The State of New Hampshire
Department of Environmental Services
Thomas S. Burack, Commissioner

Celebrating 25 Years of Protecting New Hampshire's Environment

WATER CONSERVATION PLAN APPROVAL

December 26, 2012

Tom Mason Jr.
Lakes Region Water Company Inc.
PO Box 389
Moultonborough, NH 03254

RE: Moultonborough – Paradise Shores (PWS # 1612010)
Water Conservation Plan

Dear Mr. Mason:

On December 20, 2012, the New Hampshire Department of Environmental Services ("DES") Drinking Water and Groundwater Bureau received a Water Conservation Plan, dated February 29, 2012 and signed on November 29, 2012, for Paradise Shores located in Moultonborough, New Hampshire (the "Plan"). Pursuant to RSA 485:61 and Env-Wq 2101, community water systems seeking permits from DES for new sources of groundwater shall submit a water conservation plan to DES. Based on review of the Plan, DES has determined the Plan complies with Env-Wq 2101.06, *Requirements for Existing Small Community Water Systems*.

Pursuant to Env-Wq 2101.11, the Town of Moultonborough and the Lakes Region Planning Commission were provided the opportunity to comment on the Plan. DES received no comments.

On December 26, 2015, and every three years thereafter, the water system shall submit a detailed and completed compliance report form to DES documenting compliance with the Plan. Required information includes contact information for the water-system owner and for the individual responsible for carrying out plan tasks; dates tasks were performed; and data relating to meter reading, water audits, leak detection, and public outreach. A copy of the *Water Conservation Plan Ongoing Compliance Form* may be located by going to the DES website, www.des.nh.gov, clicking on the "A-Z List" in the top right corner of the page, and scrolling down to Water Conservation.

Revisions to the Plan shall not be implemented without further approval from DES.

Please feel free to contact me with any questions at (603) 271-0659 or via e-mail at stacey.herbold@des.nh.gov .

Sincerely,

Stacey Herbold
Drinking Water and Groundwater Bureau

ec: Jake Dawson, LRWC
Diana Morgan, NHDES
Town of Moultonborough
Lakes Region Planning Commission

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Marie Samaha, Chairperson
Town of Moultonborough,
Conservation Commission
PO box 139, 6 Holland Street
Moultonborough, NH 03254

PS Form 3800, August 2006 See Reverse for Instructions

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103 Main Street, Suite 3
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Marie Samaha, Chairperson
Town of Moultonborough,
Conservation Commission
PO box 139, 6 Holland Street
Moultonborough, NH 03254

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PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

Report Form for
Water Conservation Plans
Small Community Water Systems

PROJECT NAME: **Paradise Shores (Mt Roberts) – Small Community Water System**
TOWN/CITY: **Moultonboro, NH**
EPA ID # **1612010**
DATE: **February 29, 2012**

PURPOSE A community water system seeking approval for a new source of water must meet the requirements of New Hampshire Administrative Rule Env-Wq 2102, Water Conservation. Requirements vary depending on the type of water system as follows: **Env-Wq 2101.06 Existing Small Community Water System**

This report was submitted for review to:
ATTN: Derek Bennett
NHDES – Drinking Water & Groundwater Bureau
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

PROJECT/CONTACT INFORMATION

The Preliminary Well Siting report is being submitted concurrently to the NHDES for review.

Project Contact:

Name:	**Jake Dawson**
Address:	**PO Box 389, Moultonboro, NH 03254**
Company:	**Lakes Region Water Company Inc.**
Phone Number:	**(603) 476-2348 or cell (603) 677-6478**

Project Owner:

The water system owner is: Thomas Mason Jr, President
Lakes Region Water Company Inc.
PO Box 389, Moultonboro NH 03254
(603) 476-2348

The well site owner is: Thomas & Barbara Mason
PO Box 389, Moultonboro NH 03254
(603) 476-5150

To the best of our knowledge, ownership of the water system will NOT be transferred at a future date from the person listed above to a homeowner's association or any other entity.

