Source Water Protection Challenges in **NH's Multi-Use Water Supply Lakes**

Paul Susca and Tom O'Brien

What happens when we play in the same water bodies we tap for drinking water? Are water utilities and other lake users bound to come into conflict? The potential is there, but the two have more reasons to work together than to be at odds. The source of the potential conflict is clear: a drinking water supply source that is as clean and consistent in quality as possible keeps treatment costs down, and keeps both customers and regulators happy. On the other hand, keeping a lake as clean as possible means no water-based recreation, no shoreline development – no development at all in the watershed. The challenge is to keep the lake as clean as possible for water supply while everyone enjoys the lake in other ways as well.

There's no question that recreation – especially of the body-contact variety, compromises the quality of drinking water supplies. Water quality monitoring data from Sebago Lake – the source for Portland, Maine's water system – demonstrate that fecal bacteria levels drop the further one goes from swimming beaches. And studies by the Water Research Foundation, the Trust for Public Land, and others show that both turbidity and water treatment costs increase as a watershed shifts from forest to other types of land cover. While some water utilities can achieve the ideal of an undeveloped watershed and a water supply lake or reservoir closed to all activity, in most cases water supply and other uses have to coexist. It might be because people were enjoying the lake for other uses before the water supplier came along, or the water quality and public health implications of other uses were not understood when the water supply was developed, or the water utility didn't have the money to lock up the lake and its watershed early on, or the water supplier lacks the political jurisdiction or clout to control watershed development, access, and other uses.

Examples: A patchwork of regulations in New Hampshire

Of the nearly 1,000 lakes, large ponds, and reservoirs in New Hampshire, about two dozen are used as public water supplies. Roughly half of those are used exclusively – or nearly so – as water supplies, while the others are at least partially open to recreational uses, most often boating. Swimming is allowed in only a handful of those lakes and ponds, and in almost all of those cases some part of the water body – near the water supply intake – is completely closed to recreation. To explain this patchwork of allowed and restricted uses, one only needs to recognize that the multi-use water supply lakes were tapped as water supplies at a time when the existing recreational uses were not seen as posing a likely threat to the safety of the water supply, and the compromises made since that time reflect each community's attempt to balance the desire for a safe water supply with the interests of waterfront land owners, and in some cases the larger community's interest in a recreation-based economy.

Rather than having uniform statewide restrictions on water supply lakes (and rivers), New Hampshire water suppliers or municipalities can ask the State to adopt waterbody-specific restrictions under an 1899 statute that was prompted by typhoid outbreaks during the years preceding the enactment of the law. Reading those rules today, you can see what the water quality concerns of the day were:

- "No privy, pig-pen, stable, or other building . . . in which horses, cattle, swine . . . or fowls are kept . . ."
- "No dung either human or animal, kitchen waste, swill, or garbage shall be thrown into or deposited in said lake...."
- "A person shall not deposit or allow sawdust, shavings, apple pomace, or waste from mills or factories to fall into said reservoir..."
- "No person shall bathe in said lake..."
- "A person shall not drive, ride, or race any cattle, horses, or other animals used for teaming, riding, or racing on the ice ..."

Reading the rules also makes it clear that some water systems and municipalities simply used other towns' rules as templates for their own water supplies, while others thoughtfully crafted protections to accommodate certain existing uses of their lakes and watersheds, while limiting or banning others.

Looking beyond those rules at how each lake is managed, a couple of examples help show how each situation is unique – not only in terms of each lake's natural characteristics (depth, flushing rate, etc. – regardless of whether they are natural lakes or impounded), but in terms of each lake's recreational value, history of shoreline development, and the water utility's response to water quality concerns.

