

# Salmon Falls Headwater Lakes Watershed Management Plan

## EXECUTIVE SUMMARY

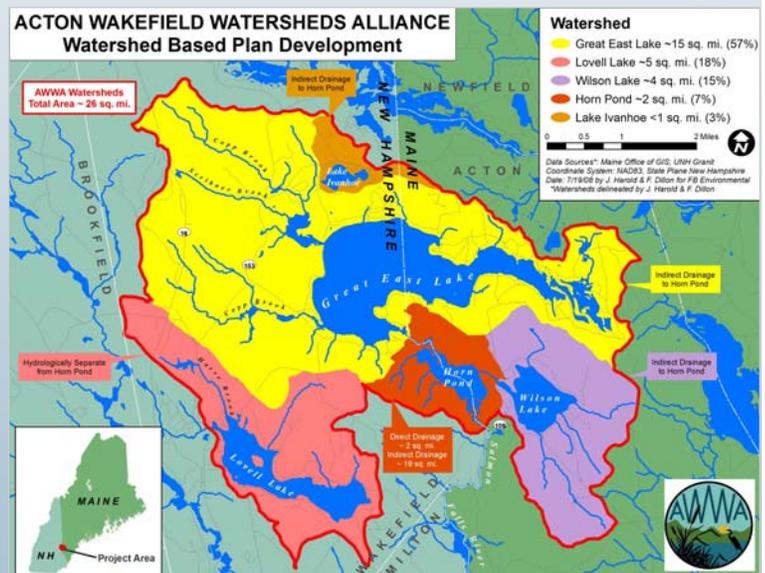
### Project Overview

The Salmon Falls Headwater Lakes Watershed Management Plan (WMP) is a reflection of the interests and ideas put forth by a dedicated group of individuals to protect and restore the water quality of the lakes that form the headwaters of the Salmon Falls River including Great East Lake, Horn Pond, Lake Ivanhoe, Lovell Lake and Wilson Lake. This group of local landowners, community decision-makers, municipal officials, lake associations, and natural resource professionals agree that these waterbodies are of significant value to the communities of Acton, Maine and Wakefield, New Hampshire, and that action is needed to preserve their high quality status. The Acton Wakefield Watersheds Alliance (AWWA) obtained a grant from the US Environmental Protection Agency (EPA) and the New Hampshire Department of Environmental Services (NHDES) to develop this community-based plan in cooperation with the towns, lake associations and other local stakeholders.

A Watershed Steering Committee, led by AWWA, came together as part of this plan representing a number of stakeholders including the Wakefield and Acton planning boards, town officials, representatives of the lake associations, local land trusts and interested community members.

### The Salmon Falls Headwater Lakes Watersheds

This WMP focuses on five of the Salmon Falls headwater lake watersheds: Great East Lake, Horn Pond, Lake Ivanhoe, and Wilson Lake, which form the headwaters of the Salmon Falls River; and Lovell Lake, which feeds the Branch River. Branch River flows into Milton Three Ponds, where it joins the Salmon Falls River. The Salmon Falls River defines the border between Maine and New Hampshire from Great East Lake to its confluence with the Cocheco River. When the Salmon Falls River joins the Cocheco River they form the Piscataqua River, defining the state border to the Gulf of Maine. These five watersheds cover approximately 26 square miles within Acton, ME and Wakefield, NH.



Development in the Acton-Wakefield region is considered rural with nearly 89% of land area undeveloped. The approximately 11% developed land is largely residential, primarily occurring along major roadways and lake shores. The lakes and their associated wetlands are home to a diverse community of fish, birds, mammals and plants that are dependent on clean water for survival.

## The Problem

Phosphorus, known as a limiting nutrient in lakes, is so minute that it is measured in parts per billion (ppb). Phosphorus is present in soils, both naturally, and as a result of human activity such as improperly functioning septic systems, fertilizers and construction activity. Small increases in phosphorus can have devastating effects on water quality leading to decreased clarity and frequent algal blooms. Rain and snowmelt result in stormwater runoff which carries pollutants, including phosphorus, from the land into the waterbodies.

A series of analyses were used to determine current in-lake phosphorus levels for all five lakes, and to determine the phosphorus threshold, (the amount of phosphorus that each lake can accept before the water quality will decline). These detailed analyses of the water quality data for the SF headwater lakes indicate that Lake Ivanhoe, Lovell Lake and Horn Pond may not meet the NHDES criteria for High Quality Waters (HQW) and that all five need phosphorus control measures to maintain or achieve HQW status.