SOURCE & SYSTEM OVERVIEW

- **Reason for New Source:** As stated in the Paradise Shores Preliminary Well Siting Report, Mt Roberts Well #2 and #4 will be used to supplement the declining yield of existing system wells along with improving capacity for an increase in demand. Beginning in the summer 2008, the Paradise Shores CWS began "running out of water" during times of peak demand. Peak demand is realized during the summer months, especially during the busy July 4th, Labor Day, and Memorial Day holiday weekends. Emergency approval was utilized during times of high demand to successfully provide consistent, safe, water service to all customers.

Service Connections/Types: The Paradise Shores CWS consists of 391 existing service connections, all of which are residential homes. There are NO known industrial, commercial, institutional, or municipal connections. Suissvale is the only service connection that receives more than 10,000 gpd which is no longer regulated by the NHDES and is to be considered one service connection to LRW Co. There are an estimated 50 additional service connections within the Paradise Shores CWS that could exist at full build-out. This is the maximum number of services that could be added in the future; however, there is no evidence to suggest that this would happen any time in the near future. Any new service connections that are added will have meters installed in a timely manner.

- **Population Trends:** The majority of the Paradise Shores customers are seasonal occupants. The summer months are when the system exhibits highest water use, because there is an increase in average occupants due to the seasonal nature of the system. The busiest times are during long holiday weekends, specifically the July 4th, Memorial Day and Labor Day holidays. The average daily use is usually less than 55,000 gpd, with maximum daily use of less than 180,000 gpd occurring during the busy July months, where peak use is realized and temperatures are usually the highest. Maximum daily yields of each well source will be re-determined during the 48 hour pumping test to be performed following the Preliminary Well Siting Approval.

SYSTEM METERING

- **Water Sources:** There are 2 active well sources currently in use for the Paradise Shores CWS and 10 inactive well sources. Each of these are drilled, bedrock wells. The active ones are named BRW #5 and BRW #6. We are currently seeking approval for two additional sources, Mt. Roberts BRW 2 and Mt. Roberts BRW 4, which were drilled in 2007.

- **Source Meters:** There is 1 source meter for the current active wells as the system is designed as a blended source. This meter is a 2" Sensus W-160 meter with flow ranges of 4 – 160 gpm. The blended source is typically read at least once a day, but they are always read at least once every 3 days. Also, meter flows are recorded in a Telemetry portal in 1 minute increments 24 hours a day 365 days a year. Flow alarms which are forwarded to Lakes Region Water Company staff via cell phone are utilized to quickly and accurately determine leak events. The last meter test date was in 2012, but we will continue to test once every 4 years as required by NHPUC rules and AWWA standards. The new wells, BRW 2 and BRW 4 will utilize individual 2

inch Badger magnetic flow meters capable of reporting to the Telemetry portal in the same manner as expressed above. The Badger magnetic flow meter will be calibrated as per NHPUC rules and AWWA standards.

Source meters will continue to be selected, installed, tested, and maintained in accordance with the procedures and protocols described in the American Water Works Association (AWWA) 1999 document identification number M6, "Manual of Water Supply Practices, Water Meters-Selection, Installation, Testing, and Maintenance".

- **Service Meters:** Each of the existing 390 Paradise Shores CWS customers are considered residential in nature and have Sensus SR 5/8" water meters currently installed. The remaining service for Suissevale is metered by a Badger M200 magnetic flow meter Any new service connections will have meters installed according as soon as possible; however, no new service connections have been recently added. We test according to AWWA and NHPUC rules, which requires a 5/8" meter to be tested no less than once every 10 years. Customer meters are read once every 90 days (once per quarter) using a Sensus Handheld AR5001 and Autogun for touch readings.

  Service meters will continue to be selected, installed and maintained in accordance with "Manual of Water Supply Practices, Water Meters-Section, Installation, Testing, and Maintenance," document identification number AWWA M6, American Water Works Association, 1999.

WATER AUDITS & LEAK DETECTION

- **Estimated Unaccounted for Water:** Lakes Region Water Company Inc. estimates for unaccounted for water at least annually, but typically about once per quarter. We review customer meter records as compared to source meter records, taking into account any excess kilowatt hours used by the pump stations (2) and any customer complaints or insight that is available to help us identify any potential leaks. We also perform system inspections about once per week, noting any significant changes in activity and perform leak detection as necessary, but at least once per year. The most recent estimate of unaccounted for water was calculated in June 2010 in which 0.66 gpm was unaccounted for and considering lost due to leakage.