Lake Massabesic, the subject of a separate article in this issue, is a sprawling, impounded lake that has long served as the sole water supply source for state's largest city, Manchester, and some adjacent areas. Massabesic is closed to all body-contact recreation, but boating and fishing are allowed except in an area surrounding the water supply intake. Manchester Water Works owns nearly all of the land with frontage on the lake as well as extensive holdings elsewhere in

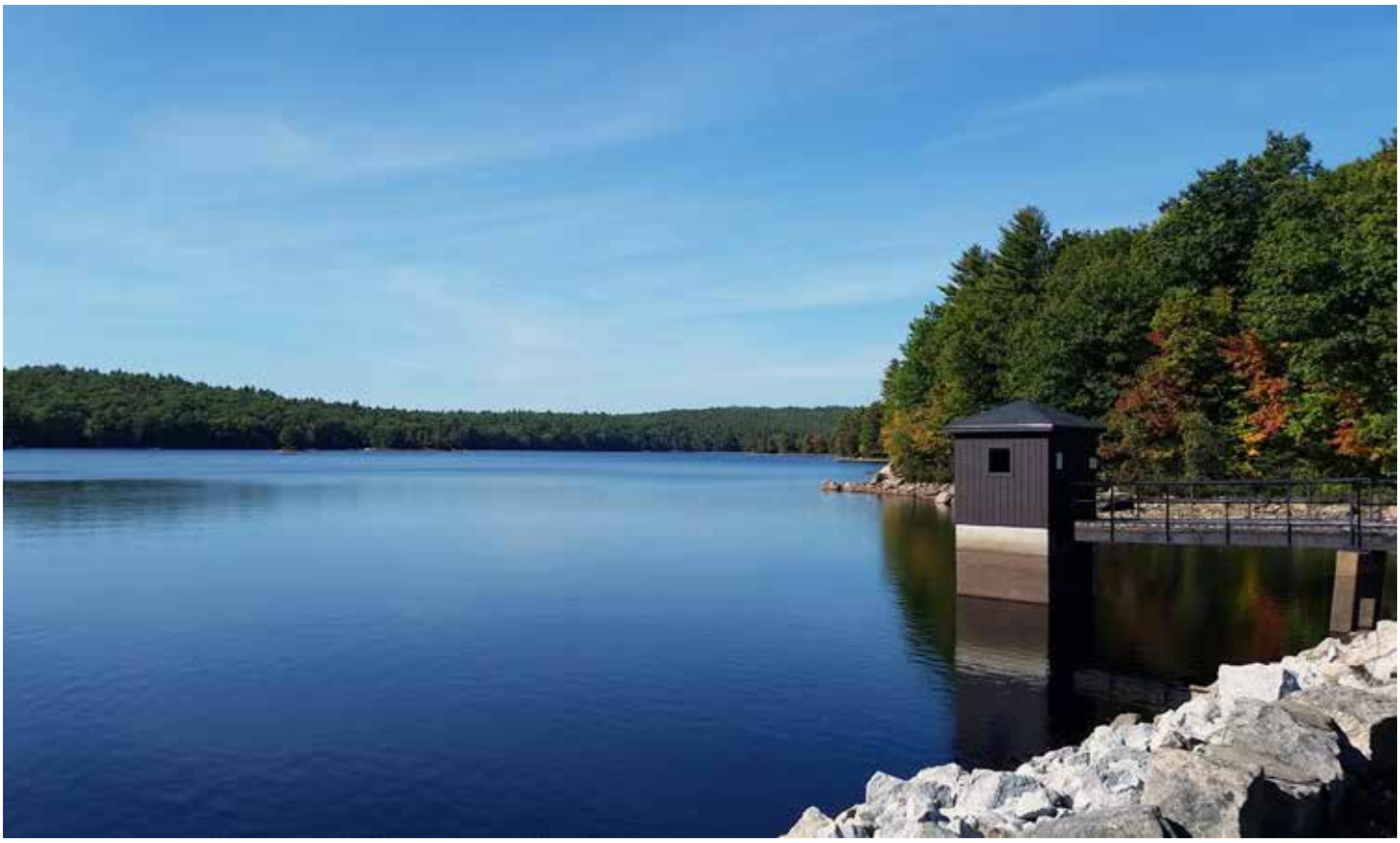

Figure 1. Manchester Water Works' land holdings include the watershed of Tower Hill Pond (shown here), whose discharge is managed to recharge Lake Massabesic, the system's main reservoir.

the watershed (Figure 1). Both the lake and the Water Works lands are important recreational resources (Figure 2), particularly given their proximity to the state's largest population center, and are monitored by the only water utility "watershed patrol" force in the state.

