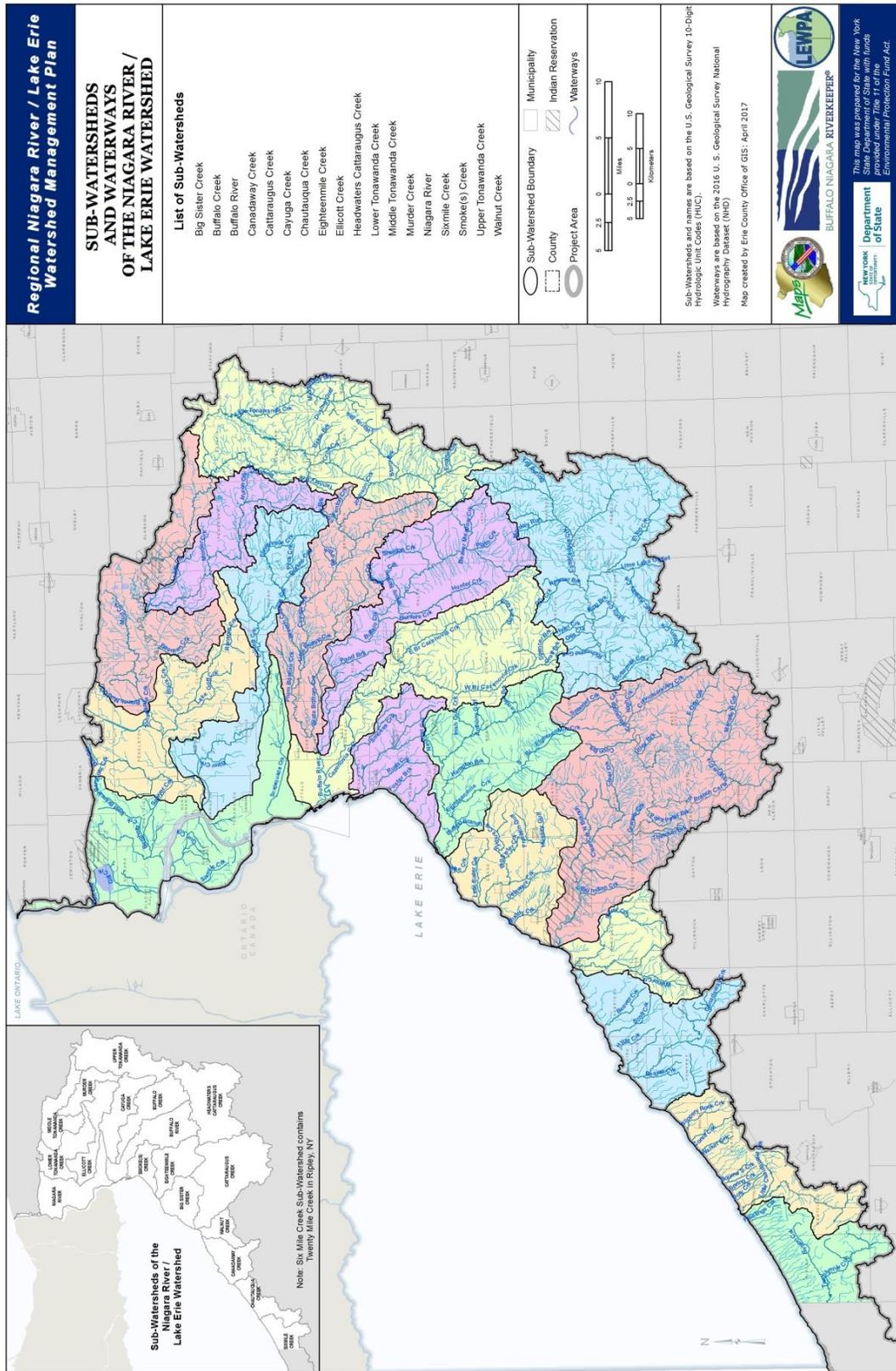


Figure 1.1: Sub-watersheds and Waterways of the Niagara River/Lake Erie Watershed

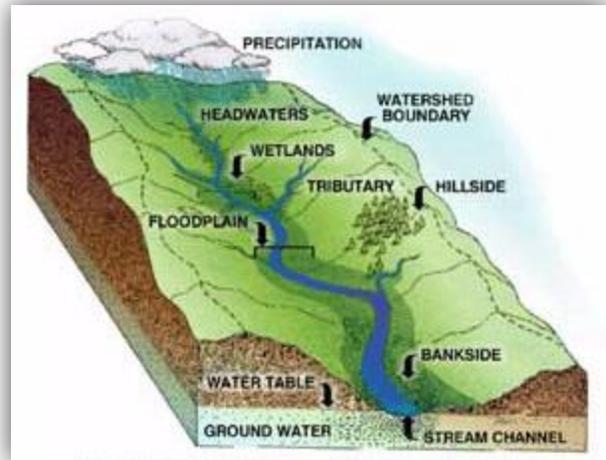


Chapter 1: Introduction

What is a Watershed?

