# A Citizen's Guide to Protecting Fremont's Water Resources

This publication is brought to you by the Fremont Conservation Commission with a grant from the Piscataqua Region Estuaries Partnership

www.fremont.nh.gov/fnhgconsvcomm1.shtml 2009

## Fremont's Wet Wonders

### Wetlands and their benefits[1]

"The freshwater wetlands of Fremont provide important functions to the ecological health of the community. The public benefit of wetlands is well documented and includes protection from flooding of streams and rivers, groundwater recharge of aquifers, and wildlife and fisheries habitat. They also provide natural filtering of sediments, toxicants, pathogens and nutrients from surface waters.

Wetlands provide open space for a variety of recreation and education activities including hiking, biking, hunting, bird watching, canoeing and nature science education. Some of the more scenic overlooks in Town are found across wetlands. The list of human benefits of wetlands is extensive and their value to the community is great."[1]

"The role of wetlands in the natural ecosystem is critical. Many of our most common wildlife species depend on wetlands for their survival. Wetlands often encompass some of the most remote areas in southern New Hampshire providing habitat for large mammals including moose, bear and deer. There are over fifty wetland dependant mammals, reptiles and amphibians in our State including several rare and endangered species. Waterfowl, herons and many other bird species depend on wetlands for survival. In addition, wetlands contain rare plant communities adding to the biological diversity of the Town".[1]

*Wetlands, like this one off of Shirkin Road, provide valuable services to the Town of Fremont. Image by Mark West.*

"Just as some types of wetlands are more easily recognized than others, some of the functions and benefits of wetlands may be less obvious than others. Lakes, ponds, rivers and streams are

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WHAT CAN BE DONE ABOUT FLOODING?

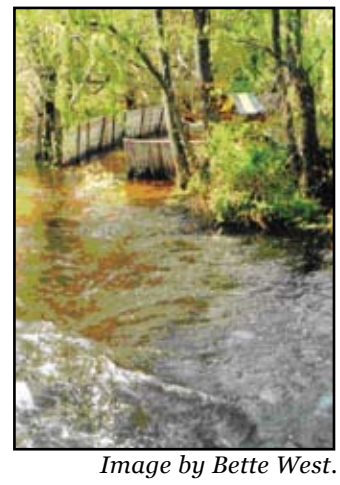

*Image by Bette West.*

FIND OUT ON PAGE 4

## Avoid The Nightmare

### A broken septic system threatens your health and your bank account. Learn what you can do to keep your septic system running smoothly.

*Allowing a septic system to fail will result in an expensive and messy replacement.*

It is easy to ignore your septic system when there are no visible problems like slowly draining fixtures after it rains, or sewage backing up into your sink. But taking your system for granted, and not having it inspected and pumped regularly, may be a costly mistake that could devalue your home and pose as a serious health risk to your family and to your neighbors.[1]

**HOW DO YOU KNOW IF YOUR SEPTIC SYSTEM IS BROKEN?**

Septic systems commonly fail when the leach field becomes overloaded with liquid.[2] Partially treated wastewater may flow up to the surface of the ground and back up into your yard, creating a health hazard. It may even back up into a sink or toilet in your house, accompanied by a very foul odor.

**WHAT IS THE BIG DEAL**

A broken septic system is a health hazard. Liquid from your overloaded leach field may flow into your or your neighbor's groundwater,

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## Tips For Taking Care Of Your Landscape

### Simple changes in your watering and pest control can have a big impact on Fremont's water resources.

*Sprinkler image by I. Sagdejev*

Did you know that you can have a beautiful lawn by watering less? Most grasses only need one inch of water every seven to ten days.[1]

If you water too often, the root system of your lawn will be weakened. If the weather is extremely hot, apply an inch of water once every three days.[2]

**HOW WILL YOU KNOW WHEN YOUR LAWN NEEDS WATER?**

"If your grass is lacking its luster or holds onto your footprints after you walk across it, now is the time to water."[3]

**HOW CAN YOU MEASURE AN INCH OF WATER?**

To measure the water, put an empty tuna can (or cat food can) on the lawn while watering. Stop watering when the can is full or if you notice water running off the lawn.[2] Determine how long it takes for you to 'water an inch'. Soften the soil by watering for 10 to 15 minutes. Wait for the water to soak in, then continue watering. You will only have to do this once to know how long it takes to 'water an inch'.[4]

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*What Are Buffers And How Do They Protect Your Water?*

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# Drinking Water: Fremont's Most Valuable Resource

## Thirsty?

### Where does your well water come from?

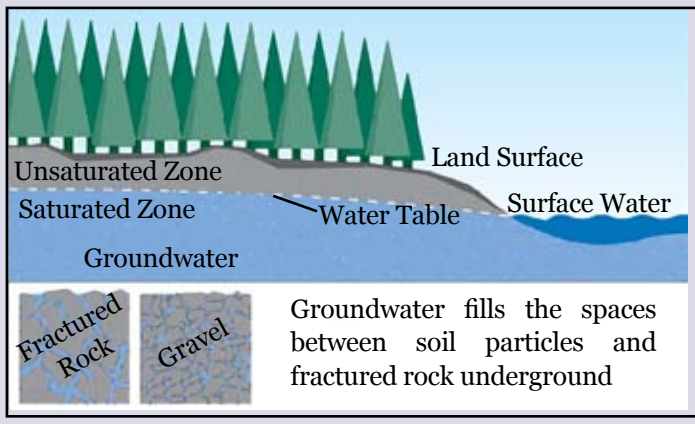
Fremont residents who get their drinking water from the tap, all have one thing in common: they are drinking groundwater that is pumped from cracks in bedrock or from spaces between sand and gravel.

The three types of wells in Town are drilled, shallow dug, and driven. The type used is dependent on local soil types and water availability.

Drilled wells penetrate about 100-400 feet into the bedrock that has fractures containing groundwater.[1] According to the NH Geological Survey, 97% of the 959 Fremont wells created since 1984 are drilled in bedrock.[2]

Shallow dug wells pull water from the water-saturated zone above bedrock. They are typically 10 to 30 feet deep.[3] Driven wells also pull water from the same zone, but are deeper, smaller diameter, and are located in areas with thick sand and gravel deposits.[4]

New Hampshire studies reveal that water from bedrock aquifers tends to be less acidic and has greater hardness. It usually contains high amounts of iron, manganese, fluoride, arsenic, and radon compared to sand and gravel aquifers .[5]




What is Groundwater?

Groundwater fills the spaces between soil particles and fractured rock underground

Source: US Geological Survey, adapted by The Groundwater Foundation.

## Water Treatment

We've learned that the majority of Fremont residents get their water from private wells that are drilled into fractured bedrock and fed by groundwater. Well water from fractured bedrock may contain iron, manganese, radon, arsenic and/or fluoride and is likely to need treatment (see Thirsty, above). There is a lot to consider when choosing a water treatment system, and guidelines for doing so can be found at the NH DES website.[1]

**Have your water tested** by a certified water testing laboratory.[2, 3]

**Investigate the contaminants** that are in your water and the amount of each contaminant.[4, 5]

**Investigate the treatment methods** that are available for treating the contaminants[6] before contacting a water treatment specialist.

**Read *What to Consider When Choosing A Water Treatment System.*** [1]

**Consider how to dispose of the backwash** of the water treatment system. The process of water treatment requires that filters and treatment media are periodically "backwashed" with water to clear out solids and regenerate media. The backwash flushing occurs on a schedule and use a significant volume of water. The backwash may contain varying amounts of silt, sand, brine, iron, manganese, arsenic, and incidental sludge. Back flushing can occur from once a day to twice a week, depending on the degree of contaminants in your water and how many people live in your household. All that extra water from the backwash can put a heavy load on your septic system and leach field, especially if the water treatment system is added after the septic system has been designed and built. If you are considering the installation of a water treatment system, consult with professionals to determine if your septic system can handle the increased load of the water treatment system and if your well has a high enough yield to handle the increase in water use.

Discharging the backwash directly into your yard is allowed, but it can cause problems to your lawn and garden and can contaminate your drinking water well. This practice can also wreck havoc to a wetland. Another alternative is to discharge the backwash into a small drywell designed specifically for that purpose. There is a NH DES fact sheet that describes alternative methods for disposing of water treatment backwash.[7] There are additional methods of disposing of back wash, some of which are described in this reference for the Village of Pinckney, including burying a tank in the ground.[8]

Those who provide water treatment devices are not required to be licensed by the State of New Hampshire. The information which they give you may be about only their product, not other ways of treating the contaminants in your water. Talk with several system providers before selecting the one best for you.

Fremont has a total of 57 wetlands that qualify as prime because of the functions they provide to the environment. Twenty-six of those wetlands have been designated as prime. Using the references provided here to carefully select and maintain your water treatment system will help to protect Fremont's water resources.

## What Is Polluting Your Drinking Water?

Groundwater is not pure water. It contains a variety of elements, chemicals and compounds that affect people differently who drink it. Some of these contaminants are natural, others are not. Below are the most common sources of contaminants.

**Natural Contaminants**

New Hampshire studies reveal that water from bedrock aquifers tends to be higher in arsenic, radon , iron, manganese, and fluoride than sand and gravel aquifers.[1] Since nearly all wells in Fremont draw water from bedrock, every resident should know something about these substances.

**Arsenic** is a cancer-causing element that naturally occurs in New Hampshire bedrock. In southeastern New Hampshire, approximately 20% of all wells exceed the EPA limit.[2]

**Radon** is a radioactive gas in bedrock that can be dissolved in well water. Most of your risk from radon in water comes from radon released into the air when water is used for showering and other household purposes. Research has shown that your risk of lung cancer from breathing radon in air is much larger than your risk of stomach cancer from swallowing water with radon in it.[3] It is esimated that 95% of New Hampshire wells exceed the limit that is being proposed by the EPA. NHDES is proposing a higher threshold than the EPA that results in 40% exceeding the limit proposed by the State.[4]

**Iron** causes red staining in plumbing and gives drinking water an unpleasant taste and unpleasant odor.

**Manganese** is now a health concern when found in high levels of drinking water. Long term exposure to manganese causes damage to the central nervous system and can produce a "Parkinson-like syndrome" in the elderly. Manganese in water is risky for bottle-fed infants. Formula contains manganese, and when mixed with water that contains high levels of manganese, the developing nervous system of the infant is put at risk. Infants absorb more manganese into their systems than others, and excrete less.[5]

**Fluoride** can cause "enamel fluoris" in children during tooth development, resulting in white spots in the teeth at small levels to pitting and staining of the teeth at high levels. Consumption of high levels of fluoride in drinking water over a lifetime can result in bone fractures and even skeletal fluorosis, a painful and potentially crippling disease.[6]

**Bacteria from septic systems** can introduce contaminants into groundwater. Any septic system that is not functioning properly may contaminate wells with bacteria and viruses.

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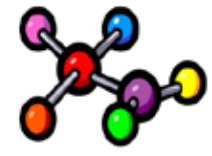
**THERE ARE MANY UNREGULATED SUBSTANCES WITH UNKNOWN PUBLIC HEALTH IMPLICATIONS**

22 million known organic/inorganic substances -- 6 million commercially available[1]

One percent (250,000) have been inventoried or regulated by any country in the world[1]

EPA regulates approximately 92 drinking water contaminants (MCLs) under the Safe Drinking Water Act (SDWA).[2]



**CAN LARGE GROUNDWATER WITHDRAWALS IMPACT OUR WATER RESOURCES?**

The New Hampshire Legislative Groundwater Commission is currently studying the role municipalities should play in permitting large ground water withdrawals. There is a lack of data and scientific studies regarding the impact of future development on water resources in the State.

For example, the cumulative impacts of water withdrawal from subdivisions with fifty or more homes remains unknown. What will be the effect on a prime wetland of a large groundwater withdrawal that occurs nearby?

More studies are being planned and hopefully the monies to support them will be forthcoming.

