

## ***Environmental Challenges***

### **Hazardous waste/Brownfields** *contributed by Michele Simoneaux*

The Massachusetts Contingency Plan (MCP) is the Massachusetts regulation that governs MGL Chapter 21 E, the Massachusetts Oil and Hazardous Material Release Prevention and Response Act. The MCP regulations guide reporting, assessment and remediation of soil, sediments and groundwater that have been impacted by the release of oil or hazardous materials (OHM). The MCP is a risk-based program that helps assess whether the site of a release poses a significant risk to human health and the environment and provides specific timelines for reporting releases of oil and hazardous materials.

The Licensed Site Professional (LSP) that has been retained to legally guide the disposal site through MCP compliance is required to submit reports to the Massachusetts Department of Environmental Protection (MassDEP). Although the Regulations are extremely complex, the description below of Phase I through V explains the major stages of compliance under the MCP.

All Norton sites that are listed in MassDEP's database are currently listed as being in compliance with the MCP. This does not mean that they have been through the remediation phase, rather it means that the responsible party has submitted the necessary paperwork, retained an LSP, if necessary, and has taken required measures. The list presented below lists the sites in Norton that are currently in Phase I through V of the MCP.

*There are many acronyms associated with the MCP but the following is an explanation of the common terms within the table below.*

RTN- Release Tracking Number is assigned by MassDEP when a spill or leak that constitutes a reportable release is identified.

Reporting Category- Specifies amount of time allotted to notify MassDEP of a reportable release. The timing of notices relates to the severity of the release.

Compliance Status- There are numerous codes that MassDEP uses to indicate compliance status. ***Listed below are just a few that are identified in the Norton table:***

RAO- Response Action Outcome- comprehensive response actions have been taken and the goal of an RAO has been achieved.

Tier 1B- As part of the numerical ranking system an LSP has to go through to score the site for "Tier Classification"; Tier 1B is the second highest, after Tier 1A.

Tier 1D- Non-compliance status; A Response Action has not been achieved and/or Responsible Party is non-responsive. There are numerous sites in Norton that are not in compliance.

Tier 2- A type of classification where the Response Actions are carried out solely at the direction of the LSP; Tier 2 is the least serious Tier Classification.

Phase- Under the MCP there are five "phases" of compliance for the remediation of an OHM site:

Phase I- Initial site investigation and "Tier Classification" of the disposal site

Phase II- Comprehensive site assessment; environmental sampling and investigation to identify the nature and extent of contamination

Items in *italics* are included in the Glossary found in Section 12

Chapter 21E Sites in Norton									
RTN	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
<a href="#">4-0000205</a>	85 MANSFIELD AVE	ARENAS AUTO PARTS INC	NONE	4/28/1986	RAO	4/2/1997		A2	
<a href="#">4-0016740</a>	BARROWS ST	BETWEEN 27 & 29	TWO HR	11/9/2001	RAO	12/21/2001		A2	
<a href="#">4-0019172</a>	RTE 495 SOUTHBOUND	BETWEEN EXIT 10 & 11	TWO HR	6/24/2005	DEPNFA	8/26/2008			
<a href="#">4-0000131</a>	250 MANSFIELD AVE	BIG E TRAILER PARK	NONE	1/15/1991	DEPNDS	7/23/1993			
<a href="#">4-0022506</a>	27 SOUTH WORCESTER ST	BUSINESS AND GOLF COURSE	TWO HR	3/30/2010	RAO	5/4/2010		A1	Oil
<a href="#">4-0011919</a>	277 RESERVOIR ST	BUY RIGHT OIL	120 DY	1/29/1996	RAO	8/16/2002		A2	Oil
<a href="#">4-0015632</a>	197 BAY RD	CHICKEN FARM FMR	72 HR	7/27/2000	RAO	4/5/2001		A2	Oil
<a href="#">4-0001304</a>	320 WEST MAIN ST	COMPUTOOL FACILITY FMR	NONE	7/15/1993	RAO	5/21/1996		A2	
<a href="#">4-0016554</a>	246 MANSFIELD AVE	CUMBERLAND FARMS	TWO HR	9/14/2001	RAO	11/16/2001		A1	Oil
<a href="#">4-0018907</a>	32 SAMOSET ST	CUMMINS RESIDENCE	TWO HR	2/2/2005	RAO	2/5/2007	II	A2	Oil
<a href="#">4-0012894</a>	27 HARVEY ST	DEMPSEY RESIDENCE	TWO HR	3/7/1997	TIER1D	7/7/2008			Oil
<a href="#">4-0016528</a>	MAPLE ST	FORMER DUMP/LANDFILL	TWO HR	8/30/2001	TIER1D	9/6/2002			Hazardous Material
<a href="#">4-0022160</a>	103 WEST MAIN ST	FREEMAN STREET RELEASE	TWO HR	9/1/2009	RAO	10/23/2009		A1	Oil

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<a href="#"><u>4-0010721</u></a>	119-125 WEST MAIN ST	HESS STATION 21214 FMR RTE 123 SPORTS	72 HR	8/30/1994	REMOPS	11/6/2009	V		Oil
<a href="#"><u>4-0017710</u></a>	HORTON DR	IN FRONT OF #5 HORTON DRIVE	TWO HR	3/25/2003	RAO	5/22/2003		A1	Oil
<a href="#"><u>4-0000130</u></a>	111 SOUTH WORCESTER ST	KILBURN GLASS INDUSTRIES	NONE	7/26/1985	TIER 2	10/14/2009	V		
<a href="#"><u>4-0012406</u></a>	RTE 123	MIDWAY AUTO PALACE	TWO HR	8/13/1996	RAO	10/4/1996		A1	
<a href="#"><u>4-0015709</u></a>	63 MANSFIELD AVE	MONIZ SERVICE STATION	72 HR	8/29/2000	RAO	8/22/2005	V	A2	Oil
<a href="#"><u>4-0019578</u></a>	WEST MAIN ST	NEAR 181 WEST MAIN	TWO HR	1/24/2006	RAO	3/9/2006		A2	Oil
<a href="#"><u>4-0010635</u></a>	EAST HODGES ST	NO LOCATION AID	TWO HR	8/2/1994	RAO	8/2/1995		A1	Hazardous Material
<a href="#"><u>4-0011918</u></a>	6 JACKSON ST	NO LOCATION AID	TWO HR	1/29/1996	RAO	2/3/1997		A3	Oil
<a href="#"><u>4-0012031</u></a>	27 RESERVOIR ST	NO LOCATION AID	TWO HR	3/20/1996	RAO	5/1/1996		A2	Oil
<a href="#"><u>4-0013082</u></a>	420 OLD COLONY RD	NO LOCATION AID	120 DY	6/6/1997	RAO	6/12/1998	II	B1	
<a href="#"><u>4-0014190</u></a>	320 WEST MAIN ST	NO LOCATION AID	TWO HR	9/22/1998	RAO	11/10/1998		A1	Oil
<a href="#"><u>4-0014686</u></a>	17 RESERVOIR RD	NO LOCATION AID	72 HR	4/16/1999	TIER1D	4/25/2000			Hazardous Material
<a href="#"><u>4-0014766</u></a>	253 MANSFIELD AVE	NO LOCATION AID	120 DY	6/1/1999	RAO	6/12/2000		B1	Oil and Hazardous Material
<a href="#"><u>4-0017382</u></a>	246 MANSFIELD AVE	NO LOCATION AID	72 HR	9/27/2002	RAO	10/3/2003	II	A2	Oil
<a href="#"><u>4-0017476</u></a>	I 495 MEDIAN	NO LOCATION AID	TWO HR	11/15/2002	RAO	10/1/2004		A2	Oil
<a href="#"><u>4-0017513</u></a>	1 BROOK PKWY	NO LOCATION AID	TWO HR	12/12/2002	RAO	8/25/2003		A2	Oil

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<a href="#"><u>4-0019632</u></a>	ADJACENT TO 5 BUTTERMILK WAY	NON-PCB MODF RELEASE	120 DY	2/16/2006	RAO	2/6/2007		A2	Oil
<a href="#"><u>4-0000765</u></a>	38 WEST MAIN ST	NORTON CENTER GARAGE	NONE	10/15/1989	RAO	1/12/2007	IV	A3	Oil
<a href="#"><u>4-0011854</u></a>	6 TAUNTON AVE	NORTON POST OFFICE	72 HR	12/15/1995	RAO	10/28/1996		A2	Oil
<a href="#"><u>4-0000672</u></a>	55 WEST MAIN ST	NORTON SENIOR CITIZENS CTR	NONE	1/5/1989	DEPNFA	7/30/1996			Oil
<a href="#"><u>4-0022033</u></a>	ROBIN CIR	NORTON VILLAGE CONDO TRUST	TWO HR	7/3/2009	RAO	9/2/2009		A2	Oil
<a href="#"><u>4-0012885</u></a>	EVERGREEN RD	POLE #2980	TWO HR	3/6/1997	RAO	5/2/1997		A2	Oil
<a href="#"><u>4-0017168</u></a>	EAST HODGES ST	POLE 2486	TWO HR	6/26/2002	RAO	8/27/2002		A2	Oil
<a href="#"><u>4-0014238</u></a>	23 EAST MAIN ST	POWER PLANT	TWO HR	10/8/1998	RAO	12/14/1998		A2	Oil
<a href="#"><u>4-0000763</u></a>	EAST MAIN ST RTE 123	PROPERTY	NONE	10/15/1989	RAO	8/9/1996		A2	Oil
<a href="#"><u>4-0001313</u></a>	308 EAST MAIN ST	PROPERTY	NONE	7/15/1993	WCSPRM	1/17/1995			
<a href="#"><u>4-0011955</u></a>	PLAIN ST	PUBLIC WATER SUPPLY	TWO HR	2/24/1996	RAO	6/25/1996		A1	Hazardous Material
<a href="#"><u>4-0012646</u></a>	70R EAST MAIN ST	PUBLIC WORKS GARAGE	72 HR	11/15/1996	RAO	9/27/2002	III	A2	Oil
<a href="#"><u>4-0022235</u></a>	3 FERNANDES CIR	RESIDENCE	72 HR	10/16/2009	RAO	12/22/2009		A2	
<a href="#"><u>4-0022502</u></a>	11 NOYES ST	RESIDENCE	TWO HR	3/30/2010	UNCLASSIFIED	3/30/2010			Oil
<a href="#"><u>4-0019522</u></a>	281 TAUNTON AVE (RTE 140)	RESIDENT	TWO HR	12/13/2005	RAO	12/19/2006		A2	
<a href="#"><u>4-0017206</u></a>	208 BAY RD	RESIDENTIAL	TWO HR	7/12/2002	RAO	11/14/2002		A1	Oil
<a href="#"><u>4-0021127</u></a>	EXIT 10 OFF RAMP	ROUTE 495 NORTH	TWO HR	3/16/2008	TIER1D	3/23/2009			Oil
<a href="#"><u>4-</u></a>	RT-495	RT 495S	TWO HR	8/25/2008	RAO	10/27/2008		A2	Oil

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<a href="#"><u>0021463</u></a>									
<a href="#"><u>4-0012752</u></a>	EAST HODGES ST	SALBEE FARMS	120 DY	7/21/1997	RAO	10/11/2000	II	A2	Hazardous Material
<a href="#"><u>4-0000132</u></a>	UNION RD	SHPACK LANDFILL	NONE	11/26/1986	ADEQUATE REG	10/1/1993			
<a href="#"><u>4-0015384</u></a>	12 SOUTH WORCESTER ST	SINCLAIR MFG	TWO HR	3/28/2000	TIER 1B	10/29/2008	II		Hazardous Material
<a href="#"><u>4-0019663</u></a>	RTE 495 S	SOUTH OF EXIT 10 (RTE 123)	TWO HR	3/15/2006	RAO	6/2/2006		A2	Oil
<a href="#"><u>4-0000777</u></a>	360 OLD COLONY RD	STRIP MALL	NONE	10/15/1989	RAO	6/14/2001		B1	
<a href="#"><u>4-0000632</u></a>	138 BARROWS ST	TWEAVE INC	NONE	1/15/1989	RAO	8/1/1996			Oil
<a href="#"><u>4-0022165</u></a>	157 MANSFIELD AVE	UNIT 14	TWO HR	9/3/2009	TIER1D	9/10/2010			Oil
<a href="#"><u>4-0022212</u></a>	151 PINE ST	VACANT/ABANDONED RESIDENCE	TWO HR	9/24/2009	RAO	11/20/2009		A1	
<a href="#"><u>4-0015936</u></a>	202 OLD DEAN ST	WERNER RESIDENCE	72 HR	12/19/2000	RAO	9/3/2002	II	A2	Oil
<a href="#"><u>4-0001350</u></a>	KNAPTON HALL EAST MAIN ST	WHEATON COLLEGE	NONE	10/1/1993	RAO	6/9/1995			
<a href="#"><u>4-0010585</u></a>	EAST MAIN ST	WHEATON COLLEGE	72 HR	6/30/1994	RAO	6/1/1995		A2	Oil
<a href="#"><u>4-0022584</u></a>	27 EAST MAIN ST	WHEATON COLLEGE	TWO HR	4/30/2010	UNCLASSIFIED	4/30/2010			Oil

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Phase III- Identification and selection of comprehensive Remedial Action Alternatives whereby remedial action alternatives are explored and the most feasible remedial action is identified

Phase IV- Implementation of the selected remedial action alternative identified in Phase III is implemented (i.e. clean-up of site)

Phase V- Operation, Maintenance and/or Monitoring

All Norton sites that are listed in MassDEP's database are currently listed as being in compliance with the MCP. This does not mean that they have been through the remediation phase, rather it means that the responsible party has submitted the necessary paperwork, retained an LSP, if necessary, and has taken required measures. The table presented above lists the sites in Norton that are currently in Phase I through V of the MCP.