  Lakes Region Water shall prepare and submit a response plan to the NHDES Water Conservation Department within 60 days anytime the percentage of unaccounted for water in the Paradise Shores CWS exceeds 15% of the total water introduced into the system, identifying how we intend to reduce the percentage to below 15% within 2 years or less.

- **Water Audits & Leak Detection:** The Company performs in-house leak detection, since several of their field personnel are certified water operators who have successfully completed training sessions of a wide variety conducted by NHDES, AWWA and Granite State Rural Water Association. Our most recent leak detection was performed in January 2012, where a small 5 gpm leak was discovered. 100% of the system was surveyed for leakage and 100% of the losses were recovered upon its immediate repair.

A Meter Master Flow Recorder (Model100 EL) is often used to record flows on a continuous basis, which are then analyzed to obtain minimum flows during off-peak hours (in the middle of the night), which is considered true water loss. This process typically occurs following an unaccounted for water estimate, but no less than once per year.

The Paradise Shores CWS also utilizes 24hr/365day telemetry to identify water use trends that may indicate abnormal water flows. This system has proven to be effective in minimizing water loss and is encouraged for other CWS's by Lakes Region Water Company.

The Paradise Shores CWS is comprised of approximately 8000 feet of 6" diameter PVC pipe; 11,000+ feet of 4" PVC; 6,000 feet of 3" PVC; 31,000 feet of 2"; and 4,000 feet of miscellaneous pipe. The age of the pipe varies significantly as replacements and extensions have been added since the 1960's. At least once every 2 years, all water mains, shut off valves, blow offs and customer service lines are completely surveyed for leakage using an acoustic listening device. A ground microphone is used in conjunction with acoustic listening device Models HL400 and HL 90 which are manufactured by Metrotech. Each of these contact points will be field surveyed for water leakage at 5 foot intervals over the top of the pipe.

Since this system has only 52,000 feet of water main and an overall low consumption volume, it is not cost effective or necessary to install zone meters to assist in leak detection. At the conclusion of this assessment, any damages to existing structures will be noted and replaced as soon as possible, but no later than 60 days.

Any and all water leaks located after the service valve, which ends the responsibility of LRW Co will be handled in compliance with the NHPUC approved tariff language under paragraph "Pipes and Fixtures".

- **Intentional Water Loss:** There are no "bleeders" used within the system at dead ends to improve water quality or prevent freeze-ups because they are unnecessary. There are also no storage tanks that we allow to intentionally overflow due to unique system hydraulics or other concerns.

- **Pressure Management:** The Paradise Shores CWS currently operates at pressures between 40 psi and 100psi. Pressure reduction is not necessary because there are no zones that exceed maximum operating pressures allowed by State Rules. If the pressure exceeds 100 psi, pressure-reducing valves will be installed on the service line or water main to maintain the pressure below 100 psi.

Lakes Region Water will perform a water audit & leak detection in accordance with "Manual of Water Supply Practices, Water Audits & Leak Detection" document identification number AWWA M36, American Water Works Association, 1999. Any identified leaks will be documented & repaired immediately or within 60 days of discovery unless a waiver is obtained in accordance with Env-Wq 2101.09.

CONSUMPTION MANAGEMENT

- **Conservation Rate Structure:** Paradise Shores community water system is charged in accordance with our Company Tariff which is NHPUC approved. Each customer receives a quarterly water bill comprised of two (2) separate charges. The first is a minimum "base rate" that is charged to each customer per quarter regardless of how much water is used. In addition to this flat fee, each customer is charged for the total amount of water that passes through their individual water meter, which encourages judicious use of water. There are no seasonal rate structures in place, and the billing policies described above will remain in effect indefinitely.

- **Educational Outreach Initiative:** The educational outreach initiative will consist of two NHDES Fact Sheets (*attached*):
  - Fact Sheet WD-DWGB-26-2: Water Efficiency Practices for Domestic Indoor Water Use
  - Fact Sheet WD-DWGB-26-3: Water Efficiency Practices for Outdoor Water Use

  These fact sheets are highly informative materials that can familiarize customers of simple water conservation measures that can be implemented at home. They will be distributed to each customer immediately following the department's approval of the new source (most likely to be included along with customer's quarterly water bills). After this initial mailing, they will be distributed annually along with the Consumer Confidence Report (CCR), which must be sent to each customer by July 1st of each year.