The NH Legislative Groundwater Commission is considering giving municipalities the power to veto large groundwater withdrawals because of possible adverse impact on the Town's water resources. One of the issues being considered is how to resolve any differences that arise among multiple towns that share an aquifer.[1]

# Murky Waters

## We must not take having an unlimited supply of clean water for granted. Ensuring that we have enough clean water for today and the future is challenging,and there are several areas that need clarification to make wise water resource management decisions.

***Concern: Fremont lacks a future water supply plan***

It remains unknown where future water supplies in Fremont will be located and how to anticipate what is needed to protect them. Fremont has had an Aquifer Protection District Ordinance (Article XI) since 1988 with strict lot sizes and land use limitations. Land uses that existed at the time the ordinance was passed that are not permitted by the ordinance are grandfathered. Because some of these nonconforming land uses still exist, there is concern that some of the aquifers in Fremont are not fully protected. Study is needed to determine the extent of any contamination.

Stratified drift aquifers, where water can be extracted with the least chance of arsenic and radon contamination, tend to occur with rivers and flat land; they are often near a relatively high concentration of roads, villages and other development. The risk of groundwater contamination because of development is high and often means these aquifers cannot be used as public well supplies.[1]

In Fremont, 97% of the wells in the NH DES One Stop database are drilled in bedrock[2] and bedrock will continue to be one of the sources of Fremont's future water supply. Our stratified drift aquifers have medium, not high yield[3], so it is not clear whether or not Fremont has the resources to support a municipal water supply. It is important to develop a future source water supply plan in order to protect Fremont's water resources for future generations.

***Concern: Fremont needs no-cut vegetative buffer protection around its significant wetlands and surface waters.***

Fremont's Wetland and Watershed Protection District Zoning Ordinance, Article IX, Section E, requires that land uses in the wetland and watershed designated buffer areas (described in Article IX:C:2) "do not result in the erection of any dwelling or building in public or private use or alter the surface configuration of the land" without a special exception. However, the cutting of trees is permitted.

A recent study found that the closer a well is located to a water body, the greater the yield that may be expected from that well.[4] This study supports the fact that surface water and groundwater are interconnected and that we need to protect our rivers, streams, ponds and wetlands to insure the safety of our future drinking water supply. The best way to protect drinking water quality is with no-cut vegetative buffers along our surface water and wetlands. The State requires a 100 foot undisturbed buffer around prime wetlands.[5]

Fremont is in the process of revising the Wetland and Watershed Protection District Zoning Ordinance, Article IX, to include no-cut vegetative buffer protection around significant wetlands and surface waters. You will have the opportunity to vote on the recommended revisions in Spring, 2010.

***Concern: Criteria for potable water are not defined in New Hampshire causing concern about the safety of drinking water for residents using private wells.[potable water is water suitable for drinking.]***

The NH State plumbing code requires that water supplies connected to domestic plumbing systems supply potable water. But the code does not define "potable" regarding the safe limits of specific contaminants as recommended by either the State or the EPA. So the plumbing code does little to insure safe drinking water for residents using private wells. The NH DES Source Water Protection Private Well Working Group has discussed the need for what constitutes potable water in the plumbing code and how to insure that drinking water from private wells meets these standards. One issue of concern is how to implement water treatment for those residences where contaminants exceed the standards.[6]

***Concern: Is there adequate water yield from Fremont wells?***

There are no State requirements at this time for new subdivisions to provide adequate water supplies to the new homes. Some municipalities, not Fremont, however, are requiring "adequate water."

The NHDES Water Well Board recommends: "a minimum water supply capacity for domestic internal household use should be capable of supplying at least 600 gallons of water within a 2 hour period once each day. This is equivalent to a flow rate of 5 gallons per minute (gpm) for 2 hours. Some homeowners may find this supply of water to be less than desirable depending on the size of the family or if outdoor use is a requirement. Water supply capacities less than this amount may be considered a hardship by many homeowners."[7] The NH DES Private Well Working Group (PWWG) reports that too often new private wells drilled do not produce enough water to meet household needs.[6]

There are 185 domestic wells in Fremont with a yield of less than 5 gallons per minute, which is approximately 20% of Fremont wells in the database.[2] Well yield of surrounding dwellings is an important factor to consider when evaluating a proposal for a large groundwater withdrawal in Fremont for a subdivision and/or for other water uses. The New Hampshire Groundwater Commission is concerned about the impact of large groundwater withdrawals on the yield of nearby wells. This topic has been discussed at several public meetings sponsored by the Regional Planning Commissions. The effect of withdrawing a large amount of groundwater on surrounding wells is the same whether the groundwater comes from a single large well or from multiple smaller wells, as in a new large housing development where each household has a private well. The impact of a large groundwater withdrawal regulated by the Statute on the well yield of nearby smaller wells requires the impact to be mitigated. Mitigation has included water companies selling water to the homeowners whose wells have been depleted, which seems unfair to the homeowner who then has to pay for all water usage. There is no State regulation of impacts to existing surrounding wells by the cumulative impact of new, multiple private wells in a subdivision. A nearby landowner whose well is depleted in the case of the cumulative effect of multiple private wells is out of luck because there are no regulations mandating mitigation.

### USEFUL WATER-RELATED DEFINITIONS

Aquifer - An underground formation that is comprised of permeable, saturated material such as sand and gravel or cracked bedrock that holds a useable supply of water.[1]

Buffer - A naturally vegetated upland area adjacent to a wetland or surface water.[12]

Emergent Vegetation - Wetland plants that rise above the water level. *i.e.* lily pads.[1]

Estuary - A body of water that is partially enclosed by land where saltwater from the ocean mixes with freshwater from one or more rivers flowing into it resulting in a unique habitat.[2]

Exemplary Fen - A high quality fen that has had very little human impact and remains in its natural state. A fen is a nutrient poor basin swamp that is very sensitive to changes in water chemistry caused by land use changes.[3,4]

Filter - The removal of substances which are too large to pass through. Wetland vegetation can remove large amounts of soil, sediment, pollutants, toxicants, and wastes from runoff, thereby preventing them from entering surface or groundwater.[1]

Floodplain - The relatively smooth area directly next to a stream or river where water frequently overflows the river or stream bed during extreme weather events. The floodplain area is formed by materials that have been eroded, transported and deposited by the river over time.[5]

Fluvial - Pertaining to or produced by the action of a stream or river.[5]

Geomorphology - Water and melting ice flowing over the land carry with it boulders, rocks, soils and sediments. The topography of the land changes where debris is picked up and also where it is deposited. Geomorphology studies these changes.[6]

Fluvial Geomorphology - The study of how rivers and their landforms interact over time through different climatic conditions.[6]

Groundwater - Water beneath the land surface and in spaces between rocks and sedimentary materials.[1]

Habitat - A place where an animal or plant has everything it needs to survive.[2]

Head Of Tide - Inland limit of water affected by the tides. Usually occurs where there is an increase in the slope of a river, i.e. at a waterfall or dam.[5]

Headwaters - The source of a stream including the upper tributaries.[5]

Hydric - Wet.[6]

Hydric Soil - Soil that is wet and has certain characteristics because it is wet.[1]

Hydrologic Regime - The dynamic and dominant presence of water in a wetland. The water is typically at, just below, or just above the ground's surface in a wetland, creating the saturated conditions that lead to the development of hydric soils and the presence of hydrophytic plants.[1]

Hydrology - The study of the behavior of water in the atmosphere, on the earth's surface and underground.[1]

Hydroperiod - The length of time and portion of the year a wetland holds ponded water.[7]

Hydrophte or Hydrophytic Plant - A plant that grows in a water saturated environment. Since soil that is saturated with water has less oxygen than normal soil, these plants thrive in soil that has decreased amounts of oxygen.[1]

Impervious Surfaces - A hard surface area from which water runs off at an increased rate of flow or an increased volume. The hard surface either prevents or retards the entry of water into the soil. Examples include concrete, pavement, rooftops, walkways, patios, driveways, compacted soil and roadways.[8]

Nonpoint Source Pollution - Pollution that is caused by or attributed to diffuse sources. NPSP results from land runoff, rainfall or atmospheric deposition. The polluted water comes from land uses such as agriculture, development, landfills, household chemicals and personal care products.[8,9]

Nutrient - Element or compound needed for the growth, reproduction or survival of plants or animals.[1]

Pathogens - Disease producing organisms such as bacteria, viruses and protozoa.[9]

Pollutants - A substance, especially a manmade substance or waste, that harms natural resources and hence, the environment.[1,9]

Prime Wetlands - Jurisdictional wetlands that, because of their size, unspoiled character, fragile condition or other relevant factors are designated by municipalities as prime and receive increased protection from the State.[11]

Riparian - An area of land and vegetation adjacent to a stream that has a direct effect on the stream. This includes woodlands, vegetation, and floodplains.[6]

Riparian Buffers - A naturally vegetated upland area next to a surface water body, such as a river, stream, lake or pond. The buffer serves to protect the water body from the impacts of adjacent land uses.[12,6]

Riparian Corridor - Land along a river or stream that includes and connects riparian habitats for wildlife.[12]

Runoff - Rainfall that cannot be absorbed by soil or vegetation and runs off of the land into streams and rivers.[1,9]

Sediment - Mineral or organic material deposited by water, wind or glaciers.[9]

Sedimentation - Process of accumulating or depositing sediment.[9]

Setback - The minimum distance that must be maintained between a structure and a wetland or surface water edge as required by law.

Tidal - Subject to or characterized by the tides.[9]

Toxicants - Poisonous substances.[9]

Toxin - A substance produced by a living organism that is poisonous to other organisms.[1]

Vernal Pool - A vernal pool is a temporary body of water which provides essential breeding habitat for certain amphibians – such as wood frogs, and spotted salamanders – and invertebrates such as fairy shrimp. Fish do not live in vernal pools because vernal pools are temporary.[13]

Water Table - The upper level of the portion of the ground in which all spaces are wholly saturated with water. The water table may be located at or near the land surface, or at a depth below the land surface and usually fluctuates from season to season.[12]

Watershed - A land area that drains to a common waterway, such as a stream, lake, estuary, wetland or ultimately, the ocean.[14]

Wetland Buffers - A naturally vegetated upland area next to a wetland.[12]

# Riparian Buffers and Floodplains

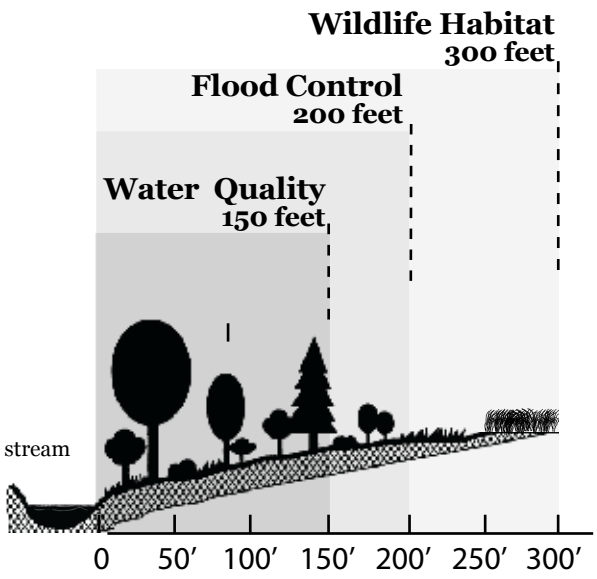
## Riparian Buffers

Land around rivers and streams, called riparian buffers, need to be protected from development to protect the quality of the water. In New Hampshire, about 63% of the riparian buffers around water supply watersheds are not protected.[1]

Flood control is another critical function that riparian buffers provide and given that climate scientists predict more flooding in our future[2], we need all the riparian buffers we can get.