### **Brownfields** *contributed by Jim Hendrickson*

A "*brownfield*" is a former or under-used industrial or commercial facility where redevelopment or full use is complicated by a real or perceived contamination. The "National Brownfields Program" involves 15 federal partners and consists of various initiatives designed to work with the state and local levels to develop Brownfield re-use solutions.

Currently there are no known sites in Norton that fall within the Brownfields program.

Among the initiatives of the Brownfields program are: Grants to develop a long range strategy for brownfield re-use, EPA assisted assessments to help local officials make informed decisions on redevelopment of a given site, revolving loans to assist in cleaning contaminated sites, training in hazardous waste assessment and remediation, and financial assistance to state level Brownfields programs.

Another matter of interest for open space or land preservation initiatives within the community is the cost of cleaning a contaminated site. Federal and state laws impose strict liability for the cleanup costs on "owners" and "operators" of a property. Under the law, Land Trusts, as owners, may be liable for cleanup costs even if they did not contribute to the contamination. The law is less clear on the holder of a conservation easement. Nonetheless it is prudent to conduct an environmental assessment before accepting an easement, or acquiring or 'operating' a property within a land trust.

### **Landfills**

Norton does not provide trash removal services to residents. Residents must contract with a private hauler to pick up and dispose of household trash. Each hauler must provide a recycling component to the contract with the residents. Norton does not have an active landfill, although the Highway Department does accept certain materials such as propane tanks and appliances for recycling. The Board of Health conducts a Household Hazardous Waste Day program when funding is available. The lack of landfill space and high disposal costs in this region have resulted in illegal dumping of household and commercial wastes. Materials commonly found illegally dumped by the side of Norton's roadways or in wetlands and streams include refrigerators, appliances, demolition debris, lumber scraps, tires, insulation, paint cans, used motor oil and metal drums, etc. Several sites have been substantially cleaned up, but new sites

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are still being discovered. Norton has historically had two active landfills. One was located on Hill Street and the second one is the Shpack Superfund Site on Union Road.

Recycling and composting programs reduce the amount of waste going to landfills, thereby saving disposal costs and landfill space. They also help conserve natural resources by providing reusable materials. The best conservation practice is to reduce the production of the material, followed by a re-use of the original product and recycling products. One important component of this cycle is to purchase products made with a high percentage of post-consumer recycled materials. This last portion is often overlooked and is necessary to complete the reduce-reuse-recycle triangle.

#### Hill Street updated 2017

The Hill Street property was purchased with a Self-Help Grant (#4) in January of 1979 from Helen Pelletier and Beverly Anderson. The parcel was subdivided into two parcels. One parcel of 10.76 acres was transferred to the Conservation Commission since the vast majority of the property was wetland and a stream. The second parcel consists of 8.67 acres and became Norton's landfill. The Norton landfill on Hill St. was closed and capped during 1991-1992. A continuous ground water monitoring program, managed by the Norton Board of Health, has indicated that there are no known contaminants leaching from the site. The Hill Street landfill is gated to avoid unauthorized access.

In 2009, the Town was approached by a company interested in creating a solar farm on the former landfill. The Board of Health investigated the project with DEP to ensure that the cap was satisfactorily completed before any new project could begin. The Town sent a Request for Proposals for a company to create a solar field and Ansar Energy LLC responded favorably. They took their proposal to the Planning Board for an informal discussion. The Town looks forward to partnering with a private organization for this renewable energy project.

In 2016 Citizens Energy Corps won the bid to place solar panels on the former landfill. During the preliminary evaluation of the property, a slump in the landfill was found and repaired. The solar project provides the town with additional funds in accordance with the lease agreement.

#### *Shpack superfund site: Union Road contributed by Heather Graf and updated by Jennifer Carlino*

The Shpack Superfund Site is named for the previous owners (1940s until 1981), Isadore & Lea Shpack. Isadore, a Russian immigrant and retired N.Y.C. municipal employee, welcomed dumpers from 1946 to 1966 to fill swampland for use as an apple orchard. The unregulated landfill received domestic & industrial waste intensively between 1951 & 1965. The Shpack Site is located on the southern side of Union Road in Norton (Peckham Street in Attleboro) adjacent to the Shpack residence at #68 Union Rd. It is owned by the Norton Conservation Commission and consists of two parcels: a 7-acre parcel (part of the Superfund Site), and a 1-acre parcel, a narrow slice used for access (which is uncontaminated). An adjacent 2 ½ acres on Peckham St. in Attleboro, owned by Albert Dumont, are also part of the Shpack Superfund Site. The adjacent 32-acre Attleboro Landfill Inc. (ALI), an open burning dump, also owned by Mr. Dumont, has been under a Consent Order from the Environmental Protection Agency (EPA) since May 1966. Mr. Dumont's operations at ALI and the Shpack site were ceased with the Consent Order.





In 1978, John Sullivan, a 20-year old Attleboro resident and a student at the Florida Institute of Technology, discovered the presence of radioactive contaminants on the Shpack property while researching snail activity. In 1979 investigations by the Nuclear Regulatory Commission (NRC) found seven different groups of radioactive materials including depleted uranium, natural uranium, enriched uranium, combined depleted uranium and radium, processed natural radium, uranium enriched radium, and radium. In July of 1981, Oak Ridge National Laboratories (ORNL), under contract with the US Department of Energy (DOE), removed  $900\pm$  pounds of radioactive material from the surface of the site and transported the waste in 55-gallon drums to their Tennessee facility. The project manager for the ORNL Team stated some of the hot spots had radiation readings 5 to 10 times normal background level.

Government agencies involved in investigations at the Shpack Site from 1979 to 1982 included the NRC, DOE, the MA Department of Public Health (MDPH), and the MA Department of Environmental Quality Engineering (DEQE). Activities included soil and water sampling and core drilling to determine the depth and breadth of the contamination. Besides the radiological waste, volatile organic compounds were found to be present on site. Chemical contaminants identified include dichloroethylene, trichloroethylene & tetrachloroethylene, dioxin, PCBs, Vinyl Chloride, as well as PVC residue from a fire (which destroyed the Thompson Chemical Company in the late 1970s). A high level of heavy metals, including arsenic was also detected. On June 1, 1981 the 8-acre parcel was sold to the Town of Norton, “through its Conservation Commission for administration, control and maintenance, as provided for in Section C, Chapter 40 of the Massachusetts General Laws.” Under this law, the Conservation Commission is authorized to “maintain, improve, protect, limit the future use of, or otherwise conserve and properly, utilize ‘open spaces’ in land and water areas within its city or town, and it shall manage and control the same”. Texas Instruments (TI), identified as a Principal Responsible Party (PRP) for portions of the nuclear waste, provided the Town of Norton with the sum of \$8,000, for the purchase of the land because the owner, Lea Shpack, refused to lease the property to the DOE for security, access, remedial investigation and cleanup. The town leased the land to DOE, who erected a fence around the most contaminated areas in 1981.

Urged by US Representative Margaret Heckler and the EPA, the Shpack Landfill was listed on EPA’s ‘National Priority List’ in June 10, 1986. In September of 1990 the EPA signed an Items in *italics* are included in the Glossary found in Section 12



Administrative Consent Order with a group of PRPs for performance of the Remedial Investigation/Feasibility Study (RI/FS). The Shpack Steering Committee (members of the PRPs) was organized, with a TI attorney as chairman. According to EPA, the town was put on the PRP List, because Superfund regulations require inclusion of the owner. In December of 1990, TI hired the Boston firm Environmental Resources Management (ERM), New England Inc. as the PRPs consultant.

During the summer of 1991, the EPA announced the “startup of cleanup operations”. An EPA spokesman stated that, “The goal is to return the property to a safe enough condition so that it can be used again.” In August of 1991, 15 companies were identified that might be responsible for the contamination, six agreed to pay for the initial phase of cleanup (RI/FS). In addition to TI, the list includes the jewelry manufacturers, rubbish haulers and an oil company of Swank, Handy & Harman, Kewanee Industries, Godit & Boyer (now Waste Management), Conoco (now Texaco) and Albert Dumont. Albert Dumont, previously mentioned, is at the top of the list for non-cooperating PRPs.

In 1993, ERM completed a three-volume report characterizing the site. In 1997, Congress transferred authority for the Formerly Utilized Sites Remedial Action Program (FUSRAP) from the DOE to the US Army Corps of Engineers (ACOE). FUSRAP was established in 1974 by the US Atomic Energy Commission (AEC), a predecessor to the DOE, under authorities granted by the Atomic Energy Act of 1954. The mission of FUSRAP is to identify, investigate, and cleanup or control 1) sites where residual radioactivity exceeding current guidelines remains from the early years of the nation’s atomic energy program, or 2) other sites assigned by Congress. Shpack was one of 46 sites nationwide identified for remedial action.

In February of 1999, the ACOE accepted responsibility for remedial action at the Shpack



FUSRAP Site. A December 22, 1999 meeting was held at Norton Public Library with representatives for the town, Project Mangers for EPA & ACOE, MA Department of Environmental Protection (DEP, formerly DEQE), and Chairman of the Shpack Steering Committee, to discuss the agencies’ plans for cleanup of the Shpack Site. According to the ACOE handout ‘FUSRAP Fact Sheet, “through the coordinated efforts of the EPA, the settling parties, and the ACOE, all contamination at the site, whether chemical or radiological, will be addressed”. In 2001, Cabrera Services, consultant for the ACOE, completed the radiological assessment of the property. After some disputes in 2002 over the ACOE’s role in the cleanup of the Superfund Site and available funding, the ACOE was reassigned to the project with a special act of the legislature. Congressman Barney Frank

played an instrumental role in keeping the ACOE involved with the project.

In July of 2003, ERM completed the Ecological Habitat Assessment, which states there are seven wetlands on site, two of which are larger than 1 acre. The common vegetation at the site is successional old field, successional northern hardwood vegetation, & successional shrubland. Vernal pools on the site provide habitat for breeding amphibians including American toads, wood frog, green frog, Spring peeper, American bull frog, spotted salamander and the Marbled salamanders (MA-Threatened species) and seasonal foraging habitat for several species of turtles

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(feeding on amphibian eggs & larvae) including painted turtles, snapping turtles and the spotted turtle (MA-Special Concern). Other reptiles observed on the site include Eastern garter snake & Northern brown snake. Forty-six bird species at or adjacent to the Shpack Site were identified. Eight fish species and one hybrid fish were identified within Chartley Pond and area mammals include squirrels, rabbits, raccoon, opossum, red fox, and white-tail deer.

Between February 2, 2000 and November 20, 2003, thirteen public meetings were held in Norton to discuss the agencies' plans for cleanup of Shpack. On June 23, 2004 at a public meeting in Norton, the EPA presented their cleanup options in the "Proposed Plan For Cleanup of the Shpack Superfund Site" and asserted one option as the best alternative. The EPA preferred plan is summarized by excavation of the site by the Army Corps and disposal of the radiological waste off-site, the EPA/PRPs would then remove some soil contaminated with Dioxin & PCBs, consolidate and cap the remaining toxic waste. Town officials, Congressman Frank; Senator Sprague; Representatives Coppola, Poirier and Travis; and several residents protested the EPA's preferred plan with letters outlining their acceptable option from the alternatives listed in the EPA's "Proposed Plan for Cleanup of the Shpack Superfund Site". The EPA's decision for the best option for the cleanup will be included in the Record of Decision (ROD) for Shpack, and is expected to be signed by September 30, 2004. Copies of all reports and investigations are kept at the Norton Public Library and Conservation Commission Office for review.