  In order to document how compliance with the requirements of Env-Wq 2102 is being achieved, Lakes Region Water Company Inc. will submit a "3 Year Water Conservation Compliance Report" to be supplied by the NHDES once every three years. All activities outlined in this water conservation plan will be completed by water system personnel under the supervision of a certified water system operator.

- **Public Notification**: Within 7 days of submitting the final water conservation report to the NHDES for review, Lakes Region Water Company Inc. will provide via certified mail:
  - The Final Water Conservation Report (after initial NHDES review)
  - Education outreach materials for review:
    - Water Conservation Rules Summary (Env-Wq 2101)
    - NHDES Fact Sheet WD-DWGB-26-2: Water Efficiency Practices for Indoor Water Use
    - NDHES Fact Sheet WD-DWGB-26-3: Water Efficiency Practices for Outdoor Water Use

  The materials listed above will be sent to the following governing boards:
  - Lakes Region Planning Commission
    103 Main Street, Suite 3
    Meredith, NH 03253
  - Marie Samaha, Chairperson
    Town of Moultonboro, Conservation Commission
    PO Box 139, 6 Holland Street

Moultonboro, NH 03254

Copies of the cover letters to be sent to the governing boards along with all pertinent attachments are enclosed for NHDES review. Certified mail receipts will be provided when available.

Before submitting, thoroughly check this form to be sure all applicable questions are answered, all information is provided, and all necessary attachments are included. Incomplete submittals will significantly slow the approval process.

If strict compliance with any of the requirements of Env-Wq 2101 is not feasible, the small community water system may apply for a waiver to a specific portion of the rule. A waiver application form is provided at the end of this document for your convenience.

I certify that I have read this Water Conservation Plan, understand the responsibilities of the water system as referenced in the plan, and that all information provided is complete, accurate, and not misleading.

Signature Owner Name (print): Lakes Region Water Company

System Owner Signature: _____ Date: 11/29/2012

Date: **November 29, 2012**

As a reminder, have you included the following?

- Educational outreach initiative documentation and materials created by the water system.
- Public notification documentation (certified mail receipts).
- Public notification cover letters and pertinent documents.
- Other pertinent or supportive materials.

-Water Conservation Rules-
Env-Wq 2101 (formerly Env-Ws 390)

Applicants applying for permits to develop new sources of water need to be aware that they are subject to new water conservation requirements required by RSA 485.61 which became law in July 2002. The law requires that the Department of Environmental Services (Department) adopt and administer water conservation rules for applicants developing the following type of new water sources:

1. New sources of groundwater for community water systems subject to RSA 485:3;

2. New sources of groundwater for bottled and bulk water operations subject to RSA 485:3;

3. New sources of groundwater that exceed 57,600 gallons over any 24-hour period subject to RSA 485-C; and

4. New sources of surface water associated with projects that require a water quality certification pursuant to Section 401 of the Federal Clean Water Act.

The Department met with an advisory committee consisting of representatives of municipalities, community water systems, environmental organizations, and business and industry to develop the water conservation rules. The rules were formally adopted by the Department in May 2005.

A general summary of the requirements of the water conservation rules is provided below.

Requirements for All Large Community Water Systems and All New Small Community Water Systems Developing New Sources of Water

1. Install and maintain meters for all water withdrawals and service connections.

2. Implement a water audit, leak detection and leak repair program in accordance with the "Manual of Water Supply Practices, Water Audits and Leak Detection", document identification number AWWA M36, American Water Works Association, 1999.

3. When applicable, development and implementation of response plans to reduce unaccounted for water to less than 15%.

4. Implement a rate structure that encourages efficient water use.

5. Implement a water conservation educational outreach initiative.

Requirements for Existing Small Community Water Systems Developing New Sources of Water

1. Either: a) Install source and service connection meters and implement a water audit, leak detection and leak repair program in accordance with the "Manual of Water Supply Practices, Water Audits and Leak Detection", document identification number AWWA M36, American Water Works Association, 1999; **or** b) Complete a system-wide leak detection once every two years.

