NEW HAMPSHIRE LIVES ON WATER

December 2012

New Hampshire Water Sustainability Commission - Final Report

Established by Executive Order 2011-02
By Governor John H. Lynch

NEW HAMPSHIRE LIVES ON WATER

NEW HAMPSHIRE WATER SUSTAINABILITY COMMISSION

FINAL REPORT - DECEMBER 2012

Contents

The Commission acknowledges with gratitude the support of the New Hampshire Charitable Foundation, the New Hampshire Rivers Council, The Switzer Foundation, and NH Listens, as well as facilities and technical assistance provided by the New Hampshire Departments of Environmental Services, Fish and Game, and Safety and the New Hampshire Higher Education Assistance Foundation.

COMMISSION OVERVIEW

The New Hampshire Water Sustainability Commission was created by Executive Order in April, 2011.[1] The Commission was composed of 14 citizens.[2] It was directed to make recommendations that will ensure that the quality and quantity of New Hampshire's water in 25 years is as good as or better than it is today.

At the outset, we asked three questions:

1. What do we need to know about water and how it is used – now and in the future?

2. What are the fundamental issues and challenges that if not addressed now will preclude the ability of future generations to ensure healthy ecological systems and enough clean water?

3. What actions are needed and who should be responsible for carrying them out?

Over the last 19 months, the Commission has sought to engage with and listen to the public at six public sessions around the state,[3] and has heard from those who have taken the time to write and e-mail us, and to come to our meetings.[4, 5, 6] We heard from approximately 500 individuals, and their thoughts and input are reflected in this report. The Commission listened to many experts on a variety of issues affecting New Hampshire's water[7] and studied the work of other water-related commissions.[8]

This report describes the work of the Commission and its findings. The Commission, through this report, presents a framework for action in seven goals with recommendations that, if met, will ensure the health and vitality of our state's ecological systems, the availability of good quality water for the health and economic vitality of future generations.

Most importantly, we learned that people in New Hampshire care and are knowledgeable about issues related to water. As a statewide community we know what we must do, but we need a coordinated voice and the initiative to do it. The work of the Commission is just the beginning of what will be required of our residents, businesses, nonprofits, public agencies and leaders in government and the private sector. That work must start with broad public engagement and collaborative partnerships. The Commission calls upon people in New Hampshire to become actively engaged as stewards of our water resources and to act upon the recommendations to achieve the goals presented in this report.

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[1] See Appendix A for the full text of the April 22, 2011 Executive Order.
[2] See Appendix B for a list of members of the Commission.
[3] See Appendix C for a summary of public input, and Appendices D and E for the reports of the May 8, 2012 NH Listens sessions and the July 9, 2012 listening event, respectively.
[4] See Appendices F and G for the summary of the online questionnaire, and mailed and e-mailed public comments, respectively.
[5] See Appendix H for a summary of the Commission's work process.
[6] See Appendix I for a description of the Commission's meeting schedule and minutes of those meetings.
[7] See Appendix J for web links to the materials used by the experts who presented to the Commission.
[8] See Appendix K for a list of water-related commissions and their recommendations.

Note: All appendices listed above are available online at: www.nh.gov/water-sustainability/.

EXECUTIVE SUMMARY

Water is our most valuable natural asset, and if we manage it well, our water offers New Hampshire a competitive advantage. It supports and is vital to a healthy environment, individuals, communities and the state economy. In short, New Hampshire lives on water.

A generation ago, issues involving water were primarily related to pollution that could be seen, smelled, and tasted. We learned where that pollution came from, and we figured out how largely to eliminate it. People learned about problems that impacted our water, they organized and acted, and as a result developed broad public support for public investments that resulted in remarkable improvements to the availability of clean, safe water. In the time since, scientific knowledge has grown greatly and has identified different and more complex problems involving water. We are learning more about how water connects us all.

The New Hampshire Water Sustainability Commission was created to develop a strategic action framework to ensure that the quality and quantity of New Hampshire's water in 25 years is as good as or better than it is today. The framework calls for partnerships and management of water across political boundaries, good science, and adaptive decision-making in managing our water resources. The Commission calls for the creation of a Water Advisory Task Force to advance work toward the goals outlined in this report and a multi-sector citizens' initiative to expand public engagement in and support for the specific recommendations offered by the Commission.

As a result of the Commission's work, we have come to understand the complexity of the responsibility facing us all concerning water. For example:

- Water infrastructure is part of New Hampshire's economic advantage. However, the condition of the systems that provide us with clean water and treat our waste may not be able to meet future demands, and many are, or will shortly be, in need of significant repair and upgrading. Unless investments are made, we will lose this competitive edge.

- The groundwater that 60 percent of the state's population drinks is contaminated in some areas by naturally-occurring or manmade chemicals, such as arsenic and MtBE, respectively (NHDES, 2008). The quality of groundwater used for private water supplies is often not known or tested.

- Growth and development within watersheds, as well as rising and changing demands for water, will affect whether we have enough good quality water when and where we need it, to support both the needs of the state's population and of the broader ecosystem.

- Some of the state's water management laws, policies and regulations should be reviewed and updated as necessary, to ensure that they reflect current scientific understanding and economic realities that best position us to comprehensively manage water in an increasingly global marketplace.

Strategic Goals

The Commission's efforts focused on highlighting the most important issues that we need to address and identifying those strategic goals and recommendations that will chart a course toward ensuring the long-term sustainability of our water resources. The seven strategic goals identified by the Commission are:

1. The people of New Hampshire will be knowledgeable, engaged, and careful consumers and stewards of our water resources.

2. Flexible and coordinated water management programs and practices will be designed and implemented to ensure that New Hampshire has an adequate quantity and quality of water to support ecological and human health and economic activity.

3. Management and planning for New Hampshire's water quality and quantity will be integrated at appropriate state, watershed and sub-watershed levels.

4. The infrastructure for delivering our drinking water, cleaning our wastewater, and managing storm water and water storage will protect human and environmental health and safety in an affordable manner.

5. Runoff from rain and snow, and the pollution it carries, will be minimized and effectively managed.

6. Our watersheds, communities, and built infrastructure will be robust, resilient, and able to adapt to changing weather patterns.

7. Adequate public and private funding will be available for managing water resources effectively and efficiently.

Resilience

Ensuring that our natural water systems (watersheds, groundwater, lakes, rivers, wetlands) and the systems we have built to manage, clean, and deliver water are able to tolerate disturbance, restore balance, and adapt to change.

As it concludes its work, the Commission believes that we can ensure that in 25 years the quality and availability of water will be as good as or better than it is today, provided we begin now to address several key areas of concern through very focused, intentional actions as follows:

- **Education** – We need a fully informed and engaged public where all sectors of New Hampshire life – individuals, businesses, organizations, and our public leaders – understand the importance of water to life and to our economy, how water works, and the challenges and consequences facing our water's future. These sectors must all be willing to take responsibility for and commit to action to ensure the quality and availability of water. We must respect private property rights while balancing a shared responsibility to ensure the quality and availability of water for future generations.

- **Infrastructure Investment** – The natural and built systems that provide recreational opportunities, support ecosystems, deliver our drinking water, manage our storm water, and clean our wastewater help provide New Hampshire with a competitive advantage over other states in terms of water availability and affordable water services. Without sustained investment in our water infrastructure, we may lose this edge. We need to renew and perhaps reinvent partnerships between and among individuals, communities, state and federal governments, and the private sector to provide the necessary levels of investment.

- **Future-Focused Management** – We need our state's policies, laws, regulations and programs to consider and balance long-term implications when addressing short-term needs, taking into account how water works, facilitating resilience, and adapting to change and new knowledge. In the face of uncertainty, we need to make thoughtful, prudent decisions that will protect the ability of our water systems to support our natural and human communities over the long-term.