*Beginning stages of the clean up include debris removal, grading, paving, dewatering and site stabilization.*

On September 29, 2004 the US Environmental Protection Agency reached its Record of Decision (ROD) in support of the Town of Norton's preferred alternative for cleanup. The SC-3b proposal, estimated to cost approximately \$43 million, involves excavation and off site disposal of all contaminated soil which exceeds EPA levels for safety. The US Army Corps of Engineers, whose job it is to rid the site of radiological waste, should begin work Spring 2005 with completion expected Summer 2006. Meanwhile, EPA will be negotiating with the Potentially Responsible Party Group (PRPs) to settle on terms for removal of remaining contaminants. The future use of the site is still in question.



In 2006 the ACOE did begin the clean-up of radiological waste at the Shpack site. The entire area has been cleared of vegetation and visible debris, like metals and trash. ERM was hired by ACOE to investigate the vernal pools on the property. At this time spotted turtle was documented using the site and the Natural Heritage and Endangered Species Program reviewed and approved the clean up plan. The removal of materials was temporarily interrupted for lack of funding but through Barney Frank's office and our State Senators and Representatives, the funding was restored in FY08. Groundwater

levels at the site have proven extremely difficult during the removal of materials. Chartley pond was investigated to see if the dam could be lowered while the ACOE is working at Shpack. Unfortunately, Chartley Pond is fairly shallow and lowering the dam, while lowering the water table at Shpack, lowers the ponded water elevation too far and exposes fish nesting areas and mussel beds.

The photograph above was taken in 2009 during the clean-up. As of September 2010, 35,283 cubic yards of radiological impacted soils have been removed from the site. Currently the town is negotiating access agreements with the PRPs and the ACOE for use of the former McGinn property, directly adjacent to the Shpack site. The McGinn property was acquired in 2010 and will aid in the clean up of the site as well as in the preservation of the Chartley Swamp area.

In September of 2017, the Environmental Protection Agency removed the Shpack Superfund site from its National Priorities list. The site was added in 1986. EPA and the State of Massachusetts concluded that all appropriate Superfund-financed responses under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), have been implemented and that no further cleanup by responsible parties is appropriate for the Site, except for wetland restoration monitoring. Moreover, EPA and the State have determined that cleanup actions conducted at the site to date continue to be protective of public health and the environment.

EPA expects that no further Superfund response is needed at this Site to protect human health and the environment. Following standard procedure for completed cleanup work under Superfund, EPA will continue to conduct reviews of the Site every five years, starting in 2018, to ensure that human health and the environment remain protected. EPA may initiate further action to ensure continued protectiveness at a deleted site if new information becomes available that indicates it is appropriate. The first Statutory Five-Year Review Report will be completed prior to June 12, 2018.

The Federal Docket for the Shpack Landfill Superfund Site deletion contains the information to support the deletion. One comment was received during the public comment period and EPA did not consider this an adverse comment. EPA addressed this comment in the Responsiveness Summary which can be found in the Federal Docket identified by Docket ID no. EPA-HQ-

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SFUND-1986-0005, online at [www.regulations.gov](http://www.regulations.gov). Further history or EPA activity at the Shpack Landfill site: [www.epa.gov/region1/superfund/sites/shpack](http://www.epa.gov/region1/superfund/sites/shpack)

The property will continue to be owned and managed by the Conservation Commission for wildlife habitat and passive recreation use only.

## Erosion

Due to Norton's relatively flat terrain, *erosion* of the landscape, in general, has not been a serious problem. The Planning Board and Conservation Commission regulate erosion that is a result of construction and development through their respective permitting processes. As a requirement of any permit, developers must install and maintain siltation control devices such as hay bales and silt fence for any proposed development that could cause erosion. The use of compost is becoming a widely accepted method of stabilizing landscapes. The new changes to the National Pollution Discharge Elimination System (NPDES) permit require that a Storm Water Pollution Prevention Plan be created for any project that alters more than 1 acre of land. Developers and homeowners must illustrate that the proposed project is not going to cause erosion or sedimentation and must routinely inspect the project. The EPA is the lead authority to enforce this change to the NPDES permit.



## Chronic Flooding

Chronic flooding occurs around Lake Winnecunnet and impacts residents living along the shoreline. This natural Great Pond has no outlet structure with which to control the water level. The problem would be worse if upstream wetlands did not hold and absorb some floodwaters

before they reach the lake. Other flood prone areas listed in the Flood Insurance Study, Town of Norton, Community Number 250060 by the Federal Emergency Management Agency (June 18, 1987) include the upper reaches of the Wading River along North Worcester Street, Walker Street and West Main Street, and Hemlock Swamp in southwest Norton. Historically, industries have been damaged at the West Main and South Worcester Street bridges and at Plain Street (by Canoe River). Most flooding has been caused by overflows from Norton Reservoir, Chartley Pond, and the Rumford, Canoe and Wading Rivers. Damage is caused by inundations since stream velocities are usually low.

Although flooding can occur during any season, most floods occur during February, March and



April (due to spring rain and snow-melt). Summer and Autumnal floods occur due to tropical storms and hurricanes along the Atlantic coastline as well as the Nor'easters in the winter months.

The historic high flooding in 2010 was exceptionally difficult for residents. A total of 12 streets were closed due to flooding in March.

The Wading River at Walker Street, Winnecunnet Pond at River Road and King Philip Road and Canoe River at Leonard Street are three areas with the

most severe flooding.

The recent Hydrologic and Hydraulic (H & H) studies of the Norton Reservoir and Chartley Pond have evaluated the inundation areas should either of the dams breach. Pare Engineering Corporation completed the H & H studies in October of 2001 in addition to preparing an Operation and Maintenance Plan and an Emergency Action Plan (EAP) for each dam. The inundation map for the Norton Reservoir shows that properties adjacent to the Rumford River from the dam up to the Crane Street could be affected if the dam were to fail. The Chartley Pond dam would affect properties adjacent to the Chartley Brook and Wading River from the dam up to the dam in the Oakland section of Taunton. There is also the potential for a part of the Wading River to back up to Camp Edith Reid on North Worcester Street in Norton. The inundation maps are included in each EAP. Both the Police Department and the Fire Department have received copies of the EAP.

In 2016-2017, the Norton Conservation Commission, in partnership with SRPEDD and the Worcester Polytechnic Institute's Senior Engineering Capstone Program, undertook an analysis and preliminary redesign of the double culvert system currently conveying the Wading River under Walker Street, in order to address the impacts of chronic flooding at this site. Student interns, working with the Norton Conservation Agent and SRPEDD's Environmental Program Director, conducted an extensive study and evaluation of the site. The results of the study showed that any flood greater than the 5-year flood will cause the Wading River to overtop Walker Street. The project team concluded that the existing double culvert system should be replaced with an open bottom arch culvert, able to handle more than the entire width of the river, is the best solution in terms of environmental, economic, and social impact.

The project and report served as the basis for a grant application to the MA Division of Ecological Restoration's (DER) Culvert Replacement Municipal Assistance Grant Program in June of 2017 (the initial application was not funded, but there are plans to reapply).

## **Sedimentation** *contributed by Joan Guerrero*

Some wetland areas directly adjacent to major roads are subject to *sedimentation* as the winter sands and salts are pushed over the curbs. Sediment also can reach wetland areas and streams in the first flush (typically the first inch) of rain during a storm. In older sections of town, storm water is directed to catch basins that discharge directly into a water body, water way or wetland. EPA's Phase II storm water control regulations aim at controlling and filtering storm water and such *point source and non-point source pollution*.

In 2015, the Norton Conservation Commission received a South Coast Rail Technical Assistance grant, facilitated through SRPEDD in order to engineer and design a natural, low-impact, storm water treatment facility adjacent to the Crane Farm and Three Mile River on Crane Street. The design was completed by the Horsley Witten Group in June of 2016. The design called for the use and retention of native vegetation and soils. These native materials would be integrated into the construction of a swale and vegetated storm water infiltration area between the Crane Farm and bridge along Crane Street.

The Town, in partnership with The Nature Conservancy, received an additional grant from the MA Department of Environmental Protection (DEP) to construct the project in 2017.

The goal of this effort is to reduce the amount of sediment carried by road run-off to the Three Mile River, improve the water quality in the river, and to serve as a demonstration of the benefits of the use of low cost, nature based projects in rural areas. Educational signage is also planned for the site, describing the structure, the plants, and the benefits of the project.

## **New development**

Due to the economy, there has been limited recent development in the Town of Norton. In the last five years, mostly additions, garages, septic system repairs and accessory buildings have been the main type of development. Approximately five commercial/industrial buildings have been constructed in the same timeframe. Two comprehensive permits were filed with the Zoning Board of Appeals but not constructed due to appeals by abutters to MA Housing. Neither project applied for permits through the Conservation Commission yet and will be required prior to construction.

## **Development impact**

The impact of the last five years of development has been greatest to the forested upland areas that are adjacent wetlands (known as the buffer zone). The buffer zone, the areas within 100-feet of a wetland, is rapidly being cleared for additional homes. The Planning Board and Conservation Commission have diligently tried to encourage cluster developments and to encourage an actual buffer zone in order to preserve the forested areas. As these areas become lawns, the native wildlife becomes deprived of their native plants used for food, cover, shelter, and migration.

The 2014 Mass Audubon report, *Losing Ground*, shows that between 2005 and 2013, 102 acres of forested land, agricultural land, bare soil, and areas of low vegetation have been converted to residential developments in Norton.



Our local agricultural activities have been hit hard by the economy and changing ways of life. The cranberry business, in particular, has been hardest hit. The competition from Wisconsin and Canada has reduced the purchase price of cranberries from Massachusetts. A great number of cranberry growers have sold their property due to the increased cost of land and the decreased price of the cranberry crop. Development of these properties has been quick. Since the last OSRP, only two parcels of land under the Chapter 61 and 61A program have been sold and converted to residential use. This accounts for 30.75 acres of land in Norton. Small lots were divided from larger agricultural parcels. One parcel was purchased by the Town at the Fall Town Meeting of 2002. The former cranberry bog on John Scott Boulevard and Harvey Street has been purchased for town uses and recreation. Currently the Slattery Property Master Planning Committee is creating a master plan for the use of the 90-acre parcel. The three major uses for the property appear to be a new Water Department Building, a recreational area and an affordable housing component.

### **Ground/surface Water Pollution, Point and Non-Point Sources** *contributed by Joan Guerrero*

The new changes to the National Pollution Discharge Elimination System (NPDES) Phase II Storm Water Regulations Permit requires that a storm water pollution prevention plan (SWPPP) be created for any project that alters more than 1 acre of land. Developers and homeowners must illustrate that the proposed project is not going to cause erosion or sedimentation and must routinely inspect the project. Uncontrolled runoff causing sedimentation can have a devastating effect on the water quality of water bodies, particularly small streams. The Environmental Protection Agency (EPA) is the lead authority to enforce this change to the NPDES.

EPA's Phase II Storm Water Control Regulations aim at controlling and filtering storm water and such point and non-point source pollution. Non-point pollution remains the largest source of water quality problems and occurs when rainfall, snowmelt or irrigation runs over land or through waterways or introduces pollutants into ground water. Not only can it pollute, water, it can adversely affect vegetation and the shape and flow of streams and other aquatic systems. In addition to sediment, construction activities yield other pollutants such as pesticides, petroleum products, construction chemicals, solvents, asphalts, and acids that can contaminate storm water runoff. Household pollutants consist of pesticides, bacteria, salts, oil, grease, toxic chemicals and heavy metals. Improperly used fertilizers and pesticides can run off during storms from lawns into the street, into catch basins and then directly into streams and wetlands. Tires and trash dumped into lesser used roads pollute swamps. Grass clippings get dumped into wetlands. Careless disposal of oil into catch basins and containers thrown into swamps all contribute to water quality degradation.

Along with the permit required for construction, Phase II requires that minimum control standards must include:

- Public education and outreach to inform the public about storm water runoff and steps to reduce pollution,
- Public participation and involvement to provide opportunities for citizens to participate in program development and implementation,
- Development and implementation of a plan to detect and eliminated illicit discharges to storm sewers
- Development of plans for construction site runoff control

Items in *italics* are included in the Glossary found in Section 12

- Management of post-construction runoff controls
- Pollution prevention from municipal operators (e.g. street sweeping, catch basin cleaning)

One method of dealing with point-source and non-point source pollution is to control storm water runoff.