In contrast to Lake Massabesic, which is managed primarily as a water supply, the state's largest lake, 72-square-mile Lake Winnipesaukee, is one of the state's most significant recreational resources. Its shoreline is heavily developed, and its use as the City of Laconia's sole water supply is treated as almost incidental. Only the area within about 1,000 feet of the intake, near the lake's outlet, is closed to recreation. While the lake's overall quality is very good, there has been a trend toward beach closings due to *E. coli* bacteria, increasing milfoil infestations, blooms of algae and cyanobacteria, and a decline in fish and loon populations. The increased frequency of noticeable cyanobacteria blooms in some of Winnipesaukee's coves and bays is a source of concern for Laconia's water department, as is the use of herbicides to control invasive aquatic plants in portions of the lake upstream from the intake. For its part, the City has taken the initiative to improve the management of stormwater in some of Laconia's more developed areas near the lake, takes an active role in reviewing proposals to treat invasive aquatic plants with herbicides, and works with lake associations and others in an ongoing sub-watershed approach to lake planning and management.

This joint effort, or community-based approach, between government, private groups and businesses, and citizen volunteers, is an intentional design on the part of New Hampshire to, among other things, protect and conserve its water resources. While there are state environmental statutes and municipal ordinances designed to protect water resources, state agencies such as the New Hampshire Department of Environmental Services place a high value on engaging and working with stakeholder communities, both professional and citizen volunteer, to effectuate on-the-ground protection and conservation.

At the state level there are several environmental regulatory programs designed primarily to protect water quality or water resources (e.g., Wetlands, Shoreland, Subsurface Septic, and Alteration of Terrain Permit Programs). But within the political and economic context and processes by which environmental laws are made (and strengthened or weakened as time goes by, more data becomes available, or legislative priorities shift), the result is that these state laws usually establish, from an environmental protection perspective, just minimum standards that have to be met. In addition, due to other demands on state environmental agency staff (such as emerging contaminants) enforcement of existing environmental laws affecting lakes may be limited to only the most egregious violations. This is where municipalities can and do step in, to greater and lesser extents, to adopt more restrictive lake-friendly ordinances and adopt best management practices (such as with road deicing).