It is clear that riparian buffers are needed, but often the question is how wide should they be? To protect water quality from sediment and nutrients a riparian buffer needs to be at least 150 feet wide. To control flooding, a buffer needs to be at least 200 feet wide. Research also shows that wildlife need at lease a 300 foot riparian buffer to thrive.[3]

**Riparian Buffer Widths**




### New Research on the Exeter River

NH Department of Natural Resources, in conjunction with the Exeter River Advisory Committee, is conducting a river study[1] in Brentwood and Fremont this summer on a twelve mile stretch of the Exeter River to learn how the river and land interact. The entire twelve miles will be assessed on foot by the consulting scientists.

The scientists will determine the major stressors by looking at the width of the river channel, the steepness and height of the banks, the condition of the floodplain, the river banks and the riparian buffers.

They will assess culvert capacities in relation to stream flow and determine if the culverts are properly sized and if aquatic creatures can pass.

At the end of the study, they will identify ways to protect our river corridor such as restoring riparian buffers, restoring the main channel of the river, improving culverts, and minimizing bank erosion.

## It All Goes Downstream

### The health of Fremont's riparian corridors and buffers is important to the health of Great Bay.

The headwaters of the Piscassic River are in Fremont. The Exeter River enters Fremont from Sandown, exits Fremont and flows into Chester, and then re-enters Fremont from Raymond which is on the western boundary of Fremont. From the Raymond entry point, the Exeter River crosses through the entire Town and flows into Brentwood.[1] Both the Piscassic and Exeter Rivers flow from Fremont downstream and ultimately into Great Bay, a nationally designated estuary. Great Bay is a mixture of fresh water from the rivers that surround and flow into it and salt water from the Atlantic Ocean that flows into the Bay from the Piscataqua River twice a day.

The rivers which flow through Fremont meander through other towns upstream and downstream, carrying pollutants and sediment which are running off of the land faster than ever.

The increased runoff is due to the steadily increasing amount of roads, buildings and parking lots in the Great Bay watershed and the increased rainfall that has been flooding our rivers. The rivers are carrying the pollutants that run off the land from one town to another and then into Great Bay.

Because of the cumulative impact of these pollutants, Great Bay is in danger of having its ecosystem disrupted.[2] Scientists are very concerned about the decrease in eelgrass habitat (a plant that provides habitat to fish, food for waterfowl, and helps to filter the waters) and the increase in algae that is showing up in the Bay, preventing sunlight from getting to the bottom of the water.[3] We need the help of each and every landowner in Fremont, especially those who abut the shore, in order to reverse the negative impacts of development to Great Bay. When we protect the riparian habitat in Fremont, we are also helping to insure that the Great Bay Estuary will remain healthy.

## Rivers Are Bigger Than Their Banks

Rivers and streams expand and shrink depending rainfall and snowmelt. The area that is engulfed in water during flooding is called the floodplain. Since rivers are expected to flood these areas in makes sense to carefully limit buildings or pollutants in these areas, however, less than 12 percent of floodplain land in New Hampshire is under some form of protection from development. Twenty-seven percent of floodplain forests are less than 400 feet away from roads and/or some other form of urban development[1] and therefore vulnerable to increased runoff.

## Dealing With Flooding

### An important key to minimizing flooding is enhancing riparian buffers.

*In 2006, flooding caused extensive damage to roadways that were not prepared to deal with surging river water. Image by Bette West*

Fremont has many areas that are prone to flooding.[1] Protecting the rivers with wide buffers helps to stabilize river banks and to minimize flood damage.

Locating buildings away from rivers and floodplains and maintaining 200 feet of lush vegetation around rivers and streams slows water volume and reduces erosion.[2]

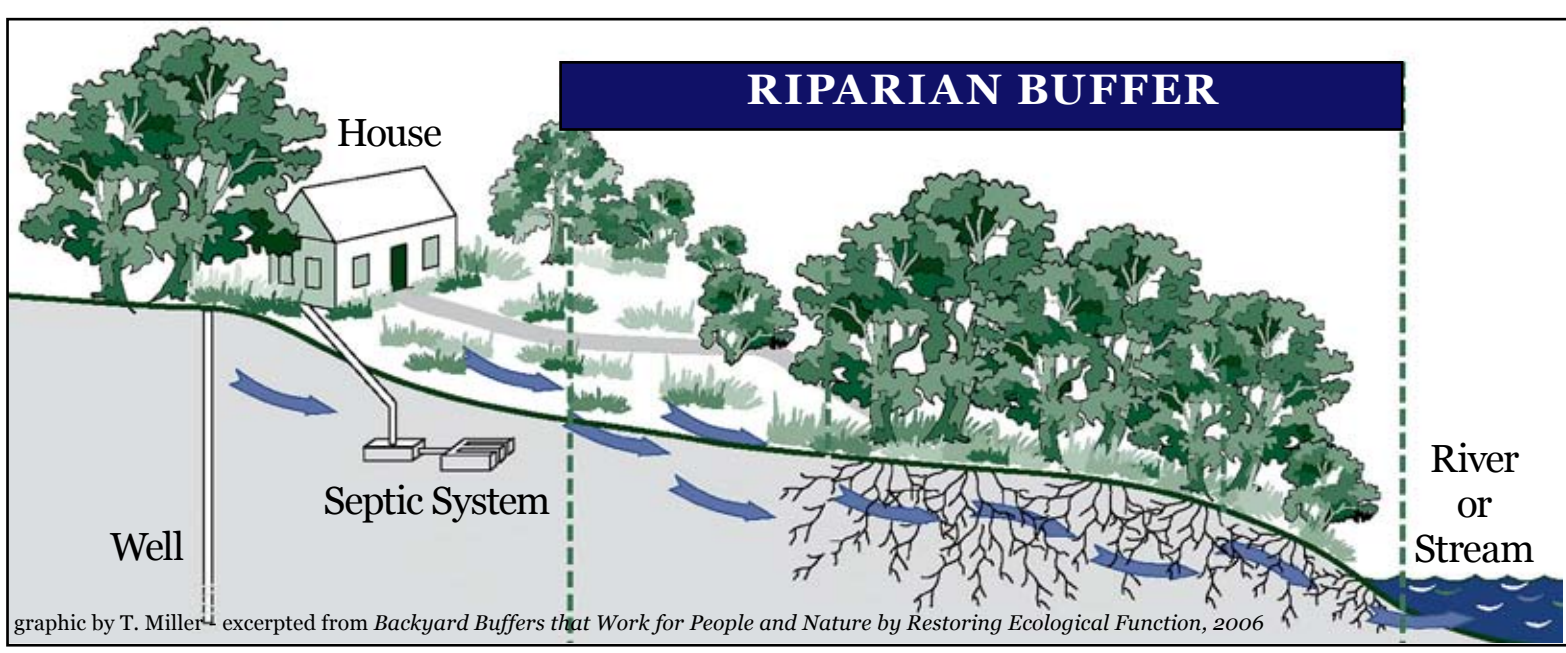
## Regulations about building in floodplains

The Federal Emergency Management Agency (FEMA) has determined the 100-year floodplain for all rivers and streams. As the name implies, these areas are suppose to flood once every 100 years. Since 2006, however, these areas have flooded three times. Once FEMA considers newer data on development patterns and climate change, the 100-year floodplain is expected to increase.

Adopted in 1988, Fremont's Floodplain Ordinance[1] is based on the requirements of the National Flood Insurance Program (NFIP). Towns are required to regulate development within the 100 year floodplain.[2]

The zoning is structured to protect property, minimize damage and insure that property owners are eligible to purchase flood insurance through the NFIP.

NFIP also has a program titled the Community Rating System (CRS) to encourage Towns to go above and beyond the floodplain management that's required to participate in the NFIP.[3] The CRS scores towns based on a variety of floodplain management techniques.[4] The more floodplain land that is protected the higher the Town scores in NFIP's Community Rating System. The higher the score the lower flood insurance rates are for residents, ranging from 5 to 45% discounts.[3,4] Fremont residents would enjoy a 45% discount on their flood insurance, if the entire 100-year floodplain was protected as open space. Fremont currently participates in NFIP but not in CRS which is a free and voluntary program.




graphic by T. Miller excerpted from *Backyard Buffers that Work for People and Nature by Restoring Ecological Function, 2006*

**Riparian buffers provide many benefits to a landowner as well as all citizens of Fremont. Wetland buffers provide:**

- Erosion and flood control
- Sediment and debris control
- Pollutant removal
- Stream flow regulation
- Shoreland stabilization
- Wildlife habitat enhancement
- Recreational opportunities
- Rural character

# Limited State Protection

## The New Hampshire Comprehensive Shoreland Protection Act[1] protects important riparian habitat, but not all shores are covered.

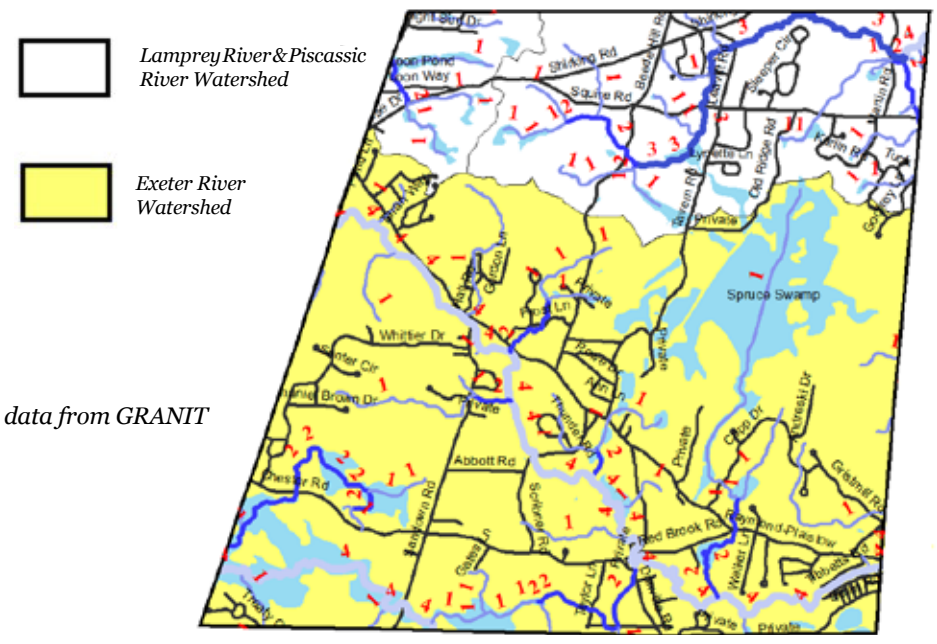
Many people know of the New Hampshire Comprehensive Shoreland Protection Act which protects all lakes, ponds and impoundments 10 acres or greater in size, all 4th order and greater streams, all designated river segments under RSA 483 and all waters subject to the ebb and flow of the tide (including tidal marshes, rivers and estuaries). What many don't realize is that this legislation protects only 4th order rivers and higher and not the headwaters and tributaries.

The main stem of the Exeter River that flows through Fremont is a 4th order river and abutters must abide by the rules of the Comprehensive Shoreland Protection Act. However, the many miles of streams and tributaries in Fremont that are not 4th order are not protected by this legislation.

*Regulators and scientists use stream order to categorize rivers and streams. Put simply, the smallest streams are 1st order and the larger the river gets, the larger the stream order (the Amazon River is a 12th order stream).[3]*

The smaller headwaters and tributaries make up approximately 78% of the rivers and streams in Fremont.[2] They are often where the largest amount of development is taking place, and pollutants that enter at the headwaters are carried to every town downstream.