### **Impaired Waterbodies** *research contributions by Joan Guerrero and Pat McLeod*

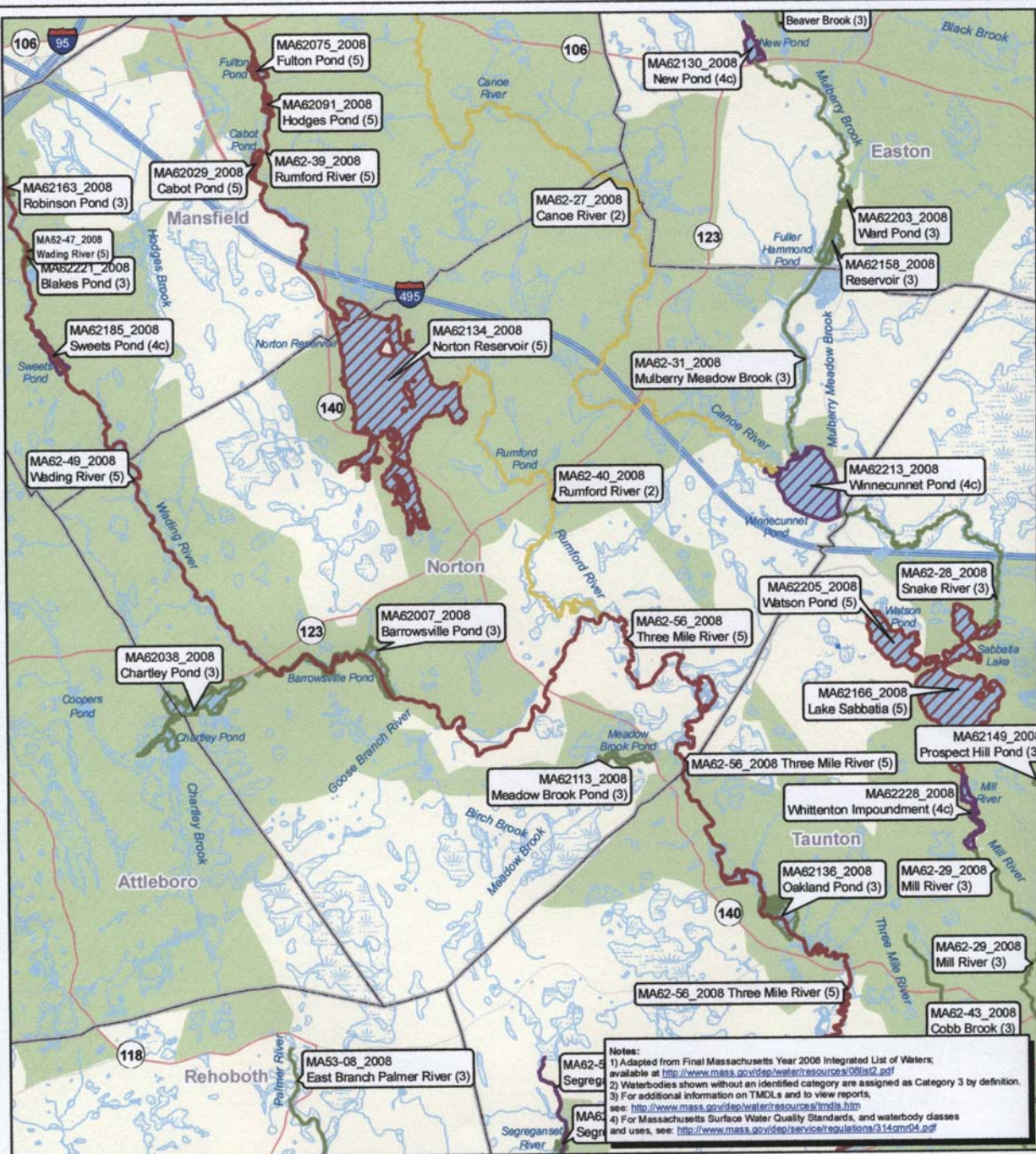
Unfortunately, Norton has several *impaired water bodies* listed in the DEP Section 303(d) list, a section in the federal Clean Water Act requiring states to submit, biannually to the EPA, a list of waterways not meeting assigned water quality standards. The 303(d) list is a list of all known impaired waters in a state or on tribal lands. This list identifies the major pollutants and stressors of the water body or waterway. Waters can become unhealthy due to a number of reasons. The following table illustrates the water bodies and waterways in Norton that are considered to be impaired as listed in the Section 303(d) list. A map on the next page shows the impaired waterbodies.

<b>Waterbody</b>	<b>Impairment</b>
Barrowsville Pond	noxious aquatic plants
Chartley Pond	noxious aquatic plants, turbidity
Meadow Brook Pond	noxious aquatic plants, turbidity
Norton Reservoir	nutrients, noxious aquatic plants, turbidity, pesticides, exotic species (non-polluting)
Winnecunnet Pond	noxious aquatic plants
Three Mile River	pathogens
Wading River	cause unknown, organic enrichment/low DO, pathogens
Rumford River	organic enrichment/low DO, pathogens

*Turbidity* the organic and inorganic particulates in water. Turbidity can occurs naturally and can be promoted by human development. Turbidity can inhibit the recreational and aesthetic value of a waterbody as well as cause a negative effect on aquatic life both within the water column and at the bottom. Turbid water can be especially dangerous for anyone diving into water because the water will be cloudy, making submerged hazards difficult to see. It can also make navigating boats difficult. The turbid waters can reduce the fish population when the suspended solids can fill in between gravel prohibiting fish spawning, remove dissolved oxygen from the water, and decreasing the food sources of macroinvertebrate populations. Adhering to the DEP storm water management policy can help reduce the human-caused turbidity problems by filtering the storm water prior to its reaching a local stream.

*Noxious aquatic plants*, like the exotic invasive plants, can outcompete the native plants and overtake a water body. When the invasive plants take over, the native fish, animals, and





## Waterbody Assessment and TMDL Status Norton, MA



0 0.5  
Miles



Map produced by EPA Region I GIS Center  
 Map Tracker ID 6678, February 25, 2010  
 Data Sources: TeleAtlas, Census Bureau,  
 USGS, MassDEP

Items in *italics* are included in the Glossary found in Section 12

invertebrates are unable to continue their regular diet and leave the pond in search of food or die. The excess plant growth also reduces the amount of sunlight reaching the bottom of the pond and can cause freshwater mussels to die.

*Nutrients* are essential for the growth of both plants and animals. Nitrogen and phosphorus are significant for growth in plants. There are several societal sources of these nutrients such as lawns, road wastewater and storm water runoff. There are several forms of nitrogen including nitrite, nitrate and ammonia. Excessive amounts of nitrate can disrupt the ecological balance in a natural system particularly saltwater and pose a public health threat. Phosphates usually occur in low concentrations in water. Plant growth is limited by the amount of phosphate present in water. Excessive amounts of phosphate in a water body can lead to a condition of unchecked plant growth known as eutrophication.

Waterborne *pathogens* are disease-causing bacteria, viruses and protozoans that are transmitted to people who consume untreated or inadequately treated water. As water moves through a watershed it collects and drains into rivers, lake and groundwater. Along the way it picks up microorganisms. The majority of waterborne pathogens that cause human disease come from animal and human fecal wastes, found in wastewater or animal waste. Harmful microorganisms, such as bacteria, have the potential to be a public health threat. In Massachusetts there are defined limits for a specific bacterium, fecal chloroform, in water bodies. Two protozoans are Giardia and Cryptosporidium. Their consumption can lead to severe problems of the digestive system which can be life threatening to the very young, the very old, or those with damaged immune systems.

Finally, organic enrichment or *low dissolved oxygen (DO)* means that there will not be enough oxygen in the water to sustain the plants and animals. Insufficient dissolved oxygen within the water column causes the anaerobic decomposition of organic materials, resulting in the malodorous release of Hydrogen sulfide, carbon dioxide and methane, typically smelled within a swamp or failed septic system. Insufficient dissolved oxygen adversely affects aquatic insects and their fish predators.

High levels of mercury in water bodies is a widespread problem. Mercury is a natural element that can be found anywhere. However, human activities have significantly increased the levels of mercury in the environment. Burning coal and trash disposal have been the major culprits. Many common products contain mercury and are burned, dumped into landfills, or dumped down drains. Mercury is transformed into methylmercury by natural processes when in lakes, ponds and oceans. Methylmercury is absorbed by smaller organisms, consumed by fish and is concentrated as it moves up the food chain. Fish containing mercury pose a significant health risk especially to pregnant women and children. In June 1998, the New England Governors and the Eastern Canadian Premiers adopted a regional mercury action plan to reduce mercury pollution in the region. Massachusetts has already reduced mercury emissions by 50%. Contact the Department of Environmental Protection or the Water/Sewer Department to properly dispose of mercury-containing products like thermostats and thermometers or call 1-866-9MERCURY.

*Resources on impaired water bodies:*

- [www.microbeworld.org](http://www.microbeworld.org)
- DEP Section 303(d) list of impaired waters

Items in *italics* are included in the Glossary found in Section 12



## Storm Water Management

Impacts to the Commonwealth's water quantity and quality due to *storm water runoff* (water that flows across the landscape after rain or snow melt) have become increasingly better understood. For a number of years, when areas were developed, storm water was collected in catch basins (the real name for the "sewer" drains in Norton) and directly discharged to a wetland or stream. The main goal was to remove the water from the road as quickly as possible. Normally, storm water would percolate into the ground, reaching the stream slowly, and the associated wetlands could absorb the storm water over a period of days prior to releasing the water into the stream. Storm water would also percolate into the forested areas, replenish aquifers and travel toward the stream as groundwater. Under normal conditions the base flow of the stream would be fairly constant because the storm water was reaching the stream more slowly and in a constant amount. As the upstream watershed areas became developed, roads were paved and the storm water was piped directly to the streams. This caused the water to reach the streams more quickly and with a greater intensity. The uncontrolled storm water can alter the path of watercourses due to increased velocities and cause erosion of the streambeds. The wetlands cannot absorb all of the storm water at one time, causing the streams to swell, change their normal courses and create a "flash flood" situation. The increased flooding situations affected the quantity of water within the streams and wetlands.

Another concern over storm water is its ability to carry pollutants like salts, pesticides, metals, hydrocarbons and solids from roads, parking lots and lawns. Piped storm water can deposit the pollutants in nearby streams and wetlands. The excess of pollutants damages the wetland ecosystems and the wetland's ability to filter small amounts of pollutants from storm water. This can also cause the destruction of aquatic habitats and increase algal growth. When storm water runs off paved surfaces the water gets warmer and can cause the water within wetlands and streams to increase too. This is called thermal flushing. Increased temperatures have a negative impact on macroinvertebrates and fish which means that a cold stream could become a warm stream. And streams where people like to find brook trout could change to only be suitable for catfish. The transport of pollutants negatively affects the quality of water within streams and wetlands.

In 1996 the Department of Environmental Protection adopted the *Storm Water Management Policy* to address negative impacts to our water quantity and quality. The policy is a method of evaluating the effects of storm water on the environment and minimizing those impacts. The policy aims to prevent untreated storm water from entering streams and wetlands, preserve the pre-development integrity of the hydrologic conditions after construction, reduce and prevent flooding impacts of development, minimize erosion and sedimentation, improve water quality, reduce pollutants and provide increased protection for sensitive areas. Nine storm water management standards have been developed as part of the policy. The standards apply to nearly all projects. The storm water management policy lists the following nine standards and their descriptions.

*Standard 1:* No new storm water conveyances (i.e. outfalls, pipes) may discharge untreated storm water directly to or cause erosion in wetlands or waters of the Commonwealth.

*Standard 2:* Storm water management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. For example, a

Items in *italics* are included in the Glossary found in Section 12

detention basin may be designed for a project to retain water during a storm and release it slowly to approximate pre-construction conditions.

*Standard 3:* Storm water must be allowed to infiltrate and recharge groundwater in the post-development rates approximately as much as the annual pre-development rates, based upon the soil types. Some projects incorporate a dry well or an infiltrator device to allow the “clean” storm water that is retrieved from a rooftop with a gutter system to percolate into the ground to recharge the groundwater supplies.

*Standard 4:* The storm water management system must be designed to remove at least 80% of the total suspended solids in the post-development conditions. In certain areas, pretreatment of pollutants must be greater than 44% before reaching a basin. The forebay section of a detention basin catches the first inch of water during a storm, holds it in a smaller basin, and slows the velocity of the storm water enough so that the larger sediments and sands will settle onto the bottom of the forebay. Water then flows to the detention basin for additional treatment and the water that leaves the detention basin is theoretically clean when it enters the wetland area.

*Standard 5:* Specific storm water management structures and pretreatment devices are required for projects that contain a higher potential pollutant load. Projects with a higher potential pollutant load include projects that expect greater than 1,000 cars per day, fast food restaurants, gas stations, salvage yards, and commercial nurseries. In these situations, the detention basins must be sealed or lined so that if a pollutant is released it can be captured and removed prior to it entering a wetland area. Treatment devices that encourage infiltration cannot be allowed with these types of projects.