2. Repair all leaks within 60 days of identification.

3. Implement a water conservation educational outreach initiative.

Requirements for Applicants Developing New Sources of Water for Industrial, Commercial, or Institutional Water Uses

1. Install water meters for all water sources.

2. Retrofit or replace single pass water-cooling systems when feasible based upon an economic analysis that includes a four-year payback period.

3. Install controls to stop the overflow or discharge of water to waste when feasible based upon an economic analysis that includes a four-year payback period.

4. Identify water conservation best management practices or best available technologies that may be applicable to the types of water-using processes at the subject facility, and implement these measures when feasible based upon an economic analysis that includes a four-year payback period.

5. For all new lawn areas, install six (6) inches of loam and devices to shut-off automatic irrigation systems when not needed.

For more information about the water conservation rules, contact Derek Bennett at 271-6685 or derek.bennett@des.nh.gov.

ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WD-DWGB-26-2 2010

Water Efficiency Practices for Domestic Indoor Water Use

Only 1 percent of the earth's water is available for drinking. The average American uses 100 gallons of water a day. Our excessive water use habits deplete potable drinking water supplies and return trillions of gallons of wastewater to streams and coastal waters. The following indoor water efficiency practices can save as much as 25,000 gallons of water per person per year. Water efficiency practices not only save water, they save money. For a description of how to determine water use in your home, see the following fact sheets at www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm and scroll to WD-DWGB-26-15, "Performing a Domestic Water Use and Conservation Audit." To save water on outdoor use, see fact sheet WD-DWGB-26-3, "Water Efficiency Practices for Outdoor Water Use" at the same website.

General Water Efficiency Practices

The following water efficiency practices apply to general domestic water use. Bathroom, kitchen and laundry water use are addressed in later sections.

- Look for the WaterSense label when considering water using fixtures, appliances, and services. WaterSense, sponsored by the U.S. Environmental Protection Agency (EPA), labels water-efficient products that have been independently tested to ensure water savings without sacrificing performance or quality.
- Shut off water when not in use, such as when you brush your teeth or shave.
- Never put water down the drain when you can use it for something else, such as watering plants.
- Insulate water pipes and hot water heaters. This retains heat so that water doesn't need to run as long to get hot. It also saves on energy costs.
- Avoid water softening systems unless absolutely necessary. Backwashing these systems uses large quantities of water. If you do use a water softener, run the minimum amount of recommended regenerations to maintain softness.
- Turn off pumps, water softeners, and other water-using equipment while on vacation.
- Check for and repair leaks. Not only will you save water but you will save energy and money. A large percentage of energy costs can be attributed to pumping, treating, heating, and cooling water.
- If you are on municipal water and have a meter at your house, check the meter over a period of time when no one is using water. If the meter moves, you have a leak.
- If you have a well, the pump shouldn't run at times when no water is being used.

Water Efficiency Practices in the Bathroom

More than one fourth of all domestic indoor water consumption is used in the bathroom. The following water efficiency practices will help you save water in the bathroom.

- Install ultra-low flow toilets (ULF) that use a maximum of 1.28 gal/flush (4.8L/flush) or retrofit existing toilets with displacement bottles or dams. Dual flush toilets offer a choice between the 1.6-gallon flush for solid wastes and a 1.0-gallon flush for liquid only. Never put bricks in toilet tanks; they disintegrate over time. Use a squat, fat glass jar, like a pickle jar, no more than 6" high, filled with water. Glass is heavier than plastic and less apt to shift around in the tank.
- Install low-flow bathroom faucets that use no more than 1.5 gallons per minute or install low-flow faucet aerators or laminar flow restrictors. These devices are readily available at most hardware and building supply stores.
- Install low-flow showerheads that use no more than 2.0 gallons per minute. Low-flow showerheads are designed to use less water and still provide the same invigorating spray as their water-wasting counterparts.
- Don't use the toilet as a garbage disposal. Avoid unnecessary toilet flushing by disposing of tissues, cigarette butts and other items in the trash, and composting vegetable food waste.
- Replace or repair toilet flush handles that stick in the flush position.
- Avoid using automatic bowl cleaners in your toilet tank. These chemicals rapidly degrade flapper valves and other tank components, causing the toilet to leak.
- Adjust the toilet tank float level so that water fills no higher than 0.5"-1.0" below the top of the overflow pipe. At higher levels water can flow down the pipe and leak through to the bowl. The refill valve then tops off the tank, causing a continuous cycle of drain and fill.
- Detect leaks in toilet tanks by dropping food coloring in the tank (12 drops). Do not flush the toilet for at least an hour. If the tank leaks the dye will show up in the bowl.
- Fill bathtubs no more than half full.