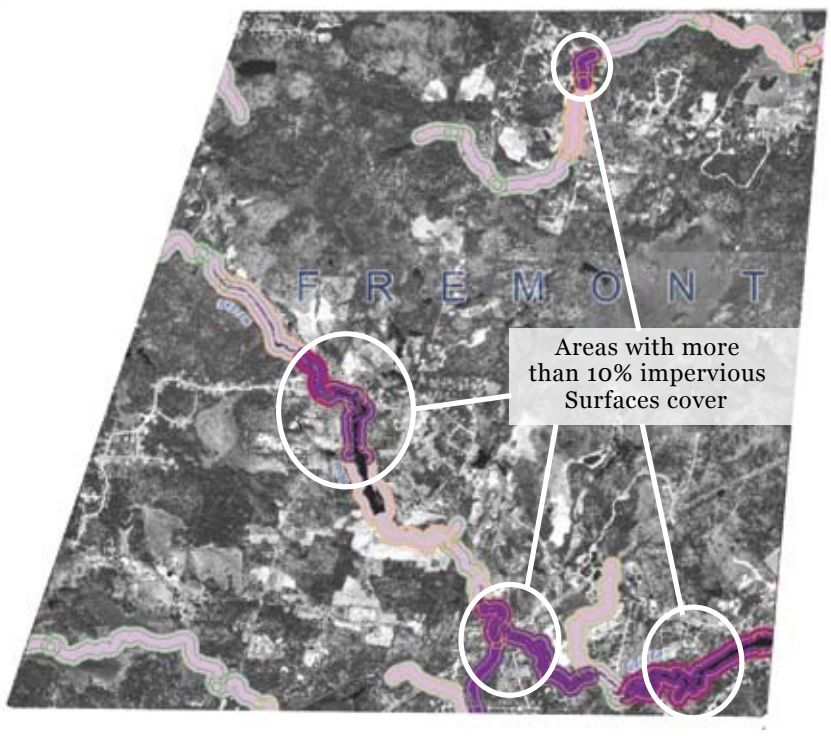
We all must work together to insure that all of the streams and rivers and their corridors in Fremont are protected to the fullest extent possible.




*data from GRANIT*

## Some Fremont Buffers Are Already Degraded

In 2005, a University of New Hampshire study characterized Fremont's buffers using high resolution aerial images.[1] The study showed that portions of the Exeter and Piscassic river buffer area exceeded 10% of imperious surface cover. This is important because research indicates that when impervious surface cover exceeds 10%, water quality noticeably degrades.[2] To avoid more degradation to the rivers, development in buffer areas with less than 10% impervious area should be minimized and extra measures should be taken to treat stormwater runoff in those areas that already exceed 10% impervious cover.




# Is It Sinking In?

## Impervious surfaces, like rooftops, sidewalks, paved driveways, roads and parking lots, are bad news for Fremont's water. But with planning, the impacts can be lessened.

Any outdoor surface that is made of material that prevents water from soaking into the ground, like asphalt, concrete, brick or stone, is called an impervious surface by water scientists.[1] When the natural landscape is replaced with impervious surfaces, the way rainwater and snow melt makes their way into our rivers is changed in some significant ways.[1]

Perhaps the most destructive change is the increased volume of stormwater (rainwater and snowmelt) that surges into rivers and causes more frequent and higher flooding. Drainage systems, like curbs, gutters, and storm drain pipes, make the situation worse for flooding.

Since the water is whisked off of the land and into streams and rivers when impervious surfaces are present, our groundwater does not receive the necessary recharge from rainwater and snowmelt that usually seeps in from the surface. This lowers the water table and can affect the water available for streams when it is not raining and for private wells.[1]

The flooding and low flow times caused by impervious surfaces can damage habitat for plant, fish, and other aquatic creatures. In places with extensive impervious surfaces, the number and diversity of living things in the water is greatly reduced.[1]

The increase in water volume during storm events causes erosion of stream banks and changes the stream channel's shape. The released sediment can smother habitat and stress aquatic organisms. During dry periods, low flows reduce deep water and swift-flowing habitats. In addition, stream edge habitat and stream channel protection is lost when the natural, vegetated stream buffer is replaced by impervious surfaces.

Impervious surfaces and drainage systems accelerate the delivery of pollutants from the watershed to rivers, lakes, and estuaries. For estuaries and their freshwater tributaries, the pollutants of greatest concern are fecal coliform bacteria and nutrients. Shellfish beds are commonly closed to harvesting after rainstorms due to elevated amounts of fecal coliform bacteria washed into the estuary by stormwater. Excessive nutrients from backyard and farm fertilizers, septic systems, and animal wastes, can cause algae blooms, which block sunlight, deplete dissolved oxygen, inhibit the growth of other aquatic plants, and can adversely affect recreational activities. Other pollutants of concern are toxic contaminants, such as metals and oil, from vehicles and business or homeowner activities, that are washed off impervious surfaces into waterbodies by stormwater.

**FREMONT IMPERVIOUS SURFACES**

Various studies from around the country show that stream ecosystems and water quality become degraded as impervious surfaces increase. Damage to streams often occurs when more than 10% of the land within a watershed is covered with impervious surfaces. When the percentage of impervious cover exceeds 25%, most watersheds experience severe habitat and water quality degradation.[2]

In 2005, a study in New Hampshire demonstrated that the percent of impervious surface and its proximity to streams can be used as indicators of stream quality.[3]

*Continued on page 10*

# Why Bother?

## Protecting our riparian corridors and maintaining wide buffers requires changes in how we manage land. But these changes are worth making for a variety of reasons.

**Water Quality Protection -** Forests and vegetation along the river help control nonpoint source pollution[1], which is contaminants that come from our homes and businesses. Some examples of nonpoint source pollution include bacteria, pesticides, herbicides, fertilizers, mud (sediment), road salt, animal waste from our pets and livestock and waste from failing septic systems. These pollutants endanger the quality of our water.

Lush, wide vegetative buffers slow down runoff from impervious surfaces, enabling it to soak in the soil and recharge our groundwater. Without riparian buffers, stormwater from impervious surfaces rapidly flows into the river, washing pollutants and sediment (mud) with it. When we protect riparian buffers in Fremont, we are protecting our drinking water and other water resources from the damage that can be done by nonpoint source pollution.

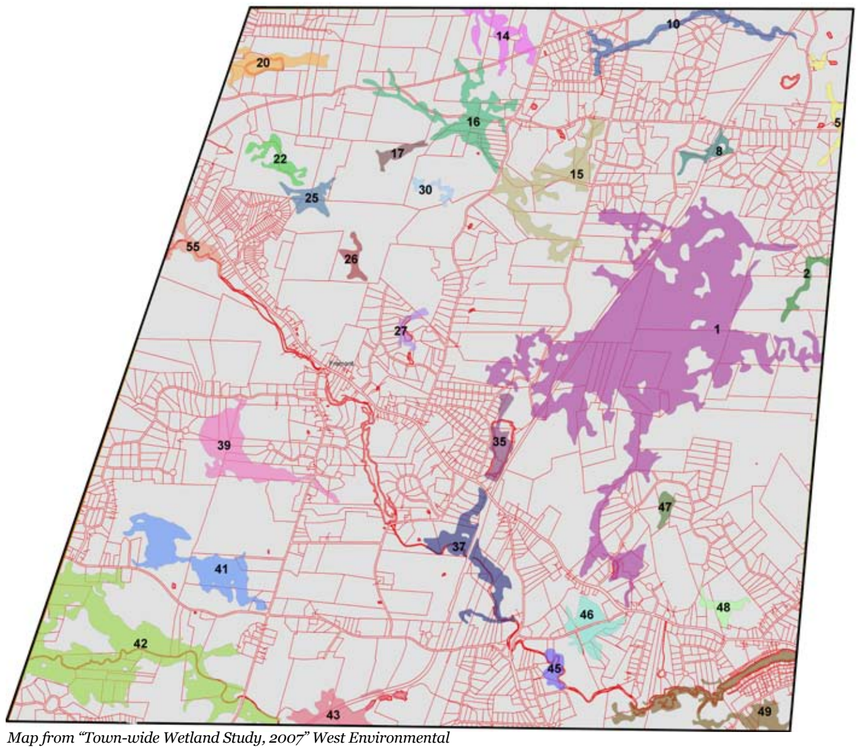
**Wildlife Habitat Protection** -Several areas along the Exeter River in Fremont have been identified as the highest quality habitat in New Hampshire.[2] The Land Conservation Plan for New Hampshire Coastal Watersheds identifies the area along the Exeter River in the southwest corner of Fremont (wetland #42) as high priority conservation focus areas.[3] Cold-water fish and insect species benefit from intact riparian buffers and corridors when streamside forests shade the water keeping it cool. Land animals such as otters, raccoons, deer, and even moose, use riparian corridors to find food and shelter and to travel from one large tract of forested land to another.

# Fremont's Prime Wetlands

In 2007, the Conservation Commission hired West Environmental to conduct an extensive Town-wide wetland study to promote better decision making in the land planning process and to identify wetlands eligible to be designated as Prime Wetlands.[1] Prime wetlands meet specific criteria of the NH Department of Environmental Services that demonstrate a prime wetland to be an exemplary wetland in a specific community that provides valuable functions like flood protection, groundwater recharge, wildlife habitat, and recreational opportunities. [2] West Environmental examined 57 wetlands in Town and collected data on each using field surveys and/or aerial photos. The resulting report ranked each by quality. The two highest quality groups, comprised of 25 wetlands, were recommended by West Environmental and the Conservation Commission for prime wetland designation. The residents approved the designation by vote at Town meeting in 2008. NHDES requires a 100 foot undisturbed buffer to be maintained around prime wetlands.[3] A NHDES permit[4] and a public hearing conducted by NHDES[5] are required for any proposed changes to the prime wetland, including disturbance to the soil, cutting timber and removing vegetation. The goal is "no net change to the prime wetlands."[6]

*Approximately 66 percent of New Hampshire's species of greatest concern are wetland or surface water-dependent.[1] Pictured is the Exeter River and is wetland #42 in the 2007 Prime Wetlands Study.[2] This wetland is a high priority habitat (Wildlife Action Plan) and a conservation focus area for both the Fremont Conservation Commission and the Land Conservation Plan for New Hampshire's Coastal Watersheds. Image by Mark West.*

## Prime Wetlands Of Fremont




*Map from "Town-wide Wetland Study, 2007" West Environmental*

## Spruce Swamp

### Fremont's First Prime Wetland and the Town's Crown Jewel of Wetlands

#### Spruce Swamp Fast Facts

- Spruce Swamp is the most remote area in Rockingham County.[1]
- Spruce Swamp is over 700 acres.[1]
- Spruce Swamp contains habitat that supports rare and endangered species.[1]
- Thousands of cavity trees have been observed in Spruce Swamp, which are needed by a variety of birds to nest.[2]
- Legend has it that two Fremont pirates buried their treasure in Spruce Swamp.[3]
- The only non-fatal B-52 crash in history happened in 1959 when a bomber crashed in Spruce Swamp after it's crew had safely ejected.[3]
- There are many hiking trails that traverse the Spruce Swamp wetland.[4]
- There are many geocaches located within the Spruce Swamp.[5]
- Spruce Swamp's large size and location over an aquifer makes it an important groundwater resource,[6]
- The practices of the landowners, as well as the fertilizers and other chemicals used on the uplands surrounding Spruce Swamp directly affect the water quality of the wetland.
- The quality of the wetland affects the quality of all of our drinking water in one way or another.

Covering a large part of eastern and central Fremont (wetland #1 on map), Spruce Swamp is Fremont's largest and most important natural resource. Approximately 711 acres in size and over two miles long north to south and one and half miles wide, the swamp sits on top of a large aquifer which has an underlying bedrock aquifer. The central portions of this wetland are the most remote areas left in Rockingham County. As a result of its size and remoteness, it contains great habitat for large mammals including deer, moose and bear. It one of the few remaining unspoiled ecosystems in southeastern New Hampshire.

As a result of a wetlands study by West Environmental in 2003, Spruce Swamp was designated as Fremont's first prime wetland by Fremont voters.

