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The Erie Canalway: Stewardship and Multivalent Significance of Historic Waterways

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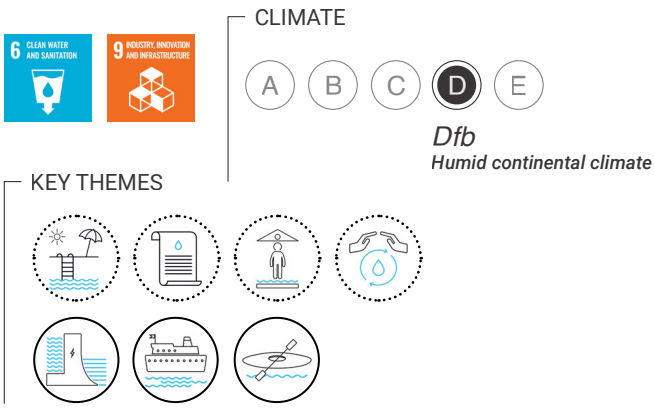
Once North America's longest constructed transportation system, the Erie Canalway has been in continuous operation for nearly 200 years (ASCE 2022; Goodstadt et al. 2020). The Canalway transformed New York City into the nation's chief port and helped New York State (NYS) become a commercial, industrial and financial center (Library of Congress, n.d.; Hay 2014). Beyond moving people and goods, the Canalway carried ideas, innovations and social movements; it connected Europe, the US Eastern seaboard and the US interior; it has been credited with facilitating settlement efforts, advancing democracy and strengthening national identity (Goodstadt et al. 2020; Hay 2014). The system of the Erie Canalway is a National Historic Landmark and is listed on the NY State and National Registers of Historic Places; it is a National Historic Civil Engineering Landmark and is part of the Erie Canalway National Heritage Corridor. The Canalway contributes to SDG 9 (Industry, Innovation, Infrastructure) through its resilience over two centuries and its repurposing from transportation infrastructure to a historic, cultural and recreational corridor. Its innovation captures the paradigm shift of water engineering for transport to water management in terms of ecology and culture. The Canalway also illustrates some of the challenges associated with SDG 6 (Water and Sanitation), especially in regard to water-related ecosystems.



< Fig.1 Active recreation trails along the Erie Canal are a destination for cyclists (Source: Courtesy of Robert Tilley, 2022).

Introduction

The Erie Canalway was once a model for future canals in the US. When it opened in 1825, the Canalway was 363 miles long and was subsequently modified and incorporated into New York State's 450-mile canal system, which included navigational channels, locks, lift bridges, dams, powerhouses and maintenance structures, as illustrated by fig.2.