Water Efficiency Practices in the Kitchen

The following water efficiency practices can be applied to routine kitchen chores.

- Operate dishwashers with full loads only. Use the water-save cycle if your dishwasher is equipped with one.
- If washing dishes by hand, rinse them in a basin rather than under running water.
- Store drinking water in the refrigerator rather than running the tap for cold water.
- Compost food scraps rather than using a garbage disposal. Not only do disposal units waste water; the fine particles they produce can clog a septic system.
- Consider installing an instant water heater on the kitchen faucet. This reduces the time needed to run water until it becomes hot.
- Do not run water to melt ice or thaw frozen foods. Defrost them in a microwave or in the refrigerator overnight.
- Rinse vegetables in a pan of water rather than under running water.

Water Efficiency Practices in the Laundry

The laundry is usually the second highest domestic indoor water use. The following water efficiency practices are designed to save water in the laundry.

- Wash full loads only. If unable to wash a full load, set your washer to the appropriate water level setting.
- Consider replacing your top-loading, vertical-axis washer with a more efficient horizontal-axis washer. Most of these are front-loading, but some newer models are also top-loading. These washers rotate clothes rather than agitating them and use much less water, an average of 20 gallons per load compared to an average of 43 gallons for conventional washers. See the EPA's Energy Star website listed at the end of this document for a catalog of Energy Star-approved washing machines.

For Additional Information

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.nh.gov or visit our website at http://des.nh.gov/organization/divisions/water/dwgb/index.htm. All of the bureau's fact sheets are on-line at http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm. More information about the DES Water Conservation Program can be found at http://des.nh.gov/organization/divisions/water/dwgb/water_conservation/index.htm.

Resources

Woodinville, WA Water District. In-depth water-saving tips, how to check for leaks. http://www.woodinvillewater.com/Conservation/District%20Program/District%20Program.htm

US EPA. Listing of Energy Star rated washing machines. www.energystar.gov

References:

New England Interstate Water Pollution Control Commission (NEIWPCC) *MRI Water Conservation Technical Bulletin #5, Water Conservation Best Management Practices for Domestic/Sanitary Water Use;* NEIWPCC, Lowell, Mass.; 1996.

US Dept. of Defense, *MIL-Handbook-1165, Water Conservation;* US Dept. of Defense; 1997; pp 25-37.

Vickers, Amy; *Handbook of Water Use and Conservation;* WaterPlow Press, Amherst, Mass.; 2001; pp 23-75, 87-133.

Note: This fact sheet is accurate as of May 2010. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.

ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WD-DWGB-26-3 2010

Water Efficiency Practices for Outdoor Water Use

Outdoor water uses increase water consumption during spring and summer by an average of 50 percent. Landscape watering and car washing are the two main outdoor water uses responsible for this demand for water. This increase in demand comes at a time of year when there is less water naturally available in the environment due to warmer temperatures and plant uptake.

By implementing just a few minor changes in how you use water outdoors, you will find that you can maintain your existing outdoor activities using much less water. This will save money on your water and electric bill, and protect the environment by leaving more water for New Hampshire's rivers, wetlands and aquifers. In the case of outdoor lawn watering, using water more efficiently will actually improve the durability of your grass, reduce the need for chemical amendments, and decrease lawn mowing frequency.

The following sections address conservation for landscape and garden irrigation and other outdoor uses.

Landscape and Garden Irrigation Conservation:

Use water-wise and region-appropriate landscape plantings. Visit the fact sheets webpage at www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm and scroll to WD-DWGB-26-4, "Fundamentals of Xeriscaping and Water-Wise Landscaping."