- **Data and Monitoring** – We need sufficient, timely and accurate information upon which to base decisions. We need to know about the existing quality and quantity of our water as well as changes that are occurring. We need to know what actions are necessary to ensure that our

lakes, rivers, groundwater, ponds, estuaries and wetlands remain the crown jewels of our state, able to support vibrant and healthy individuals, communities, economies and ecosystems.

The end of this Commission's work is but the beginning of work by all the people of New Hampshire to support and preserve their water. The work started by the Commission will need to be continued using a multi-sector approach, with a coordinated network of interests from across the state, to build upon the vision articulated in this report. We call on all New Hampshire residents to be active stewards of our water resources.

Keeping New Hampshire's water clean helps maintain our state's high quality of life.

WHY WATER?

WATER SUPPORTS LIFE

Do you know about the quality of your water?

People, wildlife, aquatic creatures, birds and many other forms of life depend on New Hampshire's water for life. Our state's environment, economy, communities and households depend on water to grow and thrive. For example, New Hampshire's farmers produce crops on approximately 400,000 acres of open space land, nearly 2,500 acres of which are irrigated (USDA, 2007).

WATER CONNECTS US ALL

Do you know where your water comes from?

Whether using private wells or public water systems, all of us in New Hampshire are connected in some way by water. Water connects us to our neighbors in our town, in other towns, in other states, and even to our northern neighbor, Canada. Water connects us within the branching, interrelated systems of our "watersheds" that cross town and county lines and other political boundaries.

What is a watershed?

A watershed is an area of land where all water flows to the same point, whether it be a river, a wetland, a lake or the ocean. Watersheds come in all shapes and sizes. They cross individual, town and state boundaries, and link all living things within their borders.

CLEAN WATER IS A LIMITED RESOURCE

Do you know how much water you use every day and how you use it?

We are very fortunate in New Hampshire to have abundant water. Our state receives approximately 40 inches of rain annually (NOAA, 2012). In most years and in most places, we have plenty of water to meet our needs for drinking water, to grow and produce food, and to supply our local industries, businesses, schools, homes and other needs. We have water of generally good quality to enjoy for recreation — boating, swimming and fishing — all around our state, which is an important factor in the success of the second largest sector of our economy, tourism. Our groundwater aquifers provide drinking water to approximately 60 percent of the state's population (NHDES, 2008). We have about eighteen miles of seacoast and over 200 miles of estuarine shoreline that support tourism, a fishing industry and estuarine incubators of life like Great Bay (NHDES, 2008). However, there is only so much water in our state that we can sustainably use. It is something essential to both well-being and life itself and thus a resource worthy of care above all others.

New Hampshire has:

- 18 Miles of seacoast
- 235 Miles of estuarine shoreline
- 17,000 Miles of rivers and streams
- 1,000 Lakes and 3,000 ponds

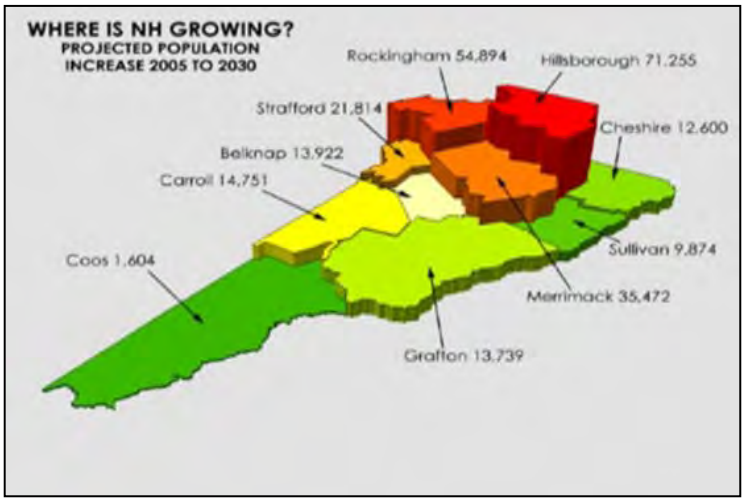
Why Now?

If we generally have sufficient water of good quality to support our needs, why are we concerned about water and its future sustainability? The answer is that there are a number of trends and indicators that collectively suggest this condition may not persist if we do not take actions now to ensure that sustainability.

- **Water Infrastructure** - New Hampshire currently faces a need of approximately $2.9 billion over the next ten years for upgrades, repairs and replacement of the infrastructure we have built to manage, clean and deliver water, retain and store water, and manage storm water (Wright-Pierce, 2011; NHDES, 2012a; NHDES, 2012b). The federal and state funding that built

these systems is available now in only a small fraction of the historical amounts. Failures of these systems will disrupt the state's economy and damage its quality of life.

- **Water Use** - While there is not a current expectation of a statewide water shortage, looking at where growth is expected to be concentrated (see the figure below) shows that some parts of the state are more likely than others to push the limits of the available future water resources. In the Seacoast region, domestic water demand is expected to grow by 54 percent between 2003 and 2025, and non-domestic water demand by 62 percent (Horn, et. al., 2008).



The geographic distribution of projected population growth in New Hampshire. ***Source: SPNHF, 2008.***

- **Water Quality** - Surface water and groundwater are intricately connected, and are adversely affected by naturally occurring and manmade contaminants. Storm water runoff and non-point source pollution are responsible for much of the pollutants reaching our waters, and will be made worse by increases in population and associated land development, and the increasing frequency of high intensity precipitation events. Relatively few people from the 40 percent of the state's population that uses groundwater from private wells for drinking regularly test their wells for contamination (NHDES, 2008).

What is storm water?

When rain or snowmelt reaches the ground the water either seeps into the surface or runs off. When the surface has been paved or disturbed the amount of runoff, or "storm water" increases. The additional water can increase erosion, raise stream temperatures, and carry pollutants including salt and nutrients into lakes and streams.

- **Data and Monitoring** - Today's water problems are more complex than just pollution and often require significant additional resources to correct. Without sufficient, timely, and accurate data, we do not know all that we need to know about how much water is available in our state, where it is located, what it takes to gain access to it, its quality, and whether we will have enough to meet all of the future water needs. Continuing to use it in the absence of reliable information regarding the quality and quantity of the resource is like writing checks without balancing your checkbook.

These realities indicate that we are not on a sustainable path with regard to the availability of enough clean water where we need it and when we need it in New Hampshire.

Questions for Consideration

The Commission is calling on New Hampshire residents to learn about and understand water because our entire state lives and runs on it. We need a shared water ethic to guide us into the future so that our children and their children, on through the generations, will have the same or better quality of life with water as we have today.

Here are some questions to think about as you read this report:

- Do I know where potential sources of contamination are located in my community and watershed that may affect my drinking water? Do I understand the nature of the contamination and its possible effects on humans and the ecosystem? If I use private well water, when was the last time I had it tested? Do I know what I should be testing for? Do I know where I can go for help in understanding the results?

- If I use water from a public water system, have I read my annual water quality report? Do I know whom to call for help in understanding it? Do I understand the issues that face my local water system?

- What do I need to do as an individual to promote responsible use of water in my everyday actions? How could I reduce the amount of water that I use every day?

- How can I work to encourage our state legislators and policy makers to keep good water laws on the books and update others to best serve today's world?

- Do I know how much it costs to deliver clean water for me to use and to treat my wastewater? If clean water is a potentially finite resource, what is its value? Is that value, and the systems required to treat and deliver our water, , reflected in the price that I pay for the water I use?