*Standard 6:* Specific storm water management structures and pretreatment devices are required for and some structures are prohibited from use with projects that contain a Critical Area. Critical areas include certified vernal pools, wetlands within an Area of Critical Environmental Concern, rare habitat areas, shellfish growing areas, cold water fisheries, recharge areas for public water supplies and public swimming beaches. Treatment devices in these areas have a much higher standard for treatment and must have a “shut off” or containment feature to contain an unexpected spill.

*Standard 7:* Redevelopment of previously developed sites must meet these standards to the maximum extent practicable. This means an abandoned building may be redeveloped but should incorporate as many of the storm water management standards as possible and improve the existing conditions of the site.

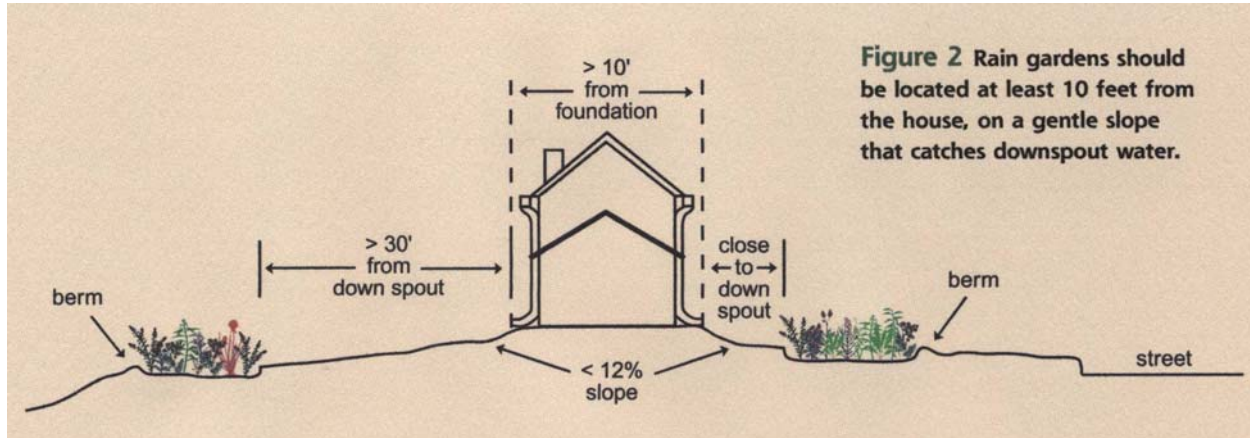
*Standard 8:* Erosion and sedimentation devices must be in place for all projects. Silt fence and compost berms are most commonly used to provide a barrier between the construction activity and the wetland areas. The erosion control devices filter the storm water as it leaves the site and prevent the silt and sediment from entering the wetlands during storm events.

*Standard 9:* An operation and maintenance (O & M) plan must be adopted. The O & M must list the parties responsible for maintaining all aspects of the storm water management system, all activities that must be done on an annual basis in order to keep the system in good



working condition. For example, an O & M plan would list that the developer will sweep the streets, empty the sediments at the bottom of the catch basin, clean the sediment out of the forebay, mow the grass on the side slopes of the detention basin and keep trash out of the outlet structure.

In February of 2008, the Department of Environmental Protection changed the Mass Wetland Protection Act to include the Storm Water Management Policy. This changed the Policy into a Regulation. All projects that trigger storm water management are now required to provide mitigation, create and implement Operation and Maintenance Plans for the drainage systems, and provide better pretreatment of pollutants. Because of the documented impacts to rivers and streams due to changes in the watershed (see Impervious Cover, page 132), the new changes include requirements to increase the amount of water that is recharged into the ground. The new changes encourage *Low Impact Development* techniques and better source control of pollutants. Some examples of Low Impact Development (LID) techniques include reducing the size of roads to appropriate widths, using smaller swales instead of large detention basins, and more thoughtful planning. Wheaton College has implemented some of these in their parking lots since 2008.



One example of an LID technique is this rain garden (shown above). Schematic is taken from Raingardens: A How-to Manual for Homeowner's.

Both the Planning Board, under the subdivision by-law, and the Conservation Commission, under the Wetland Protection Act Regulations, have legislative authority to require all projects comply with the storm water management policy. Copies of the storm water management forms, drainage calculations and engineered plans are required with permit applications in order for local boards to evaluate a project's compliance. The jurisdictional authority also comes from the Clean Water Act and the Massachusetts Water Quality Standards (314 CMR 3.00 and 4.00).

As part of the town's NPDES (National Pollutant Discharge Elimination System) permit and MS4 (Municipal Separate Storm Sewer System), Norton adopted a Stormwater Management Bylaw in 2016. Under the bylaw, all construction projects, regardless of size, must control their stormwater and sediment. The town's requirements are based upon the project type. Smaller projects have general housekeeping requirements and larger projects have a full suite of controls as required by the (EPA) Environmental Protection Agency.

#### *Resources on storm water:*

Items in *italics* are included in the Glossary found in Section 12

- DEP Storm Water Management, February 2008.  
<http://www.mass.gov/dep/water/laws/policies/htm#storm>
- Summary of Storm water amendments to Wetlands Protection Act Regulations (310CMR10.00) and 401 Water Quality Certification (314CMR9.00).  
<http://www.mass.gov/dep/water/laws/stmrreg.doc>
- DEP Southeast Region contacts, [Margo.Clerkin@state.ma.us](mailto:Margo.Clerkin@state.ma.us) 508-946-2735
- Storm Water Phase II Rule Fact Sheet Series. U.S.EPA Water Resource Center. 202-206-7786 or [www.epa.gov](http://www.epa.gov)
- Low Impact Development (LID) at <http://www.lowimpactdevelopment.org/> and <http://www.epa.gov/owow/NPS/lid/>
- Rain Gardens: A How-to Manual for Homeowners. By Roger Bannerman, Wisconsin Department of Natural Resources and Ellen Cosidine, US Geological Society. U-W Extension office, Cooperative Extension Publications, 2003. [www.clean-water.uwex.edu/pubs/raingarden](http://www.clean-water.uwex.edu/pubs/raingarden).
- MS4. <https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit>

## Exotic, invasive plants

Non-native species that quickly invade native and managed areas are known as exotic, invasive plants. They may also be known as simply “the invasives” or “non-natives”. While this definition is fairly broad the main point is that the species invades. Invasives outcompete our native plants (ones here before colonization) and cause a serious problem for our native wildlife that depend upon our native plants for their basic life functions such as food, cover, shelter and nesting. Our



native plants can better cope with environmental stresses such as climatic changes like drought or flooding and disease, and sustain the populations of plants and animals within an ecosystem during one of these tragedies. The invasion of a non-native plant can lead to a decrease of an ecosystem’s diversity. Muskrats that once lived in a cattail marsh will be forced out of their

habitat due to an invasion of Phragmites or Common Reed.

*This photograph was taken by Christopher Cox and illustrates how an exotic invasive plant (Purple Loosestrife) can fill in a pond and narrow the channel of the Canoe River.*

A non-native plant may have a more efficient propagation process. Some non-native plants can produce seeds faster and disperse them farther than our native plants. Purple loosestrife and

Items in *italics* are included in the Glossary found in Section 12

autumn olive are good examples of this. Some invasives simply grow faster than our natives. Mile-a-minute is a good example of a plant that grows extremely fast and is appropriately named. Other invasives are driven by economics, such as the landscaping industry. A desire for burning bush and Lombardy poplar, in addition to these plant's growing habits, have led to the proliferation of these species and their addition to the list of invasive plants.

Common exotic, invasive plants that have become established in Norton include Oriental bittersweet, purple loosestrife, common reed, European buckthorn, Japanese knotweed, Japanese barberry, multiflora rose, Norway maple, black swallowwort, honeysuckles, burning bush, autumn olive, Eurasian water milfoil, variable water milfoil and Fanwort. Norton Reservoir and Winnecunnet Pond are two locations where invasive plants are abundant. Unfortunately, town meeting members did not approve funding for management project in these two areas.

Barrowsville Pond was the only known location of water chestnut in Norton. This plant appears to have been brought to town in the feathers of birds. In 2008, the Open Space Committee identified the new exotic invasive plant and immediately began a removal project. Water chestnut is an annual plant which means that if we pull the plant out of the water before it produces a seed, it will not grow back the following year. The Open Space Committee obtained a permit from the Conservation Commission to do work within the pond and remove the invasive plants. Only the invasive plants are removed, other native vegetation and the perennial invasive plants are left in place. In the last two years, we have removed about 15% of the plants from Barrowsville Pond. The seeds are viable in the mud for about 7 years, so this will be one of the town's long-term management projects. We have received donations from B & B Landscaping and Dorrence to help remove the plants as well as many volunteers ranging from the Norton highway department, boy scouts, high school students, and other volunteers. This is one project where we can really see a difference from year to year and where we can prevent water chestnut from spreading throughout town. It will take many more volunteer days!

Some may say that the invasive nature is just survival of the fittest and the human introduction of these species to the landscape is irrelevant. Others will argue that we have a responsibility as stewards of this planet to try to maintain the diversity of plants and animals. Controlling the exotic, invasive species may not be as costly as doing nothing.

In 2010 Chartley Pond was reported to have two locations of water chestnut. Quick eradication at this location is a priority of the Open Space Committee. (See section on Barrowsville Pond on Page 49 for more exotic invasive plant information.)

In 2016 Town Meeting approved funding for the permitting and treatment of exotic invasive plants. The town presented this plan as a five-year (5-yr) capital project. In the Spring of 2017, the Norton Reservoir, Winnecunnet Pond, Barrowsville Pond and Chartley Pond were all treated for exotic invasive species, which include water chestnut (*Trapa natans*), variable-leaf milfoil (*Myriophyllum heterophyllum*), Eurasian water milfoil (*Myriophyllum heterophyllum*) and fanwort (*Cabomba caroliniana*).

*Resources on exotic, invasive plants:*

Items in *italics* are included in the Glossary found in Section 12

- [A Guide to Invasive Plants in Massachusetts](#). Pamela B. Weatherbee, Paul Somers and Tim Simmons. The Biodiversity Initiative, Massachusetts Division of Fisheries and Wildlife. June 1998.
- [A Guide to Invasive Non-native Aquatic Plants in Massachusetts](#). Hellquist and C. Barre, Massachusetts Department of Environmental Management, Lakes and Ponds Program. 1998.
- IPANE project c/o New England Wildflower Society, 508-877-7630. Seeks volunteers. [www.newfs.org/invasive/invasive.htm](http://www.newfs.org/invasive/invasive.htm)  
[http://invasives.eeb.uconn.edu/ipane/currentinvasives/current\\_inv.htm#life](http://invasives.eeb.uconn.edu/ipane/currentinvasives/current_inv.htm#life). (IPANE list of invasive plants).
- NIPGro. (New England Invasive Plant Group) c/o Silvio O. Conte National Fish & Wildlife Refuge, 52 Ave A, Turners Falls, MA 01376. Cynthia Boettner, 413-863-0209 ext. 6, <http://invasives.eeb.uconn.edu/ipane>.
- Nature Conservancy <http://tncweeds.ucdavis.edu/photos.html>.
- Northeast Aquatic Nuisance Species Panel [www.northeastans.org/imagelinks.htm](http://www.northeastans.org/imagelinks.htm) or [www.NEANS.org](http://www.NEANS.org).

## Impervious Cover (Paved Surfaces)

Paved surfaces, like roads, buildings, house footprints and driveways are known as *impervious cover*. Impervious cover does not allow water to infiltrate the ground and replenish our aquifers. Aquatic habitat degradation and reduced infiltration of water into the ground have been directly linked to the amount of imperviousness in a watershed. The best scientific evidence available shows that greater than 10% impervious cover in a watershed will begin to degrade water quality, reduce water quantity available for groundwater, reduce stream channel stability, reduce stream biodiversity and increase potential for pollutant impacts. What does this really mean to you? This means that since water cannot penetrate the ground after a storm, it will run off paved surfaces to the nearest wetland/stream. The increased rate and volume of water will cause a flash-flood and could erode the stream channel. The water is also moving very quickly and heats up before it enters the stream. The water may carry pollutants and sediment that could pollute the stream and poison wildlife.

Ideally we would like the water to percolate into the ground and slowly join the rest of the groundwater on its path to the wetland/stream. This keeps the water cooler and flowing more consistently throughout the year. And cooler, consistently flowing water maintains our fish habitat. Studies have shown that there is more life per stream length in the smaller streams (or headwater streams) than in the larger ones. So it is extremely important to preserve the forested areas around wetlands/streams, particularly in the headwaters, if we are to maintain our fish habitat.