In New Hampshire, municipal ordinances need to fall within existing

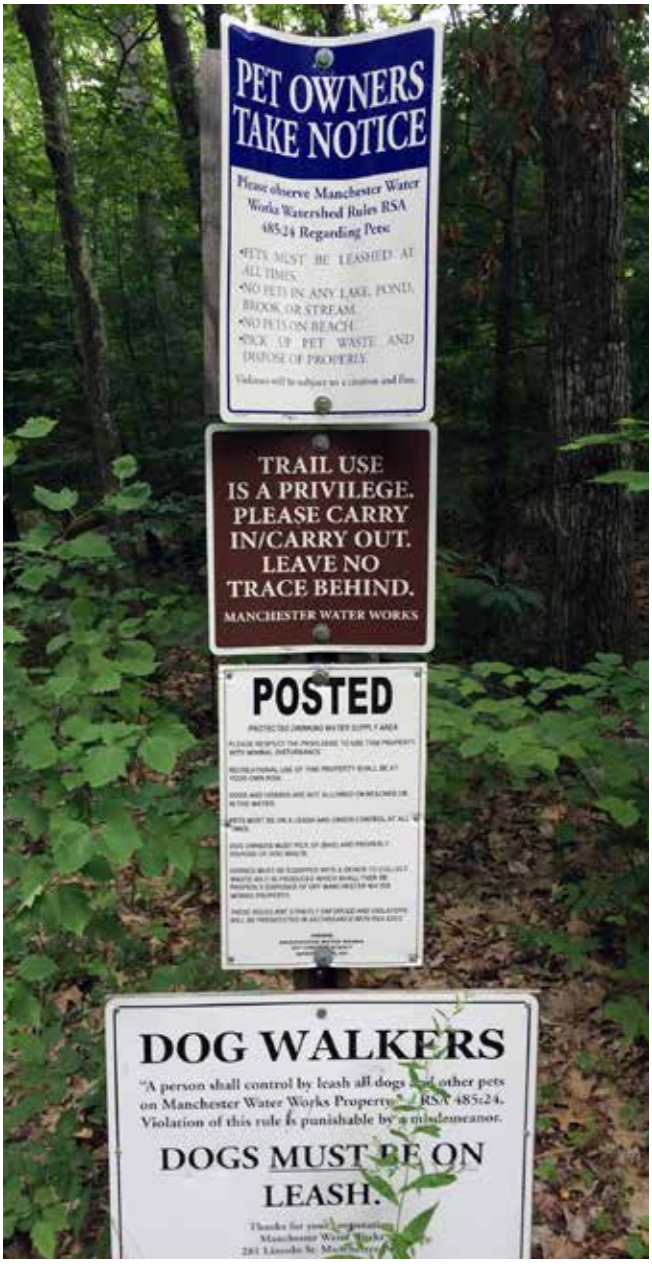

Figure 2. Manchester Water Works' watershed lands are an important recreational resource.

state law to the extent that state statutes enable more restrictive local ordinances.

Lake-friendly ordinances that municipalities have adopted in New Hampshire address steep slope development restrictions, increased shoreline or wetland setback distances for septic systems or other development disturbance, and restrictions on the application of road salt. In addition, restrictions can be placed on any lake in New Hampshire, either through statute or, in the case of safety-related rules (which may have environmental effects), by way of a citizen petition process administered by the New Hampshire Department of Safety (NHDOS). An example of a safety-driven rule that can have environmental consequences is the elimination of group mooring of boats near a dam or a public access boat ramp. Creating rules that prohibit such "mooring fields" may be driven primarily by safety concerns but, depending on the circumstances, may have water quality benefits as well.

Nonprofit partners – statewide and local

NH LAKES is a statewide nonprofit organization whose mission is to keep New Hampshire's lakes clean and healthy, now and in the future. This group has been an important partner in many lake and watershed related initiatives in the state. One of the ways that NH LAKES works to ensure good lake water quality is by helping its local lake association partners and other conservation groups get lake-friendly ordinances and other best management practices adopted at the municipal level. In addition, NH LAKES facilitates, with its local association partners, public participation in the process by which the NHDOS is petitioned and which, as mentioned, may set rules for each lake and which may have environmental benefits. So, we have a tiered source water protection public policy framework in New Hampshire that has both strengths and weaknesses.

One of the unintended consequences associated with this tiered framework of state laws, municipal ordinances, and lake-by-lake restrictions, is that New Hampshire now has a patchwork of standards, permit processes, and allowable uses from place to place, town to town, and lake to lake. This makes it challenging for state environmental regulators, municipal code enforcement officers, contractors and other permit applicants, lakefront property owners, and visitors to understand and comply with all the laws, ordinances, and rules. And, even when there are adequate protections provided through these public policies and practices, we know from experiences across the United States and over the decades that, when a watershed is populated with people and their associated human enterprises, a cooperative, community-based approach to source water protection may be a necessary and important complement to an environmental regulation framework.

Engaging landowners in lake protection through LakeSmart

In New Hampshire there are several programs directly or indirectly administered by government agencies or public universities which rely on the voluntary participation of private citizens and groups concerned about the long-term health of New Hampshire's 1,000 lakes. These lake water quality programs cover water quality monitoring, aquatic invasive species (prevention education, early detection, and management), and watershed assessment and pollution mitigation. One such program, directed primarily at reducing polluted runoff from private property around lakes, is LakeSmart. It is the newest program in our water quality toolbox, but one that is voluntary, non-regulatory, and which involves private property owners within and near the lake "shoreland" area (within 250-feet of shore).

