



Place-making, place-disruption, and place protection of urban blue spaces: perceptions of waterfront planning of a polluted urban waterbody

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ABSTRACT

Urban waterfronts are experiencing a renaissance, as it is estimated that by 2030 more than 60 percent of the world's population will live in cities, the majority of which are located in coastal or riparian regions. On a global level, changing public demands have spurred a new language of sustainability, revitalisation, and resilience with regard to urban waterfronts. Prior research has explored the potential ecological and social impacts of these trends, both in terms of benefits such as opportunities for recreation, as well as negative consequences such as increasing gentrification. Less explored, however, are how these planning and development processes can alternately support and/or interrupt existing “sense of place” that people hold with waterfront spaces, particularly spaces considered to be degraded and/or that are located in marginalised communities. This paper explores place-making, place-disruption and place protection associated with Coney Island Creek, a heavily polluted waterbody in New York City. We find that the creek provides recreation, sustenance, and social connections for substantial numbers of people, and we discuss these findings in the context of proposed resiliency planning and development projects that are perceived by some local stewards to threaten existing place attachments and meanings. In particular, we emphasise the importance of incorporating local knowledge and values in waterfront planning, especially in neighbourhoods that have been historically marginalised. This study contributes to a growing literature on values associated with urban blue spaces, thus furthering knowledge of how to improve current environmental governance strategies in coastal cities around the world.

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1. Introduction

Urban waterfronts around the world are experiencing profound transformation, spurred by one of the largest human migrations of modern times (Tibbetts 2002; McGranahan, Balk, and Anderson 2007). It is anticipated that by 2030, more than 60 percent of the world's population will live in cities, and much of this urban migration is occurring in coastal areas, where over half of the

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world's megacities are located and population density is highest (von Glasow et al. 2013). Both new developments (land reclamation, grey and green infrastructure projects) and changing public demands for waterfronts have spurred a new urban planning and management focus on sustainability, revitalisation and resilience in urban waterscapes and landscapes (Bunce 2009; Curran and Hamilton 2012).

Current planning and management efforts in coastal areas across both the Global South and North incorporate various approaches to “reconnect” and “revitalise” urban waterfront spaces, including pollution mitigation, coastal restoration, climate change adaptation, rezoning, economic development, and increased public access in waterfront areas (Williams 2004; Shamsuddin et al. 2011). Prior research has explored the potential ecological and social impacts of these trends, both in terms of benefits such as opportunities for recreation and improved quality of life (Grau and Kekez 2010; Doucet, Van Kempen, and Van Weesep 2011), as well as negative consequences such as increasing gentrification and subsequent social and cultural displacement (Oakley and Johnson 2013; Gould and Lewis 2017). Less explored, however, are how these planning and development processes can alternately support and/or interrupt existing “sense of place” that people hold with waterfront spaces, particularly spaces considered to be degraded and/or that are located in marginalised communities. This is an important area of exploration, because the global shift back towards coastlines raises questions about if and how some types of waterfront connections and social meanings are being privileged over others, and whether city-wide or regional scale planning and management efforts may inadvertently devalue existing social-ecological connections and meanings at the local level.

The aim of this study is to explore and articulate the ways that planning and development processes at different scales are perceived to interact with place attachments and meanings that local populations hold with degraded waterfront spaces. Towards this objective, we use the concepts of place-making, place-disruption, and place-protection, which articulate the various types of engagement and diverse meanings that place can have for individuals and communities, and the way that some meanings and uses are privileged over others (Williams 2014). We explore these concepts in the context of Coney Island Creek (CIC), a polluted waterfront space in Brooklyn, New York City (USA), using a mixed quantitative and qualitative social assessment methodology. Finally, the paper unites these concepts as part of a new integrated framework to help to illustrate how local populations perceive, support and/or resist planning and development proposals at different scales. This is intended to give visibility to different ways of engaging with place, thus providing a shared vocabulary for engagement in urban planning processes by capturing and sharing narratives that would not otherwise be represented.

