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# Environmental Injustice in the Onondaga Lake Waterscape, New York State, USA

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**ABSTRACT:** This paper examines two interrelated cases of environmental injustice and social mobilisation in the Onondaga lake watershed in Central New York State, USA: (1) the case of the Onondaga Nation, an indigenous people whose rights to, and uses of, water and other resources have been severely reduced through historical processes of Euro-American settlement and industrial development; and (2) the case of the city of Syracuse, New York's Southside neighbourhood, a low-income community of colour, where a sewage treatment facility was constructed as part of a broader effort to remediate the effects of pollution in Onondaga lake. The Onondaga Nation and the Southside neighbourhood are connected by Onondaga creek, which flows through each before joining Onondaga lake. These communities are also linked by shared histories of marginalisation and environmental injustice. Taken together, the cases demonstrate the temporal and spatial continuities of social relations of power, and their embodiment in water resources. Conceptually, the paper brings together the literatures of environmental justice and the political ecology of water resources. In doing so, we employ the concept of waterscape as an analytical lens to examine processes of marginalisation and social exclusion in the Onondaga lake watershed. The waterscape concept, and the political ecology of water resources literature more generally, have much to contribute to the study of water-related environmental (in)justice.

**KEYWORDS:** Environmental justice, waterscape, water pollution, Onondaga lake, New York State

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## INTRODUCTION

Onondaga creek flows northward from its headwaters in the hills south of Syracuse, New York, through mixed hardwood forest, rich agricultural bottomlands, and urban neighbourhoods, before reaching the lake that shares its name. Along its journey, the creek connects many communities: farmers, Native Americans, suburbanites, and inner city neighbourhoods. The normally placid character of the creek belies its recent turbulent history of environmental transformation and social conflict. Indeed, these processes are integrally and causally linked: environments have been transformed and wealth produced at the expense of certain groups, in most cases lower-income communities of colour. This paper examines two separate but interrelated cases of environmental injustice and social mobilisation in the Onondaga lake watershed: (1) that of the Onondaga Nation, an indigenous nation that retains part of its ancestral territory south of the city of Syracuse, New York, and whose rights to, and uses of, the Onondaga lake watershed (particularly Onondaga creek, a major tributary) have been severely reduced through historical processes of Euro-American settlement and industrial development; and (2) that of Syracuse's Southside neighbourhood, a lower-income, predominantly African American community,

which was chosen as a site for a satellite sewage treatment facility as part of a broader effort to remediate the effects of pollution in Onondaga lake.

Historically, Onondaga lake and its watershed formed part of the territory of the Onondaga Nation, one of the six nations of the Haudenosaunee (sometimes referred to as the Iroquois Confederacy). The area that is now the city of Syracuse, at the southern end of Onondaga lake, was intensively settled in the early 1800s by Euro-Americans who quickly set about transforming the landscape by clearing forests, diverting waterways, and platting townships and farmlands. Processes of environmental change accelerated during the late 19th and early 20th centuries, with the establishment of chemical factories on the western side of the lake, which regularly released heavy metals and other highly toxic and environmentally persistent pollutants. The combination of industrial pollutants and decomposing sewage (released from Syracuse's inadequate waste treatment system) de-oxygenated the lake ecosystem. Reduction and contamination of fish stocks, mammals, birds, riparian vegetation, and other organisms, combined with massive territorial loss as a consequence of Euro-American encroachment, have severely impacted the traditional fishing, hunting, gathering, and other resource use practices of the Onondaga people. In 2005, the Onondaga Nation filed suit in United States federal court to restore recognition of title to its aboriginal territory. Long-term goals of the lawsuit, which is currently working its way through the courts, include a programme for environmental restoration and protection.

In the 1990s, high levels of industrial and municipal pollution led scientists to declare the lake 'dead', earning it a reputation as the most polluted lake in the United States. In 1994, the US Environmental Protection Agency (EPA) declared the entire lake bottom and surrounding contaminated areas to be a Superfund site, initiating a hazardous waste remediation process. In 1998, a federal judge ordered Onondaga County to begin a nearly US\$400 million municipal waste remediation project intended to improve water quality in the lake and its tributaries. As part of this effort, the county government planned a series of satellite sewage plants or 'regional treatment facilities' (RTFs) that would capture and partially treat sewage emitted by the city's many combined sewer overflow outlets. One of these was planned for Syracuse's Southside neighbourhood. In 2000, community residents formed the Partnership for Onondaga Creek (POC) in order to oppose the construction of the Southside regional treatment facility (RTF) and to propose alternative ways of cleaning up the creek, an effort that has met with mixed results.

While the cases presented here could be (and indeed, have been) examined individually, we argue that the struggles of the Onondaga Nation and the Partnership for Onondaga Creek may productively be considered as two historically and geographically specific moments within broader processes of environmental transformation and social exclusion. While exploring the particular details of the two cases, we highlight the historical, social, and environmental continuities between them. Viewing these cases within a single waterscape – that is, place-based flows of water, capital, and power – highlights the ways in which water and social relations shape one another historically and geographically. The paper proceeds as follows. The next section critically reviews certain themes prominent in the environmental justice and political ecologies of water resources literatures, and argues for an integrative approach that explicitly considers questions of justice in relation to water pollution. This is followed by a historical and geographical discussion of the Onondaga lake watershed, which in turn is followed by the presentation of our two empirical cases. The paper ends by considering the social (re)production of injustice in relation to water pollution.

## **JUSTICE, WATER AND POWER**

### **Conceptualising environmental justice**

The literature on environmental justice is by now both deep and wide. Having emerged in the 1980s at the edges of the civil rights and environmental movements, environmental justice has grown as a field of both social activism and activist scholarship (Bullard, 2000). If not quite mainstream, environmental

justice has at least entered the lexicon of some major international environmental organisations (Greenpeace and Sierra Club are notable examples), and college courses on the topic are offered throughout North America, Europe, and elsewhere. With this growth in acceptance has come an increase in conceptual and theoretical sophistication. A single, universally accepted definition and set of metrics with which to evaluate environmental (in)justice are neither likely nor necessarily desirable. Instead, analysis typically relies on varied and highly contextualised empirical criteria and theoretical frameworks. As Holifield (2001, emphasis in original) notes,

Instead of assuming that claims about environmental justice refer to a universal, monolithic agenda, we should ask what the term means in different contexts. Environmental justice might have one meaning for a community fighting for cleanup of a Superfund site and another meaning for one struggling to have a wastewater treatment plant built.

Holifield's call for contextualised analysis is particularly apposite in light of the cases discussed here, which involve not only the cleanup of a Superfund site and the (contested) construction of a wastewater treatment plant, but also profound and widespread environmental degradation and social marginalisation that have affected different social groups in distinct ways over a period of two centuries. How then, do we understand environmental justice in this context? What conceptual tools are at hand to make sense of these diverse and seemingly disparate problems?

As has been widely discussed, environmental justice, as a framework for both research and activism, grew out of advocacy work by the United Church of Christ and the pioneering scholarship of sociologist Robert Bullard (see, for instance, United Church of Christ Commission for Racial Justice, 1987; Bullard, 2000), which focused on the disproportionate exposure to environmental harms and relative lack of access to environmental amenities faced by communities of colour in the American south. Valuable as this work is – both for its pioneering character and because such analysis remains vitally important in most environmental justice activism and scholarship today (as evidenced by the cases presented here) – it has been widely critiqued for its overly narrow focus on distributive justice and reliance on statistical analysis, to the relative neglect of historical, spatial, and institutional processes (e.g. Pulido, 2000; Cole and Foster, 2001; Holifield, 2001; Holifield et al., 2009).