*Spruce Swamp in Fremont, NH. From the Fremont Prime Wetland Designation Study by West, Environmental, 2003*

"Great Spruce Swamp" has been noted in documents dating back as far as 1744 and was named for the spruce trees that grow there. [7] It contains upland islands, most notably Chase Island (five acres) and Bear Island (1/2 acre). Interestingly, the vastness of the swamp is thought to have actually hindered the settlement of Fremont, as early settlers migrating west from Brentwood or Exeter found their passage blocked.[4]

Spruce Swamp was created by retreating glaciers[8] and is an example what scientists call an Exemplary Fen, which means that it is a nutrient-poor basin swamp that is very sensitive to changes in water chemistry caused by land use changes in the surrounding uplands.[1]

Key functions and values of Spruce Swamp include flood control, water purification, water storage, and recharge of both ground and surface waters, as well as protection of the surrounding ecosystem. In addition, wetlands improve quality of surface water because they retain, remove and transform nutrients and contaminants.[6]

Spruce Swamp feeds four streams and it drains into the Exeter River[1] via Red Brook, which originates within the wetland.

The swamp's large size and diversity of habitat provide homes for many wildlife species. Great blue herons nest in colonies called rookeries in tall dead trees. Many migratory ducks breed in the swamp and a variety of turtles, snakes, frogs, and salamanders live in its many pools. Beavers are evident by the many lodges. A major deer heard thrives in the swamp and hikers report seeing moose tracks. Rare species, such as the Blandings turtle, is expected to live in Spruce Swamp. In July of 2005, several members of the Conservation Commission spotted a Blandings Turtle in the Oakridge Town Forest on a walk with Charles Moreno, the Town Forester. Numerous threatened plant species have been identified within the swamp.

**SPRUCE SWAMP OFFERS MANY RECREATIONAL OPPORTUNITIES TO THE COMMUNITY.**

The railroad bed that travels north from Route 107 to North Road bisects Spruce Swamp and provides elevated views of the wetland. Parking is available at the library and on North Road. Spectacular views of the southern finger of Spruce Swamp can also be viewed in the Oak Ridge Town Forest. There are marked hiking trails that lead out to an overlook. The trails can be accessed on the right just past the parking lot that is on the west side of the dirt portion of Meetinghouse Road or via the rail trail. There are also trails within Glen Oakes Conservation Area that will take you along the edges of the swamp. Although Spruce Swamp may seem to be a bit hidden, it really is beautiful and worth the time to explore. You never know what exciting discovery you may find within Fremont's Crown Jewel.

Directions to the Oak Ridge Town Forest

Take Beede Hill Road to Poplin Drive. Poplin Drive is just south of the Fremont Post Office and on the same side of the road. Turn onto Poplin Drive. When you have travelled to the end of Poplin Drive, Poplin Drive intersects Meetinghouse Road. Turn left onto the gravel/dirt continuation of Meetinghouse Road. Keep to the left on the dirt road and proceed past the privately owned open area on the right to the newly constructed parking lot. Please do not park on the privately owned open area on the right. The Town parking area is located about 737 feet from the intersection of Poplin and Meetinghouse. It's on the left, just past the sign marking the beginning of the Town owned area

Directions to the Glen Oakes Conservation Area

Take route 107 to Copp Drive, located on the north side of route 107. The entrance to Copp Drive is marked by a sign titled "Evergreen Estates. Proceed on Copp Drive to Andreski Drive which will be on the left. Turn left onto Andreski Drive. Glen Oakes is located at the end of Andreski Drive, and there is ample parking in the dirt area ahead of you

## The Pollution In Your Backyard

### What Is Nonpoint Source Pollution (NPSP)? How Does It Differ from Source Point Pollution?

When you think of "water pollution" do you think of large pipes draining from factories or sewage treatment plants? Pollution draining from pipes is known as point source pollution because the source (point) of contamination can be easily identified. The passage of the Clean Water Act more than thirty years ago followed by the passage of additional legislation (Safe Drinking Water Act) and strict federal regulations has enabled this type of pollution to be identified and dealt with. As a result, much of the known point source pollution entering America's rivers and streams has been addressed.

What has been increasing as the population increases and more development occurs, is nonpoint source pollution (NPS or NPSP). The greatest cause of pollution to our groundwater, rivers, streams, lakes, ponds and wetlands is nonpoint source pollution.[1]

Nonpoint source pollution occurs when rainfall, snowmelt, or irrigation runs over land or through the ground, picks up pollutants, and deposits them into rivers, lakes, and coastal waters or introduces them into the groundwater. Examples of these pollutants include runoff from agricultural areas draining into a river, trash we leave behind when we visit the beach which gets carried out to sea and fertilizers, pesticides and herbicides from our houses being carried from our yards by the rain as it follows its natural drainage flow path.

Anything which you use in your home can end up in the groundwater and surface waters as nonpoint source pollution, including prescription medicines, over the counter drugs, veterinary drugs, fragrances, cosmetics, sunscreen, vitamins, and cleaning products. Other manmade pollutants of concern include road salt, oil, gasoline, MtBE, pesticides, herbicides, fertilizers, sewage which contains bacteria, leaks from landfills, paint and anything else people pour down their sinks or toilets. The amount of salt in groundwater in New Hampshire has been steadily increasing.[2] Concerns are increasing that this increase puts people with private wells that have high blood pressure at risk.[3]

The best news is that we can voluntarily reduce much of the nonpoint source pollution. NH DES has a free, downloadable manual[1] that includes information about how households can reduce NPS pollution (pages 19-21) by using "best management practices." Best management practices (BMPS) have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

A few examples of BMPS to consider at your house include[4]:

**SLOW THE WATER AND RETAIN THE POLLUTANTS**

- Plant a buffer
- Make a rain garden

The vegetation slows down the water and lets it soak into the ground, recharging the groundwater. The plants and soils will absorb and neutralize some of the pollutants.

**REDUCE THE NUMBER OF POLLUTANTS AT THE SOURCE, I.E. YOUR HOUSEHOLD**

- Minimize the use of detergents and bleaches. You can usually get by with less than the amount recommended in the directions on the bottle.
- Use alternative, less toxic cleaning products such as baking soda and lemon juice and non-chlorine scouring powders.
- Check the ingredients and toxicity of the products you are considering buying before you purchase. Strong chemicals can kill the necessary bacteria in your septic system and prevent proper decay of sludge.
- Buy only the quantity that you need and use only the recommended amount. Read the label about how to properly dispose what is not needed.
- Take your hazardous products to the community hazardous waste day rather than pouring them down your sink or toilet or into your yard.
- Carefully label and store hazardous wastes until you can dispose of them at the community hazardous waste collection. DO NOT pour these chemicals on the ground, down the drain, discard them in the trash, burn or bury them.

**SLOW THE TRANSPORT OF THE POLLUTANTS BY REDUCING THE AMOUNT OF WATER CARRYING THE POLLUTANTS**

- Conserve water so that you are not overloading your septic system and leech field and flushing pollutants into the groundwater.
- Use water that is not being filtered by your water treatment system to water your lawn and garden.
- Using rain barrels reduces the amount of water running off of your property
- Plant buffers
- Make a rain garden

Buffers and rain gardens enable more water to soak into the ground reducing the amount of runoff from your property

By learning how to use best management practices at home, we can together, successfully make a tremendous cumulative impact on protecting our water resources.

*Buffers and rain gardens enable more water to soak into the ground reducing the amount of runoff from your property. By learning how to use best management practices at home, we can together, successfully make a tremendous cumulative impact on protecting our water resources. Images by Jean Eno.*

# Tips . . .

*continued from page 1*

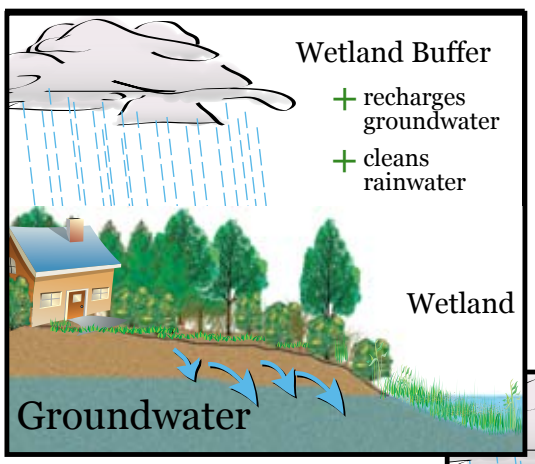
**PRACTICE INTEGRATED PEST MANAGEMENT**

Integrated pest management, or IPM, is a systematic approach to managing pests that focuses on having minimal impact on human health, the environment, and beneficial insects,[5] such as bees, that are not the target.[6] "IPM offers the opportunity to eliminate or drastically reduce the use of pesticides, and to minimize the toxicity of and exposure to any products which are used".[7]

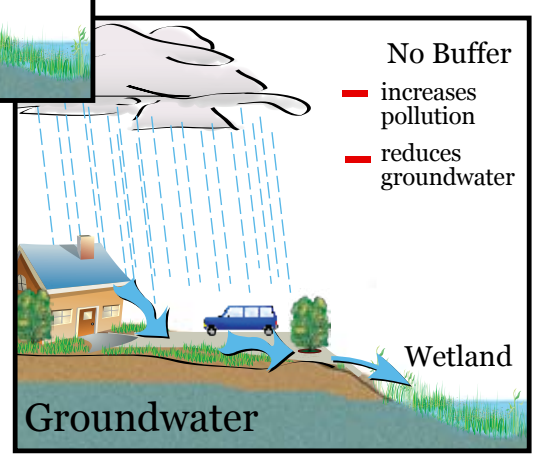
**THE STEPS OF INTEGRATED PEST MANAGEMENT INCLUDE:**

- Monitoring- the site should be regularly inspected to determine the degree of infestation.
- Record-Keeping – keep records about what you find when you inspect for pests including the numbers you are finding and the treatment(s) that you are using.
- Action levels – determine the level of control needed. You will never completely eradicate a pest. What is the level of action that is needed? Did the previous treatment work? Beware if a lawn service company says they will guarantee to eliminate all pests. That means they will be using too much pesticide, will destroy the good insects like bees and will risk creating pesticide resistant strains of the real pests. Alternating pesticides can reduce the risk of creating resistant strains.
- Prevention – implementing prevention measures should be a primary focus in integrated pest management.
- Strategy criteria – what strategies can be used to prevent the pests? For example, mowing high may limit the grub population. Beetles prefer low cut grass for their eggs. A combination of techniques should be tried: traps, picking off the beetles by hand, mowing high and using the least toxic pesticide possible when the population is heavy.
- Evaluation – Evaluate the success you have achieved with your strategies and continue seeking better alternatives. Evaluate the health risks associated with a particular pesticide.[7]
- Before hiring a lawn pest control service, find out what pesticides they will be using and seek information about these pesticides.[8]

*NOTE: Before spraying or dusting any crop against any pest, make sure that the crop you intend to protect is listed on the label. Follow all label directions explicitly. Dispose of empty containers safely, according to NH regulations and the manufacturer's directions. Check at your household hazardous waste collection day for disposal options.[9]*




*Rainwater that falls on or flows through a wetland buffer soaks into the ground where it is cleansed and it recharges the grounwater we need for drinking water. Nitrogen is removed naturally from the rainwater before it enters the wetlands*




*Rainwater that falls on or flows over roads, parkinglots, and roofs washes oil, sand, and other pollutants directly into an unprotected wetland where water quality is reduced.*

# What Is Polluting . . .

*continued from page 2*

**Bacteria from animal waste** from pets, livestock, poultry and horses can cause serious illness to humans and must be kept away from drinking water wells, reservoirs and surface waters. The best way to manage pet waste is to clean it up using a plastic bag as a glove and then dispose of it by flushing it down the toilet. Flushing it enables it to be properly treated by your septic system. The second best way is to dispose of it by burying it in a three foot hole away from your drinking water well. It can be sealed and disposed of in your trash.[7] Fremont regulation requires dog owners to pick up the wastes left by their dog while not on private property.[8]

Wastes from livestock, horses and poultry can also endanger human health when it enters drinking water and/or surface waters. Use Best Management Practices as recommended by the EPA to promote human health.[9]

**Improper Handling of Gasoline, Oil, Pesticides, and Fertilizers** Backyard mechanics should never pour any automotive fluid on the ground or down the drain. As little as a 1/2 cup of gasoline can contaminate as much as 250,000 gallons of drinking water.[10]

# NH Department of Environmental Services

## A valuable resource to help Fremont citizens learn more information about water testing, private wells, and septic systems

**LOCATING INFORMATION ABOUT YOUR WELL**

An on-line query (see below) will provide information about your well, including depth and yield. Reporting of well construction records by well drillers was mandated by State law effective January 1, 1984.