2. Literature review

2.1. *Sense of place and urban waterfronts*

To better describe the manifold individual and collective relationships between humans and physical places and how these relationships are expressed in terms of associated attachments, meanings, and actions, scholars often use the concept of “sense of place” (Tuan 1977; Basso 1996; Williams 2014). Sense of place is important for understanding the scale and impact of climate change adaptation and resilience plans at the local level, as well as how these influence vulnerability, risk, and benefits as experienced by vulnerable populations (Adger et al. 2011; Lyth et al. 2016). Sense of place – including both place attachment and place meanings – has also been connected to practices of environmental stewardship (Enqvist et al. 2019; Murphy, Enqvist, and Tengö 2019; Gottwald and Stedman 2020). Sense of place is frequently understood to consist of both attachment to place as well as meaning of place; this includes individual, social, and environmental dimensions, where place identity, affect, dependence, social bonding, and biophysical characteristics can shape the place meanings held by individuals and communities, and vice-versa (Jorgensen and Stedman

2006). Place attachment and meaning have been theorised and operationalised in a multitude of ways, with various subcomponents, depending upon discipline and approach (see Trentelman 2009). For place attachment, we define attachment as a strong bond between a person or setting (Altman and Low 2012), but consider that bond to be positive, ambivalent, and/or negative. For place meaning, we refer to the individual and shared interpretations and ideas people hold about a place (Williams 2008; Smith et al. 2011). The intersection between place attachment and meanings can serve as motivation for action and/or resistance to change (Lewicka 2011; Enqvist et al. 2019); uncovering place attachment and meanings is thus an important means of predicting what potential outcomes or consequences result from implementing future environmental management or urban development plans. As such, characterising and identifying the drivers of place attachment and meanings in communities can help us to understand how these will influence the shaping, disruption and maintenance of places, and vice-versa (Devine-Wright and Howes 2010; Cresswell 2014).

To better understand the diverse ways in which place meanings and attachment can mobilise change-based advocacy, or alternately, how such advocacy can be used to influence place meanings and attachment, scholars across various fields, particularly human geography, urban planning, and environmental psychology, have used the concept of “place-making” (Wyckoff 2014; Dupre 2019; Murphy, Enqvist, and Tengö 2019). Place-making has been described as a type of “performance” of recreational, civic engagement, or livelihood-based activities enacted in a given place, and can also be understood in relation with broader social, economic and political contexts beyond the localised scale (Cresswell 2014; Williams 2014; Toomey et al. 2020). Dupre (2019), via a 25-year systematic review of the literature, describe various definitions of place-making and the lack of synergy across disciplines therein. Common areas of contradiction are in whether power is explicitly recognised in place-making, and if so, the direction by which power is enacted. For example, in the context of tourism planning, Lew (2017) distinguishes between different spellings in the use of the term: “place-making” and “placemaking”, where the former refers to “organic and unplanned actions of individuals”, and the latter describes “planned and intentional global theming by governments and tourism authorities” (449). Highlighting these subtle distinctions communicates the local-global continuum of place making, where many options and scenarios exist. Similarly, other authors have modified the term through qualifiers such as “creative placemaking” (Courage and McKeown 2018), “tactical placemaking” (Wyckoff 2014) and “socio-cultural placemaking” (Røe 2014) to add complexity to how a place is being “made” and by whom. For example, Toolis (2017) uses the term “critical placemaking” to acknowledge that placemaking can be perceived as apolitical and oppressive to minority groups in the context of certain beautification and revitalisation projects.

While an important expansion of the place-making concept, the research described above can still overlook key differences in how sense of place is developed by different urban communities, and positive perceptions and values associated with environments that have been degraded or disrupted by environmental pollution and extreme events, particularly by vulnerable communities. Recent work in California demonstrates that sense of place among urban communities is tied more strongly to sociocultural, rather than biophysical, aspects of place, as compared to non-urban environments (Ardoin et al. 2019). However, this likely does not take into account the educational and experiential values of urban ecological systems (Kudryavtsev, Krasny, and Stedman 2012), or the diverse ways in which low income or people experiencing homelessness are reliant on the biophysical aspects of urban environments for livelihood and subsistence needs (Palta et al. 2016). Existing place-making research thus potentially neglects urban-based place-making that is more strongly tied to biophysical aspects.