Such critiques prompted environmental justice scholars and activists to broaden their analytical frameworks in a variety of ways. Cole and Foster (2001) and Holifield (2004), for instance, call attention to procedural and institutional justice, highlighting what may broadly be considered questions of governance: the multi-scalar legal and institutional frameworks that shape rights to access, processes of participation, and modes of social action and state practice. While not rejecting the distributive paradigm, these authors move beyond it to consider the ways that the social and spatial distribution of environmental injustices are (re)produced through institutionalised processes and historically constituted social relations. As Cole and Foster (2001) demonstrate, environmental injustice can as easily result from so-called 'race-blind' policies as from deliberately racist decision-making by state or corporate actors. In this sense, racial or class-based bias in environmental decision-making may not be intentional, but in most cases it is far from random. Rather, injustice, environmental and otherwise, is often a predictable outcome of existing legal and institutional frameworks through which environments and populations are governed. This insight highlights the need for more historically rich and theoretically nuanced analyses than are possible with a focus on distributional justice alone.

A paradigmatic example of such an approach is Laura Pulido's analysis of white privilege and industrialisation in Los Angeles (Pulido, 2000). While retaining her focus on communities of colour and their exposure to pollution, Pulido inverts the original environmental justice framework. Rather than inquire as to why African Americans and Latinos are disproportionately exposed to pollution, she asks why it is that white people are disproportionately able to avoid both pollution and people of colour. This line of inquiry necessarily involves examination of historically sedimented patterns of racial segregation, and the institutional structures that gave rise to such patterns and reproduce them today. Pulido's work, with its emphasis on urban segregation, spatial scale, racially differential patterns of

social and spatial mobility, and political economic structures that shaped these processes since the early 20th century, has served as something of a template for much environmental justice work of the past decade. Similar approaches have been taken by Sze (2007) in her analysis of the relationships between race and health in New York City, Heynen's work on the scalar production of environmental injustice in Indianapolis' urban forest (Heynen, 2003), and in a variety of works examining the racialised effects of Hurricane Katrina on New Orleans (see, for instance, Pastor et al., 2006; Rydin, 2006; Bullard and Wright, 2009).

In recent years, researchers have extended the analytical and epistemological frontiers of environmental justice scholarship in a myriad of ways (Holifield et al., 2009), and in so doing have reconceptualised the spaces and places (Holifield, 2009; Walker, 2009) and scales (Heynen, 2003; Swyngedouw and Heynen, 2003) of environmental (in)justice and social mobilisation. Meanwhile, others have extended formerly US-based environmental justice analysis into international and global spheres, highlighting, for instance, international trade and the global politics of environmental inequality (Newell, 2005), the contradictory layers of injustice in artisanal gold mining in Ghana (Tschakert, 2009), the politics of solid waste management in Mexico (Moore, 2008), and conflicts over agricultural development in Brazil (Wolford, 2008). Indeed, recent volumes have explicitly sought to extend the environmental justice framework internationally (Carruthers, 2008; Schroeder et al., 2008). There is little doubt, then, that environmental justice scholarship has flourished in the two decades since the concept first made its appearance. Still largely absent from this literature, however, is consideration of the diverse forms of environmental injustice that affect indigenous peoples in the USA and Canada (but see La Duke, 1999; Martin, 1999). This is particularly true with regard to urban and semi-urban environmental justice issues, which are more commonly represented as the concern of other ethnic groups. As Silvern (1999) acknowledges, "[t]he common aspirations of native peoples located in... liberal democracies include the recognition of treaty rights, affirmation of 'inherent' powers of self-government and sovereignty, and the right to participate in national and sub-national government decision-making processes. These struggles are fundamentally about the control of territory and the restructuring of the geographical scale of aboriginal-state relations". As we discuss below in the case of the Onondaga Nation, the aspirations of native peoples also frequently center on rights to exercise traditional livelihood, cultural, and spiritual practices, which in turn involve questions of environmental quality and resource access.

### **Waterscapes of injustice**

Questions such as these have similarly been taken up by political ecologists working on water resources, albeit from a somewhat different theoretical perspective. Scholars in this tradition have addressed a variety of themes, including inequity in the provision of urban water supply (see, for example, Loftus, 2006; Loftus and Lumsden, 2008), and in the allocation of rights to water for irrigation (Boelens, 2009); gendered geographies of water access (Harris, 2006; O'Reilly, forthcoming); and socially differentiated vulnerabilities to water hazards (Halvorson, 2004; Mustafa, 2004; Sultana, 2010). With few exceptions, this work is concerned with inequalities in, and struggles over, access to drinking water or irrigation. In a broad sense, then, water in these studies is examined as a socially necessary environmental 'good', access to which is highly uneven and often in dispute. By contrast, the social consequences of pollution – a cornerstone of work in environmental justice – have received considerably less attention in the political ecology literature (but see Halvorson, 2003; Sultana, 2010). This is surprising, given political ecologists' concern for the political economies of environmental change. As we hope to demonstrate below, water pollution represents a particular spatio-temporal moment in processes of production, which results in accumulation for some groups but diminished quality of life for others. In short, one group's wealth is another's pollution. In this sense, we suggest that water pollution may usefully be viewed as an embodiment of structurally unequal and highly unjust social relations, which are both internal to, and inherent in, capitalist relations of production.

In our focus on environmental transformation and social (in)justice in the Onondaga lake watershed we employ the concept of 'waterscape', which, following Budds and Hinojosa (2012) we take to mean "the ways in which flows of water, power and capital converge to produce uneven socio-ecological arrangements over space and time, the particular characteristics of which reflect the power relations that shaped their production". The concept of waterscape has come into use over the past decade, largely among geographers, anthropologists and others working in the field of political ecology, to recognise water as a form of hybrid socio-nature, at once natural and socially produced, and which both embodies and reproduces forms of social power (Swyngedouw, 1999, 2004; Bakker, 2003; Harris, 2006; Loftus, 2006, 2007). In this view, such attributes as water rights, access, use, flow and quality are expressions of uneven power relations. In turn, these characteristics serve to shape, reinforce, and reproduce those same power geometries. Thus, we may say that water and social power are co-produced in dialectical fashion (Budds and Hinojosa, 2012). As Swyngedouw (2004) avers, we must be attentive to the social relations of power

through which socio-environmental processes take place. It is these power geometries and the social actors who carry them out that ultimately decide who will have access to or control over, and who will be excluded from access to or control over, resources or other components of the environment. These power geometries, in turn, shape the particular social and political configurations and the environments in which we live.

The notion of waterscape, or water landscape (Swyngedouw, 1999), thus permits analysis of the relationship between water and society, broadly conceived, within a particular socio-spatial context. Importantly, a waterscape does not exist at a fixed, pre-given spatial scale – an analytical frame that both underpins and undermines watershed analyses (Molle, 2009; Cohen and Davidson, 2011). The waterscape concept is not antithetical to watersheds, and in fact watersheds – both as hydrological entities and as administrative units for policy and management – may be central to the understanding of any given waterscape. But as Budds and Hinojosa (2012) assert, a waterscape is a "socio-spatial configuration" constituted by the interrelationships between social and geo-ecological processes that incorporate but in most cases extend beyond any given watershed. As such, waterscapes may entail distant social or natural processes, social relations, institutions or artefacts not physically proximate to the watershed in question. Examples might include investment capital for the construction of dams and canals, legislation granting or prohibiting rights to access, social arrangements such as regional water management boards or irrigators' associations, or built infrastructure such as wells, canals, water meters, dams, or sewage treatment facilities. This networked view of hydro-social relations highlights the place-based material effects of processes, relations and phenomena that may be spatially and/or temporally distant (Swyngedouw, 2004; Loftus, 2006; Budds and Hinojosa, 2012). Crucially, a waterscape perspective highlights the power relations that flow through, are reflected in, and reproduced by these complex assemblages.