**LOCATING YOUR SEPTIC PLAN**

There are several ways you may be able to obtain a copy of your "as built" septic plan. Be sure to request "as built" rather than "as designed."

- An online query (see below) will enable you to find the names and contact information of your septic system designer and installer. Contact the designer for a copy of the plan.
- The Selectmen's Office may have a copy of your plan and/or the names and contact information for the installer and designer in their property file for your tax map and lot number
- The NHDES Subsurface Systems Bureau may have a copy of your septic plan and can be reached at 603-271-3501 or by email to: jo-ann.mckenney@des.nh.gov. Septic plans were not required prior to 1967.

**ABOUT PRIVATE WELL WATER TESTING**

SITE: http://des.nh.gov/organization/divisions/water/dwgb/well_testing/index.htm.

NHDES encourages private water testing and this site is the gateway to information about water testing and treatment, including a list of accredited testing laboratories. After you have received the results of your tests, a variety of fact sheets are available to help you understand the results and determine appropriate treatment methods.

**TIPS FOR ACCESSING THE NH DES ONLINE WELL AND SEPTIC INFORMATION DATABASES**

Well Information: www2.des.nh.gov/onestop/Well_Query.aspx

Septic Information:
www2.des.state.nh.us/OneStop/subsurface_Application_Approval_Query.aspx

- Know your tax map and lot number which you can get at Town Hall.
- You will be able to look up the information for both well and septic using only the Town box and the Site Street or Road Box.
- TOWN: Select Fremont from the drop down list in the Town box.
- STREET or ROAD: Use wild card searching (%) for the Street or Road boxes in your search. Type the wild card character %, the name of your road followed by %. Example: For North Road, type %North%. The wild card symbol % enables you to find the road name you're looking for without having to have an exact match because road names have been entered into the database several ways: North, North Rd., North Road, Old North Road, for example.
- For septic info, scroll down the map and lot number columns until you come to your map and lot number. Click on designer and or installer button in that row to obtain that information.
- For well info, use the location column or the tax map lot number columns. Click on the state well id column for your row, and that will take you to your well yield and depth information.

**Recommended Reading**

*Water Quality Testing for Private Wells, NHDES, www.des.nh.gov/organization/divisions/water/dwgb/well_testing/documents/well_testing.pdf*

# Water and Medicines

"The U.S. water supply is laced with residues of hundreds of medicinal and household chemicals, compounds that originate not at a Dow Chemical drainage pipe but from our own personal plumbing. The contaminants come from our bladders and bowels, our bathtub drains and kitchen sinks. As much as 90 percent of anything the doctor orders you to swallow passes out of your body and into your toilet. Wastes from farm animals are never treated -- and loaded with antibiotics and fertility hormones. As chemists make new concoctions, the water supply takes the hit."[1] - Mark D. Uehling

Not only is the water supply taking a hit, but so are aquatic ecosystems. PPCPs (Pharmaceuticals and Personal Care Products) are being found in trace amounts in our nation's surface and groundwater. New tests for detecting them in our drinking water are emerging.[2][3] NHDES has a fact sheet that explains proper disposal methods of PPCPs.[4] NH DES also has a web page titled Medicine Disposal Information for New Hampshire with links to a wealth of information about the proper disposal of medicine.[5]

# Taking Care of Water Around the Home

## Give Your Septic System A Break

Reducing the amount of water going through your septic system will prolong its life and improve its performance.

There are several ways to reduce the amount of water that your septic system has to process.

**Water Plants with Rainwater**

Treatment systems, such as water softners, require backflushing that sends excessive water to your septic system. Therefore, anytime you can use untreated water, it will benefit your septic system. Watering plants can take a great deal of water, which usually can be collected from well-placed rainbarrels.

**Improve Laundry Practices**

Spacing laundry throughout the week will prevent a surge of water entering your septic system. A traditional top-loading washing machine discharges an average of 43 gallons of water per load[1] into your septic system.

**Redirecting Backflush**

Consult with a licensed plumber about draining backflush from water treatment systems away from your septic system.[2]

**Inspect and pump frequently**

You should have a typical septic system inspected at leastevery 3 years by a professional and your tank pumped as recommended by the inspector (generally every 3 to 5 years).[3] Alternative systems with electrical float switches, pumps, or mechanical components need to be inspected more often, generally once a year.[4]

## 10 Homeowner Tips That Protect Water

When it comes to keeping Fremont's water clean, it is often the individual homeowner who can make the biggest contributions. The following 10 things can be done around the outside of your house to maintain healthy water quality.[1]

*#1 PLANT RAIN GARDENS*
Direct downspouts and sump pump discharges to areas planted with water-loving plants. Water filters through the soil and recharges groundwater.

*Rain gardens help water from downspouts soak into the soil and recharge groundwater.*

*#2 LANDSCAPE WITH NATIVE PLANTS*
Planting native plants reduces need for pesticides and fertilizers. Also they provide food and habitat for wildlife.

*#3 MOW HIGH*
Mowing your lawn higher than 3 inches creates a lush turf that holds water, is weed-resistant, and requires less fertilizer.

*#4 MINIMIZE EROSION*
Maintain lush plant growth in areas with steep slopes to hold soil in place. Minimize soil loss on seeded areas by using straw mulch.

*#5 MANAGE RAINWATER*
SLOPE DRIVEWAYS AND PATIOS TO DIRECT RAINWATER TO PLANTED AREAS THAT RECHARGE GROUNDWATER.

*#6 PREVENT CHEMICAL SPILLS*
Secure stored oil, gasoline, fertilizer, and pesticides in leak-proof containers and never near wetlands.

*#7 MAINTAIN YOUR SEPTIC SYSTEM*
NH Department of Environmental Services recommends that septic systems be inspected annually and pumped every three to five years.

*#8 MINIMIZE IMPERVIOUS SURFACES*
Build the smallest buildings, patios, and driveways as needed. For driveways, use water-permeable materials.

*#9 REDUCE FERTILIZER USE*
Grow plants that require no fertilization and reduce lawn area.

*#10. MAINTAIN HEALTHY BUFFERS TO WETLANDS*
Maintaining 100 feet of lush, vegetated areas next to wetlands will filter rainwater, reduce erosion, lessen impacts of flooding, and provide wildlife habitat.

**Recommended Reading**

*A healthy garden and lawn makes for a healhty watershed (2007), NHDES, www.des.nh.gov/organization/commissioner/pip/newsletters/greenworks/07july.htm*

Anatomy of a Septic System

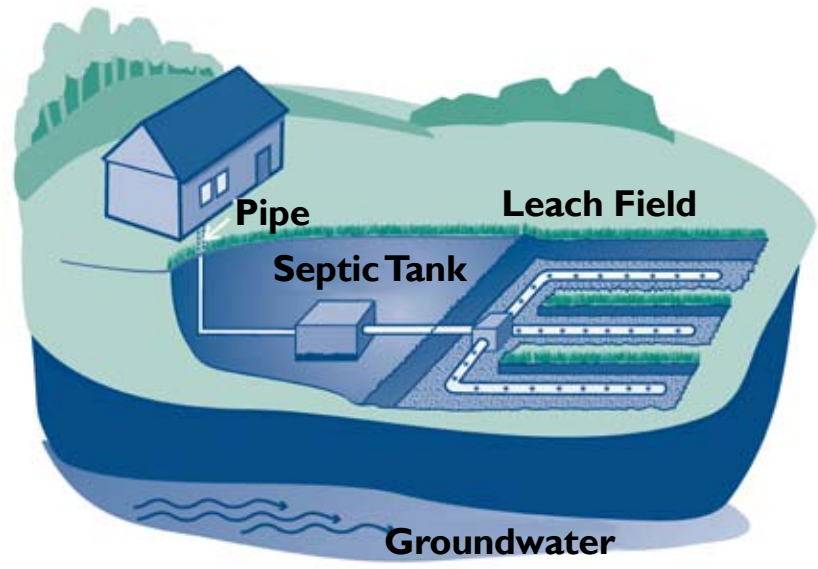



*Image courtesy of U.S. EPA[2]*

### There are some things that you should never do to a septic system.

- NEVER flush diapers, dental floss, cat litter, cigarette filters, coffee grounds, grease, feminine hygiene products, cotton swabs or any other items that will clog your septic system
- NEVER flush chemicals like cleaners, gasoline, oil, pesticides, or paint
- DON'T install a garbage disposal if you have a septic system.
- DON'T drain your hot tub or your swimming pool into your septic system. Drain cooled hot tub or pool water into a natural wooded area or onto a turf or landscaped area, far away from the septic tank and the drainfield.
- NEVER park or drive on your septic tank or leachfield.
- DON"T use septic system additives (These products are not needed and may be harmful to your septic system).[5]
- DON'T wait for a septic system problem; have it inspected this year.

Septic systems require some care to function properly. Below is a checklist of maintenance actions. How many of these have you done?

_ Locate septic system and kept a sketch of it with your maintenance records.

_ Have your system inspected yearly and pumped out at least every three years (or more often if reccomended).

_ Conserve water by installing ultra low-flush toilet, low-flow faucet aerators, low-flow showerheads and/or low-flow washing machines.

_ Use liquid laundry detergents because the powders don't readily break down in a septic system.

_ Avoid driving on your leach field

_ Plant only grass on your leach field

## Avoid the Nightmare . . .

*continued from page 1*

contaminating drinking water, nearby streams and rivers. The contamination can include bacteria, viruses, and protozoa that can cause gastrointestinal illness, cholera, hepatitis A, and typhoid.

The contamination can also include nitrates that can cause a condition called methemoglobinemia (blue baby syndrome) in infants. Left untreated, methemoglobinemia can be fatal.[3]

**MAINTENANCE IS THE SOLUTION**

Fixing septic systems and cleaning up contaminated wells is very expensive. Thousands of dollars can be avoided by regular septic system maintenance. NHDES recommends yearly inspections and pumping as needed, but at least every three years.[4] Homeowners with newer, nontraditional septic systems may have to pump out their system every year.[5]

# Wetlands and Wetland Buffers

**Wetlands** are areas that are periodically saturated with water (hydrologic regime) continuously for seven days or more between May and October. Water -loving plants (hydrophytes) like cattails, swamp milkweed, skunk cabbage or alder and wet soils (hydric soils) must be present on the site.[1]

An accurate determination of whether or not your property contains a wetland can only be made by a certified wetlands scientist.

A temporary body of water on your property that dries up in summer may be a vernal pool. Vernal pools are classified as wetlands by New Hampshire Department of Environmental Services (NH DES), however they are identified by different criteria than described above for wetlands.[2] Any construction in a wetland or vernal pool no matter how small requires a dredge and fill permit from.[3] To protect water quality, maintain a buffer of plants around wetlands and vernal pools.

Before doing any work in a wetland, no matter how small, a "dredge and fill" permit is required from the New Hampshire Department of Environmental Services.