With increased development, phosphorus runoff generally increases if development is not properly managed. The build-out analysis conducted for the project estimated that (given current growth rates) 4,239 new buildings and 9,000 new people may become part of this watershed within the next 44 years. This could result in several hundred more pounds of phosphorus entering the lakes each year which would have a devastating effect on the lake water quality if proper controls are not put in place.

## Why Develop a Management Plan?

Lakes are arguably one of our most valuable natural resources. We use them for recreation, relaxation, drinking water, and to build our homes near. Lakes and their surrounding lands also provide habitat for plants, wildlife and aquatic life. While clean water is essential for all life, pollution and irresponsible water use plague our waterbodies, making proactive protection of water resources essential. The Acton-Wakefield region in Western Maine and Eastern New Hampshire has an economy that depends greatly on the local waterbodies, including those that form the Salmon Falls Headwaters.



*Photo credit—Jim Theisen*

It is estimated in Maine that the State's lakes generate 13 million annual recreation user days and New Hampshire's lakes generate nearly 15 million recreation user days per year. This generates more than 1.1 billion dollars in total sales (for boating, fishing, and swimming) in each state. Additionally, lakefront property owners in these states contribute nearly \$600 million per year in property taxes. The value of lakes (including property values) declines when water quality declines. Therefore it is essential to find the balance between environmental quality and economic growth that benefits these valuable waterbodies.

This WMP provides a roadmap for protecting and improving the water quality of the five headwater lakes and provides a mechanism and rationale for acquiring grant and other funding to help pay for the efforts needed to address the recommended actions. In addition, it sets the stage for ongoing dialogue among key stakeholders in many facets of the communities, and promotes coordinated municipal land use ordinance changes to address stormwater runoff. For this plan to succeed, it will need a concerted effort of volunteers, and a strong and diverse steering committee that will meet at least annually to review progress made, and to make adjustments to the plan as needed.

## What the Plan Includes

Over the two year project period AWWA, NHDES and FB Environmental Associates (FBE) partnered to assess the five lakes' watersheds. Several models were utilized to help stakeholders understand the state of the current water quality in the lakes, and to assist with quantifying necessary efforts to improve and protect them in the future. In order to estimate pollution flowing off of the land during storm events the project team analyzed current land uses and phosphorus inputs to the watershed. A separate model and ordinance review were used to estimate future water quality levels based on new development. In order to measure current inputs, the AWWA conducted watershed surveys with the help of over 100 local citizens to identify sites contributing excess phosphorus, the main pollutant of concern, to the project lakes and tributaries. Finally, the project team worked together with Maine and New Hampshire environmental agencies to organize, summarize, and analyze all of the lake water quality data gathered by volunteers and professionals for more than three decades for the project lakes. These data enabled the project scientists to determine the current in-lake status and set phosphorus goals for each of the five lakes. This plan describes the challenges of overcoming the differences in water quality standards in Maine and New Hampshire, and outlines recommendations that aim to harmonize these standards so they can be used on a regional, watershed-wide basis (*see below*).

In January 2009, 32 stakeholders gathered to provide valuable input for this plan. The ideas were refined into an Action Plan by the Steering Committee in March and May of 2009. With the assistance of FBE these actions were further defined, and time-frames and associated costs were set.

## MAJOR GOALS FOR 2010-2020: MAINTAIN OR IMPROVE EXISTING WATER QUALITY

**Maintain** existing water quality at current phosphorus levels.

- ◆ **Great East Lake at 6.4 ppb**
- ◆ **Wilson Lake at 6.5 ppb**

**Improve** existing water quality. Reduce in-lake phosphorus to 7.2 ppb.

- ◆ **Lake Ivanhoe—reduce by 0.8 ppb**
- ◆ **Horn Pond—reduce by 0.8 ppb**
- ◆ **Lovell Lake—reduce by 0.3 ppb**

