

INTRODUCTION

We have an interesting experiment going on in the Great Lakes region—an ambitious multinational program to restore and maintain a complicated natural system of flowing water. The modern understanding of large, shared, freshwater ecosystems began here, as did the policy infrastructure for a unique Canadian–US–First Nations approach to management. We have invested half a century in this experiment and I am grateful to have had a small part in it almost from the beginning.

My purpose in writing this book is to share some of this experience to enrich our collective literacy about water in its natural habitat. I am writing to students in environmental studies; to river scientists; to government agencies and policy makers whose decisions affect our waters; to local and worldwide advocates for clean water, healthy rivers, and climate stability. I am writing to all water people, which is basically every one of us on this planet whether we know it or not.

The book is grounded in my explorations of how rivers work in the largest freshwater ecosystem on Earth and in my own home geography of western New York. It was born from a gradually acquired love of this place and was fueled by sorrow and anger over the degradation of some of my favorite spots, including an oxbow wetland on Buffalo Creek. Many of you will have experienced similar losses. For anyone who becomes attached to a “wild” place, or even to a bit of recovering unmanaged landscape, anger and sorrow are almost guaranteed. Loss of natural land and rivers has been occurring and increasing in the Great Lakes region over the past two centuries, despite our more recent restoration efforts.

In my time of living here, things have gotten better and they have gotten worse. Ohio's Cuyahoga River is no longer burning. Lake Erie is no longer "dead," but we still have pollution problems, and the physical rearrangement of our rivers seems almost complete, to the detriment of a river's resilience or capacity to recover. If you are trying to figure out where a stream begins to unravel—where erosion first becomes "a problem," or where, in its course, a stream first cannot support its native aquatic life—you might as well start at the source. I'm not suggesting that no Great Lakes stream reaches are healthy or intact. Our rivers and creeks have ways of being reborn all along their courses. But from a Great Lakes perspective, where restoration efforts are usually focused downstream at the mouths of major tributaries where most of us live, we should not lull ourselves into thinking that this is sufficient. We have sprawled one way or another all the way up into the headwater hills without thinking or even awareness of the small natural waters—the springs, seeps, wetlands and fingertip flows—that begin everything.



My interest in all this began in literature. My doctoral dissertation was on three early nineteenth-century English poets—John Keats, William Blake, and William Wordsworth—whose works and lives in many ways expressed their own anger and sorrow over the privatization of common land and industrialization of the natural world. Blake raged, Wordsworth documented, Keats watched his mother and brother die of tuberculosis in coal-fired London, and then succumbed himself at age 26. When I finally realized it was this context, rather than the poetics, that moved me, I changed course, went back to school, studied urban planning and environmental law, and got my master's degree and first paying job as a watershed planner for the Erie and Niagara Counties Regional Planning Board. Most of my education has been in the field: from childhood explorations, to work on stream assessment and restoration projects, to many long meetings with international, federal, state, and

local agencies and governments hashing out goals and strategies for conserving lakes, streams, wetlands, and groundwater.

Our Great Lakes organizations have hosted contingents of planners from countries like Hungary, needing to upgrade to European Union standards to manage their water and sewer impacts on multinational rivers like the Danube. I have shared our documents with friends in Burma to help them consider the potential effects of proposed dams or mining projects on transboundary rivers like the Irrawaddy and Salween. Over the past 150 years we have witnessed how a relatively pristine and natural freshwater ecosystem has responded to major chemical, biological, and physical abuse. Over the past 50 years, we have begun to grow an archive of policies, regulations, and practices necessary for recovery.



As a child, I liked to ride along with my Dad on Friday afternoons to dump a week's worth of construction debris in one of our waterfront wastelands. Sometimes we clanged across the metal lift bridge at the foot of Ferry Street to Squaw (now Unity) Island in the upper Niagara River. More often we soared over the Buffalo River on the new Skyway from whose top we could see Lake Erie stretching south and west to Lackawanna and the black smokestacks of Bethlehem Steel. Our piece of Lake Erie shoreline was once the busiest inland port in the world—the Port of Buffalo—but that was over by the time I came along. I remember it as unsupervised and smoldering—the sweet smell of aniline spiked with acrid notes of burning rubber.