At its inception in 2004, LakeSmart was a program of the Maine Department of Environmental Protection (DEP). In 2012, the Maine DEP handed over the ownership of the program to nonprofit groups, and it now functions as a program of the Maine Lakes Society, a statewide nonprofit organization. LakeSmart is a voluntary, non-regulatory program in Maine and participation is free. Maine DEP recognized the limitations of a getting private property owners to enthusiastically allow officials from a regulatory agency to come on to their private property. The agency recognized that they could increase participation in the program by transferring the program

to a private nonprofit organization. Since doing so, the program has really taken off. In 2012, the last year of DEP program ownership, ten lake communities were participating. Since being handed over to the Maine Lakes Society, the program now has over 60 participating lake groups – what we call in New Hampshire "lake communities." We talk about it in terms of community because that is who we work with and how we get it done – by engaging with communities who have a vested interest in ensuring the long-term health of our lakes.

Not unlike other major watershed programs in the U.S. today, LakeSmart is built upon concepts of community-based social marketing. Whether it is through coffee and conversation in kitchens and backyards overlooking the lake, or sessions at NH LAKES' annual Lakes Congress, highly motivated early adopters self-identify in each lake community. These folks are provided with the training, tools, and resources they need by NH LAKES to assess how lake-friendly their property is – what the potential is for their property to negatively impact water quality. With their self-assessment scores, and in many cases with follow-up on-site visits by LakeSmart Evaluators from NH LAKES or the local community, participants can then make upgrades to become more lake friendly and improve their score, ultimately scoring high enough to become LakeSmart. With that recognition comes certification and a sign (Figure 3) from the LakeSmart program. This recognition has its own social, and maybe even economic, value and is designed to inspire others to participate.

The social marketing piece here is based on the fact that the early adopters (you know, those people in your neighborhood who are always trying out new things) will pave the way, or un-pave it as the case may be. Then they can model their properties in any number of ways – again all voluntarily – with the hope and expectation that others will follow. This is not just theory but proven in practice by both social psychologists and, more importantly, by countless numbers of cooperating conservationists over the last 80-90 years with the US Department of Agriculture, County Soil and Water Conservation Districts, and the Cooperative Extension Service, and through dozens if not hundreds of other voluntary, non-regulatory conservation efforts by private property owners. LakeSmart in Maine was built on this premise and it has worked swimmingly. Now, in 2019, the program has been adapted by NH LAKES in New Hampshire and is underway with ten pilot groups participating and many more queuing up to get involved.

New Hampshire is one of many places that figured out a long time ago that private citizens can and should play a pivotal role in the conservation of our special places and shared natural resources, including our water supplies. With our land ownership model resulting in the majority of lakefront property – including the shoreland of many water supply lakes – being in private ownership, it simply makes sense for New Hampshire to augment its environmental laws, municipal ordinances, and other public policies and practices with a voluntary, non-regulatory (cooperative conservation) model to ensure the long-term health of its lakes. It also makes sense for source water protection strategies to encompass that model. In this way, on previously developed lands, we can reduce the inevitable impacts to water quality that shoreland property development might otherwise bring, and make it possible for water supply and other uses to continue to coexist.

Figure 3. Properties with LakeSmart signs carry a cachet of social responsibility.

Paul Susca supervises the Planning, Protection & Assistance section of the Drinking Water and Groundwater Bureau at the New Hampshire Department of Environmental Services. He has served in leadership and advisory capacities with national organizations focused on drinking water protection, including the Ground Water Protection Council and the AWWA Research Foundation. He currently chairs the Source Water Protection Committee of the Association of State Drinking Water Administrators.

Tom O'Brien has been the president of NH LAKES since 2011. Prior to that he was the executive director of the Network of Oregon Watershed Councils and the executive director of the Watershed Agricultural Council in the New York City water supply watersheds. This nonprofit executive experience was preceded by 20 years of public service as a natural resource manager in Massachusetts. His professional passion is helping local groups around the lakes of New Hampshire improve their capacity, impact, and sustainability.