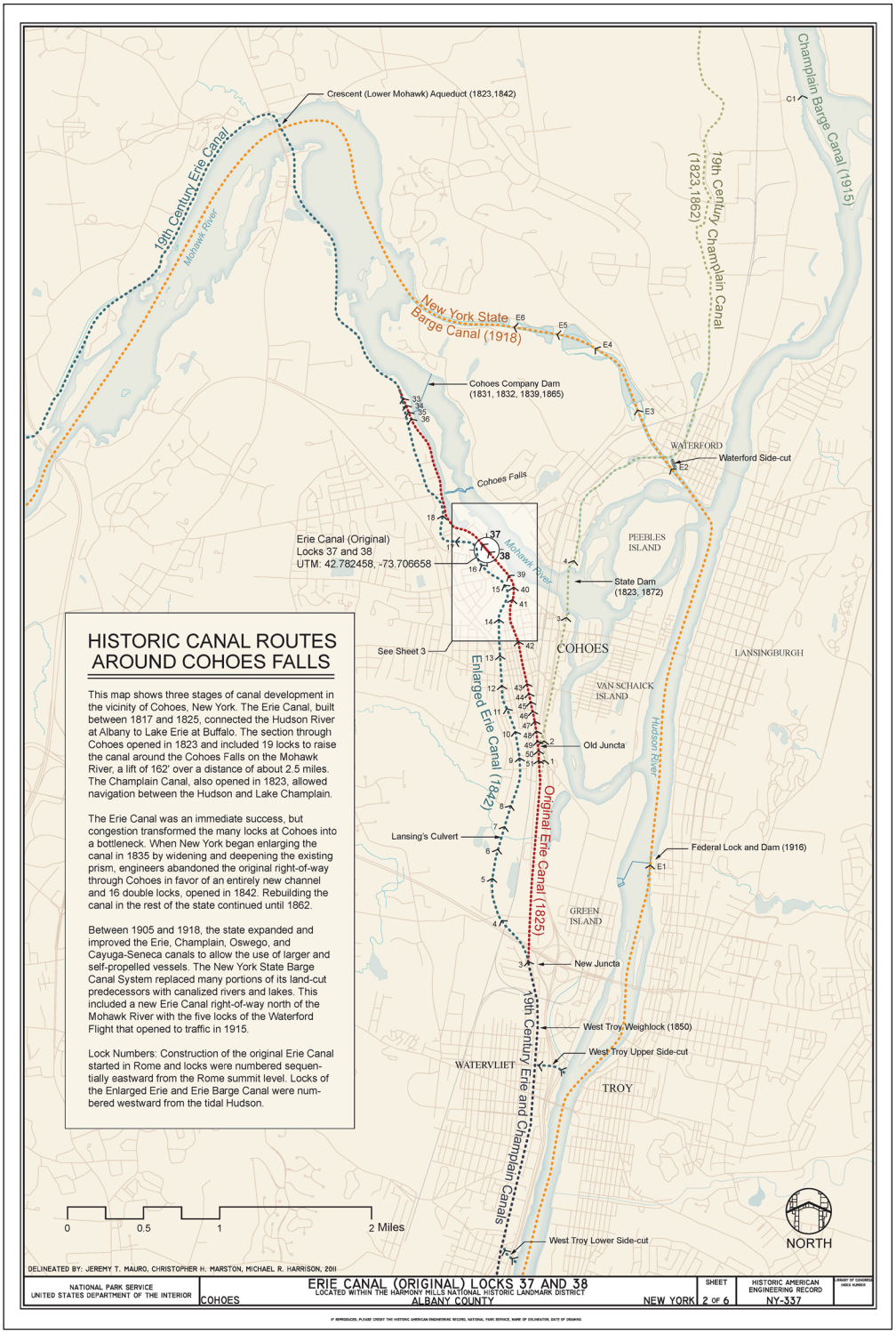
The Canalway facilitated transport of grains, European manufactured goods from the ports and lumber between the big lakes and the East Coast. Major New York State cities – from the Great Lakes to the Hudson River – are located along the trade route established by the Erie Canalway (e.g., Buffalo; Rochester; Syracuse; Utica; Albany; New York City). Builders oriented canal towns toward the Canalway; architecture including school buildings, churches, opera houses, main street and industrial buildings reflected prosperity from 1825 until the end of the nineteenth century, as seen in fig. 3 (Hay 2014; Tobin 2017).

A route for westbound and predominantly European immigrants and cargo, the Canalway opened the country west of the Appalachian Mountains and offered a cheap and safe way to carry produce to market. During the Civil War, the Canalway transported food, supplies and social ideas between the Northeast and the Midwest, facilitating the Federal war effort. Pivotal social movements such as abolition, women's rights and religious revivalism took place along the Canalway. Historic published travel accounts bear witness to how the Canalway captured the public imagination and inspired popular music, prints, children's books and postcards (Hay 2014).

As railroads became the dominant mode of transport and shipping, the Canalway traffic declined (Library of Congress, n.d.). The system deteriorated when the New York State Thruway bypassed canal communities, diminishing its commercial influence (Preservation League of NYS 2022). Contemporary challenges include enhancing regional economic development and preserving cultural value regionally, nationally and globally. Repurposing the historic corridor to meet contemporary transportation, recreational and cultural heritage needs is a premier example of combining historic water management with contemporary ecological and cultural water practices, sustainable development and public education.

Current Approaches to Preserving and Managing Water Heritage

In December 2000, the US Congress passed the Erie Canalway National Heritage Corridor (ECNHC) Act. The Act designated the Canalway's natural resources, the New York State Canal System and the communities along the Canalway a National Heritage Area. The legislation acknowledges the value the Canalway played in local, regional and national growth and its value as a historic, cultural, recreational, educational and natural resource. The Act designated the ECNHC Commission as the primary management entity for the implementation of the Erie Canalway Preservation and Management Plan (ECPMP), which included stakeholder inputs, key strategies and guidance for implementation (New York State 2010; Erie Canalway National Heritage Corridor 2006). Water managers continue their involvement through active maintenance to provide consistent draft for water transportation vessels (New York State Canal Corporation, n.d.). Water management has further expanded to include environmental stewardship with regard to stormwater pollution and



^ Fig. 2 Erie Canal (Original), Locks 37 and 38, 84 North Mohawk Street, Cohoes, Albany County, NY, Historic American Engineering Record (Source: Courtesy Library of Congress, no known restrictions on publication, documentation compiled after 1968).