## 5 KEY ACTION CATEGORIES FOR THE SALMON FALLS HEADWATER LAKES

- ⇒ **Private and Public Roadway Best Management Practices (BMP)** - Reducing sediment loads to the lakes and tributary streams is a priority and can be accomplished through the stabilization and reinforcement of road crossings and roadsides to trap pollutants before entering the watercourses.
- ⇒ **Community Planning & Development** - local ordinances must be strengthened to protect water quality and both local and state regulations must be routinely and fairly enforced.
- ⇒ **Residential BMPs - Riparian Buffers, Low Impact Development and Septic Systems** – coordinate with local landowners to encourage vegetated buffers at the shoreline and low impact development techniques, and implement a septic system inspection and pumping recommendation program.
- ⇒ **Education and Outreach** – work with seasonal and full-time residents to enhance the understanding of land use/water quality connections through school programs, lake associations, and community groups.
- ⇒ **Land Conservation** – coordinate among municipalities, land trusts, regional planning commissions, and lake associations to protect upland areas of the SF headwater lakes' watersheds to ensure that some land remains in an undisturbed state which will help reduce total phosphorus runoff.

### Funding the Plan

Reducing phosphorus inputs from existing development and preventing phosphorus inputs from future development in the SF headwater lakes watersheds will require significant financial and technical resources on the order of at least \$600,000 per year including the financial support of private, town, state and federal partners. Section 5.4 lists the costs associated with successfully implementing the 10-year plan, including both structural and non-structural measures. Success requires that a sustainable funding plan be developed to ensure that the major planning objectives can be achieved over the long-term. This funding strategy will outline the financial responsibilities at all levels of the community (landowners, towns, community groups, and state and federal government). The funding plan should be incorporated into this WMP within the first year, and revisited on an annual basis.

## **Administering the Plan**

AWWA will work with the municipalities and stakeholder groups to administer the Salmon Falls Headwater Lakes Watershed Management Plan. AWWA will work toward implementing the Action Plan which outlines responsible parties, potential funding sources, approximate costs, and an implementation schedule for each task within the five categories.

AWWA will convene the Steering Committee at least annually to provide periodic updates to the plan, track and record any progress made, maintain and sustain the action items, and make the plan relevant on an ongoing basis by adding new tasks as they develop. The Steering Committee will use established indicators within the WMP to determine the effectiveness of the Plan. All achievements, such as press coverage, outreach activities, number of sites repaired, number of volunteers, amount of funding received, and number of sites documented, will be tracked by AWWA.

## **Next Steps**

The success of this WMP will weigh heavily on the cooperation of the local municipalities and key stakeholders to support the plan, and the Steering Committee to engage enthusiastic support, to develop a sustainable funding plan and acquire the necessary funds to implement it. AWWA has been approved for a NHDES Watershed Assistance grant for 2010-2011 to begin implementing some of the action items recommended in the Plan. The goal is to engage all facets of the communities in the protection of the region's most valuable assets – **our lakes**.



*Photo credit—Jeanne Achille*

## KEY CHAPTERS IN THE PLAN

**Chapter 1** of the Plan introduces the plan, describing the problem, defining the goals and objectives, the community-based planning process, and outlines the federal requirements of the Plan. Chapter 1 also provides background information of the AWWA's activities related to the plan development and watershed protection.

**Chapter 2** describes the watershed, providing detailed information about climate, population, land use and growth trends, physical features and the threat of invasive plants. Chapter 2 also explains the process of estimating the pollutant load sources using the STEPL model.

**Chapter 3** provides an overview of the water quality standards, the methodology used to assess the water quality, and the recommendations for managing these lakes to prevent water quality decline in the future. Further, this Chapter will describe why several of the Salmon Falls (SF) headwater lakes may not be considered High Quality Waters and the evidence that shows that they are experiencing a decline in water quality. Chapter 3 also includes the results of the Master Plan and Ordinance Review, the Build Out Analysis and the Shoreline Survey Assessment.

**Chapter 4** offers the Management Plan rationale and approach and details the goals and techniques that may be used to achieve them. This Chapter explains non-structural and structural restoration approaches to phosphorus reduction and describes the current and projected pollution sources. An explanation of how to use an adaptive management approach is also included here.

**Chapter 5** gets to the core of the Plan, outlining necessary management strategies to reduce phosphorus to the SF headwater lakes. The Action Strategy is included detailing the action items, schedule and estimated costs.

**Chapter 6** provides recommendations for how the action items in the plan will be tracked in order to ensure that necessary steps are being taken to protect or improve the water quality of the SF headwater lakes over the next 10 years. Specific water quality monitoring recommendations are made for each lake.

**Chapter 7** describes who will be carrying out the plan and suggests methods for securing sustainable funding.