A watershed or drainage basin is a delineation of land within which water collects and drains to a common place, such as a set of streams, rivers and eventually a larger body of water (Figure 1.2). For example, Figure 1.3 outlines the watershed for the Great Lakes, which encompasses 8 U.S. states and the Canadian province of Ontario. Rainfall and snow melt within these watershed lands will drain into the Great Lakes. This Watershed Management Plan encompasses the New York State portion of the Niagara River and Lake Erie watershed, which is termed the **Niagara River/Lake Erie Watershed or “Watershed,”** and is illustrated in Figure 1.1.

Figure 1.2: Watershed Diagram



Source: Gualala River Watershed Blog

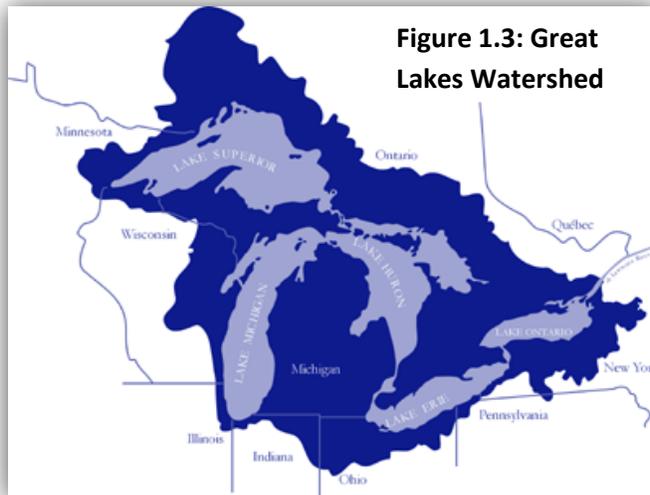


Figure 1.3: Great Lakes Watershed

Source: GreatLakes.net

Each watershed can also be broken down into smaller delineations, such as sub-watersheds or sub-basins, and further more into catchments that identify lands where waters enter smaller order creeks and streams. In the Niagara River/Lake Erie Watershed there are 18 sub-watersheds that outline areas of land that collect waters draining to the major tributaries of the basin. These are defined by the U.S. Geological Survey (USGS). The 2013 10-digit Hydrologic Unit Codes were used to define the sub-watersheds.

Changes have since been made by USGS to these delineations and are discussed further in Chapter 2.

Defining the boundaries of a watershed is important to identify how water moves, and therefore plan for maintaining those waters as a resource. The overall Niagara River/Lake Erie Watershed drains over 1.5 million acres of land or over 2,300 square miles. It includes all of Erie County and portions of 7 other counties. Major waterways include Tonawanda Creek, Buffalo River, and Cattaraugus Creek. Water quality and quantity are affected by the lands over and under which they move, as such factors

as soils, vegetation, development patterns and historic land uses influence what types of contaminants waters may pick up or how they are filtered and cleaned on their journey to a larger body of water. In addition, much of today's research evaluating quantitative thresholds at which water quality and watershed conditions begin to degrade, utilize geographic parameters..

Historical Context

The Niagara River/Lake Erie Watershed was inhabited by Iroquoian-speaking tribes when Europeans arrived to New York State. They relied heavily on agriculture and subsistence hunting, fishing, and gathering. For generations, they taught respect for the land and resources, which are borrowed from future generations. As European settlement increased and the population grew, more and more land was developed. Buffalo became a city in 1832 and grew to become an industrial center, primarily as a result of its location on the Buffalo River, Great Lakes, and Erie Canal terminus. Shipping and manufacturing industries located along the waterfront to take advantage of the water resources. The first hydro-electric power plant in the world was built in Niagara Falls and the alternating current power transmission system allowed designers to light the Pan American Exposition in 1901 in Buffalo, the eighth largest city in the U.S., using power generated 25 miles away. Similarly, the first natural gas well in America was drilled in Fredonia, NY and was used to light the first stores in the village. As industry grew, areas such as Love Canal in Niagara Falls and West Valley in Ashford, were used as dumping grounds for toxic materials from the Manhattan Project and power generation. Nuclear waste is still buried at West Valley today.

