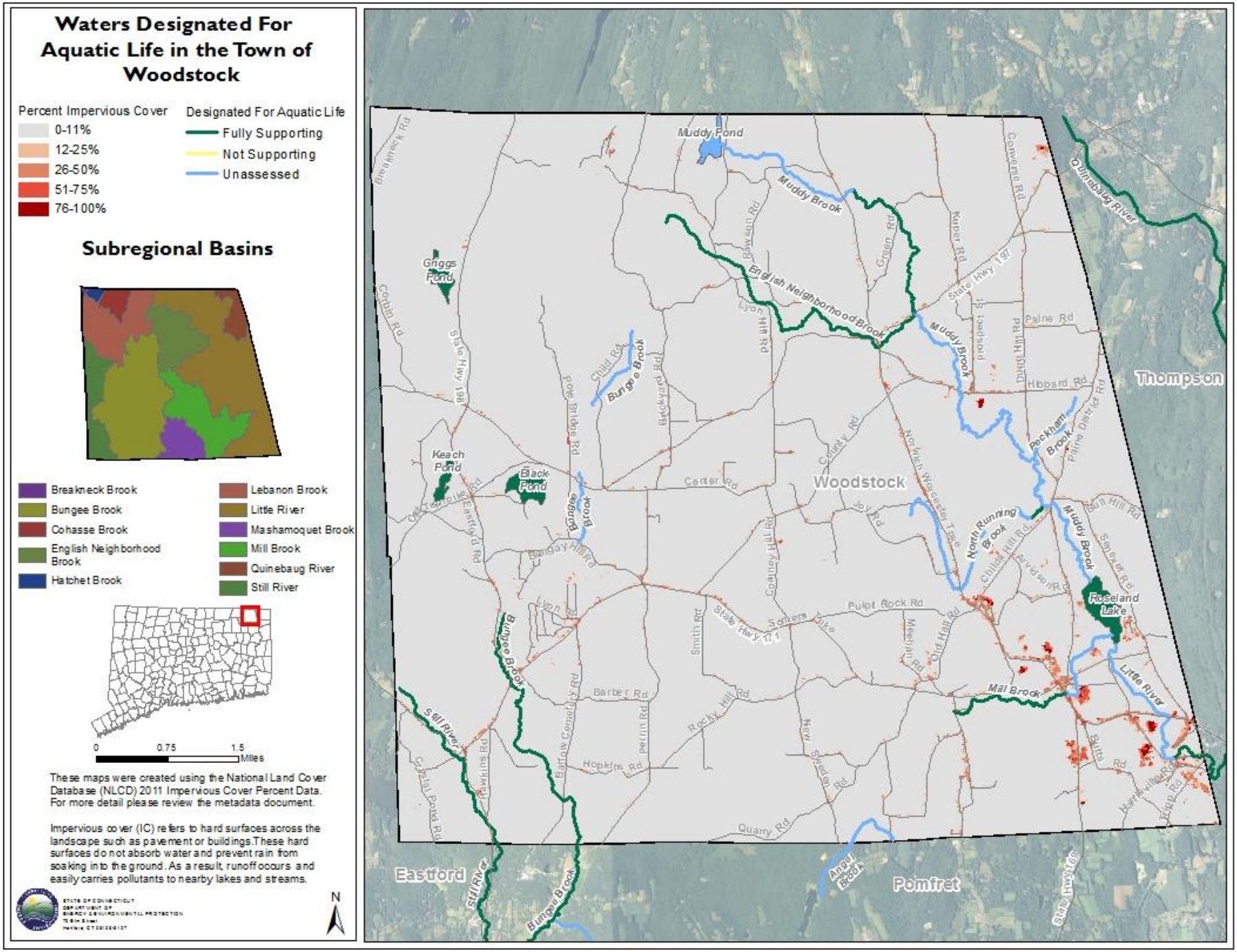
Waters Designated For Aquatic Life in the Town of Woodstock



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STATE OF CONNECTICUT
DEPARTMENT OF
ENERGY & ENVIRONMENTAL PROTECTION
79 Elm Street
Hartford, CT 06106-5127

Waters Designated For Recreation in the Town of Woodstock