The MA Storm Water Management requirements aid us in treating storm water from impervious cover so that it is infiltrated and the pollutants are removed. We should differentiate between storm water from impervious cover that isn't treated and storm water from impervious cover that does meet the Storm Water Management requirements and *is* treated. The untreated storm water is the problem (see the Storm Water Management section on page 139 for more details).

The impervious cover of the six major watersheds in Norton was evaluated in 2008. Impervious cover was found to already be greater than or approaching 10% for each of Norton's watersheds. Adrienne Edwards, the Town of Easton GIS Coordinator, created the Impervious Cover Map on the next page for us and found that 20% of the Rumford River, 13% of the Wading River, 13% Items in *italics* are included in the Glossary found in Section 12



of the Three-mile River, 13% of the Canoe River, 8% of Mulberry Meadow Brook and 9% of the Mill River watershed were impervious. A second map, created by the Environmental Protection Agency, is also included. These maps demonstrate that Norton's waters are already impaired and resulting in changes to our wildlife. If we are to simply maintain what we have now, we will need to start thinking about getting water back into the ground. The maps in this section illustrate the impervious cover.

In addition, the Massachusetts Wellhead Protection Regulations 310 CMR 22.21(2)(b)(7) requires municipalities to adopt impervious surface controls in approved Zone II recharge areas of public wells, further highlighting the importance of reducing impervious cover and encouraging infiltration of storm water. In order for Norton to maintain stream channel integrity, recharge capacity for all watersheds, and the quality and quantity of biodiversity; all projects with proposed impervious cover should be required to provide a groundwater recharge component. Groundwater recharge mitigation for impervious cover on single family lots should also be required.

There are easy ways for residents to infiltrate storm water on their own properties before there is a problem. There are many alternatives to pavement and ways to conserve/reuse water. Residents can use rain barrels at their downspouts for watering lawns, gardens and flowers. They can also create rain gardens near driveways and downspouts so the water goes directly to a flower garden and saves the owner from having to carry water back and forth. Pervious pavement can be used as a hard surface for driveways that is suitable for winter plowing but allows water to infiltrate. Pervious pavers can be mingled with gravel to create patterns on walkways and patios.

Developers can include infiltration basins in their storm water management systems and use cluster development to reduce the amount of paving and increase the amount of maintained forest cover. In this manner, new development projects can preserve our environment and allow for new growth. Balancing natural resource protection with growth and development is the goal!

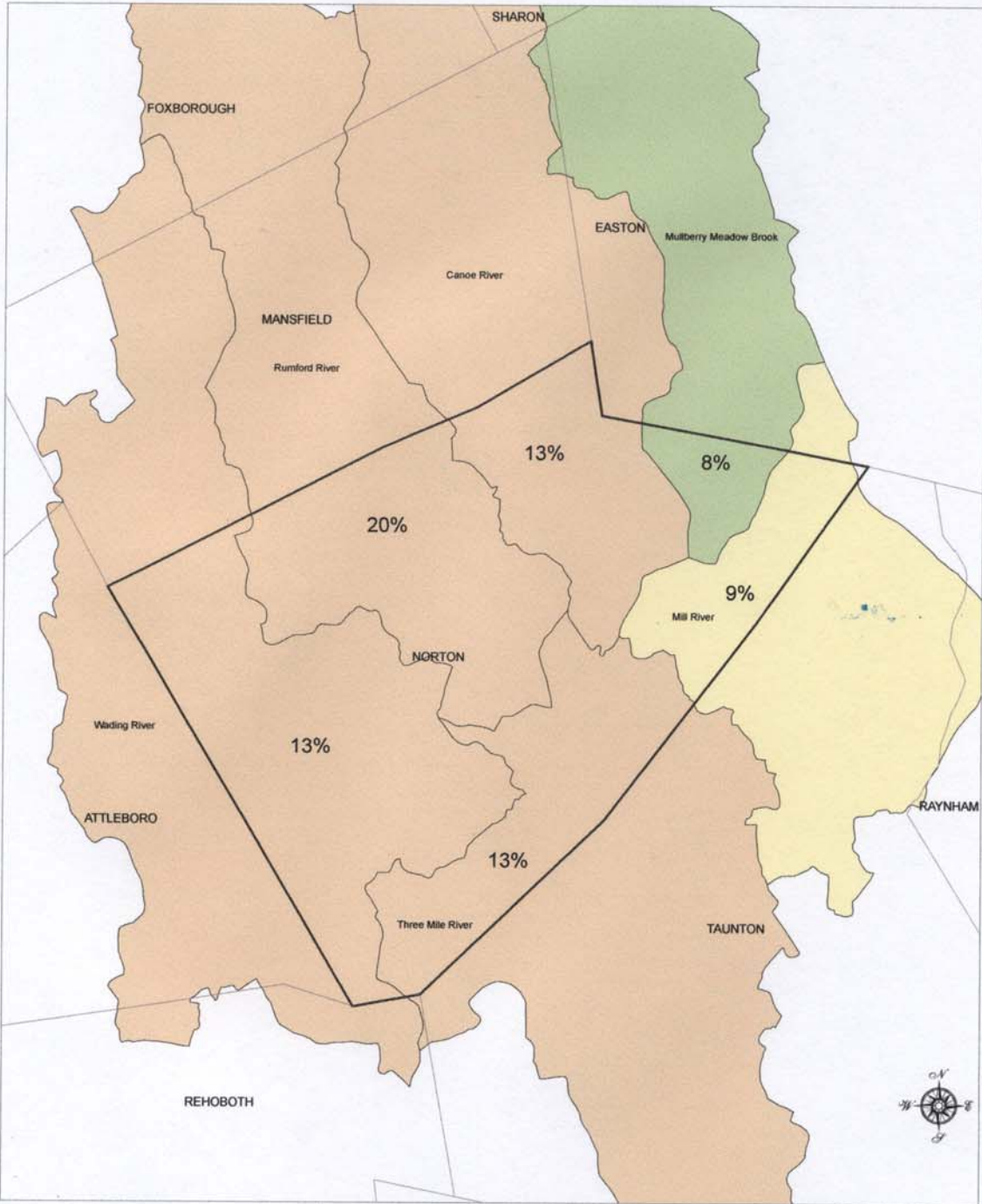
*Resources on impervious cover:*

Impacts of Impervious Cover on Aquatic Systems. Tom Shueler. Center for Watershed Protection, March 2003. <http://www.cwp.org/>  
Trout Unlimited. <http://www.tu.org/>

Rain Gardens: A How-To Manual for Residents at <http://clean-water.uwex.edu/pubs/pdf/home.rgmanual.pdf>

Pervious Pavement information can be found at <http://www.lakesuperiorstreams.org/stormwater/toolkit/paving.html>

# Town of Norton: Taunton River Basin Sub-Basins



**Norton Watersheds**  
**Percent Impervious Cover**

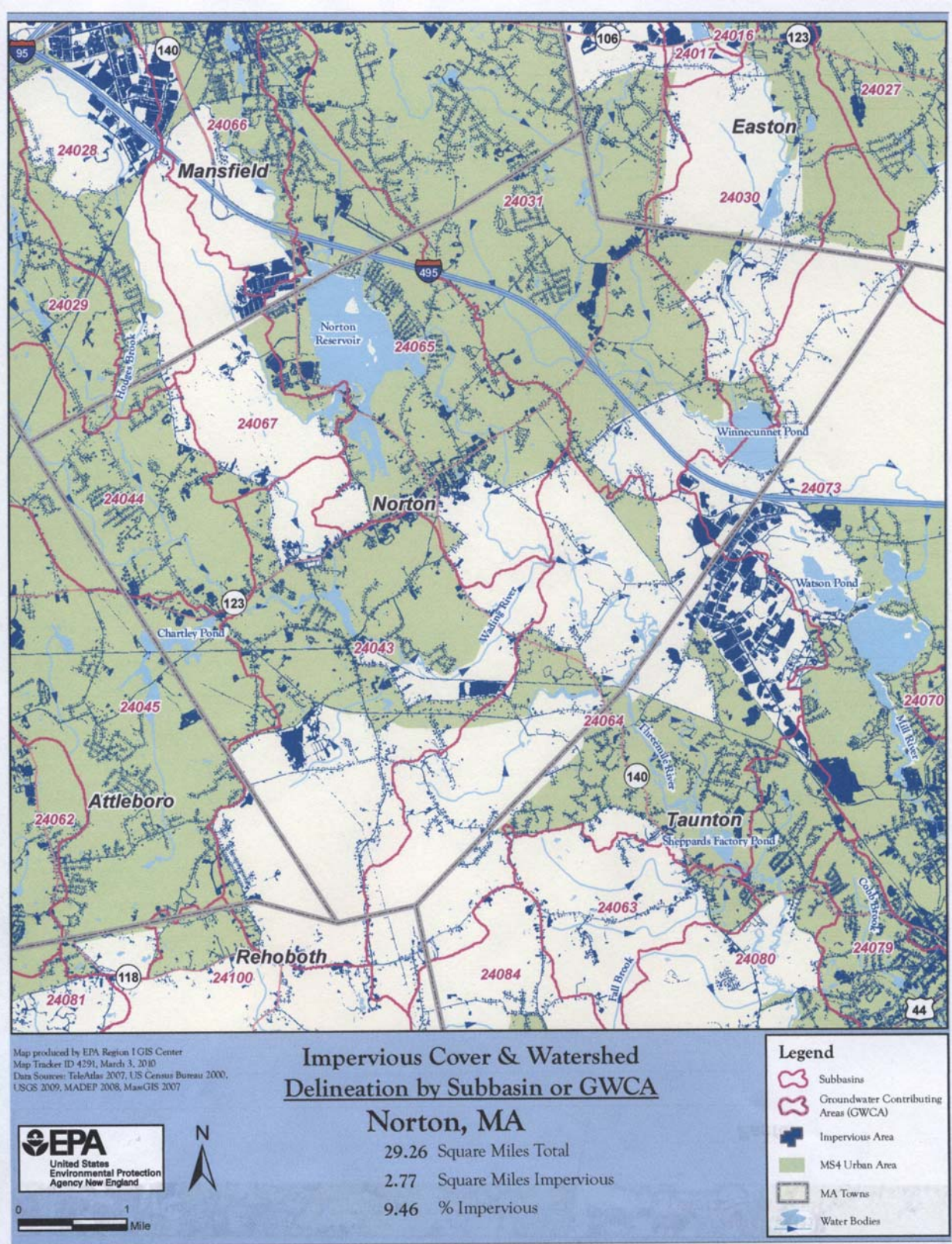
- 8%
- 8.1%-12%
- >12%

0 0.2 0.4 0.8 1.2 1.6 2 Miles



Prepared by  
Norton Watershed Committee 2017  
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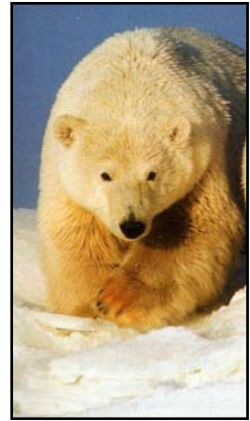




Items in *italics* are included in the Glossary found in Section 12

## Climate Change

Despite strong resistance to the idea of climate change, nearly three decades of scientific research has clearly documented that our climate is changing more quickly due to human disturbances than historic changes. The question is no longer, is climate change a real threat? States, private non-profit land trusts and municipalities are evaluating the data in an effort to understand *how* the climate will change and *how* that will impact current land use and land management decisions.



The following excerpt regarding climate change was taken from Voluntary Guidance for States to Incorporate Climate Change into State Wildlife Action Plans & Other Management Plans, a collaboration of the Association of Fish & Wildlife Agencies' Climate Change and Teaming with Wildlife Committees, November 2009 and outlines the general global trend.