Watering frequency should be based on soil moisture, weekly precipitation and plant/turf conditions. Typically, established landscape plants and turf grass require one inch of water per week, and this amount may be applied in one application. You may see golf courses watering lush greens almost continuously; however, these are often exotic grasses that must be cooled from the heat of the day. Do not copy the watering practices of these types of operations.

Use a rain gauge to calculate your lawn and garden water needs. A rain gauge allows you to measure how much rain has fallen. These devices are available for a minimal cost at your local garden/hardware store and are easy to use. Mature lawns only require about one inch of water a week. The amount of water you should apply to your garden or lawn equals one inch minus the amount of rain you received for the week.

Soil moisture sensors are useful in determining how wet your soil is. You can check the moisture of the soil to determine watering needs. In some instances you will find that you do not need to water even if it has not rained recently.

Water only those areas that are dry. Water by hand, if possible.

Determine sprinkler or hose application volumes by placing cans at various locations in the lawn or garden. Mark a one-inch depth on the inside of the cans. Time how long it takes your sprinkler heads or hose to deliver an inch of water to each of the cans, and average the times it takes to fill each can one inch

deep. This is how long you should run your sprinklers or hose to deliver an inch of water.

Completely wet the plant root zone each time you water to prevent dry layer formations that inhibit root growth. Probe the soil after irrigating to determine whether the water reached the root zone. If water penetration is too deep, too shallow, or spotty, adjust your watering practices to correct it.

Do not over-water your lawn. Only water to the depth of the root zone. Excess water percolates too deeply, making it unavailable for plant use. Also, too much water prevents air from reaching root systems and encourages shallow roots and plant diseases.

Plant drought-resistant turf grass. The most drought-tolerant grasses are the fine leaf fescues. The University of New Hampshire Cooperative Extension recommends a mix containing hard fescue, Chewings fescue and perennial ryegrass. Most garden centers carry this type of mix.

Set your mower height to two inches. Longer grass blades retain moisture better, shade the root system, and encourage roots to grow deeper and stronger.

Keep the mower blades sharp. Mowing with a dull blade gives grass a "split ends" look making it seem drier than it is.

Give lawns the lowest priority for watering, since they are able to go dormant for long periods of time, slower to die and less expensive to replace than other vegetation.

If using a sprinkler system, connect it to an automatic timer. If you do not have a timed system, set a kitchen timer to avoid over-watering.

Be sure sprinkler heads are producing drops rather than a mist. This helps to reduce evaporation.

If you use automatic, pop-up sprinkler heads, choose the type that incorporate electronic sensors to monitor soil moisture and rain events. Periodically check to ensure sensors are operating properly.

Operate automatic sprinkler systems connected to public water systems only when the water demand is low, usually between 4 a.m. and 6 a.m.

Irrigate between 9 p.m. and 9 a.m. to prevent evaporative water loss.

Don't water the pavement. Adjust sprinklers so that they water only the plants.

For larger systems, develop an irrigation maintenance program. Routinely inspect all water lines, valves and pumps for leaks. Keep replacement and repair parts on hand. Inspect sprinkler nozzles to ensure they are operating properly and are distributing the water uniformly. Evaluate irrigation system pressures to better control application rates.

Apply appropriate fertilizers to encourage the growth you want in your plants. Nitrogen promotes leaf growth, phosphorus benefits fruits and flowers and potassium promotes root development. For instance, lettuces require primarily nitrogen; grass needs nitrogen in the spring and potassium the rest of the growing season. Roses and tomatoes call for phosphorus. Usually a balanced fertilizer, such as 10-10-10 that contains 10 percent each of potassium, phosphorus and nitrogen, is best for vegetables, shrubs and flowers. Specialty fertilizers for lawns contain higher percentages of either nitrogen or potassium depending upon what time of year they should be applied.

Do not irrigate during windy conditions.

Utilize drip or trickle irrigation wherever possible. These systems apply water near the root zone of the plant, ensuring a complete watering while lessening excess water usage.

Plant species native to New Hampshire. Native plants are hardier and tend to need less water. Visit the New England Wildflower Society's website at www.newfs.org for information about native plants.