Such a perspective is particularly useful in examining the cases of the Onondaga Nation and Syracuse's Southside neighbourhood. At first glance, these cases appear to have little in common. They differ in location (one is rural, the other inner-city), demographics (Native American and African American), and historical time frame (the Onondaga Nation case dates to the early days of Euro-American settlement in the 18th century, whereas the Southside case dates to the second half of the 20th century). Connections between the cases become apparent, however, when viewed through a broader temporal and spatial lens. In the most basic sense, both the Onondaga Nation and the Southside neighbourhood are located within the Onondaga lake watershed along Onondaga creek. Seasonally variable stream flow, sedimentation events and agricultural run-off affect both communities, as do the historical transformations of the creek's ecosystem. The Onondaga Nation and the Southside community are also linked through the manifold hydro-social relations that have made water integral to processes of both accumulation and social exclusion (cf. Swyngedouw, 2004; Loftus, 2007).

Viewing the Onondaga Nation and Syracuse's Southside neighbourhood as located, both physically and socially, within the same waterscape permits us to view their struggles through a single analytical lens, as historically and geographically distinct moments within broader processes of colonial domination, racial discrimination, industrial development, environmental transformation, and social struggle. Water – both as 'natural', material entity and as embodied social relations – has figured centrally in the marginalisation of both communities, and is similarly at the heart of their efforts to mobilise socially and politically for environmental justice. Such a perspective allows us to ask, *how are relations of power, social exclusion, environmental transformation, and environmental injustice connected historically and geographically through the flow of water in the Onondaga lake waterscape?* This question is taken up below, through close examination of the cases of the Onondaga Nation and Syracuse's Southside neighbourhood.

### GEOGRAPHICAL AND HISTORICAL CONTEXT<sup>1</sup>

Onondaga lake is situated immediately north of the City of Syracuse in Onondaga County in central New York State (see figures 1 and 2). The lake and its watershed lie at the centre of the aboriginal territories of the Haudenosaunee, a name that is translated as 'People of the Longhouse' and refers to the citizens of an ancient confederacy of Native American nations<sup>2</sup> (Venables, 1995). Onondaga creek is fed by over 65 smaller tributaries, draining a total area of 288 km<sup>2</sup> (OEI, 2008a), and receives variable quantities of sewer discharge from the city of Syracuse, as discussed below (OEI, 2009). Water exits Onondaga lake by a single outlet at its northern end, emptying into the Seneca river and ultimately flowing north, by way of the Oswego river, into lake Ontario. Onondaga lake's hydrological connections with the Finger Lakes region of Central New York, and with lake Ontario and the St. Lawrence river (and thus the Atlantic Ocean), have shaped its history in important ways. Prior to the mid-18th century, Atlantic salmon (*Salmo salar*) and American eel (*Anguilla rostrata*) migrated in great numbers through these water bodies to reach Onondaga lake and Onondaga creek (Beauchamp, 1908; Tango and Ringler, 1996). Interconnection of the region's waterways also rendered Onondaga lake a vital link for communication and trade between the Onondagas and the other Haudenosaunee nations (Chaumont and Dablon, [1655] 1899). Euro-American settlers later utilised and altered these natural transportation corridors to further land speculation, defence, and transportation interests, thereby greatly accelerating commercial trade as well as the acquisition and colonisation of Haudenosaunee lands (Hauptman, 1999).

According to Euro-American historical sources and the modern oral history of the Onondagas, the Onondaga lake watershed supported a remarkable abundance and diversity of flora and fauna prior to the 19th century. Salt springs and associated salt marshes dotted much of the lake's shoreline. Forested wetlands abutted large stretches of the lakeshore and enveloped the lower reaches of many tributaries (A map of part of Onondaga lake, 1800). The lake's "swampy and marshy" shores (Macauley, 1829) undoubtedly helped maintain water quality and served as a buffer against erosion and flood damage, while supporting a large diversity of aquatic and terrestrial life.

Historically, Onondaga creek cut a sinuous channel through the low, flat land where the city of Syracuse stands today. Its lower reaches were bordered by wetlands that probably received the creek's overflow during its frequent floods (A map of part of Onondaga lake, 1800; OEI 2008a). In the southern

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<sup>1</sup> Case studies and other empirical material presented here are based on detailed review of historical archives, court documents, scientific reports, and press reports, and are rooted in several years of collaborative advocacy work by authors S. Wraight and M. Perreault with the Onondaga Nation and the Partnership for Onondaga Creek (POC). This paper was written in coordination and consultation with, and was reviewed and approved by, representatives of the Onondaga Nation and POC.

<sup>2</sup> The Haudenosaunee, commonly referred to in English as the Six Nations Iroquois Confederacy, was founded in ancient times by five indigenous nations: the Mohawk, Oneida, Onondaga, Cayuga, and Seneca. The Tuscarora Nation joined the Haudenosaunee in 1722 (Venables, 1995).

part of its watershed, Onondaga creek passed through an extensively forested, hilly landscape (De Quen, [1657] 1899; OEI, 2008b).

Figure 1. The Onondaga lake watershed.