## Sinking In . . .

*continued from page 5*

Examining where and how much impervious surface is currently covering Fremont is helpful when planning future development that will not harm our water resources. Data collected from aerial photographs in 1990, 2000, and 2005 showed that the percent of land that is covered by impervious surfaces was 3.0%, 4.9%, and 5.9% respectfully.[4]

Overall, we should be happy that our Town is still well below the 10% of impervious surface coverage threshold when water quality begins to degrade. However, the impervious cover is not evenly distributed throughout the Town. Several areas along the Exeter River have impervious surface coverage greater than 10% within 300 feet of the Exeter River.[5] A small area within 300 feet of the Picassic River has impervious coverage greater than 10% (see map under Some Fremont Buffers Already Degraded on page 5). Many areas along the rivers and streams are below 10% impervious surface coverage and it is very important to protect these areas from encroaching development to offset the areas that are impacting water quality.

**HOW CAN YOU REDUCE THE IMPACT OF IMPERVIOUS SURFACES?**

- Minimize lawn areas by planting shrubs, groundcovers, flowers and trees at the border of the property. Studies have indicated that lawn areas recharge groundwater less efficiently than planted landscape areas.
- Limit the amount of impervious surface on your property.
- Direct rainwater runoff from gutter drains to areas that are landscaped. This provides the plants with moisture that is needed for survival and increases groundwater recharge.
- Sweep driveways and walkways instead of hosing them down[1]

## Wet Wonders . . .

*continued from page 1*

easily recognized as are the opportunities that they offer for recreation and wildlife habitat. However, they also provide flood storage, may be used as water supplies and provide sedimentation control. Swamps and marshes (both freshwater and tidal) are often easily recognized but regarded as "worthless" because they are not areas that are directly used for recreational or business pursuits. Actually these areas are extremely valuable and their removal may have immediate harmful effects on both the adjacent uplands and any nearby, more popular lakes and streams.

Marsh and swamp areas provide flood storage and wildlife habitat as well serving as a natural filtering system. The flood storage functions of marshes and swamps are fairly obvious, particularly in the spring when they store snow melt and early spring rains."[2]

"Wildlife habitat is a function that is common to all natural areas. What sets marshes and swamps apart is the tremendous diversity of habitat types they provide which in turn support a wide range of wildlife. Scrub areas may support a variety of birds, insects, amphibians and small mammals. Emergent vegetation such as lily pads, arrowweed, cattails and marsh grasses provide nursery habitat for many species which, while they may not be thought of as "marsh animals", could not survive without these areas. Many species of ducks nest in marsh grasses near the waters edge, young fish hide among the lily pads and arrowweed stems to avoid predators, and frogs and salamanders leave clusters of eggs in shallow water among the grasses and rushes. Emergent vegetation also makes up a large portion of the diet of moose and beaver."[2]

"The filtering functions of wetlands are the most likely to be overlooked by the casual observer. As water fans out across a wetland it slows down allowing sediments and some contaminants to settle out. Wetlands vegetation traps the sediments and their root systems help to ensure the underlying soil's stability. These plants also have some ability to remove contaminants and excess nutrients from the water. The plants and microorganisms in wetlands breakdown and recycle these materials into forms that may once again be used by larger organisms. In this way wetlands improve both water clarity and quality which is beneficial to everyone."[3]

## What Is A Wetland Buffer?

A wetland buffer is the area directly adjacent to wetlands that has lush plant growth. It may be along the wooded shoreline of a pond or the grassy border of a freshwater marsh. Regardless of the kind of wetland, the key is the lush plant growth and absences of built structures.

The roots of the plants enable a wetland buffer to absorb water very well. The water that is missed by the plant roots of the buffer seeps deeper into the ground and eventually enters the groundwater. The plants and soil organisms of a wetland buffer clean the rainwater and stormwater they absorb. Because the spongy soil of a buffer soaks up water, wetland buffers are also good at lessening the impact of flooding. A watershed that has wide vegetated buffers will flood less often than one that is covered with roads, buildings, parking lots, and other impervious surfaces.

Not only do buffers protect wetlands, rivers, streams and other water resources, buffers add value to your property. They add beauty to your yard, give you privacy, reduce the surrounding noise, protect your water and air quality, provide habitat for interesting wildlife that will come to visit, and shade and cool the waters that are flowing. The shade keeps the temperature of the water low enough for cold water fish, thereby protecting habitat for fish and the aquatic macro invertebrates and other creatures that the fish depend on for food. A rich aquatic environment adds interest and value to your waterfront property; buffers control erosion on slopes and limit sedimentation that clogs the gills of fish and other aquatic animals. They protect wetlands, rivers and streams and other bodies of water from the runoff of increasing impervious surfaces. They neutralize and absorb toxins. They can reduce unpleasant odors from nearby farms. A one acre buffer can store 1 to 1.5 million gallons of water.[1] Up to one half of North American bird species nest or feed in wetlands.[1] Now is a great time to evaluate, upgrade and extend your wetland and riparian buffers

The Planning Board is in the process of revising the Wetlands and Watershed Protection Ordinance to promote buffers for all of Fremont's significant wetlands and surface waters. The goal of the Planning Board and Conservation Commission is to maintain healthy buffers because of the great benefits they provide to wetlands and surface waters for all residents.

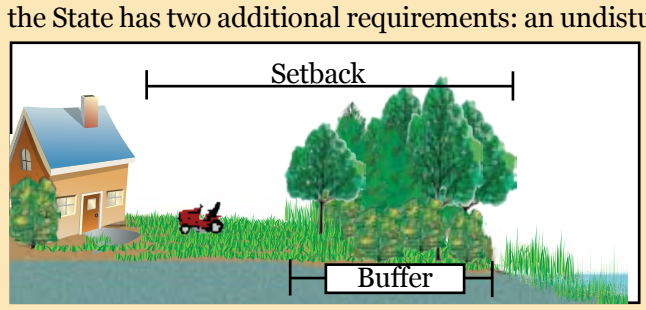
In addition to adhering to the Town Wetland and Watershed Protection District Ordinance, careful stewardship of buffers is an important role for individual landowners.

- Do not store vehicles in a wetland buffer because oil seeping from engines can easily pollute our water.
- Traditional landscaping is prohibited in the buffer areas of the Wetland and Watershed Protection District Zoning Ordinance because alteration of the surface of the land is not permitted without special exception.
- Plant native plants that are beneficial to wildlife.[2,3]
- Consider maintaining a buffer larger than 100 feet which will better protect wetlands and extend the habitat range for wildlife.[4]
- Limit mowing to minimize disturbance to wildlife habitat.[5]
- Have a pesticide and herbicide free zone.[6] Do not use pesticides and chemicals within 25 feet of the water or wetland. Minimize their use elsewhere.[7]
- Plant vegetative buffers that are multi-layered and that have groundcover, shrubs and trees.[8, 9]
- Use slow release fertilizers, and use them sparingly and you will reduce the amount of nitrogen running off in heavy rains.[10] It's better to use less more frequently.[11]
- Do not dispose of yard waste such as leaves, clippings and branches in buffers and/or wetland areas.[12]
- Minimize erosion by planting deep-rooting vegetation and groundcovers on sloped areas and stream banks.[13]

## Buffers And Setbacks

A wetland buffer is a "naturally vegetated upland area adjacent to a wetland or surface water."[1] This should not be confused with a "setback," which is the minimum distance a structure can be built from a wetland edge.

The existing Wetland and Watershed Protection District Ordinance Article IX, prohibits the removal of stumps and vegetation at ground level as no alteration of the surface configuration of the land is permitted without special exception. It does not include a no-cut area in the buffers to wetlands and surface waters which means that the cutting of trees is permitted. In addition to Fremont's Wetland and Watershed Protection District Zoning Ordinance, the State has two additional requirements: an undisturbed buffer of 100 feet for Prime Wetlands and protection of lakes, ponds, and 4th order streams by the Comprehensive Shoreland Protection Act (see page 5, Limited State Protection).



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*Continued on page 12*

## Role of the Conservation Commission

As defined in N.H. RSA-36-A the Conservation Commission role is to provide "for the proper utilization and protection of the natural resources and for the protection of the water resources of" the Town of Fremont. The Commission conducts research, generates maps and keeps records of all Open Spaces and natural, aesthetic or ecological areas. It also coordinates the activities of the Open Space committee and keeps records of its meetings and actions. The Commission also advises the Planning Board, Selectmen & Zoning Board on conservation matters and investigates application for dredge & fill permits filed with the NH DES Wetlands Bureau. In addition, with authority granted by the local governing body it also protects the natural resources by acquiring of the full title or lesser interest in land and manages these conservation areas which include the Town Forest.

**GET INVOLVED IN FREMONT'S FUTURE**

We need your help! There are open positions available on all of Fremont's land use boards. This includes the Planning Board, Zoning Board of Adjustment, and Conservation Commission.

The positions involve evening meetings and occasional site walks. The positions require dedication to the Board or Commission; knowledge of the Town's regulations, ordinances and procedures, and a willingness to participate in community issues. This knowledge can be gained as you attend meetings and become familiar with regulations and ordinances.

Contact Meredith Bolduc at 895-3200 ext 17 for more information. Meredith has office hours Mondays 8:30 am to 12:30 and 1:00 to 5:00 p.m.; Tuesday through Thursday 8:30 am to 12:30 p.m. and by appointment. You can also reach her by email at fremontpz@comcast.net.

Additional information, minutes, and regulations can be seen on the Town's website at www.Fremont.nh.gov by clicking on Planning Board, Zoning Board, or Conservation Commission.

## What Protects Fremont's Water Resources?

The protection of Fremont's water resources, including water from streams, rivers, ponds, wetlands and underground aquifers, is everyone's personal responsibility and often comes down to personal choices on private land. Fremont has a number of zoning ordinances which protect some of our water resources including Article IX: Wetlands and Watershed Protection District Ordinance; Article X: Floodplain Development Ordinance; Article XI: Aquifer Protection District Ordinance.[1] Fremont has a chapter in the Master Plan[2] dedicated to Water Resources and how to generally protect them.

## Fremont's Water Resources Are Interconnected

"Fremont's water resources consist of an intricately interconnected system of rivers, streams, brooks, small ponds, wetlands, and groundwater. In some locations and under some conditions, the surface waters "recharge" the groundwater and in other locations and conditions, the groundwater feeds our rivers, ponds, wetlands and streams and keep surface waters flowing even during droughts."[1] The quality and quantity of one can significantly affect the other and hence both affect the quantity and quality of Fremont residents' private wells.