- How can I contribute as a member of my community to advocate for the responsible use and protection of water so that future New Hampshire generations have enough clean water? What local organizations could I work with and support to bring this about? If I serve on a town committee or commission, do I understand how land use affects water quantity and quality? Do I know whom to contact for more information? Does my town have a water management plan for the future? Does my town take steps to protect and conserve land around or near source water areas and aquifers?

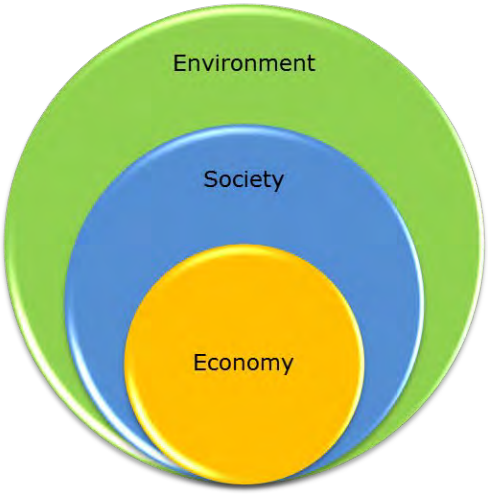
VISION OF NEW HAMPSHIRE'S WATER FUTURE

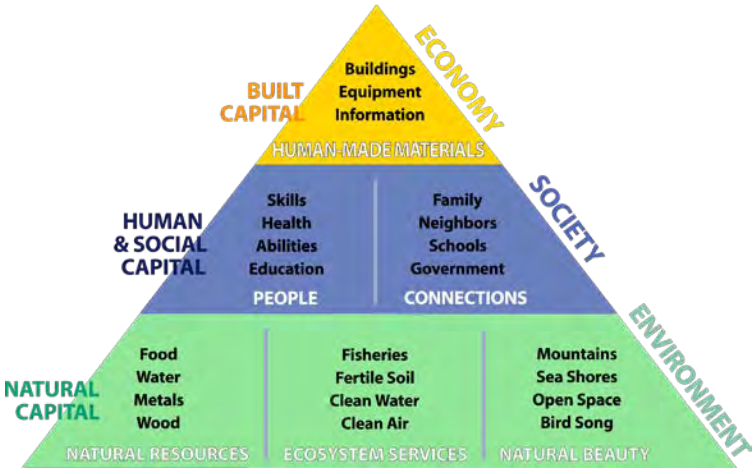
What is Water Sustainability?

"Enough, for all, forever" – Unknown

Water sustainability means that we take care of our water and water systems to meet our current needs in ways that ensure that an adequate quantity of good quality water is available and accessible for future generations. It is based on the concept that an economy can only exist in the context of a society and, in turn, a society exists within an environment that both supplies resources and provides an acceptable place to live and work and play (see the diagrams below). In this context, the key elements of sustainability include:

- **Resilience** - Ensuring that our natural water systems (watersheds, groundwater, lakes, rivers, wetlands) and the systems we have built to manage, clean, and deliver water are able to tolerate disturbance, restore balance, and adapt to change.
- **Equity -** Ensuring that ecological needs and human needs are both met so that all systems can thrive without impairing the ability of future generations to enjoy the same opportunities and benefits.
- **Affordability** - Ensuring that water is available at an affordable cost to meet the needs of individuals while supporting healthy communities and vibrant economies.
- **Stewardship** - Promoting the use and management of water by individuals, communities, businesses and organizations in a manner that protects the quality and resilience of our water and water systems for the long-term.





Water Sustainability: As illustrated above, water sustainability occurs in the context of the environment providing the resource foundation on which society is built, and society, in turn, providing the basis for a healthy economy. *Right graphic source: © Sustainable Measures, 2011* (www.sustainablemeasures.com).

Guiding Principles for Sustainable Decision-Making About Water

While the state has the responsibility to protect water, its residents, businesses and institutions have a shared responsibility for the stewardship of this critical resource. The set of principles that follows offers guidelines for resource management decisions as actions on the Commission's recommendations are formulated.

- Residents, businesses and other institutions understand the value of and work together to conserve water and use it efficiently.
- Public policies, programs, laws and practices are based upon the knowledge that New Hampshire's environment is the source of abundant, clean water that supports human and ecological life, and, in turn, the state's economy. Access to enough clean water is a key element of our state's quality of life.
- Decisions concerning water reflect how water moves and interacts with the landscape, are coordinated within a watershed system, are science-based and collaborative, and engage individuals and local, state, and federal officials, as needed.
- Recognizing that there is often uncertainty as well as opportunities for innovation, we make decisions that protect the ability of our water systems to support our natural environment and human communities over the long-term.

Water Sustainability Commission's Vision Statement

New Hampshire's water is essential for the people and ecosystems that draw their life from it. The vision of this Commission is a renewed commitment and partnership between and among the state, its municipalities, its residents, its businesses, other stakeholders and the federal government. The purpose of this partnership is to collaborate on investments, management policies, practices and tools that ensure clean, plentiful and affordable water that meets both societal and ecological needs while protecting water for future generations.

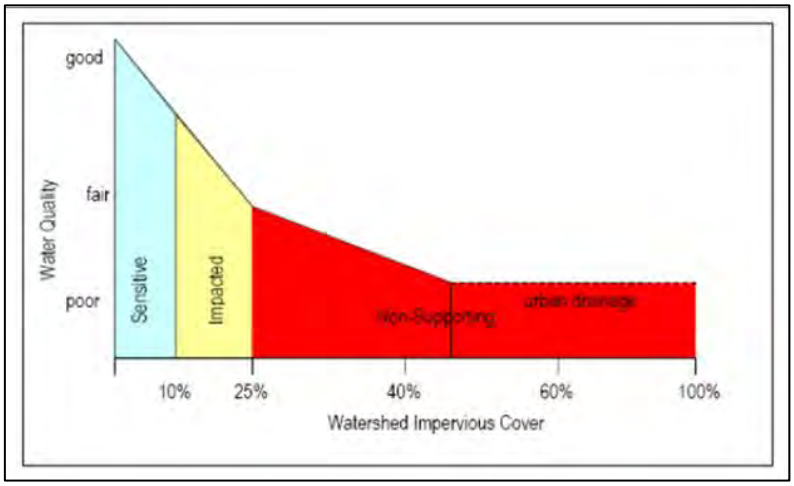
FINDINGS

Today, most areas of New Hampshire have sufficient quantities of good, clean water to support healthy ecosystems, individuals, communities and economic activity. However, there are conditions in at least some regions of the state with the potential to challenge this assessment over the long-term. Many important issues with the potential to adversely affect future water quality and availability are identified in the bulleted items that follow.

- **We take water for granted.** While most New Hampshire residents generally recognize the crucial role that water plays and its importance to their quality of life, many do not fully understand the responsibilities required to assure that our water is as good or better in 25 years. In addition, the typically low price of water services does not reflect the true cost or the true value of those services. Throughout all the public sessions held by the Commission, a common theme was the need for more education and outreach about water. People want to do what is best for water, but they do not always know how to go about it or where to find the resources to learn more.

- **Our management of water resources is poorly integrated.** For many practical and historical reasons, a "one resource at a time" approach has been the norm for environmental regulation. Resources such as air, water, wetlands, soil or groundwater are handled separately, and the programs that administer them are similarly segregated. Programs that address water are further segregated by resource types (rivers, lakes, wetlands, groundwater) and uses (water supply, alteration of terrain, wastewater). Today, water issues are complex and extend across one or more of these artificial divides. Managing water and watersheds as a single resource is more efficient and effective. While coordination across levels of government is often excellent, true watershed-based decision-making is rarely accomplished due to inflexibility in regulatory language and funding.