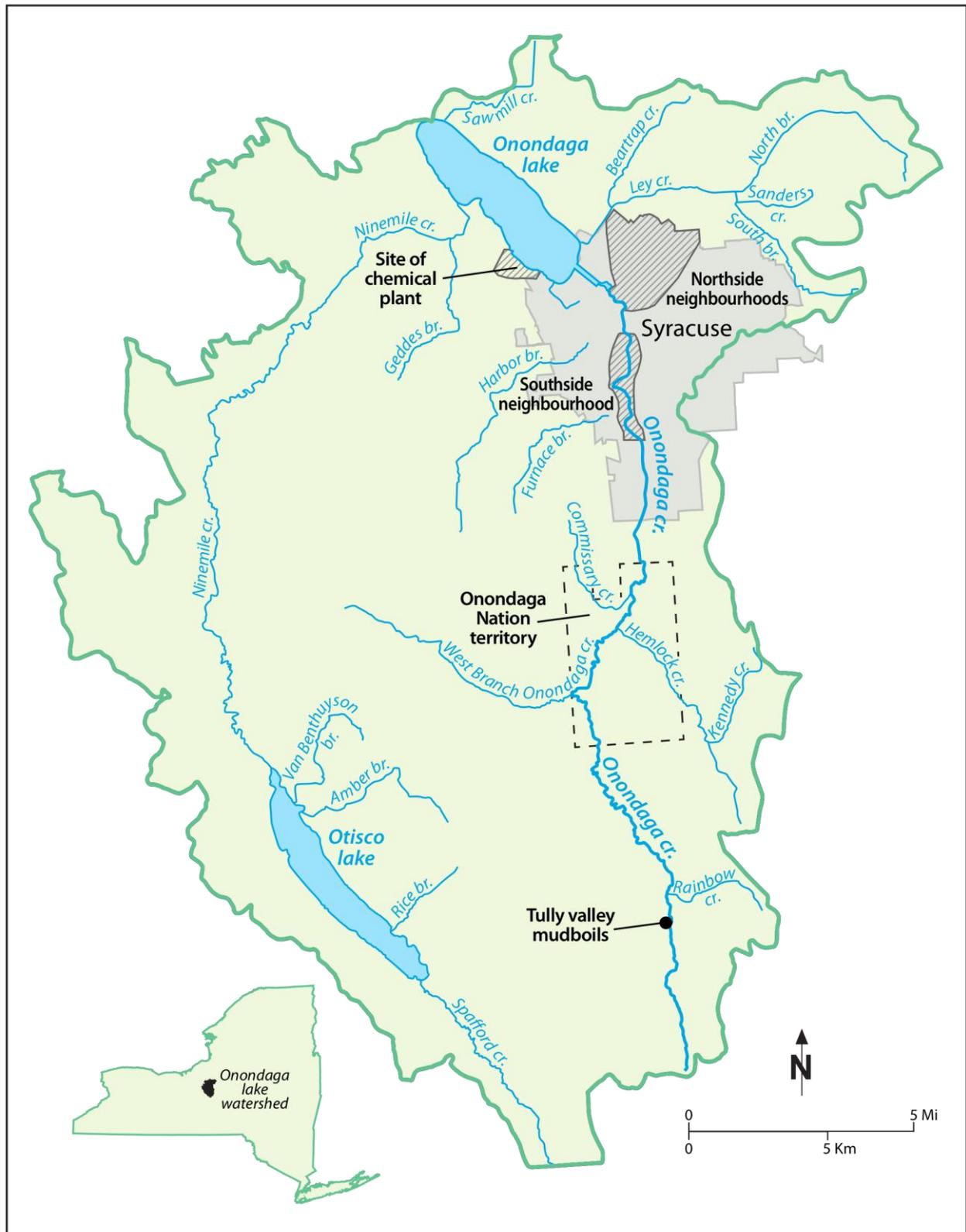


Figure 2. New York State and the Onondaga lake waterscape.



The diverse riparian, wetland and upland environments also supported many generations of Onondagas. They made clearings throughout the lake's watershed, including along the shores of the lake itself and along Onondaga creek, for the construction of settlements and cultivation of crops like corn, sunflowers, beans, and squash (Greenhalgh, [1677] 1849; Onondaga Nation, 2005). For many centuries, the region's abundant and diverse cold-water fishery was a vital food source for the Onondaga people (Onondaga Nation, 2005).<sup>3</sup>

Beginning in the 1790s, intensive Euro-American settlement resulted in dramatic environmental transformations. In the late 18th century, Onondaga lake's many brine springs began to be exploited for the commercial production of salt, a valuable resource that proved a major driver of regional population growth throughout the 19th century (Rowell, 1996; Effler and Matthews, 2003). Salt production, agriculture, and other development spurred widespread deforestation within the watershed, which would continue through the early 1930s, when forest cover in Onondaga County reached a nadir of 8% (Nyland et al., 1986). Heavy erosion negatively impacted water quality and damaged lakeside wetlands (Clark, 1849).

<sup>3</sup> Historical records of large catches of whitefish (*Coregonus sp.*) indicate that the lake had sufficiently high dissolved oxygen and low temperatures to support a cold-water species assemblage (Auer et al., 1996). Jesuit missionaries of the 17th century remarked that Atlantic salmon and American eel were the most common fish in the area (De Quen, [1657] 1899).

Euro-American settlers also effected a series of dramatic physical changes to Onondaga lake and its tributaries. Mills and dams impacted regional fish migration patterns and the quality of tributary habitat (Sly, 1991). Wetlands were drained, filled, and developed, particularly around the southern end of the lake where salt works were located (Ferrante, 2005). In 1828, two major branches of the Erie Canal were joined near the shores of Onondaga lake, providing salt producers with access to supply routes and distant northern and western markets. The industry subsequently came to dominate the national salt market during the American Civil War (Effler and Harnett, 1996; Rowell, 1996). Economic prosperity and geographic proximity to major transportation corridors fostered Syracuse's rapid expansion during the mid-1800s. As development encroached upon the lower reaches of Onondaga lake's tributaries, residents increasingly used them for sewage disposal (Effler and Harnett, 1996). In order to speed the removal of waste to Onondaga lake and lower the risk of property damage from flooding, the mouth of Onondaga creek was moved southward and the lower portion of the creek, stretching from the lake to the Onondaga Nation's northern border, was gradually channelised between 1855 and 1963 (OEI, 2009).

Water quality in the Onondaga lake watershed has been degraded by a host of pollutants. A long history of dumping municipal and industrial wastes in and around Onondaga lake has had devastating impacts. When Syracuse began developing a sewage treatment system in the 1920s, the city allowed for continued discharge of untreated sewage into Onondaga creek via overflow points in combined sewers that carried both sanitary and sewage (Effler and Harnett, 1996; OEI, 2009). These combined sewer overflows (CSOs) and the effluent from inadequate sewage treatment contributed high loads of nitrogen and phosphorus to the lake throughout the 20th century (Effler et al., 1996).

Industrial activity accelerated in Syracuse following the American Civil War. The Solvay Process Company, a manufacturer of soda ash ( $\text{Na}_2\text{CO}_3$ ), a basic ingredient in many industrial processes, began operations on the western shore of the lake in 1884. For over 100 years, the company and its successors extracted local salt and used the lake as a source of cooling water and as a sink for industrial wastes (Effler and Matthews, 2003). By the late 19th century, over-extraction from salt springs near the lake had diluted the brine. Consequently, the Solvay Process Company began mining halite deposits in the bedrock of the southern part of Onondaga creek's watershed. These mining operations, which resulted in the removal of over 96 million tons of salt and caused fracturing and subsidence of the bedrock, continued until 1986 (Kappel, 2000). The chemical process of manufacturing soda ash also produced vast quantities of salty wastes. The facility deposited waste materials in the lake and surrounding wetlands, ultimately covering over 8 km<sup>2</sup> of land. The soda ash facility later diversified its production, manufacturing more than 30 chemical products before its closure in 1986 (Effler and Matthews, 2003). Over the course of the 20th century, an array of highly toxic pollutants, including mercury and chlorinated benzenes, were deposited in and around the lake by the soda ash facility and other local industries.

The combination of municipal and industrial waste disposal impacted Onondaga lake's water quality in a variety of ways. Dissolved oxygen levels plummeted and water clarity decreased as the lake reached a state of hyper-eutrophy that persisted from the end of World War II through the turn of the century (Tango and Ringler, 1996). Other impacts included heavy precipitation of calcite ( $\text{CaCO}_3$ ), which altered the lake bottom sediments, and a sharp rise in salinity (Effler and Matthews, 2003). Radical transformation of the creek and lake environments led to a decline in rooted aquatic plants and invertebrates and the replacement of cold-water fish species with a warm-water fish community (Auer et al., 1996). Toxic contaminants such as mercury and polychlorinated biphenyls (PCBs) accumulated in fish tissue, forcing strict limits on human consumption of fish from the lake (CNY RPDB, 2010).

Since the 1970s, Onondaga lake's water quality has improved as a result of government efforts to mitigate municipal and industrial wastes, as well as the closure of highly polluting industrial facilities (Effler and Harnett, 1996). In 1994, the entire lake bottom and a number of other polluted areas in the watershed were listed on the Superfund National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act, allowing the New York State and U.S. federal governments to compel responsible parties to complete part or all of the necessary hazardous waste

remediation projects. Onondaga County, which manages wastewater from the City of Syracuse and surrounding communities, is bound by a 1998 court order known as the Amended Consent Judgment (ACJ) to upgrade its wastewater collection and treatment systems so that effluent from CSOs and the Metropolitan Syracuse Wastewater Treatment Plant ('Metro') complies with water quality regulations (CNY RPDB, 2010).