As a result of limited environmental regulation, Lake Erie and the Buffalo River became heavily polluted from industrial discharges and were once considered, "dead." The residents of Love Canal started getting sick and this resulted in the creation of Superfund through the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) to clean up toxic waste sites. In addition, the 1987 Great Lakes Water Quality Agreement designated the Buffalo River and Niagara River as Areas of Concern by the U.S. Environmental Protection Agency due to the high levels of contamination. Millions of dollars have been spent in this region to clean up this legacy of pollution. While the clean-up is not complete, the focus has shifted toward the need to protect our natural resources while growing our economy. This is why watershed management planning is so critical.

Purpose of a Watershed Plan

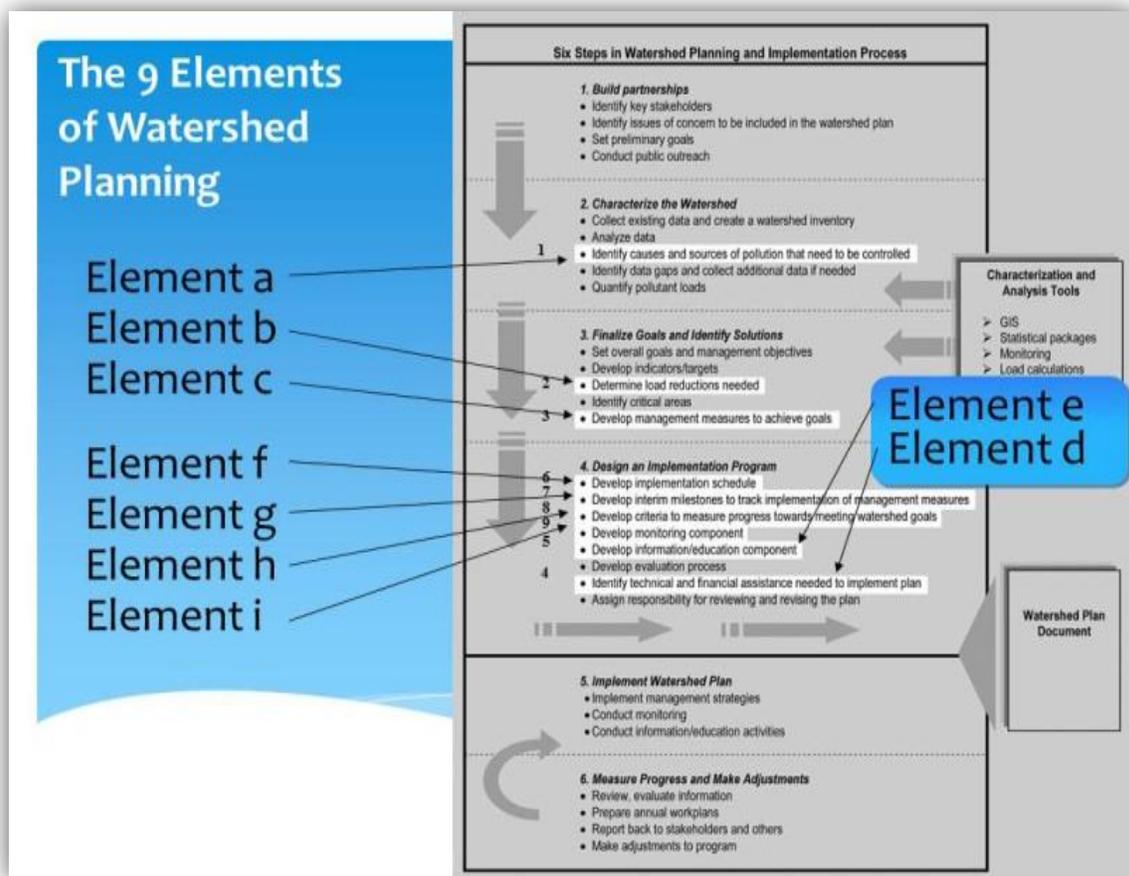
Water plays such an essential role in our lives, so essential that it's connected to everything in our world. We use it for drinking, cooking, cleaning, agriculture, industrial processes, bathing, shipping, fishing and aquaculture, plus our recreational enjoyment. Its uses are many and also essential to our lives, lifestyles, and economy. Water is also a finite resource. There is only so much water on the earth and we have little control over where that water moves and locates, as much of it is dependent

upon our local geography, topography, and weather patterns. As a finite resource that is so interconnected with our health and economies, it is vital that planning be conducted to properly manage its usage and all of the factors that affect its quality. For the Niagara River/Lake Erie Watershed, many planning efforts¹ have occurred over the last several decades to address various issues present in the watershed, but until now there hasn't been an overall Watershed Management Plan developed that looked at the watershed in its entirety. In addition, addressing water quality through the lens of flood management has become very important with the increase in storm events.