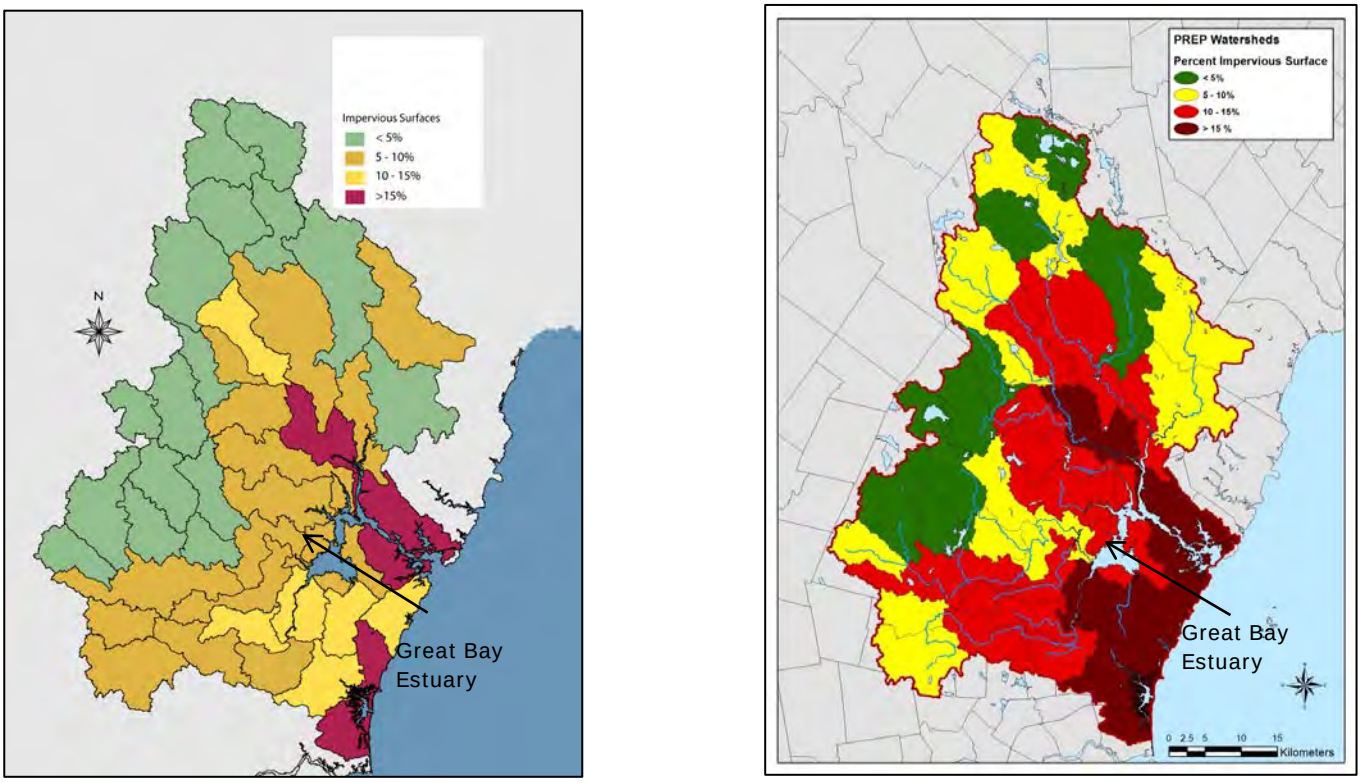
- **Surface water pollution sources have become more diffuse, more numerous and harder to manage.** Water quality in New Hampshire's lakes, streams and estuaries is generally good. However, where we have problems, they are increasingly related to storm water runoff. In fact, over 80 percent of the water quality problems in New Hampshire waters are related to the pollutants found in storm water runoff and wastewater (NHDES, 2012). This correlation reinforces the need to design new sites and retrofit existing sites to minimize and better manage runoff from rooftops and paved areas, especially in the more populated parts of the state.



The impact of impervious surfaces – roads, parking lots and buildings – on water quality. As impervious surface area increases, storm water moving off site increases and water quality is degraded. *Source: Adapted from Center for Watershed Protection, 2003 and Deacon et al., 2005.*

Effect of Impervious Surfaces

Water quality and wildlife habitat appear to be adversely affected by development when the amount of impervious surface is between 7 and 14 percent, or more, of the total land area (CWP, 2003).



Impervious surface cover in the Piscataqua region – 2005 (left) and 2010 (right). (The color-coding for each of the above maps is slightly different.)
Source: PREP, 2009 and 2012.

- **We do not know enough about the quality of groundwater, especially for private wells.** Naturally-occurring contaminants such as arsenic and manmade contaminants such as MtBE are commonly found in groundwater (e.g., arsenic and radon levels in 20 and 55 percent of private wells, respectively, exceed safe drinking water standards). Many people do not know to test their private wells regularly (i.e. every 3 to 5 years) (NHDES, 2008).

When was the last time you tested your well?

Some naturally-occurring contaminants are common in private wells at levels that can be harmful to health. Some human-caused contaminants are also widespread and, therefore, the Department of Environmental Services (NHDES) recommends testing for MtBE and other volatile organic compounds that can also be hazardous to your health.

NHDES recommends having the following tests done before buying a home and every 3 to 5 years thereafter, except for bacteria and nitrate, which are recommended annually. The parameters below are grouped according to test packages available at the New Hampshire Public Health Laboratory. Similar, although not necessarily identical, packages of tests are available at certified private drinking water-certified laboratories.

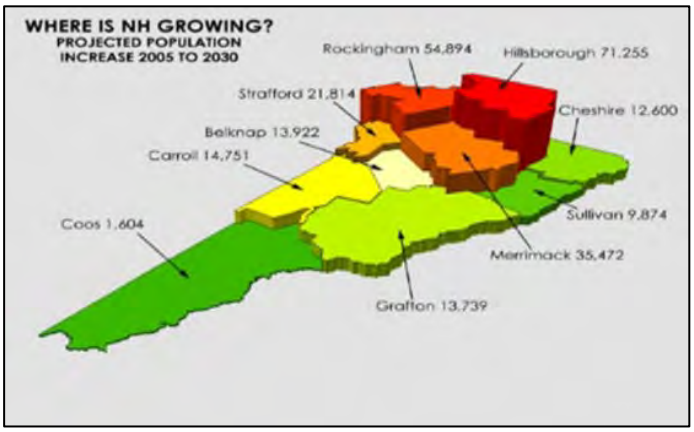
Standard Analysis - Arsenic, Bacteria, Chloride, Copper, Fluoride, Hardness, Iron, Lead, Manganese, Nitrate & Nitrite, pH, and Sodium
Radiological Analysis - Radon, Uranium, and Analytical Gross Alpha
Volatile Organic Compounds

Additional information about private well testing is available at:
http://des.nh.gov/organization/divisions/water/dwgb/well_testing/index.htm

- **We lack critical information regarding site-specific interrelationships between water sources (e.g. groundwater, streams, and lakes).** Additional information is needed to understand and address demands and impacts upon these resources.

- **Water supply systems in some locations may be inadequate to meet future demand.** Demands and stresses on New Hampshire's water are changing and variable due to differing regional conditions, shifts in population centers, and weather patterns. Because of varying conditions within different regions of the state, one-size-fits-all solutions to water issues usually do not work.

- **Although water use on a per-person basis is declining, demands on water withdrawals grow with population**, projected to be approximately 200,000 more people over the next 20 years (Norton, 2011), which may result in increased demand for and, potentially, conflicts over water use in our state related to access to and control of land.