We argue that Onondaga lake and creek may be seen as part of a broader waterscape, which entails spatially extensive socio-environmental relations. The quality of, and access to, the waters of the creek and lake have been shaped over time by a myriad of actions, notable among them military incursions, Euro-American settlement, salt extraction, industrialisation, and urbanisation occurring over the span of two centuries. Throughout these processes, water was of fundamental importance as a means of transportation and regional integration during the period of Euro-American settlement; as a factor of production for early mills, salt production, and industrial development; and as a crucial sink for the wastes of industrialisation and urban growth. In this sense, then, Onondaga lake and creek represent a historically important node in a broader project of state consolidation, national and regional integration, and capitalist development, the underlying forces of which extend far beyond the immediate watershed. In the following section, we turn to our two cases of communities affected by environmental degradation and remediation efforts: the Onondaga Nation and Syracuse's Southside neighbourhood.

## **HISTORIES OF INJUSTICE IN THE ONONDAGA LAKE WATERSCAPE**

### **Onondaga Nation**

The impacts of local environmental degradation on the Onondaga Nation must be understood within the context of their spiritual, cultural, and historical relationship to the land and water. Historically, fish constituted approximately one-third of the Onondagas' diet. They gathered plants from lake and tributary shorelines for food as well as for medicinal and ceremonial purposes. Onondaga lake and Onondaga creek were also used for recreational boating, swimming, and long-distance transportation. The Onondagas' intimate relationship with the waters of their homeland is still reflected in the names of some of their matrilineal clans, such as the Turtle Clan, the Beaver Clan, the Heron Clan, and the Eel Clan (Fenton, 1998; Onondaga Nation, 2005). In interacting with their surroundings over the course of their long history, the Onondagas have striven to follow their spiritual instructions, which include the duties to respect the equal right of all parts of Creation to exist and carry out their unique responsibilities, to give thanks for the gifts of the natural world, and to preserve those gifts for the well-being of future generations (Lickers, 1999; Onondaga Nation, 2005).<sup>4</sup>

The Haudenosaunee confederacy was founded on the shores of Onondaga lake, which is considered a sacred and historically important site by the Onondagas and other Haudenosaunee nations. The formation of the Haudenosaunee confederacy was accomplished through the establishment of a spiritual, political, and cultural framework called Gayanashagowa, known in English as the Great Law of Peace, which continues to guide the people today. The Great Law of Peace outlines a system of landownership by which rights to land and resource use are held in common by all Haudenosaunee (Mohawk, 2005).

Euro-American colonisation resulted in the imposition of a system of private landownership and resource management throughout most of the Onondaga Nation's traditional homelands. After suffering the destruction of many of their villages during the American Revolution, the Onondaga Nation saw the transfer of all but 2469 ha of its aboriginal territory to New York State between 1788 and 1822 (Blau et al., 1978; Venables, 2004). The Onondaga Nation contends that the 'treaties' by which they lost their land are void because they were made with unauthorised representatives of the

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<sup>4</sup> [www.onondaganation.org/land/declaration.html](http://www.onondaganation.org/land/declaration.html) (last accessed 26 September 2011)

Onondaga Nation and violated both Haudenosaunee and United States law.<sup>5</sup> Of the multiple forces that drove Onondaga dispossession, two of the most significant were American land speculation and settlers' rush to secure access to Onondaga lake's profitable salt springs (Hauptman, 1999).

Although Onondagas continue to exercise their traditional resource use rights<sup>6</sup> throughout their historical lands, they have been hampered in doing so by New York State regulations on harvesting and restricted access to private property (Kirst, 1991). Over 200 years of regional environmental degradation has further eroded those rights. The extirpation, decline, or contamination of many animal and plant species in the Onondaga lake watershed contributed greatly to the dramatic alteration of subsistence practices among the Onondagas (Beauchamp, 1908; Shenandoah, 2006). The Onondagas have expressed particular concern over the decline of local fish and riparian plants for traditional uses (Onondaga Nation, 2005, 2011).

The creek has been physically altered in ways that have impeded the Onondaga Nation's traditional fishing, hunting and gathering practices (Gonyea, 1999). In 1949 the US Army Corps of Engineers built a flood control dam on the Onondagas' territory as part of a broader effort to protect the city of Syracuse from flood damage (OEI, 2009). Locating the 543 m long, 20 m high dam and associated flood control features on the Onondaga Nation resulted in a significant loss of land (USACE, 2011). Flood control for Syracuse came at the cost of increased risk of flooding over an area of approximately 348 ha upstream of the dam, much of this land lying within Onondaga Nation territory. The structure also impedes boat traffic and fish migration (OEI, 2008b; USACE, 2011).

A second major alteration to Onondaga creek has been the advent of heavy sedimentation as a result of mudboils in the Tully Valley, upstream from Onondaga Nation territory. The earliest historical record of mudboils in the Onondaga creek watershed is a local newspaper article published in 1899, about a decade after the Solvay Process Company began mining for brine along the upper reaches of the creek (Kappel, 2000, 2009).<sup>7</sup> Mudboil activity increased greatly in the late 1930s and has been continuous since the 1950s (OEI, 2008d). Decades of turbid conditions have impaired the creek's aquatic habitat and stressed its fish populations (OEI, 2008c,d). The Onondagas, whose elders recall how the creek's clear waters formerly brought residents together for fishing, plant harvests, social and ceremonial gatherings, and swimming, have seen dramatic changes in their community's interactions with the creek as a result of increased sedimentation (OEI, 2008d; Gonyea, 1999).

Onondaga leaders argue that infringement of their nation's traditional resource use rights and desecration of its aboriginal territory, especially places like Onondaga lake that are central to its culture, have harmed their people's cultural, economic, physical, emotional, and spiritual well-being (Gonyea, 1999).<sup>8</sup> The Onondaga Nation has repeatedly protested against Euro-American acquisition of its land and the land's subsequent degradation. It has also worked for environmental and archaeological

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<sup>5</sup> *Onondaga Nation v. State of New York et al.*, First Amended Complaint for Declaratory Judgment (2005):12-13.

<sup>6</sup> The Onondagas' traditional resource use practices are properly considered rights, and have been historically referred to as such. Onondaga leaders understand and discuss these practices as rights (Kirst, 1991; *Onondaga Nation v. State of New York et al.*, Declaration of Sidney Hill [2006]). According to Haudenosaunee historian John Mohawk, this interpretation is codified in the Great Law of Peace: "[The Peacemaker] said the territories were common to all and that each individual member of any of the nations had full rights of hunting and occupation of all the lands of all the nations of the People of the Longhouse" (Mohawk, 2005).

<sup>7</sup> The mudboils in Onondaga Creek's watershed – which can be over 9.1 m in diameter – are geological phenomena that discharge groundwater, dissolved mineral salts, and fine sediments as a result of artesian pressure in the aquifers underlying the valley floor. Mudboil activity is accompanied by subsidence of surrounding land due to the erosion taking place under the land's surface (Kappel, 2009). In an unpublished report, Kappel (2010) suggests that mudboils may have been intermittently present in the Onondaga Creek watershed since the last glacial retreat. The proximate causes of mudboil activity are disputed.