Use mulch to retain moisture. Mulch can be used almost everywhere in the garden, even on row vegetables. Mulch hay, straw and sheet composting work well in the vegetable garden.

Minimize your lawn area. Replace grass with moss, rocks, gravel, wood chips or mulched flowerbeds. Consider xeriscape or "Zen" gardens. Xeriscape effectively uses drought-tolerant vegetation that subsists on precipitation alone. Zen gardens traditionally contain no vegetation, only raked sand, sculpture and a water feature. See fact sheet WD-DWGB-26-4 "Fundamentals of Xeriscape and Water-Wise Landscaping" for more information.

Use rain barrels, cisterns, and ponds to collect water that can be reused for gardens.

Establishing Turf grass:

Underlay turf areas with at least six inches of loam.

Choose a drought-resistant seed mix that favors at least 50 percent fine leaved fescues. You will need three to four pounds of seed per 1,000 square feet. Try to avoid mixes that contain Kentucky bluegrass. This grass, despite its name, is actually a native to England and requires a whopping 35 inches of rain a growing season to survive.

Test your soil. Fine leaf fescues thrive at pH values between 5 and 6.5. If your soil test indicates more acid conditions apply lime at a rate of 50 lbs/1,000 square feet. Contact your county cooperative extension for cost and information on obtaining a soil test kit. See extension.unh.edu for a complete listing of UNH county extension services and contacts.

Apply a starter-type fertilizer and till lime and fertilizer into the top 6 inches of the soil.

Rake and smooth the soil.

Apply seed uniformly. A broadcast spreader is an excellent tool for seeding lawns. The two most common types of spreaders are push spreaders that drop the seed out of the bottom of a hopper as you walk behind them and the crank type that broadcast the seed in a circular pattern from the hopper as you turn a crank. Make sure you overlap your passes with the seeder to avoid bare spots.

Roll or tamp the soil to make sure you have good seed-to-soil contact. The seed must be in contact with the soil to germinate. Water the area thoroughly.

Apply a weed-free mulch such as straw. Don't allow the seeded area to dry out, as seeds also need moisture to germinate.

The best time to plant grass seed in New Hampshire is August through September. If you plant earlier there is greater risk of broadleaf weed infestation. If you plant too late in the season the slow-germinating fescues will not have time to establish a good root system before freeze-up. Once established, a lawn of fine leaved fescues requires no watering. For more information, visit the UNH Cooperative Extension's website at extension.unh.edu.

Other Outdoor Water Use Conservation:

Cover swimming pools when not in use to prevent evaporation.

Lower the water level in the pool to prevent water loss from splashing.

Minimize pool filter backwashing.

Wash vehicles using a bucket and sponge, using a hose for rinsing only.

Sweep driveways, walks and decks with a broom rather than hosing them off.

Use hose nozzle shutoff devices.

Check your irrigation system, outdoor faucets, and hose connections for leaks. A 25-cent hose gasket can save money on your water or electric bill.

For Additional Information
Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.nh.gov or visit our website at http://des.nh.gov/organization/divisions/water/dwgb/index.htm. All of the bureau's fact sheets are on-line at http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm. More information about the DES Water Conservation Program can be found at http://des.nh.gov/organization/divisions/water/dwgb/water_conservation/index.htm

Additional Resources
University of NH Cooperative Extension, Home & Garden Education Program. Phone: 1-877-398-4769

UNH Cooperative Extension. Links to home and garden fact sheets.
www.extension.unh.edu/resources/category/Home_and_Garden

North Carolina Cooperative Extension. Detailed fact sheet on efficient irrigation. Includes directions for setting up a drip irrigation or sprinkler system.
www.bae.ncsu.edu/programs/extension/publicat/wqwm/ag508_6.html

References
_____; *MRI Water Conservation Technical Bulletin #7, Water Conservation Best Management Practices for Landscape and Turf Management;* New England Interstate Water Pollution Control Commission, Wilmington, MA; 1996.
_____; *MIL-Handbook-1165, Water Conservation;* US Dept. of Defense; 1997; pp 67-75.
Vickers, Amy; *Handbook of Water Use and Conservation;* WaterPlow Press, Amherst, MA; 2001; pp 140-223.