The geographic distribution of projected population growth in New Hampshire. *Source: SPNHF, 2008.* *See page 6 for a larger image.*

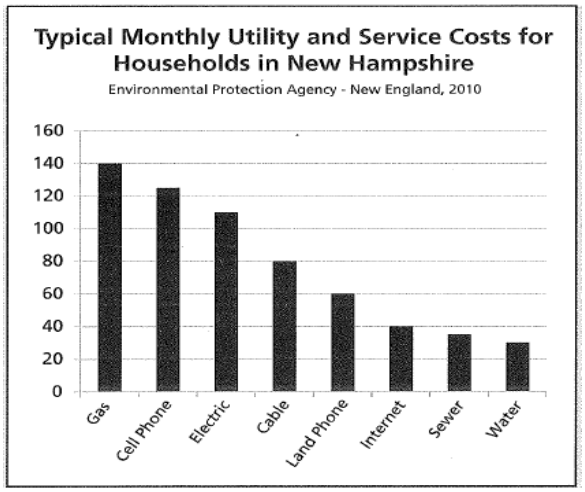
- **The bill is coming due on deferred maintenance and investment in water infrastructure.** Our water infrastructure is a key part of New Hampshire's economic advantage. It is increasingly expensive to maintain and replace, and is aging and increasingly inadequate to meet our needs due to deferred maintenance and more protective standards for treatment as knowledge grows. The increasing frequency of extreme weather events (see the figure on page 14) presents an additional challenge to the existing infrastructure. The scale of the need is currently estimated to be approximately $2.9 billion over the next ten years alone, and there are substantially fewer funds available to address these needs (Wright-Pierce, 2011; NHDES, 2012a; NHDES, 2012b). Continued infrastructure decay and the absence of investment will directly affect the quality and availability of water, and thus, the state's economy and quality of life.

New Hampshire
Water Infrastructure Needs
Estimated 10-Year Funding Need

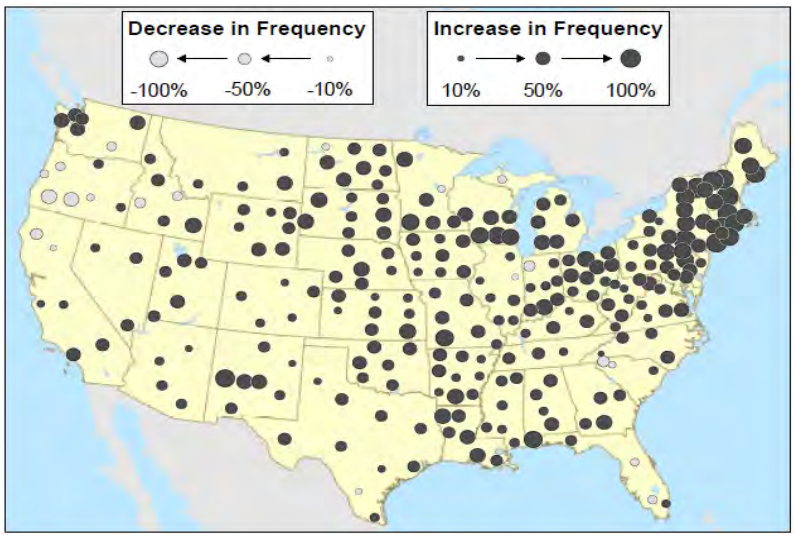
Water Supply	$857 Million[1]
Wastewater	$1,730 Million[2]
Storm water	$269 Million[2]
Dams - State	$18 Million[3]
Dams - Municipal	$40 Million[3]
TOTAL	**$2,914 Million**

Sources:* [1]*Wright-Pierce, 2011.
[2]NHDES, 2012a.
[3]NHDES, 2012b.

- **In the absence of adequate public funding, public water infrastructure and access to water sources will shift to private utilities.** There are commercial interests from inside and outside the state that are willing to fund investments in water infrastructure in the absence of such investments by the state and municipalities. While a useful and necessary option, in some circumstances private investments may transfer control of water sources to such private entities, raising questions and concerns regarding the long-term control of New Hampshire's water sources.



In New Hampshire, the cost for water and sewer services is less than all other typical utility and service costs. ***Source: Fortier, 2012. Data source: EPA, 2010.***



Extreme downpours have become more frequent across much of the United States, particularly in the Northeast. An extreme weather event (represented by individual dots) is only expected to occur once per year in a particular location based on historical records. New Hampshire now experiences extreme weather twice as frequently as in the past. *Source: Madsen, 2012.*

- **Changes in weather patterns will stress flood control, storm water and storage infrastructure.** The frequency of extreme weather events in New Hampshire has doubled in recent years (Madsen, 2012), and these events put significant pressure on and, in some cases, overwhelm existing storm water systems, dams and other water infrastructure, and contribute to non-point source pollution. In addition, there are greater fluctuations in rain and snow amounts with attendant consequences for groundwater recharge, storm water runoff, drought and flooding. Relevant engineering standards for water infrastructure and dams are in many cases inadequate for the increasing frequency of extreme weather events.

What are point and non-point source pollution?

Point source pollution comes from a single source such as a pipe from a factory or from a wastewater treatment plant.

Non-point source pollution occurs when rainfall, snowmelt or irrigation runs over land or through the ground and picks up pollutants that end up in lakes, rivers, coastal waters and groundwater. These pollutants can include oils, pesticides, fertilizers, sand and sediment, road salt and toxic metals.

Consequences

There is a range of foreseeable consequences associated with the identified issues if they are left unaddressed, including:

- Failure of water infrastructure and expensive repairs of water systems will lead to economic disruption. Kicking small problems down the road causes big problems, and big problems cost more money to fix.
- In some areas, there may not be enough clean water available to meet local needs. This condition will have adverse effects on public health, the economy and the environment.
- Human and ecological systems may no longer be able to fully tolerate disturbance, restore balance and adapt to change. Full restoration of such systems is often extremely expensive and difficult, if not impossible.

STRATEGIC GOALS

As a part of its work, the Commission reviewed the reports and recommendations of other water-related commissions, including the interim report from the Senate Bill 60 Water Infrastructure Sustainability Funding Commission. Those commission reports contain important recommendations, many of which have not been acted on (see Appendix K). The Commission's charge was not to repeat the work of the other commissions, but rather to create a strategic framework within which the recommendations of the other commissions can be implemented. Accordingly, the strategic goals identified by this Commission are founded upon the work of the other commissions; however, the recommendations of those commissions stand on their own merit.

The Commission has identified seven strategic goals to ensure that, in 25 years, New Hampshire's water is as good as or better than it is today. For each of the seven goals, the Commission offers recommendations for achieving progress toward these goals and specific ideas for action, where practicable, as well as suggested areas of additional inquiry.

Goal 1 - The people of New Hampshire will be knowledgeable, engaged and careful consumers and stewards of our water resources.

Recommendations

1. **Form a multi-sector network with statewide scope to implement the vision and recommendations outlined in this document.**

   Ideas for action:

   - Create a forum to bring important water issues to the public.
   - Encourage and participate in existing efforts to implement the New Hampshire Environmental Literacy Plan in New Hampshire schools. (Additional information about this plan is available at: http://www.education.nh.gov/state_board/documents/nh-elp.pdf.)
   - Provide useful materials and tools for New Hampshire residents to know how much water they use and how to test its quality.
   - Create opportunities for pilot projects and promote those that demonstrate good water management techniques.

2. **Ensure that the sectors of our economy that depend on water – including manufacturing, agriculture, and recreational and tourism industries and interests- participate in actions needed to ensure that those sectors remain viable in the future.**

   Ideas for action:

   - Evaluate the economic impact of reduced water quality and reduced water availability on specific economic sectors and widely publicize the findings.
   - Ensure the participation of representatives of the major sectors of the economy in a Water Advisory Task Force to review and advise on water management matters.

Goal 2 - Flexible and coordinated water management programs and practices ensure that New Hampshire has an adequate quantity and quality of water to support ecological and human health and economic activity.