*Despite the certainty that climate change is currently underway and having an impact on natural resources, there are still many unanswered questions about how these climate effects will play out at local, state and regional scales and how ecosystems will respond to those changes.*

*Although there is still uncertainty on regional variations in climate change impact, it is likely the nation's fish and wildlife species and their habitats will experience many of the following impacts:*

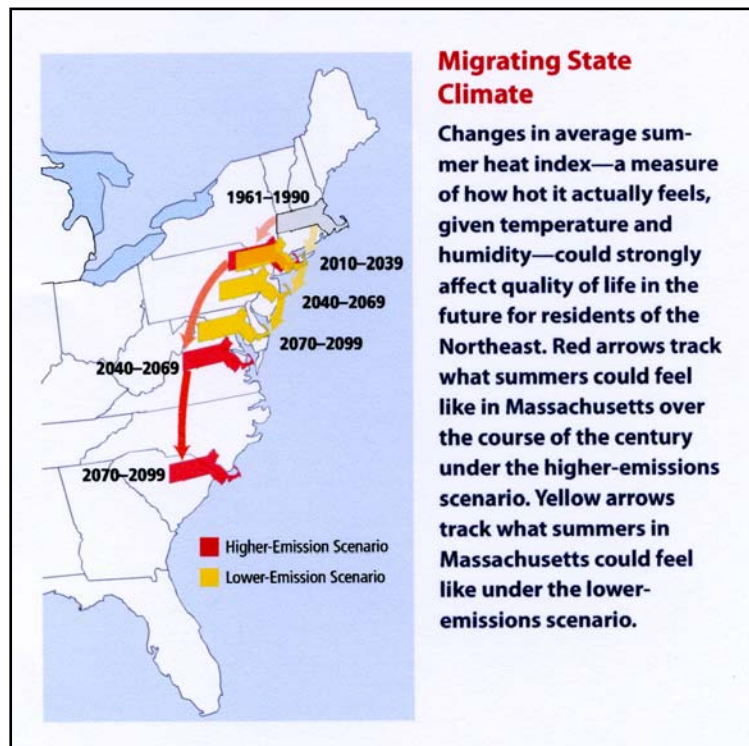
- 1. Temperatures and precipitation changes will vary regionally but will lead to changes in the water cycle that will impact both aquatic and terrestrial species.*
- 2. Extreme events such as floods, heat waves, droughts and severe storms are expected to increase resulting in increased wildfires, pests, diseases and invasive species that will alter habitat for many species.*
- 3. Sea level rise will result in significant losses to coastal wetlands and estuary habitats. Some regions will see large shifts in their coastline due to increased sedimentation and/or coastal erosion. Ocean acidification will impact marine life, particularly coral reef ecosystems.*
- 4. With increasing temperatures, flora and fauna will migrate northward and/or to higher elevations to escape warming conditions. For some species, the inability or lack of opportunity to migrate to a more suitable climate may lead to extinction or [extirpation](#).*
- 5. Temperature increases will alter seasons and all the physiological processes associated with certain seasons. This will result in [phenological](#) shifts which may cause misalignment of food availability and reproduction.*
- 6. Reduced snowpack and increased temperatures in streams, rivers and lakes will contribute to decreased populations of freshwater and anadromous fish such as salmon and trout and altered flooding regimes that will affect spawning and rearing habitat for many aquatic species.*

Items in [italics](#) are included in the Glossary found in Section 12



*Individual species and habitats will have very different responses to climate change. Many species and habitats will be negatively affected by climate change and will require a special set of actions in order to ensure their survival. Some species may benefit from a changing climate and could expand their range or increase in abundance; requiring a separate set of actions. In addition, the movement of species will create new communities of species for which there will be no previous examples and will require new management regimes. Wildlife management plans will need to reflect these changes and will likely need to be updated on a more frequent basis. Climate change is a large and growing threat to wildlife and natural systems, but it will also exacerbate many existing threats. Efforts to address climate change should not diminish the immediate need to combat threats that are independent of climate change, such as habitat loss, invasive species spread, pollution and wildlife diseases. Our goal should be to sustain ecosystems and viable wildlife populations regardless of the threat.*

Globally, since 1895, temperature have risen by 2.8 degrees Fahrenheit. Over this same period of



time, temperatures in New England and Massachusetts have risen by 3,3 degrees Fahrenheit. Potential changes due to climate change in MA include a 6-10-degree temperature increase in the next century. MA's climate would be more like Charlotte NC, Richmond VA or Atlanta GA. Changes in the climate will directly influence our ability to grow certain crops and for our forests to respond to the temperature changes. In fact, since 1950, the growing season in the northeast has increased by 10 days. This will have a significant effect on our local economy, food availability, air quality and health. Our fall foliage of birch, maple and spruce would have to migrate north if the warming trend was slow enough for

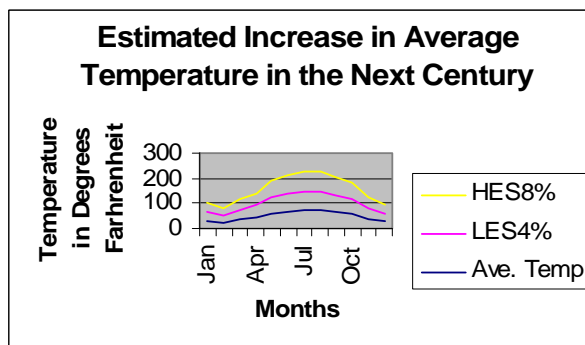
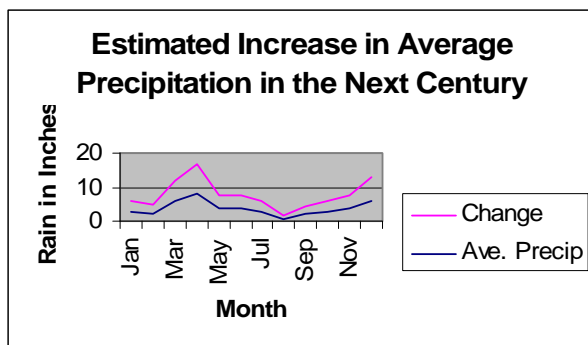
the trees to migrate or those trees could become extirpated from the northeastern US. The fall foliage, ski, maple syrup and fisheries industries would suffer or disappear. With hotter temperatures and declining forest cover, smog and acid rain would increase and diminished air quality could create more heat and respiratory related deaths in summer. Lyme, West Nile Virus, Eastern Equine Encephalitis could spread and currently unknown illnesses like malaria and dengue fever could become more common. Map source: Union of Concerned Scientists.

In the northeast, including all of New England, the occurrence of very heavy precipitation has increased by 74% since 1958. Overall, precipitation could increase by 10% in the Spring/Summer, 15% in the Fall and 20-60% in the Winter. This change will significantly affect our ability to provide clean drinking water and methods of protection from the weather and

Items in *italics* are included in the Glossary found in Section 12

flooding. Winter precipitation would likely switch from more snow to more rain, creating an increase in flooding where rain cannot infiltrate the frozen ground. Rain events would also become more extreme with increased frequency and intensity of hurricanes, nor'easters, heavy winds, rainstorms and flash floods as well as increases in tornadoes. Sea level rise and changes in hydrology will likely lead to increased flooding. Lakes and ponds would see more algal blooms and spread of exotic invasive species.

So the question becomes, what will be the impacts be to Norton's landscape and how can we plan for the future? Norton is unlikely to be impacted by sea level rise, although portions of neighboring Taunton are impacted by tidal influences in the Taunton River and will likely experience a 3-4 foot in sea level rise (sea level has increased by 10 inches in the northeast since 1922). This will have an impact on our groundwater levels anywhere from 1-2 miles from the Taunton River, but the extent of groundwater change is not yet known. There could be serious implications for residential septic systems and continued effective functioning of local culverts and drainage systems. Our present wetlands and upland forests are absorbing carbon from cars and industry and should have strict protections to maintain those carbon sinks. We will need to protect different natural communities and wildlife habitats as well as the linkages between them in order to keep our native wildlife.



These tables are based on Norton climate data and projected increases due to climate change. They show the general increasing trends. Particular attention should be paid to the Spring months where average precipitation is likely to increase dramatically. We already have significant flooding after snow melt and spring rains. In 2010, twelve roads were closed in Norton all at the same time during the March storms. Also note the second graph. The HES is the High Emission Scenario and LES is the Low Emission Scenario. These percentages are based upon whether we can successfully reduce our greenhouse gas emissions over the next few decades. Notice that both scenarios still show a dramatic increase in summer temperatures. The question is not *if* the temperature will rise, the question is to *how much*? Such higher temperatures will have important impacts to how we grow food in household gardens, how much energy will be needed for air conditioning, how much water is available for drinking, never mind irrigation purposes.

## CLIMATE CHANGE RECAP

Precipitation                      10% increase for Spring/Summer  
    15% increase for the Fall  
    20-60% increase for the Winter

Temperature                      2-4% increase for low emissions scenario

Items in *italics* are included in the Glossary found in Section 12



8% increase for high emissions scenario

Heavy storm events                      74% increase in heavy rain events

Sea level/groundwater                  3-4 feet rise in sea level with a 1-2 mile influence to increase groundwater levels

With climate change predictions, come a lot of gloom and doom but there are small things that everyone can do to try to make it less gloomy! *Many hands make light work!* If everyone does a small part, we can reduce the impacts and save residents money in the process. Reducing greenhouse gases and pollution, maintaining our forests to promote absorption of carbon dioxide and investing in green technologies would do the most to reduce the impacts of the incumbent changes. This means using our purchasing power to buy cars that produce the least emissions and purchasing products from responsible companies who are actively reducing their emissions. Preserving large forested areas and maintaining a variety of age-size trees to maximize carbon absorption is another critical action Norton can take. Investing in solar and wind technologies for energy, requiring green building materials and energy efficient doors/windows/appliances in our building permits can all help. There isn't any one magic solution for reducing the harmful effects of climate change, but we can adapt to them even by taking many small actions as residents and through town regulations to create a beneficial cumulative effect.

## **HERE ARE A FEW THINGS WE CAN DO LOCALLY TO REDUCE THE IMPACTS OF CLIMATE CHANGE:**

### Reduce winter heat and summer cooling costs

- maintain trees around homes and businesses, particularly on the north side
- use energy efficient building materials
- take advantage of tax credits for energy efficiency
- implement *Green Communities Act*

### Maintain recreational boating, fishing and wildlife habitat

- provide storm water management for all new impervious surfaces with strong encouragement of infiltration
- retrofit storm water management systems for previously paved surfaces
- make sure detention basins are large enough to contain the pre-development volume of storm water and to account for frozen conditions in winter

- reduce amount of fertilizer on lawns to reduce phosphorus input to local streams and ponds
- create plans for maintaining exotic invasive plants
- maintain large vegetated buffers to wetlands and streams including the intermittent ones
- preserve different types of natural communities and their linkages to each other and neighboring town's habitats

### Maintain local air quality and temperatures

- preserve large forested areas that are maintained with forestry plans
- reduce carbon dioxide emissions from cars, and businesses
- plant new street trees on local roads
- encourage green technologies like solar and wind power

- reduce your carbon footprint by planting trees or purchasing forested land

#### Minimize health risks

- better public education about mosquito- and tick-borne illnesses
- maintain land for tick management
- ensure septic systems are not constructed in flood prone areas, provide shade at recreation fields
- reduce emissions

#### Buy local

- Locally grown vegetables/fruits
- Locally produced wood/forest products

#### Reduce flooding impacts and maintain stream bank integrity

- provide storm water management as described above
- maintain large vegetated buffers to wetlands and streams
- create new wetland areas in flood-prone areas to store the flood waters
- repair/replace ineffective culverts and replace with box culverts or bridges
- do not build or cut vegetation in the floodplain

#### Maintain integrity of local groundwater drinking water supplies

- maintain large forested areas around groundwater wells

- encourage infiltration of storm water for all impervious surfaces
- identify point-source and non-point source pollution in the drinking water supply watershed
- retrofit storm water management devices to clean pollutants before entering the water system
- provide safeguards for potential pollution sources into the groundwater
- encourage water conservation and minimize importance of lawn irrigation needs vs. need for water to drink or bathe
- revise zoning or create new bylaw to include the more accurate Cornell University rainfall data in determining storm water calculations. Rainfall amounts shall be taken from the Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada known as the “Cornell data”. The following values should be used for our region:
  - 2-yr storm=3.3 inches
  - 5-yr storm=4.2 inches
  - 10-yr storm=5.0 inches
  - 25-yr storm=6.2 inches
  - 50-yr storm=7.4 inches
  - 100-yr storm=8.75 inches

#### *Resources on climate change:*

New England Climate Coalition at [www.newenglandclimate.org](http://www.newenglandclimate.org)

New England Aquarium at

[http://www.neaq.org/conservation\\_and\\_research/climate\\_change/index.php](http://www.neaq.org/conservation_and_research/climate_change/index.php)

Climate Change Research Center, University of New Hampshire at <http://www.ccrs.unh.edu/>

Calculate your ecological footprint at

<http://www.footprintnetwork.org/en/index.php/GFN/page/calculators/>

Calculate your water footprint at

<http://environment.nationalgeographic.com/environment/freshwater/water-footprint-calculator/>

US Fisheries and Wildlife Service at <http://www.fws.gov/home/climatechange/strategy.html>

Union of Concerned Scientists at

[http://www.climatechoices.org/assets/documents/climatechoices/massachusetts\\_necia.pdf](http://www.climatechoices.org/assets/documents/climatechoices/massachusetts_necia.pdf)

Items in *italics* are included in the Glossary found in Section 12

Climate data taken from Norton city profile at <http://www.city-data.com/city/Norton-Massachusetts.html#top>

Northeast Regional Climate Center at Cornell (NRCC) Extreme Precipitation in NY and NE: [www.precip.eas.cornell.edu](http://www.precip.eas.cornell.edu)

Third National Climate Assessment, U.S. Global Change Research Program, 2014; [www.nca2014.globalchange.gov/report](http://www.nca2014.globalchange.gov/report)

NOAA Climate Division Database (nCLIMDIV); [www.ngdc.noaa.gov/cag](http://www.ngdc.noaa.gov/cag)

Resilient Taunton Watershed Network at [www.srpedd.org/rtwn](http://www.srpedd.org/rtwn)

### **Light Pollution** *contributed by Jennifer Carlino*

Ever try to look for stars at night or see an eclipse or meteor shower? It is getting increasingly more difficult as the years pass, even in suburban Norton. It was once much easier to see the night sky. The effects of development on the night sky are well documented and satellite images like the one below clearly illustrate just how much energy is being used to light areas at night.