Watershed Planning Process

Watershed management planning, according to the U.S. Environmental Protection Agency, involves six steps and watershed management plans have nine key elements, as outlined in Figure 1.4. They involve building partnerships, identifying all of the contributing factors, issues and trends affecting

Figure 1.4: Planning Process



Source: US Environmental Protection Agency

¹ The Niagara River/Lake Erie Watershed Atlas and Bibliography is a comprehensive resource for these materials, and has been prepared in conjunction with this Plan.

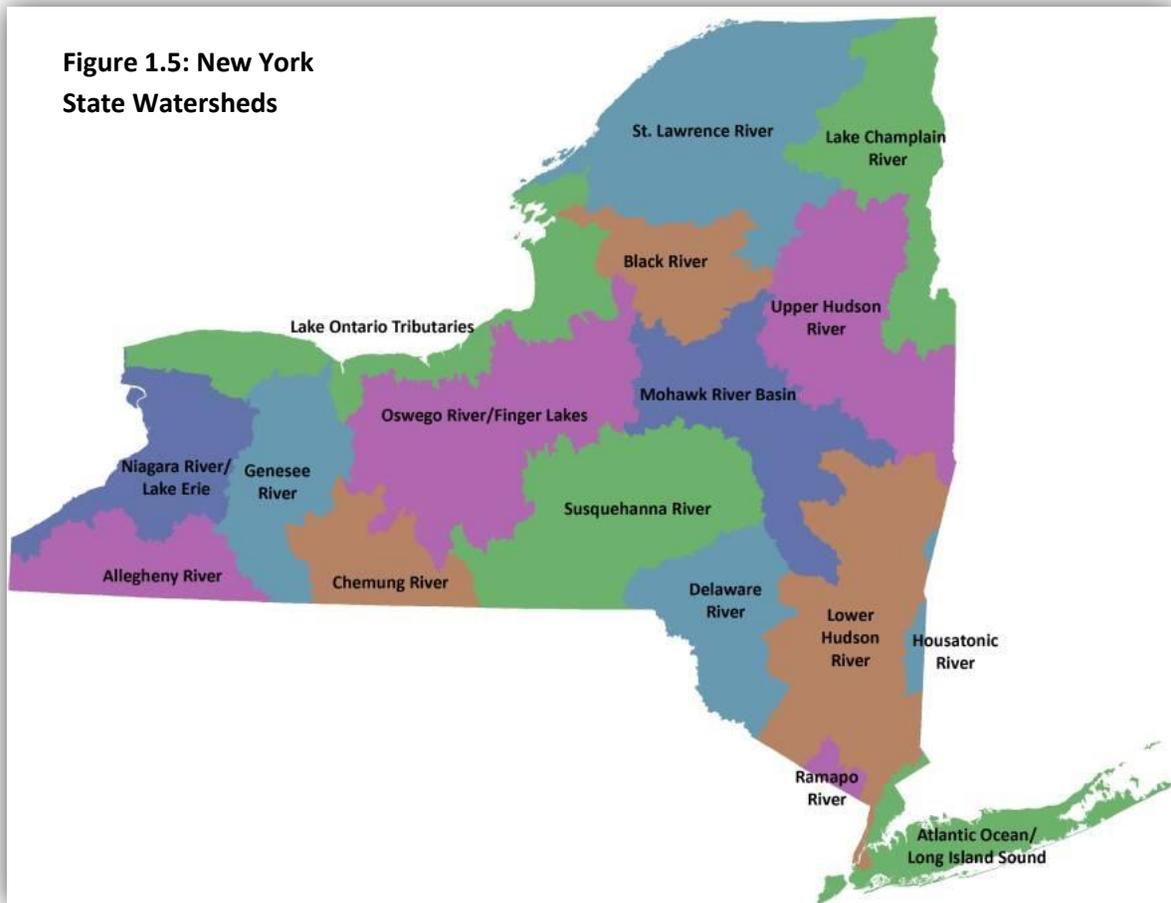
our water resources; setting goals for improvement and outlining strategies to meet those goals; and finally, implementing the plan's strategies and tracking their progress and effectiveness (Figure 1.4). Ideally watershed management planning is an on-going process that continually re-evaluates itself and reacts to the changing conditions of the watershed. It is essential to the planning and implementation process that the watershed's citizens, municipalities, stakeholders and other organizations are involved at the very beginning. Their role helps guide the planning process and ensures waters are managed in line with local values.