Recommendations

1. **Promote water efficiency and water conservation in all sectors.**

   Idea for action:

   - Create a coordinated multi-sector program of education and incentives to promote efficient use and conservation of water.

2. **Explicitly consider the linkage between ecological and human health in decision-making and programs addressing management of the state's waters.**

   Ideas for action:

   - Encourage and provide incentives to homeowners with private wells to have their water tested for a full suite of potential contaminants.
   - Provide information on potential drinking water contaminants including risks and treatment options.
   - Create broad public awareness about the extent and impact of natural and manmade contaminants, such as MtBE, in our waters.
   - Promote the conservation and management of New Hampshire's forestlands as a priority strategy for ensuring adequate water quantity and quality in the state.

3. **Ensure that the impact indicators for water withdrawals, single and cumulative, are scientifically and technically based, and consistently support and protect ecological, public and economic health, and community vitality.**

   Ideas for action:

   - Invest in collection of necessary scientific data regarding the locations and characteristics of all water resources in the state.
   - Analyze the collected data to identify the effects of water withdrawals.
   - Revise and develop water management policy, laws and regulations based upon the data and analyses to address cumulative impact of withdrawals, and ensure that all identifiable needs are accounted for and that there are adequate mechanisms for community and public participation.

4. **Expand the existing monitoring system such that it can provide, sufficient, timely and accurate data on quantity, quality and changes in both of these characteristics in surface water and groundwater.**

   Idea for action:

   - Expand and coordinate public and private networks of groundwater and surface water monitoring identified as critical by water-related commissions to fully understand the condition of and potential threats to the state's water.

5. **Promote water planning efforts that address the many uses of and demands for water from human consumption, economic and ecological needs, including evaluation of cumulative impacts.**

6. **Employ decision-making practices that recognize regional differences and incorporate principles of adaptive management (i.e. allowing decisions to change with new knowledge or data) in making prudent decisions to protect the ability of our water systems to support our natural and human communities over the long-term.**

Areas of Additional Inquiry

1. Are our current laws, policies and programs adequate to address issues such as the export of water and other effects of international trade agreements?
2. Do we have adequate processes and mechanisms for resolving conflicts between different water uses and demands, or do we need to design new ones?
3. Is there a role for reuse of treated or lightly impacted (gray) water in groundwater recharge systems? What are the potential risks to groundwater quality and human health? What are the conflicts with existing regulatory requirements and building codes? What are the benefits?
4. What is the extent of and risk from existing and emerging contaminants, such as pharmaceuticals and personal care products, in our water?

Goal 3 - Management and planning for New Hampshire's water quality and quantity will be integrated at appropriate state, watershed and sub-watershed levels.

Recommendations

1. **Encourage municipalities through incentives and other means to enter into inter-municipal cooperative agreements to address water quality, quantity and infrastructure issues at appropriate watershed and sub-watershed levels.**

   Ideas for action:

   - Establish enabling legislation for inter-municipal cooperative management and regulation of water resources and related infrastructure at the watershed and sub-watershed levels in cooperation with state and federal permitting and enforcement programs.
   - Invest in pilot and demonstration projects, and evaluate and refine their effectiveness in fostering cooperation among municipal, state and federal governments.

2. **Coordinate regulations affecting water resources between state and local governments.**

   Ideas for action:

   - Review current state-level permitting regulations and practices to identify and implement opportunities for watershed-based decision-making and resource-focused coordination among local, regional, state and federal agencies.
   - In local and state permitting, incorporate analysis of land use changes in terms of cumulative water quality impacts at the watershed level.

- Develop processes to transfer state-level water-related technical knowledge and expertise to local government officials making land use decisions.
- Review and, if necessary, revise current permitting processes to foster communication and transparency among differing levels of government to avoid or minimize conflicts over water management decisions.

3. **Provide municipalities with technical assistance and incentives to develop and adopt innovative, consistent regulations to protect water across political boundaries.**

   Ideas for action:

- Create and fund a pilot project(s) to support watershed committee(s) to review the consistency of key local land use regulations in different impaired watersheds and make recommendations for improvements.
- Support and expand local watershed organizations, including Local River Management Advisory Committees, the Southeast Watershed Alliance and the Piscataqua Region Estuaries Partnership, that encourage municipal coordination and watershed-level planning.
- Establish indicators for and related capacity to monitor such issues as water quality and consumption, demographic changes, and land development that are designed to identify conditions that need to be corrected to prevent potentially irreversible effects. Broadly communicate these indicators to local governments and New Hampshire's residents to establish common understanding of indicator related issues and create a constituency for necessary action.

Examples of Watershed Organizations in New Hampshire

Local River Management Advisory Committees (LACs): LACs represent a partnership between the state and local communities. The committees develop and implement river management plans, and advise local, state and federal government entities on activities that may affect rivers designated through the New Hampshire Rivers Management and Protection Program (RSA 483). Additional information is available at: http://des.nh.gov/organization/divisions/water/wmb/rivers/lac/index.htm.

Southeast Watershed Alliance (SWA): SWA was established by the New Hampshire Legislature (RSA 485:E1) to provide a framework for watershed communities in the Seacoast region to work together to protect and restore its water resources. Additional information is available at: http://www.southeastwatershedalliance.org/.

Piscataqua Region Estuaries Partnership (PREP): PREP is part of the National Estuary Program, which is a joint local/state/federal program established under the Clean Water Act with the goal of protecting and enhancing nationally significant estuarine resources, including the Great Bay and Hampton-Seabrook Estuaries. Additional information is available at: http://www.prep.unh.edu/.

Areas for Additional Inquiry

1. What are the potential benefits that can be identified to communities of coordinating planning, regulation and sharing of resources and infrastructure within a watershed? What incentives can be established to encourage such collaboration?

2. Are our zoning principles consistent with the vision of New Hampshire's water future? What are the fundamental organizing principles, and do they need to change?
3. Are there elements of water regulations where federal authority supersedes state and local regulations? If so, how can coordination with federal authority be improved?
4. How do international trade agreements affect management of New Hampshire's water resources?

Goal 4 - The infrastructure for delivering our drinking water, cleaning our wastewater, and managing storm water and water storage will protect human and environmental health and safety in an affordable manner.

Recommendations

1. **Promote integrated management of water systems to reduce the need for capital associated with replacing or upgrading water infrastructure through, as appropriate, innovative planning, design, asset management, and regionalization of the technical and financial capacities of existing infrastructure systems.**

   Ideas for action:

   - Promote, where appropriate, the interconnection of small water utility systems with other small and large systems.
   - Promote coordinated installation and repair of water and other utilities and community assets (e.g., gas, electric, roads, etc.).
   - Identify and promote innovative, lower-cost technologies and business strategies.
   - Create a model program to allow and encourage water infrastructure systems to form cooperative agreements, where appropriate, to reduce operational and management costs, and where possible, to interconnect to gain additional cost efficiencies.

Integrated Management

"The coordinated planning, development, protection, and management of water, land, and related resources in a manner that fosters sustainable economic activity, improves or sustains environmental quality, ensures public health and safety, and provides for the sustainability of communities and ecosystems." (American Water Resources Association, 2011)

2. **Require asset management planning, set aside money for future repairs and replacements, and plan implementation for all water infrastructure receiving state or federal grant or loan funds, in order to decrease the need for capital for long-term maintenance, upgrade and replacement.**

Asset Management Planning

Asset management planning is a decision-making tool that helps water infrastructure managers determine how to operate and maintain their systems at the lowest life-cycle cost while maintaining the desired level of service. All water systems do this kind of work to varying degrees, and more coordination of these efforts helps systems manage the risks that come when dealing with limited resources.