## Water Facts

All living things on Earth must have water. Humans live less than a week without drinking water. Doctors recommend to be healthy, people should drink 2 quarts of water a day.[1]

Where is the Water - 97.5 % of all the water on earth is salt water. 1.74% is frozen in ice caps and glaciers, 0.75% is groundwater, 0.008% is surface water, 0.002% is in the soil and the atmosphere.[2]

Water is not created nor destroyed; it is just put into a form which makes it unavailable, contaminated, salinated, and removed from aquifers. Humans can reduce the quality and availability of water by their changes to and use of land.[3]

**TOWN OF FREMONT, LAND USE OFFICE**

*P.O. Box 120, 295 Main Street, Fremont, NH 03044*
*Ph: 603.895.3200 ext 17, email: fremontpz@comcast.net, website: www.Fremont.nh.gov*

*Special thanks to the Town officials, residents, and resource professionals that reviewed this document or contributed to its content:*

*Meredith Bolduc, Land Use Administrative Assistant*
*Patricia deBeer, Conservation Commission*
*Jack Karcz, Chair, Conservation Commission*
*Bill Knee, Conservation Commission*
*Janice O'Brien, Conservation Commission*
*Tina Sturdivant, Conservation Commission*

*The Fremont Conservation Commission applied to the Piscataqua Region Estuaries Partnership (PREP) Community Technical Assistance Program to produce this publication. PREP is not responsible for the content or views and opinions expressed in this publication. PREP is a U.S. EPA—funded program at the University of New Hampshire with the mission to protect, enhance, and monitor the environmental health of the region's estuaries. Printed on recycled paper.*

*This document is available online in pdf format to enable direct linking to resources at www.prep.unh.edu/resources/pdf/a_citizens_guide-tof-09.pdf*

*continued from page 11*

**References . . .**

1 NH DES WD-DWGB-26-2 Fact Sheet: Water Efficiency Practices for Indoor Domestic Water Use, 2007, www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-26-2.pdf
2 EPA: Homeowner's Guide to Septic Systems, file page 13, www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf
3 H DES WD-SSB-2: Environmental Fact Sheet: Care and Maintenance of Your Septic System, www.des.nh.gov/organization/commissioner/pip/factsheets/ssb/documents/ssb-2.pdf
4 EPA: Homeowner's Guide to Septic Systems, file page 5, www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf
5 ASHI (American Society of Home Inspectors), www.wehomeinspect.com/septic_systems.htm

**Wetlands (page 10)**
1 NH RSA 482-A:2:X, the official definition of a wetland, www.gencourt.state.nh.us/RSA/html/L/482-A/482-A-2.htm
2 NH DES Administrative Rules for Vernal Pools: Env-Wt 101.99 and sections Env-Wt 301.01 and Env-Wt 302.04(a), www.des.nh.gov/organization/commissioner/legal/rules/documents/env-wt100-800.pdf
3 NH RSA 482-A, Fill and dredge in wetlands, www.gencourt.state.nh.us/RSA/html/NHTOC/NHTOC-L-482-A.htm

**Buffers vs Setback (page 10)**
1 Buffers for Wetlands and Surface Waters: A Guidebook for New Hampshire Municipalities (1995), Chase et al., Audubon Society of New Hampshire, www.extension.unh.edu/commdev/Buffers.pdf, page 7.
2 Piscataqua Region Environmental Planning Assessment (2009), Piscataqua Region Estuaries Partnership. www.prep.unh.edu

**What is a Wetland Buffer? (page 10)**
1 EPA 843-F-01-002c: Functions and Values of Wetlands, www.epa.gov/owow/wetlands/pdf/fun_val.pdf
2 Plant Native: Designing for Wildlife: plantnative.com/how_wildlife.htm 3 Plant Native: Native Plant Nurseries for New Hampshire: www.plantnative.com/nd_netook.htm#nh 4 Buffers for Wetlands and Surface Waters, A Guide for Municipalities, Table 4:3-3, Minimum Buffer Widths for Wildlife, page 28, Chase et al., 1995, www.extension.unh.edu/commdev/Buffers.pdf
3 Plant Native: Native Plant Nurseries for New Hampshire: http://plantnative.com/nd_netook.htm#nh
4 Buffers for Wetlands and Surface Waters, A Guide for Municipalities, Table 4:3-3, Minimum Buffer Widths for Wildlife, page 28, Chase et al., 1995, http:// www.extension.unh.edu/commdev/Buffers.pdf
5 EPA Beneficial Landscaping- Wildlife: Amphibians Need Our Special Consideration, www.yosemite.epa.gov/r10/ECOCOMM.NSF/webpage/Beneficial+Landscaping+-+Wildlife//
6 At Home with Wetlands: A Landowner's Guide: Chapter FOUR: Activities That Effect Wetland Plant Communities: Using Chemicals, by Joy P. Michaud, for the Washington State Department of Ecology, Ecology Publication #90-31 www.ecy.wa.gov/programs/sea/pubs/90031/index.html
7 NH DES Summary of the New Shoreland Protection Act Standards, Effective July 1, 2008, RSA483-B, An easy to understand summary of NH's revised Shoreland Protection Act, www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/cspa_brochure.pdf
8 Riparian Buffer Zones, Functions and Recommended Widths: Vegetation,Mix, Hawes and Smith , Yale School of Forestry and Environmental Studies, page 6, www.durhamnc.gov/departments/planning/pdf/wqattachment3.pdf
9 River Banks and Buffers, Backyard Buffers: Beginning Your Buffer: First Steps, www.crjc.org/buffers/Backyard%20buffers.pdf
10 NH DES Best Management Practices to Control Nonpoint Source Pollution – A Guide for Citizens and Municipal Officials, January, 2004, page 20, www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-03-42.pdf
11 Home and Garden Tips: Lawn and Garden Care: Apply Fertilizer Properly, www.nrcs.usda.gov/feature/highlights/homegarden/lawn.html
12 At Home with Wetlands: A Landowner's Guide: Chapter FOUR:General Protection Considerations: Dumping and Filling, by Joy P. Michaud, for the Washington State Department of Ecology, Ecology Publication #90-31 www.ecy.wa.gov/programs/sea/pubs/90031/index.html
13 Riparian Buffer Zones, Functions and Recommended Widths, Buffer Types, Zones1 and 2, pages 9-10, Hawes and Smith , Yale School of Forestry and Environmental Studies, www.durhamnc.gov/departments/planning/pdf/wqattachment3.pdf

**What Protects Fremont's Water Resources? (page 12)**
1 Town of Fremont's Zoning, Zoning Ordinance by Article, left margin at http://www.fremont.nh.gov/fnhgplanbd1.shtml
2 Town of Fremont's Master Plan, 2009, some chapters available at http://www.fremont.nh.gov/fnhgplanbd1.shtml

**Fremont's Water Resources are Interconnected(page 12)**
1 Town of Fremont Natural Resource Inventory, 2008, Section 4.8 Surface Water Resources, page NRI-18

**Water Facts (page 12)**
1 Quickfacts, #57, //www.ec.gc.ca/water/en/e_quickfacts.htm//
2 The 2nd United Nations World Water Development Report: "Water, A Shared Responsibility, Part 1: Global Hydrology and Water Resources, figure 4.1, page 4 of file (marked page 121) www.unesco.org/water/wwap/wwdr/wwdr2/pdf/wwdr2_ch_4.pdf
3 Water Ethics: Beyond Riparian Rights, WSSS Seminar 2/18/05, Slide 10, www.tufts.edu/water/ppt/ShellykWater%20Ethics.ppt

# Recommended Readings:

For people wanting more information about issues discussed in this newspaper, the Fremont Conservation Commission suggest looking at the resources listed below.

**Buffers**
Buffers for Wetlands and Surface Waters: A Guidebook for New Hampshire Municipalities (1995, Audubon Society of New Hampshire, NH Office of State Planning), This booklet describes the importance of buffers and includes information about wildlife, wildlife habitat, techniques for planting buffers, and native plant sources. www.extension.unh.edu/CommDev/Buffers.pdf

**Drinking Water**
NHDES Water Resource Primer (2009, NHDES), A very informative and highly recommended document on all water resources in NH. www.des.nh.gov/organization/divisions/water/dwgb/wrpp/primer.htm
The NH DES Private Well Program (webpage, NHDES). Site includes information about private wells, drinking water testing, common drinking water contaminants, water treatment, accredited labs, and a link to the NH DES laboratory which tests private wells water. http://des.nh.gov/organization/divisions/water/dwgb/well_testing/
Salt in our Waters, an Emerging Issue for New Hampshire Communities (2007, Local Government Center), Report discusses the issue of increasing amounts of salt in our groundwater and surface water. www.nhlgc.org/LGCWebsite/InfoForOfficials/townandcityarticles.asp?TCArticleID=53

**GIS**
NH GRANIT: New Hampshire's Statewide GIS Clearinghouse (website, UNH). Site has a viewer to see selected maps and data about Fremont and Rockingham County, www.granit.unh.edu
MapWindows, free software to view GIS data on Windows OS. www.mapwindow.org

**Homeowner Tips**
A Healthy Environment Starts at Home, (2005, Massachusetts Water Resources Authority). Guide to "reducing our use of hazardous products" with some innovative alternatives for household cleaning chemicals. www.mwra.com/publications/hhw2005.pdf

**Lawn and Garden**
Home and Garden Tips (website, NRCS) Tips for water use, soil treatment and fertilizer use. www.nrcs.usda.gov/feature/highlights/homegarden/lawn.html
Beyond Pesticides, What is Integrated Pest Management? Fact sheet describes Integrated Pest Management (IPM), and includes information on using pesticides and talking to lawn service companies www.beyondpesticides.org/infoservices/pcos/IPM.HTM
A Citizen's Guide to Pest Control and Pesticide Safety (2005, US EPA) A comprehensive guide about pesticides, www.epa.gov/oppfead1/Publications/Cit_Guide/citguide.pdf

**New Hampshire RSAs**
NH DES Summary of the New Shoreland Protection Act Standards, Effective July 1, 2008, RSA483-B, An easy to understand summary of NH's revised Shoreland Protection Act, www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/cspa_brochure.pdf
NH RSA 482-A-2, the official definition of a wetland www.gencourt.state.nh.us/RSA/html/L/482-A/482-A-2.htm

**Radon**
Radon in Air and Water: An Overview for the Homeowner (2009,NHDES). Important factsheet because so many homes in southern New Hampshire have radon in the air and in the water. www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-3-12.pdf

**Septic Systems**
A Homeowner's Guide to Septic Systems (2006, US EPA), www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf
Septic System Management for Homeowners (video, 2008, NHDES) A very informative video www.des.nh.gov/organization/divisions/water/wweb/homeowner_video.htm

**Town of Fremont**
*Fremont – New Hampshire's Most Historic Town?*, (2003, Vol. 7, Number 9, *As I Please*,), An interesting online article about Fremont's Town Historian, Matthew Thomas and some interesting facts about Fremont, seacoastnh.com/arts/please092203.html
*History of Fremont, N.H. Olde Poplin An Independent Republic 1764-2004*, Matthew E. Thomas
Fremont Natural Resource Documents, including the 2003 Prime Wetland Designation Study (Spruce Swamp); The Town Wide Wetlands Evaluation Report, 2007; The Fremont Natural Resource Inventory, 2007 which is all about Fremont's Natural Resources; The Glen Oakes Forest Management Plan, 2009, Fremont's Hazard Mitigation Plan, updated 2009. Contact Meredith Bolduc in the Fremont Land Use Office (fremontpz@comcast.net) for a compact disk of the documents. A small fee applies.
"Fremont Natural Resource Documents: A CD of The Fremont Natural Resource Documents will be made available after all of the documents have been completed and after the CD has been prepared. There will be a small fee for the disk. An announcement will be made in the Fremont Newsletter when the CD is ready for distribution. Contact Meredith Bolduc in the Fremont Land Use Office (fremontpz@comcast.net) for more information.

**Water and Medicine**
NH DES web page, Medicine Disposal Information for New Hampshire. This web page has links to a wealth of information about disposing of medicines in the home. http://des.nh.gov/organization/divisions/water/dwgb/dwspp/medsafety/index.htm

**Water Treatment**
Considerations When Purchasing Water Treatment Equipment, (2005, NHDES) Describes how to chose a water treatment system. www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-2-5.pdf
Disposal of Water Treatment Backwash at Single Family or Duplex Residences (2008, NHDES) Describes alternate ways and precautions to consider when operationg a water treatment system that backflushes. www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-22-17.pdf

**Wetlands**
At Home with Wetlands: A Landowner's Guide by Joy P. Michaud, An excellent guide for the homeowner that includes information on defining a wetland, wetland functions, and wetland enhancement. www.ecy.wa.gov/programs/sea/pubs/90031/index.html

**Wildlife**
A Landowner's Guide to Inventorying and Monitoring Wildlife in New Hampshire (2004, UNH CE) Free to download: www.extension.unh.edu/resources/files/Resource000418_Rep440.pdf or $10 for hard copy: www.extension.unh.edu/resources/files/Resource000418_Rep889.pdf
NH Wildlife Action Plan (2005, NHFG) A comprehensive plan that includes descriptions of habitats at risk as well as individual species information. www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm

**Vernal Pools**
NH DES Vernal Pool Page (website) Provides links to several interesting resources about vernal pools, including a free downloadable publication Identification and Documentation of Vernal Pools in New Hampshire. www.des.nh.gov/organization/divisions/water/wetlands/vernal_pools.htm