**Earth at Night** 2000 November 27

**Credit:** C. Mayhew & R. Simmon (NASA/GSFC), NOAA/ NGDC, DMSP Digital Archive  
<http://antwrp.gsfc.nasa.gov/apod/ap001127.html>

There are four components to *light pollution*, which is defined as an excessive and inappropriate artificial light.

- Urban sky glow-the brightening of the night sky over inhabited area
- Light trespass-light falling where it is not intended, wanted or needed
- Glare-excessive brightness which causes visual discomfort. High levels of glare decrease visibility.
- Clutter-bright, confusing and excessive groupings of light sources, commonly found in over-lit urban areas. The proliferation of clutter contributes to urban sky glow, light trespass and glare.

Items in *italics* are included in the Glossary found in Section 12

You may ask if this is really a problem and isn't our safety and displaying festive holiday spirit more important than having dark streets? The answer is yes and no. Of course our safety is important. But using proper lighting better directs light to the intended surface and prevents light from being directed into the sky. There are some other very good reasons for not using excessive lighting.

Wildlife can be severely impacted by bright lights at night. Nocturnal animals would lose their ecosystem. Bats, moose, coyote, raccoon and deer could see declines in reproduction, have difficulty foraging for food, be exposed to predators and experience impairment to their night vision. Birds that hunt at night would have trouble finding food and could be drawn to light sources that can make them fly off course or continue to fly in the light's beam until they are exhausted. Turtles and frogs can be impacted by light, diverting them from nesting sites and diverting the hatchlings toward lit roads. Insects become easy prey for predators and when they become attracted to the light they could fly around it all night interfering with mating, migration, and pollination.

Safety can be compromised by bad lighting. Over lit areas create a sharp contrast between light and darkness, making the area outside the illuminated section nearly impossible to see. Studies show that there is no conclusive correlation between night time crime and lighting, including one by the National Institute of Justice. Shielded lighting aimed at the road, parking lot, landscape and residence increases visibility and decreases distractions like glare. Glare can make it more difficult to see a pedestrian on the road and illuminated signs and flashing lights create distractions.

Human Health can be negatively impacted by excessive light. Glare causes us to avert our eyes and reduces our contrast sensitivity, color perception and ability to see contrasts. Circadian rhythms can be impacted by light in our rooms from clocks and TVs that cause insomnia and depression. It has also been linked to cancer and cardiovascular disease. Room darkening shades, eye masks and relocating electrical devices can help maintain the body's production of melatonin, the chemical that regulates our daily cycles, which will help prevent sleep disorders.

Energy Consumption can be as excessive as the lighting chosen. Shielded lights use lower wattage lamps and because the light is pointed downward where needed, is more efficient. Turning lights off in a building at night is one obvious way to save money and prevent the general sky glow in a city or town. LED lights have become very popular but must be fully shielded, pointing downward and cannot emit light above the 90-degree angle to prevent sky glow. Our carbon footprint is increased with inefficient lighting as well. A shielded light bulb on your doorstep that is reduced from a 60 watt to a 40 watt bulb could yield a 33% savings on your energy bill.

The educational opportunity, peace of mind and energy saving opportunities cannot be denied. There are some things that you can do in order to accommodate our needs for safety and our nocturnal wildlife's needs for darkness. The International Dark Sky Association has some tips for us:



- *Use light only where it is needed and when.* Turn off lights when they are not needed and minimize light use with timers and motion detectors.
- *Only light as much is needed.* Overlighting reduces the eye's ability to see outside of the lit area and can produce glare. Select the correct lamp wattage for your needs to reduce excess light and energy costs as well as increase safety.
- *Shine lights down, not up.* Directing the light where it is needed is more efficient. Select fully shielded fixtures and refer to the International Dark Sky Association's website for fixtures with the Seal of Approval.
- *Use efficient light sources for outdoor lighting around homes and businesses.* Compact fluorescent lights provide plenty of light and are fully shielded. They provide good, energy efficient and economical lights. Lights should not direct light above 75-degrees above horizontal.

*Resources on light pollution:*

International Dark Sky Association at <http://www.darksky.org>

### **Other Environmental Challenges** *contributed by Jim Hendrickson and Jennifer Carlino*

The Massachusetts Department of Public Health may be contacted for further information on the following insect related diseases. While there are many potential adverse results when interacting with nature, the three diseases listed below are especially threatening and serve to highlight the need to apply protective measures when out in wooded areas and backyards.

#### *Lyme disease*

Lyme disease is a tick-borne bacterium that is contracted from tick bites. In 1975 several residents in Lyme CT came down with the illness and it has been important ever since. Lyme can be contracted by the Deer tick described as a very tiny tick with a teardrop shape. The back of the tick is blackish with a reddish-brown abdomen and the male is uniformly dark brown. It can be distinguished from the American Dog tick by its size and color. The dog tick has a whitish back with a chestnut brown abdomen. The male dog tick is mottled gray. Ticks can be found in woodland habitats, brush, vegetation and tall grasses along trails and in backyards. Symptoms of lyme disease include headache, chills and fever, prolonged fatigue, muscle and joint pain and a circular "bull's eye" rash that increases in size. Not all patients develop the rash. If you think you may have contracted lyme disease see a doctor right away. Delays in treatment may result in major medical problems like heart, nervous system and arthritic conditions. The best method of protection is using tick repellents and covering hair and skin. Check frequently for ticks on clothing and skin.

#### *Eastern Equine Encephalitis (EEE)*

Eastern Equine Encephalitis is contracted from mosquitoes and so rare that in Massachusetts fewer than 50 cases have occurred since 1940. Of those who do contract EEE, 30% die and few ever recover completely. Most of the types of mosquitoes that can carry the EEE virus do not bite people; but, sometimes the virus is picked up by those mosquitoes that do bite people and horses. Symptoms of EEE include a high fever (103° to 106°F), stiff neck, headache and lack of energy. Symptoms will present themselves within two to ten days after a bite and many patients Items in *italics* are included in the Glossary found in Section 12

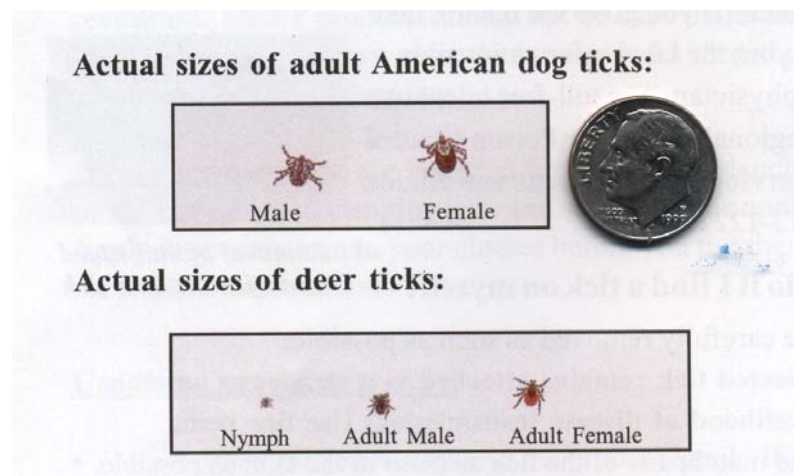
go into a coma within one week. The most dangerous symptom is swelling of the brain (encephalitis). Again the best protection is to cover the skin and use insect repellent.

#### West Nile virus (WNV)

West Nile virus is contracted from mosquitoes commonly found in Europe, Africa, Australia and Asia. WNV made its way to Massachusetts during 2000 and 2001. WNV is spread by a bite from a mosquito that has bitten a bird that is infected with the virus. Not all mosquitoes carry WNV. People who contract WNV usually experience no illness or very mild illness that can include the symptoms of high fever, stiff neck, severe headache, muscle weakness, confusion, and sensitivity to light. WNV can cause encephalitis or meningitis, but fewer than 1% of people infected will develop such serious illnesses. Once again this is worth avoiding; protection involves covering the skin and using insect repellents.

#### *Ways to protect yourself from ticks, mosquitoes and mosquito-borne illnesses:*

1. Wear a hat and long sleeved shirt and pants at dawn and dusk if you will be outside.
2. Wear light colored clothing so that ticks are easier to see.
3. Tuck pants into socks and shirts into pants to keep ticks on the outside of clothing.
4. Use tick/insect repellents that contain DEET on clothing and on skin. Make sure to read the instructions carefully for any type of tick/insect repellent before applying to skin. Avoid repellents with DEET concentrations above 10-15% for children and 30-35% for adults. Never use DEET on infants and do not apply to face or hands of children. Avoid products containing high amounts of alcohol because they can be absorbed through the skin.
5. Use mosquito netting when bringing carriages or playpens outdoors.
6. Conduct a tick check when ready to return indoors. Remember to check the hairline.
7. Check pets for ticks and use a veterinarian-approved tick repellent.
8. Walk in the middle of trails and avoid brushing up against vegetation.
9. Empty outside containers, wheelbarrows, unused flower pots, trash cans and lids, watering cans, wading pools, tires and storm gutters if they collect water after a storm.
10. If you have a bird feeder, place it away from the house since birds can carry ticks.
11. Repair screen doors and windows and make sure they are tightly attached to the door and window sills.



#### *Removing ticks:*

Items in *italics* are included in the Glossary found in Section 12

The correct way to remove a tick is outlined in the pamphlet “What you should know about Ticks and Lyme Disease on Cape Cod and the Islands” Cooperating Agencies of Barnstable County Department of Health and the Environment, Cape Cod Cooperative Extension, Nantucket Board of Health and UMASS Vineyard Extension. Revised 4/99 and is available at the Board of Health Office.

1. DO NOT APPLY PETROLEUM JELLY, NAIL POLISH REMOVER OR A HOT MATCH TO THE TICK. This will not make the tick back out on its own.
2. Grasp the tick at the point of attachment using fine tipped tweezers. Do not squeeze the body.
3. Pull straight out with slow and steady pressure. Avoid twisting the tick.
4. Apply an antiseptic to the bite area.
5. If the tick is difficult to remove, contact your physician.

If you are really concerned about lyme, you can always submit a tick for analysis at UMass-Amherst for about \$40.00. Ticks can also be analyzed for babesiosis and anaplasmosis for \$140.00 per sample. See <http://www.extension.umass.edu/agriculture/index.php/services/tick-borne-disease-diagnostics> for more details.

*Resources on environmental hazards:*

- Massachusetts Department of Public Health. (doctor consultation) 617-983-6800. or <http://www.state.ma.us/dph>.
- Bureau of Environmental Health Assessment. (health effects of pesticides) 617-624-5757.
- Massachusetts Poison Control Center. (adverse reactions to pesticides) 1-800-682-9211 or 1-888-244-5313 (hearing impaired).
- Massachusetts Department of Food and Agriculture. (regional mosquito control) 617-626-1781
- Bureau of Animal Health. (horse vaccine) 617-626-1795.
- Norton Board of Health. 508-285-0263.

**Environmental equity** considers the distribution of the conservation, recreation and open space resources in a community, with particular consideration given to availability to populations who are underserved or live in state recognized Environmental Justice areas. The Open Space Planning Committee, incorporating its own study of the issue (including outreach from its members to their own organizations, agencies, etc.), as well as reviewing the Open Space Survey and comments received at public meetings, determined that Environmental Equity issues do not appear to be a problem in Norton. Open space areas are scattered throughout the town, except in areas where we are obviously focusing our current conservation/recreation efforts, like in the Canoe River Aquifer. (See Section 3 for the Environmental Justice information).