3. **Identify and/or create innovative economic, environmental, and technical strategies that replace "old" infrastructure and techniques/methods with new technologies such as green infrastructure, wastewater reuse, and storm water storage, to improve performance and reduce or eliminate operation, maintenance, and replacement costs that are not sustainable by ratepayers or practical for the environment.**

4. **Secure a state commitment and establish mechanisms that provide stable and reliable funding and incentives for shared responsibility through a variety of partnership options for construction, upgrade and expansion of necessary water-related infrastructure.**

   Ideas for action:

   - Create an initiative to design new public/public and public/private funding partnerships among state, local and federal governments, the private sector, and individuals.
   - Adequately fund existing state programs that assist municipalities in funding water and wastewater improvements.

Areas for Additional Inquiry

1. Are there new technologies in development that will reduce capital requirements and promote integrated management? How are such technologies identified, evaluated, and approved for cost-effective use? Who is doing this work, and how could we work with them most effectively?
2. How do we effectively and efficiently accomplish knowledge and technology transfer?
3. Do regulatory principles governing private water utilities need to be revised to foster asset management and establishment, and use of capital reserves?
4. How do we properly value and price water to fully pay for the costs of water-related services and systems? What are the implications for New Hampshire's residents and the economy of employing full cost pricing for these services and systems?
5. Because water-related infrastructure drives our economy and directly benefits public health and the environment that we all enjoy, how do we equitably share the costs?

Full Cost Pricing

Full cost pricing is a pricing structure for drinking water and wastewater services that fully recovers the cost of providing that service, including operations, maintenance, and future repair and replacement in an economically efficient, environmentally sound and socially acceptable manner, and which promotes efficient water use by customers.

Goal 5 - Runoff from rain and snow, and the pollution it carries, will be minimized and effectively managed.

Recommendations

1. **Mitigate the impacts of storm water runoff on water quality by promoting low-impact development and investing in green infrastructure.**

   Ideas for action:

   - Capitalize and target public and private funding programs to support investments in green infrastructure.
   - Create pilot program(s) to analyze investments in and efficacy of green infrastructure on at least two impaired water bodies and one watershed.
   - Create and promote a model storm water ordinance (such as the one developed by the Southeast Watershed Alliance) that can be readily adopted by municipalities and provide incentives and technical support to planning boards and town councils to assist in implementation.
   - Expand mapping and analysis of existing impervious surface coverage and growth rates throughout the state to at least two watersheds experiencing significant rates of land development.
   - Expand the use of new methods for designing and constructing impervious surfaces beyond the Seacoast region. Target at least two watersheds experiencing significant rates of land development.
   - Promote groundwater recharge, where appropriate, with revised storm water management techniques designed to capture, minimize, and infiltrate runoff rather than carry it away.
   - Improve ease of disposal of harmful materials (e.g. pharmaceuticals, household chemicals, compact fluorescent bulbs, etc.) to limit their presence in non-point source pollution.

Green Infrastructure

Green infrastructure consists of strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations.

2. **Promote and invest in the maintenance, re-design and upgrade, where necessary, of storm water infrastructure that protects water quality and reduces flood risk.**

   Ideas for action:

   - Where appropriate and feasible, complete separation of storm water infrastructure from wastewater infrastructure, allowing it to be managed for recharge.
   - Create and secure funding to support pilot storm water utilities at different scales, where appropriate.
   - Reevaluate design standards and criteria to address changing weather patterns, particularly the increasingly frequent extreme precipitation events.
   - Foster cooperative agreements regarding storm water systems to ensure long-term maintenance and cleaning.

Storm Water Utilities

A storm water utility generates funding through user fees that are typically based on the impervious surfaces (e.g., roofs, roads, driveways, parking lots) of each property within the storm water utility district. Storm water utilities are similar to the dedicated municipal funds for public water and sewer utilities. The funding from storm water utilities can be used for catch basin cleaning, street sweeping, storm water infrastructure upgrades, and a variety of other storm water management activities, in addition to the administrative costs of running a storm water program.

Additional information is available at: http://des.nh.gov/organization/divisions/water/stormwater/utilities.htm.

3. Encourage homeowners and individuals to reduce pollutants and runoff from private property.

Ideas for action:

- Use and promote recently developed educational materials for homeowners and individuals to reduce non-point pollution by reducing fertilizer use, properly disposing of pharmaceuticals, conservatively using and properly disposing of household chemicals, properly maintaining septic systems, managing pet waste, and installing residential rain gardens.
- Expand and improve access to drop-off points for household hazardous waste and pharmaceuticals to promote safe disposal.
- Reach out to businesses to encourage voluntary participation in storm water management programs including sponsorship and participation in community rain garden projects, salt reduction, parking lot sweeping programs, and installation of permeable parking lot and walkway surfaces.

Areas for Additional Inquiry

1. How can we better address the impact of road salt in storm water? What processes can be put into place to evaluate and approve the use of alternative, more environmentally benign materials?
2. How do we monitor development indicators that will trigger impairment of water quality and quantity?
3. How do we communicate broadly the status of conditions relative to indicators so that proactive measures can be taken to prevent water impairments?

Goal 6 - Our watersheds, communities, and built infrastructure will be resilient and able to adapt to changing weather patterns.

Recommendations

1. **Collect and apply the most current data, technology, and performance information to support the location and design of built infrastructure and to predict and prepare for future risks from natural hazards such as floods.**

   Ideas for action:

   - Evaluate the vulnerability of existing water, wastewater, storm water, and dam infrastructure to increased frequency and severity of extreme weather events including flooding and drought.
   - Review, reevaluate, and revise design criteria and standards for water infrastructures with respect to changing weather patterns.
   - Complete the mapping of the state using light imaging detection and ranging (LiDAR) technology.
   - Use LiDAR-generated high-resolution topography data and new weather data to develop statewide flood risk maps.
   - Complete mapping and evaluation of river corridors with regard to potential future shifts in channels locations.

2. **Encourage collaboration and coordination among communities connected by water to plan for, prepare for, and respond to extreme weather events.**

   Ideas for action:

   - Expand the role of Local River Management Advisory Committees in inter-community collaboration and coordination. (See page 18 for additional information about Local River Management Advisory Committees.)
   - Encourage participation in the New Hampshire Public Works Mutual Aid Program (which includes water and wastewater system mutual aid). (Additional information about this program is available at: http://www.t2.unh.edu/ma.)

Areas for Additional Inquiry

1. How do we appropriately respond to and equitably distribute water if severe or prolonged drought or increased demand creates a shortage?
2. Are there water-related conditions that will affect public health due to changing weather patterns? How do we address such issues in water management?

Goal 7 – There will be adequate funding for managing water resources effectively and efficiently.

Recommendations

1. **Provide adequate funding statewide to support the elements of sustainable water management including:**
    - **Monitoring of water quality and quantity in the state.**
    - **Information and technology transfer for innovative methods of treating water and wastewater, managing storm water, and maintaining and managing dams.**
    - **Technical support/assistance to municipalities and other regional or inter-municipal entities to facilitate effective management of water at appropriate scales.**
    - **Completion of legacy contaminated site cleanups.**
    - **Enhancing the capacity to identify and address manmade and natural sources of pollution.**
    - **Investments in innovative models, pilot projects and partnerships.**

    Idea for action:

    - Explore alternative funding mechanisms to meet these water management needs both apart from and, if practicable, in combination with the funding needs identified in Goal 4.

2. **Establish mechanisms for developing funding in a manner that shares responsibility across different economic and government sectors and scales.**

Areas for Additional Inquiry

1. What is the role of and how can funding be secured for programs such as the Land and Community Heritage Investment Program and the Water Supply Land Protection Grant Program?
2. How do we ensure that the future costs of water protect the ability of all residents to gain equitable access to water and water systems?