New York State provides for home-rule, meaning local cities, towns, and villages serve as the primary authority for community planning. Counties and regional planning organizations can only make recommendations to local municipalities. Therefore, this Plan serves as a tool to educate municipalities on the importance of watershed planning and what to look for when developing or updating a comprehensive plan, zoning codes, or other local laws that impact water quality. It also serves as a resource for existing conditions and potential future impacts.

In addition, this Plan follows ecosystem-based management principles taking the entire ecosystem into consideration when making recommendations including, plants, animals, and humans, in a process that aims to conserve major ecological services and restore natural resources while meeting the socioeconomic, political, and cultural needs of current and future generations. The goal is to create a sustainable regional plan for our Niagara River/ Lake Erie Watershed that can be utilized for years to come. It is designed to be a working document that will be amended over time.

Methodology

The Regional Niagara River/Lake Erie Watershed Management Plan-Phase 2 builds upon the Phase 1 efforts by Buffalo Niagara Riverkeeper, which characterized the Niagara River Watershed between 2010 and 2014. This Phase 2 Plan expands the original Plan to include land and waterways in the southern part of the watershed that drain to Lake Erie. This ensures that the entire western portion of New York State draining to the Niagara River and Lake Erie is addressed as one unit, since water flows across many municipal boundaries. This also matches the New York State Department of Environmental Conservation (NYSDEC) definition of the Niagara River/Lake Erie Watershed, as shown in Figure 1.5. New York State has a total of 17 major watersheds. The Niagara River/ Lake Erie Watershed is the westernmost drainage basin in the state.



Source: NYSDEC

The plan focuses on assessing the current conditions, trends, and major contributors to water quality conditions in the watershed. A description of the Plan chapters is provided below. The very beginning of the planning process involved the creation of an Atlas and Bibliography of existing data, including maps, studies, reports, and plans that were gathered and analyzed to help assess the physical, biological, and ecological conditions of the watershed. The work completed by Buffalo Niagara Riverkeeper and the original Project Advisory Committee to create the *Niagara River Watershed Management Plan (Phase I) Atlas* was updated to include the Lake Erie watershed as part of Phase 2 of this project and can be found as an accessory document to this Watershed Management Plan. It is entitled, *Niagara River/Lake Erie Watershed Atlas and Bibliography*, and includes all of the original data, as well as reports, maps, etc. covering the expanded territory. It was put together with the assistance of the Lake Erie Watershed sub-committee of the overall Project Advisory Committee and is available online at the Lake Erie Watershed Protection Alliance’s website².

² www.erie.gov/wmp

Regional Niagara River Lake Erie Watershed Management Plan (Phase 2) Components:

Chapter 2: Watershed Characterization. This chapter outlines the current context of the watershed, including its geographic setting, geology, topography, hydrology, climate and precipitation, and other related infrastructure influencing our waters.

Chapter 3: Population and Development in the Watershed. Building on the context of Chapter 2, this chapter outlines the current demographics and population trends in the watershed, as well as how land is utilized and how much of it is protected as these are major elements influencing our water resources.

Chapter 4: Water Quality. Reporting on the most current data and reports, this chapter outlines water quality conditions and identifies the most significant impairments found in the watershed today.

Chapter 5: Ecology & Biology. Ecological health and biological indicators are another way of assessing the health of the overall watershed and identifying what factors are contributing to its decline. This chapter outlines the available ecological resources found in the watershed with a focus on the habitat assessment work conducted by Buffalo Niagara Riverkeeper under the Niagara River Habitat Conservation Strategy.

Chapter 6: Assessment of Local Laws & Practices Affecting Water Quality. Understanding the laws and practices governing use of land and resources in the watershed is essential to understanding factors that influence watershed health. This chapter looks at the regulatory and non-regulatory practices found in municipalities within the watershed.