<sup>8</sup> See also *Onondaga Nation v. State of New York et al.*, Declaration of Sidney Hill (2006).

protection in its aboriginal territory through government-to-government consultations, legal actions, education and outreach efforts, and partnerships with neighbouring Euro-American communities.<sup>9</sup>

On 11 March 2005, the Onondaga Nation filed a lawsuit in U.S. federal court asking for a declaratory judgment that New York State's acquisition of Onondaga lands between 1788 and 1822 was illegal, and that the Onondagas therefore still hold title to approximately 10,360 km<sup>2</sup> stretching from the St. Lawrence river and the eastern shore of lake Ontario south to the Pennsylvania border (McAndrew, 2005). The Onondaga Nation views this suit, which it refers to as a land rights action (as opposed to a 'land claim'), as a step toward healing its relationships with all those who live in its traditional homeland. Its leaders have expressed the hope that recognition of their nation's property title would initiate negotiations with New York State regarding the acknowledgment and redress of the many injustices their people have endured over the past two centuries (Hill, 2006).<sup>10</sup> In articulating those injustices to the public, Onondaga leaders have laid special emphasis on water pollution and other forms of environmental degradation. Tadodaho (spiritual leader) Sidney Hill has explained, "[w]e want to use this action to put us at the table and enforce your laws and exert our laws of responsibility for the earth, water, air and animals" (quoted in McAndrew, 2005). The Onondaga Nation has argued that Superfund remediation projects being carried out by Honeywell International, Inc.; the corporate successor of the Solvay Process Company, are not adequate to protect the health of the lake ecosystem (Hill, 2006).

In September 2010, a U.S. federal judge dismissed the Onondaga Nation's suit, declaring that the land rights action was disruptive and that too much time had elapsed since the alleged offence (McChesney, 2010).<sup>11</sup> The Onondaga Nation has appealed its case. If in future their options within the U.S. court system are exhausted, Onondaga leaders are prepared to address international courts (Hill and Heath 2010). Meanwhile, the Onondagas have continued to voice their concerns about remediation plans for Onondaga lake. In 2010 the Onondaga Nation published a document outlining specific goals for the lake informed by the unique cultural perspectives and needs of its people.<sup>12</sup> The Onondagas are also participating in government-to-government discussions about future lake restoration efforts as part of the Natural Resource Damage Assessment and Restoration process for the Onondaga lake Superfund site (USFWS, 2009).

The Onondagas' access to the waters of the lake and creek has long been circumscribed by multiple processes and interests operating across spatial scales, and extending far beyond the immediate region. Their ability to pursue traditional livelihood practices of fishing, hunting, and gathering have been systematically undermined as a result of actions on the part of the US and New York governments, as well as private interests. These range from military campaigns aimed squarely at dispossessing the Onondagas of their land, to banal bureaucratic decisions regarding flood control, and from the incursions of individual settlers, to the use of the lake and its wetlands as dumping grounds for industry. Viewing these within a broader waterscape helps shed light on the trans-scalar processes that shape water quality, quantity and access for the Onondagas and others.

For many years, the Onondagas' struggle for environmental justice has intersected with neighbouring communities' environmental activism (Hill and Heath, 2010). One such movement was the opposition by residents of Syracuse's Southside neighbourhood to the construction of a sewage treatment plant in their community. It is to this struggle that we now turn.

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<sup>9</sup> *Onondaga Nation v. State of New York et al.*, First Amended Complaint for Declaratory Judgment (2005); *Onondaga Nation v. State of New York et al.*, Declaration of Joseph J. Heath, Esq. (2006). [www.onondaganation.org/land/stewards.html](http://www.onondaganation.org/land/stewards.html) (accessed 26 September 2011)

<sup>10</sup> The Onondaga Nation argues that the distinction between property title and possession under U.S. law should allow for the recognition of the Onondaga Nation's title without the disruption that would result from transferring physical possession of its territories (*Onondaga Nation v. State of New York et al.*, Plaintiff's Memorandum of Law in Opposition to Defendants' Motions to Dismiss, 2006). The Onondaga Nation has declared publicly that it will not use its land title to evict current landholders or to seek monetary damages from individuals (*Onondaga Nation v. State of New York et al.*, Declaration of Sidney Hill, 2006).

<sup>11</sup> *Onondaga Nation v. State of New York et al.*, Memorandum-Decision and Order (2010).

<sup>12</sup> The latest edition of this document, The Onondaga Nation's Vision for a Clean Onondaga Lake, is available from the Onondaga Nation's website at [www.onondaganation.org](http://www.onondaganation.org).

### Partnership for Onondaga creek

Before joining Onondaga lake, Onondaga creek runs for nearly 15 km through the City of Syracuse. Like many ageing cities in the north-eastern United States, Syracuse has long used its waterways as sinks for the overflow from its combined sanitary and stormwater sewers. By the end of the 20th century, Onondaga creek received diluted untreated sewage roughly 50 times per year from the city's combined sewer overflows (CSOs) (Effler and Harnett, 1996). The degradation of the creek's and lake's water quality resulting from municipal waste disposal led to the filing in 1988 of a lawsuit by the environmental organisation Atlantic States Legal Foundation (ASLF) and New York State against Onondaga County, which owns and operates the sewer lines fitted with CSOs as well as Metro, the sewage treatment plant that serves Syracuse and surrounding areas (CNY RPDB, 2010). ASLF and New York State alleged that Onondaga County had violated state and federal water quality regulations. The court's settlement, known as the Amended Consent Judgment (ACJ), required Onondaga County to implement a series of infrastructure upgrades to Metro and the CSOs.<sup>13</sup>

The Partnership for Onondaga Creek (POC) was formed in 2000 by residents of Syracuse's Southside community, a predominately African American, low-income neighbourhood,<sup>14</sup> in opposition to a particular component of the county's plan to meet the ACJ's requirements for mitigation of CSOs. In 1999, the county unveiled plans to construct a 2787 m<sup>2</sup> rudimentary sewage treatment plant, known as an RTF, along a portion of the creek that passed through a Southside residential area. Effluent from six CSOs would be transported nearly 2.4 km through a 3.7 metre-diameter pipe to the RTF, where solids would be separated from the liquid waste. Solids would be sent to Metro for treatment, while the liquid waste would be disinfected with chlorine bleach, de-chlorinated, and discharged to the creek an estimated 10 times per year (Adams, 2003).

Emerging from a diverse group of activists with an array of concerns about the impending construction project, the POC developed a multifaceted critique of the county's plan. One thrust of its arguments centred on potential harm to the environment, particularly its members' concerns about the release of partially treated sewage and harmful chemicals into the creek and what effects they might have upon the aquatic environment and air quality. The group also focused its criticism on what it perceived as a lack of opportunities for public participation in environmental decision-making as well as the RTF's potential negative social impacts, including resident relocation, neighbourhood disruption, and social stigmatisation. The POC argued that the county's siting decisions constituted environmental racism because the potential environmental and social impacts of the proposed RTF would disproportionately affect the Southside community and impede residents' efforts to overcome the pressures of substandard housing, a degraded creek environment, industrialisation and its attendant pollution, and a history of forced relocation in the wake of urban construction projects (Adams, 2003; POC, 2004, 2006).

Memories of previous forced relocations had a particularly strong impact on Southside residents' perceptions of the county's RTF plans. In the 1950s, most of Syracuse's African American population lived in the city's vibrant Fifteenth Ward neighbourhood, on the city's east side. In the 1960s, despite vigorous protests, thousands of Fifteenth Ward residents were displaced by urban renewal projects, including the construction of an interstate highway, a police station, and a hospital expansion project (Knight, 2007). A paucity of affordable housing, widespread discriminatory housing practices, and an exodus of white residents aggravated racial segregation in the city. Many Fifteenth Ward families relocated to the city's Southside, where they experienced additional disruption in the 1970s with the expansion of an existing bus garage. Southside residents successfully resisted the county's attempt to

<sup>13</sup> *ASLF v. Onondaga County*, Amended Consent Judgment ('ACJ') [1998]: 1-12.