WHERE DO WE GO FROM HERE?

The end of this Commission's work is but the beginning of work by the people of New Hampshire to protect and wisely use our water, and **that work needs to begin now**. The Commission has presented goals as a framework for planning, and recommendations and areas of inquiry as pathways for action. The Commission recognizes, however, that the full potential of its recommendations will be realized only with non-partisan leadership from both the public and private sectors. That leadership is necessary to provide a coordinated voice for water in the state, to identify and support priorities, to describe a time- frame within which to accomplish specific goals and actions, to identify responsibilities and accountabilities for implementation, and to develop benchmarks and indicators to evaluate progress and measure success. To accomplish these requirements, the Commission recommends a two-pronged initiative that includes the following components:

Water Advisory Task Force -The Commission recommends the Governor of New Hampshire create a multi-sector task force as soon as practicable. The purpose of the task force is to advance the goals set forth in this report. Its role in this process would be to:

1. Define and create new partnerships across jurisdictions and agencies to set priorities (including time-frames) and to secure and apply necessary investments for maintenance, repair and upgrades of the state's water infrastructure.
2. Develop mechanisms for technical support and assistance to communities for watershed planning and inter-municipal cooperation.
3. Identify priorities for research and analysis.
4. Promote technology transfer and applied research.
5. Set priorities for and secure support for monitoring, information and data gathering.
6. Identify opportunities for pilot projects and promote their implementation.
7. Promote and be a catalyst for collaboration across jurisdictions (local, state, regional and international), agencies and sectors.
8. Review existing water policies and laws, and make recommendations for necessary changes.
9. Coordinate with and support efforts of other groups around public engagement on water issues.

Water Advisory Task Force

- Federal agencies
- State agencies
- Legislature
- Municipalities
- Congressional offices
- Academia
- Water and wastewater industry
- Conservation organizations
- Business and industry
- Agriculture
- Private landowners
- General public

Multi-sector public engagement initiative on water - We know that accomplishing much of what needs to be done to ensure the long-term quality and quantity of the state's water resources will require a substantial long-term understanding among and commitment from the people of New Hampshire and their leaders. Accordingly, the Commission recommends the organization of a multi-sector, ten-year initiative that, in conjunction and collaboration with the efforts of the Water Advisory Task Force, will:

1. Provide a statewide forum for education on and discussion of water issues.
2. Expand public awareness about and promote public engagement in issues related to the state's water.

3. Develop an awards and recognition program to bring attention to meritorious efforts occurring on a sub-watershed, watershed or statewide basis.

4. Support initiatives to secure and provide for:

    - Infrastructure and other investments specified in Goals 4 and 7.
    - Technical support and assistance.
    - Cross-boundary planning and management.
    - Policies, laws and programs that will ensure the availability of clean water where it is needed for future generations.

5. Create pathways for civic involvement and engagement about water.

Because New Hampshire lives on water, and everyone has an interest in ensuring that there will be enough clean water in the future, support for these next steps should come from the full range of businesses, individuals, philanthropic, not-for-profit and governmental sources. No single organization or person acting alone can be successful in this enterprise; rather, we must all work together to address New Hampshire's water needs.

What You Can Do

Individuals and Homeowners

Individuals and homeowners can conserve water, reduce pollution from lawns and driveways, and make sure their septic systems are working properly and their wells are tested (if not using public water infrastructure).

1. Look for and fix leaky faucets or pipes. You will save money on your water bill, too!
2. In landscaping, use native plants and replace lawns with less water-intensive plantings.
3. Do not over-fertilize your lawn. Use only as much fertilizer and weed killer as you need to keep your lawn healthy.
4. Have your septic system maintained every few years. Your system will last longer, and work better.
5. Have private wells tested regularly.

Businesses, Institutions and Organizations

Businesses, institutions and organizations can take a leadership role by pioneering best management practices and publicizing the importance of water resources to the state's economic vitality.

1. Support conservation and best business practices that minimize water quality impacts (e.g. low flow appliance, minimize salt application).
2. Develop, identify or adopt the use of innovative technologies to support water treatment, conservation or use.
3. In landscaping, use native plants and replace lawns with less water-intensive plantings.
4. Assist utilities and the Legislature in developing pricing and funding strategies that support the real cost of functioning water infrastructure.

Water Utilities

Utilities operate and maintain most of the state's piped water treatment infrastructure. They must meet their clients' needs for clean drinking water and treated wastewater while facing the challenges of maintaining aging infrastructure.

1. Develop asset management plans and other practices that reduce the need for infrastructure investments.
2. Develop or encourage innovative technologies that reduce costs, water consumption, or convert waste products to energy.
3. Utilize pricing and funding strategies that support infrastructure improvements.
4. Promote landscaping that uses native plants and replaces lawns with less water-intensive plantings.

Municipalities

Municipalities regulate activities within their boundaries. They rely on local knowledge and serve both urban and rural communities.

1. Adopt a storm water ordinance that treats and minimizes storm water runoff. Reducing runoff will improve water quality and reduce flooding.
2. Evaluate existing water infrastructure (water supply, wastewater, storm water, dams) and develop asset management plans and other practices that reduce the need for infrastructure investments.
3. Develop or encourage innovative technologies that reduce costs or water consumption, or convert waste products to energy.
4. Explore the benefits of cooperative agreements between municipalities to address water-related needs (e.g. shared wastewater treatment facilities, or pooled resources to support maintenance of storm water infrastructure).
5. Promote landscaping that uses native plants and replaces lawns with less water-intensive plantings.

Government Entities

The New Hampshire Legislature can support sustainable water resources throughout the state by enacting legislation that promotes the recommendations in this report or that removes some of the barriers identified.

1. Establish enabling legislation for cooperative inter-municipal management and regulation of water resources and related infrastructure at the watershed and sub-watershed level in cooperation with state and federal permitting and enforcement programs.
2. Create a coordinated public/private program of education and incentives to promote efficient use and conservation of water.
3. Establish a state commitment and broad-based mechanisms to provide stable, reliable funding and incentives for public/private partnerships for construction, upgrade, and expansion of necessary water-related infrastructure.

Everyone

1. Support the establishment of a water advisory task force.
2. Participate in a multi-sector public engagement initiative on water.

CONCLUSION

If we look back in our state's history, it is clear that we did not always understand our relationship to the state's lands and waters. This led to clear-cutting of our forests in the 1800s and growth without planning. Today, we have regional planning commissions and local planning boards with many tools at their disposal to guide land use. Yet somehow water is typically overlooked, perhaps because it has not reached a crisis in our state. Because of our population, human actions can have a substantial impact on natural systems. If we do not learn to take note of what we are using and how, and if we do not take the time to understand the natural systems we rely on, our cumulative impact may result in there not being enough good quality water where and when it is needed to meet human demands and ecosystem needs.

The Commission is calling on New Hampshire residents to learn about and understand water because New Hampshire lives on water. Our families, our communities and our manufacturing and tourism-based economy absolutely depend on water. We need a shared water ethic to guide us into the future so that our children and their children, on through the generations, will have the same or better quality of life as we have today.

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APPENDICES

*All of the appendices listed below are available online at: www.nh.gov/water-sustainability/.

Appendix A - Executive Order

Appendix B - Commission Members

Appendix C - Summary of Public Input

Appendix D - May 8th Listening Session Report

Appendix E - July 9th Listening Session Report

Appendix F - Questionnaire Summary

Appendix G - Mailed and E-mailed Public Comments

Appendix H - Commission Work Process

Appendix I - Commission Meeting Schedule and Minutes

Appendix J - Reference Documents

Appendix K – Water-Related Commissions Reference