Chapter 7: Watershed Projects Inventory. This chapter outlines the current and recently completed large-scale water-related projects within the watershed, including those associated with infrastructure and research. The focus is on State and Federal projects with some large-scale local projects also mentioned.

The remaining components of the Watershed Management Plan pull together all of the information from the preceding chapters listed above to outline the major findings of the watershed investigation and outline recommendations to address the major issues found. The remaining element of the plan involves exploring the next steps to the watershed management plan to continue with this important work.

Chapter 8: Key Findings and Recommendations. This chapter outlines the findings from the preceding chapters of the report and identifies recommendations to address the issues presented.

Chapter 9: Management Plan Phase 3 Strategy. This final chapter of the report outlines the immediate next steps needed for continued watershed management planning in the Niagara River/Lake Erie watershed, including a structure for implementation, key stakeholders and implementation partners, and funding.

It should be noted that in addition to the completion of an overall Watershed Management Plan, the region's stakeholders and watershed management organizations ultimately desire a Nine-element Watershed Management Plan for the region, developed by the U.S. EPA and approved by NYSDEC. Watersheds with a recognized nine-element plan become eligible for federal funding resources for watershed restoration. Currently the Niagara River/Lake Erie Watershed does not have a Nine-element Watershed Management Plan and is not eligible for those federal resources. However, the development of this Phase 2 Watershed Management Plan will fulfill a portion of the nine-elements required for such a plan. As follow-up planning occurs, subsequent planning efforts will aim to fully complete a nine-element plan. Work is underway with NYSDEC, US Geological Survey, and the Lake Erie Watershed Protection Alliance to conduct baseline water quality monitoring and modeling in the Watershed so that target load levels can be created, best management practices and projects can be designed, and projects can be implemented to achieve those goals.

Advisory Committee & Public Involvement

The planning process for the Watershed Management Plan included involvement from a wide array of citizens, key individuals, organizations, and other entities in an advisory capacity in both Phase 1 and Phase 2. Project Advisory Committees were established at the beginning of the planning process for both Phase 1 and Phase 2. Some committee members remained the same for both phases, however new individuals were brought in to advise on Phase 2 due to the expanded territory. The full community engagement strategy and list of organizations involved in the Phase 2 Project Advisory Committee and various subcommittees can be found in the *Regional Niagara River/Lake Erie Watershed Management Plan – Phase 2 Community Outreach and Participation Plan*.

Project Advisory Committee members and subcommittees guided the development of the *Niagara River Watershed Management Plan (Phase I) Atlas*, and *Niagara River/Lake Erie Watershed Atlas and Bibliography* in Phase 2, identifying watershed characterization content, and reviewing the plan's drafts through electronic email communications and meetings. A full list of Phase 2 Project Advisory Committee members and Lake Erie Subcommittee members is provided in the Acknowledgements.

In addition to contributions by the Advisory Committee, public involvement and input were encouraged throughout the planning process. There were two Public Informational Meetings during Phase 1. One took place November 2011 at the North Tonawanda Public Library and asked participants to break into small groups to discuss and identify the major positive and negative aspects of the watershed, as well as the future threats to watershed health as they see it. A second Public Information Meeting was held in December 2014 at the Anna M. Reinstein Public Library and provided participants with an in-depth review of the findings of the watershed's characterization, and update on the next steps in the planning process. Final draft Phase 1 recommendations were presented to the public via the Watershed Management Plan webpage³.

During Phase 2, in order to reach a wider audience, public presentations were taken "on-the-road" and tables were set up at events and festivals throughout the watershed to interact with participants and obtain input. These included the Erie County Fair in 2015, Williamsville Earth Day/Arbor Day Event in 2015, Cattaraugus County Farmer Neighbor Dinner in 2016, Elmwood Festival for the Arts in 2016, Daemen College Environmental Summit in 2015 and 2016, and Great Lakes Experience in 2015 (Dunkirk, NY), 2016 (Buffalo, NY), and 2017 (Dunkirk, NY). Buffalo Niagara Riverkeeper conducted a public meeting on April 6, 2017 in Buffalo, NY to explain the Watershed Management Plan and present their findings. In May of 2017 there was a presentation given and table set-up at the Lake Erie Rally in Dunkirk, NY as well. In early 2019, the Watershed Management Plan was discussed at three public meetings, one in each county at their respective water quality committees. Feedback was solicited on how to prioritize sub-watersheds. The public comments from all public meetings and events throughout the development of the plan were taken into account and incorporated into the Watershed Management Plan process.

³ <http://bnriverkeeper.org/healthyniagara>

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