Over the years these postindustrial wastelands began to green up and look natural again. And as it turns out, Buffalo's waterfront—dump or no—is extremely important to global wildlife, especially to spring migrating birds who have stopped here to rest and feed and then follow the river north for generations beyond count. As the birds, fish, and other animals began to return, people took note. We set aside places like Tiff Farm and Times Beach as official nature preserves and began

to help restore them. Now if you see a father and daughter on the Outer Harbor or Unity Island, they are likely taking in the sights and sounds of courting mergansers or maybe just picking up a piece of garbage to dispose of properly.

In the late 1980s, I joined a handful of other volunteers who became the Friends of the Buffalo River. We created a not-for-profit organization and discussed our mission statement over fried bologna sandwiches at the old Harbor Inn, where a few remaining grain millers and scoopers also took their lunch. Our mission finally boiled down to this: “to promote, preserve and protect the Buffalo River and its natural and cultural environments.” We planned to be a watchdog and player in the remediation of the Buffalo River, listed as one of 43 toxic hot spots or Areas of Concern around the Great Lakes. We persisted for almost a decade as Friends before expanding our mission, hiring staff, and eventually becoming Buffalo Niagara Waterkeeper, part of the international waterkeeper network begun by John Cronin and Robert F. Kennedy Jr. on the Hudson River.

Somewhere along the line we came upon the oxbow wetland on Buffalo Creek, about ten miles upstream from Lake Erie. Considered a nuisance source of the sediment to the Buffalo River navigation channel downstream, the oxbow meander had been cut off from the creek by agreement between two major federal agencies with engineering authority over our streams.

The consequence of all this is where my story begins. I want to show you a hill, a severed meander, an old piece of industrial lakeshore, and something I found in my backyard last summer. I want to connect the dots to inspire new or greater appreciation for this beautiful battered corner of the Great Lakes and for the many hidden parts of it that still function.

But for those of you who prefer a straighter course from A to B, here is a brief summary of where we are going.

Part 1 explores the vocabulary and regulatory context for Great Lakes rivers—from stream orders and hydrologic codes, to the language of the Clean Water Act and the changing legal meaning of “the waters of the United States,” to the Great Lakes Water Quality Agreement

and how it led some of us to understand a small oxbow wetland on Buffalo Creek as regionally significant.

Part 2 tells the story of what actually happened at this oxbow and what it became: a wildlife refuge surrounded by suburban sprawl; a reference site for restoring the lower Buffalo River; Exhibit A in the case against stream channelization; and an anomaly in being a place that is both full of life and a death trap.

Part 3 explores stream anatomy, specifically how tributaries work in this corner of the Great Lakes ecosystem. What's going on down there? We pick up stones and study the lifeways of the invertebrates living below the flow, such as the caddisfly, which spends the greater part of its life underwater. What do they tell us about stream health? How important is groundwater as a source of our creeks and the life they support? I explore the how and why of stream meandering and channel development and find a "hill made of water"—a birthplace of Buffalo Creek and its sister tributaries to Lake Erie; key to understanding how the glacial history of the Great Lakes Basin, in effect, drives everything.

Part 4 widens the scope to include cultural context. The settlement of the Great Lakes region and particularly western New York was governed by distant land speculators whose concept of the place was based on a "vacant land" mindset permitting expedited rearrangement of flows of water, wildlife, and Indigenous people that had coevolved for millennia. In contrast, we have a message from the Haudenosaunee or Iroquois people still living on remnants of their original lands: an instruction calling for a "value change for survival." Buffalo Creek is the silk thread raveling through this labyrinthine narrative all the way to the end, to its delta on Lake Erie. Buffalo's Erie coast, like many Great Lakes postindustrial waterfronts, is a place in profound transition. Which way will it go?

The book concludes with another model for development that is beginning to take hold in coastal cities around the world in response to climate instability. The Dutch call it "making room for rivers." I see it as an opportunity for bringing our Great Lakes experiment to the global project of restoring and maintaining a livable planet.