^ Fig. 3 Erie Canal at Salina Street, Syracuse, Detroit Publishing Company, c. 1900 (Source: Courtesy of the Library of Congress, no known restrictions on publication)

invasive species (New York State Canal Corporation, n.d.). The Plan's key goals include:

- expressing and consistently protecting the Corridor's historic and distinctive sense of place; applying the highest standards of environmental quality to the Corridor's natural resources;
- achieving maximum scope and diversity for the Corridor's recreation opportunities, in harmony with the protection of heritage resources;
- encouraging current and future generations to value and support preservation of the Corridor's heritage;
- advancing balanced and self-sustaining economic growth and heritage development along the Corridor and;
- promoting the Corridor as a "must do" travel experience for regional, national and international visitors.

Formerly linking markets, the Canalway now connects natural, cultural, recreational and historic resources. Heritage and recreational tourism have flourished, attracting enthusiasts of history, culture, fishing, swimming, boating, bicycling and hiking (fig.1).

The Erie Canal Museum, National Heritage Corridor and Canal Corporation educate the public about the Canalway's history and significance. The Erie Canal Museum features permanent exhibits, temporary themed exhibits, educational programs, and virtual and in-person field trips (Erie Canal Museum 2023).

The ECPMP emphasizes the natural, historic, cultural and recreational resources of the canal system and its impact on the economy and quality of life because of public and private investments. Direct investments in the ECNHC include funds from the National Park

Service (NPS), NPS Heritage Partnership Program (HPP) and other non-NPS federal agencies (e.g., Department of Transportation; Department of Housing and Urban Development). Funding during 2002–2017 included non-federal Match Funds (61 per cent), NPS/HPP (25 per cent), other NPS funds (12 per cent) and Non-NPS federal funds (1.5 per cent) (Erie Canalway National Heritage Corridor 2023).

Current and Future Challenges to this Water System

The stewardship of a canalway requires collaboration between elected officials and government agencies, private enterprise and nonprofit entities. The Canalway's existence is a testament to the success of its management; however, with rapidly changing climate patterns, globalization and development pressures, the Canalway faces unprecedented challenges. Beyond politics and funding, significant challenges to sustainable stewardship include invasive species (vegetative and aquatic), water pollution, environmental degradation of adjacent lands and supporting regional economies.

Environmental and ecological impacts from the physical (hard-edge) barrier the Canalway creates are becoming apparent. From its inception, the Canalway's construction divided three critical wetland ecosystems, separated them from their native water sources, disrupted natural hydrology and reduced essential nutrients, thereby reducing their effectiveness within the framework of resilient storm water management (Navarro 2020). These ecological challenges and the Canalway's linear nature have facilitated the migration of invasive species (e.g., Round Goby fish; Water Chestnut plant) economically impacting the area with expensive prevention, treatment and removal requirements and decreasing property values (Navarro 2020).

The Canalway threads through large cities and small villages where nonpoint source stormwater pollution accumulates and transports to sensitive areas, the result of the expansion of impervious surfaces draining to the Canalway through connected waterways. While the need to reconnect specific waterbodies exists, others require isolation to minimize pollution.

Growing demand for improved access and increased outdoor recreation for kayakers, boaters and cyclists utilizing the Canalway as a "regional linear park" requires attention. The challenge is to re-integrate the Canalway into towns after its separation from construction of busy roadways. Improving access can help foster a growing economy centered around recreational tourism along the Canalway.

The greatest obstacles to addressing these challenges are effective stakeholder management and cooperation. Most of the solutions require periodically restricting access to (or through) parts of the Canalway. Adjacent landowners, the recreation sector and other canal-dependent economies may experience direct, negative impacts (Preservation League of New York State 2022).

Conclusion and Future Approaches

For nearly two centuries, the Canalway has faced and adapted to substantial challenges: transformations in cargo shipping and travel, governmental policy shifts, hydrology-related engineering problems, extreme weather events and changing societal attitudes toward the natural world, many of which continue to shape the present management of the Canalway and

affect local and regional interpretations of previous uses. Challenges offer opportunities for embracing tensions embedded in supporting active uses of historic waterways to meet contemporary demands while acknowledging and engaging with multiple cultural narratives around water and heritage corridors.

Lessons from interpretative and adaptive use of historic canalways can be applied to other waterways, including aqueducts and river reaches. They may also be applied to other heritage corridors inscribed on the landscape, including historic roads, railways and international borders.

Unique qualities of historic waterways, with their complex intertwined values regarding nature and culture, provide a shared creative space to encourage collaboration across academic disciplines, stakeholder groups and political affiliations. This approach will prove critically important in the future. The evolution of uses across generations combined with public involvement will be instructive in addressing new challenges for the Erie Canalway to maintain the functionality and ongoing contemporary relevance of this heritage corridor. With globalization, swings in international transportation, increasing redevelopment pressures, ecological effects from aggressive nonnative species, regional environmental stresses and climate change, the collective "lived experiences" embodied by the Canalway represent a legacy of resilience to guide adaptive management of the Canalway and serve as insightful models for historically informed stakeholder engagement for other heritage transects.

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