<sup>14</sup> Syracuse's Southside neighborhood is geographically defined as the area within United States Census tracts 42, 52, 53, 54, 58, and 59 (Adams, 2003). According to the United States Census Bureau (2010a), the population is approximately 80% African American. The most recent (2004-2009) annual per capita income estimates range from US\$6329 in census tract 42 to US\$14,476 in census tract 54 (United States Census Bureau, 2010b).

build a garbage-powered steam plant in their community during the 1970s, and in the 1980s they negotiated with Syracuse University and the city to reach an agreement regarding the expansion of an existing steam plant in the Southside. In light of this history of land conflict and struggle against unfair community burdens, the county's plans to build a large above-ground sewage treatment plant in the neighbourhood were viewed by many protesters as perpetuation of oppressive power structures and unjust targeting of the community (Adams, 2003).

The POC worked hard to communicate its concerns to elected officials and the public, and propose alternative courses of action for mitigation of CSOs (Lane and Heath, 2007). It gained the support of the Syracuse city government, which in 2001 responded positively to residents' petitions requesting that it refuse to sell the requisite land to Onondaga County. In response, the county sued the city, and formal negotiations were arranged in an effort to resolve the conflict. The Onondaga Nation, which claimed a historical and legal interest in Onondaga creek and which supported the POC from the outset of its struggle, was granted admission to the negotiations being held between the county, city, ASLF, and the New York State Department of Environmental Conservation (NYSDEC). In contrast, the POC's request to be included in negotiations was ignored, spurring its members to arrive at the talks uninvited and request entry. This tactic proved successful. With the support of the Onondaga Nation, the POC was admitted as a party to the negotiations and was ultimately instrumental in bringing to the table an alternative facility design that would store effluent of CSOs underground until it could be piped to Metro for treatment (Adams, 2003). Thus, while there is no formal political alliance between the POC and the Onondaga Nation, the two groups frequently support each other in pursuing environmental and economic justice. The Onondaga Nation actively supported the POC in filing its Title VI claim with the EPA (see below) by providing legal assistance and paying for the printing of necessary documents. Onondaga Nation lawyers assisted the POC to incorporate legally, and have provided advice and advocacy at key moments in its struggle. Indeed, the POC and Onondaga Nation share a common network of support and solidarity, including legal counsel, a local environmental non-profit organisation, and community peace and justice activists.

The POC advocated underground storage of effluent of CSOs in place of the large above-ground facility planned by the county. Activists believed that the two smaller above-ground buildings required under this alternative plan would be less stigmatising for the community and would not threaten efforts to revitalise the area. Moreover, the POC argued that because the underground storage facility would not discharge chlorine to the creek, the health of residents and the aquatic ecosystem would be protected (Adams, 2003). The new design gained the support of all parties except for the county which, after 9 months, abruptly ended the group negotiations and entered into private talks with the city (Sieh and Weiner, 2002). Three months later, a court ruled in the county's favour, allowing it to take the land needed for the RTF (Weiner, 2002).

The demolition of homes and commercial buildings for preparation of the construction site began in the summer of 2004. Thirty-two families were evicted and relocated as a result of the RTF's construction (Weaver, 2004). According to the POC, evictions associated with installation of the plant's massive pipeline brought the total number of displaced families to 42, 36 of whom the POC considered to have been inadequately compensated by the county (POC, 2006; Lane and Heath, 2007). During the construction, POC members' protests included acts of civil disobedience and the filing of a Title VI administrative complaint<sup>15</sup> asking the EPA to rule that the project was discriminatory. The EPA initiated an investigation, but did not freeze federal funds for the project or visit Syracuse as the POC had originally hoped. Nearly a year after it was first filed, the EPA dismissed the Title VI claim, and the POC challenged the decision. The POC received permission to forward additional information to the EPA in support of its case, a massive task which they completed in late 2006 (Lane and Heath, 2007).

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<sup>15</sup> Under Title VI of the 1964 Civil Rights Act, any programme or project that receives monetary assistance from the US federal government cannot discriminate on the basis of color, race, or national origin ([www.epa.gov/ocr/t6home.htm](http://www.epa.gov/ocr/t6home.htm), accessed 26 September 2011).

In its re-submission, the POC presented evidence to support its argument that the county's RTF project on the Southside and plans for similar facilities in Syracuse's Downtown and Westside neighbourhoods disproportionately burdened low-income minority communities with negative impacts including evictions, the stigma of living next to a sewage plant, disruptions from construction work, and degraded water and air quality. In contrast, the POC argued, the wealthier and predominately white Northside neighbourhoods received a less disruptive combination of facilities that failed to adequately mitigate pollution of CSOs in that part of the city. Consequently, most of the burden of required pollution control was shifted onto the Southside, Downtown, and Westside<sup>16</sup> communities (Lane and Heath, 2007). The POC also argued that the county actively worked to prevent public involvement in decisions regarding control of CSOs (POC, 2006).

The EPA never responded to the POC's re-submission, and ultimately it was local elections in 2008 that produced a shift in the political winds.<sup>17</sup> The incoming Onondaga County Executive was familiar with and sympathetic to the POC's cause. Upon taking office, she halted construction of an RTF in the city's Downtown neighbourhood and ordered a review of the county's sewer policies. In the ensuing months, the county administration abandoned plans to build new RTFs and worked closely with the Partnership for Onondaga creek, Onondaga Nation, ASLF, NYSDEC, and local activists to develop a strategy for combining green and grey infrastructure to mitigate the effects of discharges of CSOs (Knauss, 2010).<sup>18</sup> In 2009, the ACJ was revised to accommodate the new plan, which calls for the reduction of stormwater run-off through the construction of numerous green infrastructural projects including green roofs, rain gardens, tree plantings and an initiative to help home-owners to install rain barrels (Knauss, 2009a; see <http://savetherain.us>). The resulting lower volumes of combined sewage will be managed by grey infrastructural projects like underground storage and sewer separation (Knauss, 2009b). Although the Southside RTF had already been completed by the time these plans were developed, the POC convinced the county to apply the new approach to the unfinished pipeline intended to deliver effluent of CSOs to the facility.<sup>19</sup> Consequently, the pipeline was abandoned in favour of a series of smaller green and grey mitigation solutions (Knauss, 2010). The POC continues to pursue environmental justice by advocating for the professional development and hiring of low-income minority residents for green jobs as well as by providing environmental education and jobs training for Syracuse youth. Its members remain, in their words, "dedicated to environmental justice and to water quality of Syracuse's waterways, especially Onondaga creek".<sup>20</sup>

Like the Onondaga Nation, the residents of Syracuse's Southside neighbourhood have a history of displacement, discrimination, and marginalisation. Forced out of the 15th Ward by urban renewal projects, and relegated to the less-desirable Southside neighbourhood by discriminatory housing practices (legal and otherwise), current residents have long experienced polluted environments. Thus, the waterscape of Onondaga creek stretches beyond the immediate neighbourhood, to include state and federal policies of urban redevelopment, investment patterns driving industrialisation, and environmental remediation practices at the county, state, and federal levels. Built infrastructure such as the RTF and CSOs both embody and reproduce highly uneven relations of power in the city. Particularly in regard to urbanisation and environmental remediation, the creek has been a central focus, managed more for flood control and the conveyance of sewage than as an environmental or social amenity. As such, the POC's struggle for environmental justice may be seen as a particular moment in broader geographical and historical relations of production and power, in which the waters of the lake and creek have played an important role.

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<sup>16</sup> Like the Southside, Syracuse's Westside neighbourhood is a predominantly low-income community of colour.

<sup>17</sup> Aggie Lane, Partnership for Onondaga Creek, personal interview by authors, 14 September 2011, Syracuse, NY.

<sup>18</sup> In the context of stormwater run-off management, 'grey infrastructure' refers to traditional engineering solutions involving artificial water conveyances and end-of-pipe water treatment technologies. By contrast, 'green infrastructure' reduces impermeable surface area and lowers the quantity of stormwater run-off that enters the sewers in the first place.

<sup>19</sup> [www.onondagacreek.org/history](http://www.onondagacreek.org/history) (last accessed 26 September 2011)

<sup>20</sup> [www.onondagacreek.org/about](http://www.onondagacreek.org/about) (last accessed 26 September 2011)

## DISCUSSION AND CONCLUSION

In this paper, we have considered themes of water, power and injustice through a comparative examination of two cases of marginalisation and social struggle in the Onondaga lake waterscape in Central New York state. As discussed by Budds and Hinojosa (2012), the concept of waterscape has three central characteristics: (1) it views water as 'co-produced', that is, simultaneously natural and social; (2) it emphasises wide-ranging socio-ecological processes occurring over multiple spatial and temporal scales; and (3) it highlights the complex assemblage of social relations, geo-ecological processes, artefacts, discourses, and meanings that are produced within highly uneven power relations. We contend that the concept of waterscape provides a useful analytical tool for examining the cases presented here. The first case, that of the Onondaga Nation, involves large-scale environmental degradation as a result of industrial and urban development, and the concomitant loss of territory and access to water resources that traditionally supported subsistence and other practices. The second case, that of Syracuse's Southside neighbourhood and the Partnership for Onondaga Creek, involves a decision by the county government to place a sewage treatment facility in a low-income community of colour. While at first glance these cases would appear to be unrelated, we have argued that, when viewed at broader spatial and temporal scales of analysis, their social and environmental continuities become evident. To the extent that Onondaga creek, which flows through both the Onondaga Nation and the Southside neighbourhood, carries sediments from the Tully valley mudboils and bacteria from the city's ageing sewers, it embodies historically constituted and deeply uneven social relations of power. It was the water in Onondaga lake and creek and associated environments, that first attracted Euro-American settlers to the region and that facilitated their movements and the development of their towns, cities, farms and industries. The water in the lake and creek became a repository for the wastes of these activities, and the exercise of the rights of industries and local governments to pollute the waters usurped the rights of the Onondagas and Southside residents (as well as other residents of the watershed) to use the water for sustenance, recreation and other needs, diminishing their quality of life in multiple ways. In this sense, the waterscape of Onondaga creek, as a co-produced hydro-social system, both reflects and reproduces long histories of domination and social marginalisation (cf. Swyngedouw, 2004; Loftus, 2006, 2007; Budds and Hinojosa, 2012). Taken together, the cases of the Onondaga Nation and the Partnership for Onondaga creek demonstrate the multiform social relations and modes of environmental injustice at play in the Onondaga lake waterscape. These involve distributional injustice (the US Army Corps of Engineers' construction of a dam on Onondaga Nation territory; the county's decision to locate a sewage treatment facility in the Southside neighbourhood), and procedural injustice (New York's imposition of fraudulent treaties with the Onondaga Nation, and the US government's failure to provide redress; Onondaga County's failure to fully involve the POC in decision-making regarding the sewage treatment plant, and the forcible evictions of Southside residents). These cases further exemplify processes of white privilege (the long history of racist actions taken by the US government and New York State against the Haudenosaunee and other Native American peoples; a sewage treatment plant was not sited, and never seriously considered, in the largely white Northside neighbourhoods, despite the fact that its sewer infrastructure is nearly identical to that of the Southside).

We share Holifield's (2001) contention that there is no single, universally agreed upon understanding of environmental justice, and that both the struggles themselves, and the conceptions of justice to which people aspire, must be viewed within historical and geographic context. In the cases under consideration here, both the Onondaga Nation and the POC groups have called for New York State and the US federal government to recognise the legitimacy of their claims (the Onondaga Nation's land rights action calls explicitly for recognition of ancestral rights to territory and resources; the POC demanded to be treated as a legitimate representative of the Southside community). Similarly, both the Onondaga Nation and the POC have called for procedural justice, demanding to be included in the processes of decision-making regarding economic development and the management of water and

other natural resources. For both groups, these calls are themselves rooted in the historical nature of these injustices: the displacement and structural discrimination that have shaped the lives of Native Americans and African Americans alike in central New York.

By taking a broader historical and geographical perspective, we also uncover the multi-scalar nature of environmental injustices in the watershed, which involve actions by local governments and industries, as well as regional, national and international political economies. The demands of capitalist expansion that provided an impetus for the building of the Erie Canal and successive transportation systems, as well as national and global markets for agricultural goods, salt, manufactures, and chemicals produced in the watershed, had profound and multi-layered effects on its environments and peoples. Thus, as we have argued, viewing the struggles of the POC and the Onondaga Nation as distinct spatio-temporal moments within broader processes of capitalist expansion sheds light on ways that water, capital, and power conjoin to shape the waterscape of Onondaga creek.

In part, the spatial and temporal relations of injustice examined in this paper are rooted in the very materiality of water itself: its ability to flow permits it to serve as a medium for transporting people and goods, as well as industrial and municipal wastes. These functions facilitated early Euro-American settlement and ensuing processes of urbanisation and economic growth. Indeed, Onondaga creek and lake were central to regional accumulation strategies throughout the 19th and 20th centuries, contributing to the construction of the Erie Canal, providing water for grain mills and salt production, and later as a sink for the wastes of municipal development and the city's chemical industry. Moreover, to the extent that these activities inhibit ecological processes (such as the reproduction and migration of fish and other aquatic organisms), and produce pollutants that are carried downstream, they connect peoples and places across time and space. As permanent geo-ecological features on the landscape, the lake and creek are necessarily trans-generational, and as spatially extensive features that flow, they link spatially distant communities.

In examining the complex and uneven relations of power that inhere in the hydrosocial geographies of the Onondaga lake waterscape, we have drawn on the literatures of environmental justice and political ecology of water. While these literatures address similar socio-environmental problematics, it is only rarely that they have been brought into the same analytical frame. Environmental justice scholars have traditionally focused their attention on environmental disamenities – exposure to pollution or other forms of environmental degradation (e.g. Bullard, 2000). Even those authors critical of this early focus, and who have endeavoured to expand the analytical frame of environmental justice scholarship by focusing on, for example, structural racism and white privilege (e.g. Pulido, 2000; Cole and Foster, 2001), have put forth arguments that ultimately rest on the spatial distribution of pollution (and other undesirable environmental conditions) relative to marginalised populations. In contrast, literature on the political ecology of water has focused largely on questions of access and governance in drinking water and irrigation systems. As we have argued, just as uneven access to water as an environmental 'good' embodies inequitable relations of social power, these same power geometries are reflected in and reproduced through uneven exposure to water pollution as an environmental 'bad'.

Together, the cases presented here demonstrate that water is no politically neutral element of nature. Rather, it is more productively viewed as a socio-nature: socially produced and mediated, it is a factor of production and a strategy for accumulation, and as such embodies highly uneven relations of social power. As central to capitalist development as it is universally necessary for life itself, water has been integral in the establishment and consolidation of highly racialised social, political, and economic configurations in Central New York. It has also, not coincidentally, figured centrally in the social struggles of the region's marginalised peoples, as both the Onondaga Nation and the Partnership for Onondaga Creek have sought to bring public attention to the creek and its social and ecological importance. Both cases involve extensive political economic processes and social relations that extend far beyond the Onondaga lake watershed. Viewing these struggles as distinct moments within a single waterscape draws attention to the continuities of marginalisation, and the centrality of water to processes of settlement, industrialisation, urbanisation, and social struggle in Central New York.

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