Scholars and activists have created additional terminology to clarify the potential impacts of change on place attachment and meaning. For example, concepts such as place “disruption” or “threat” describe the various ways that changes – especially those externally driven and outside the control of local communities (e.g. natural disasters, large development projects) – can lead to negative feelings such as grief and loss, and reductions in social capital (Chamlee-Wright and

Storr 2009; Devine-Wright and Howes 2010). To counteract such “place-disruption”, terms such as “place-protective actions” and “place-guarding”, refer to the ways in which communities seek to maintain the physical and cultural environment of their neighbourhood, highlighting the importance of retaining historical associations and social memory for long-term residents (Devine-Wright 2009; Pritchard 2018). However, it is important to point out that how the change is interpreted, rather than the actual change itself, will determine whether place disruption is likely to lead to local (individual and/or collective) resistance, and not all external changes to a place will be perceived to have negative impacts (Stedman 2002; Devine-Wright and Howes 2010).

While terms such as place-making, place-disruption, and place-protection have been used to unpack the perceived impact of external projects on landscapes considered “restorative” i.e. “those considered to be natural, wild or places to escape from cities” (Devine-Wright and Howes 2010, 272), less work on the impacts of such projects has examined degraded places in urban settings. This research gap has significant justice implications, as lower income and communities of colour are more likely to live in polluted areas (Mohai, Pellow, and Roberts 2009). Additionally, spaces deemed by city planners to have low economic value (e.g. unmanicured land in urban or suburban settings) are often threatened with changes to place, where the land cover (and the associated community uses and meanings) is replaced entirely, often for use by a different set of people (Foo et al. 2014). This omission is particularly striking with regard to polluted urban waterfronts, which are often deemed “derelict” or “wasted” by city planners, and any mitigation is perceived as a potential improvement (Shamsuddin, Latip, and Sulaiman 2008; Shamsuddin et al. 2011; Sepe 2013; Palermo and Ponzini 2014). As a result, existing uses of, attachments to and meanings associated with polluted places may be invisible or ignored (Cox, Johnstone, and Robinson 2006; Palta, Grimm, and Groffman 2017).

In the remainder of the paper, we explore these concepts in the context of Coney Island Creek (CIC), a polluted waterfront space in NYC, to illustrate the various ways that place-making, place-disruption, and place-guarding are enacted through the efforts of individuals, community-based groups, and external planners. We ask the following questions: (1) What place attachments and meanings are associated with CIC? (2) In what ways is place-making expressed? (3) Which external proposals are perceived to “disrupt” locally-held place attachments and meanings, and why? (4) How, and in what scenarios, do waterfront users articulate and engage in place-protection?

3. Study site

3.1. Local context – human-waterfront connections in New York City

New York City contains 837 km of waterfront, more than the coastlines of Miami, Boston, Los Angeles, and San Francisco combined (Maantay and Maroko 2009). Over the last few centuries, NYC’s waters have radically transitioned: from an estuary supporting a vibrant shellfish industry, to waterways completely dominated by industry and unable to sustain aquatic life due to severe pollution, to a recovering ecosystem with greatly diminished pollution and returning wildlife (Kurlansky 2006; Harbor Estuary Program 2012). As in many other cities around the United States, NYC relies on an aging combined sewer system in which stormwater and sewage are mixed and treated together at wastewater treatment facilities. During storms the system becomes overloaded and raw sewage and stormwater bypass treatment plants, resulting in more than 75 billion litres of raw sewage and polluted stormwater discharge flowing into local waterways each year (McPhearson et al. 2013). In addition, much of the NYC waterfront was previously (or is still currently) used for industrial (manufacturing) purposes, adding additional sources of water contamination and further limiting public use and engagement with the waterfronts (Kurlansky 2006; Harbor Estuary Program 2012). While known for its rich culture and diversity, NYC also experiences high levels of economic inequality, and several low-income, waterfront-proximate neighbourhoods have been projected to become more vulnerable due to sea-level rise and projected increased volumes of urban runoff (NYU Furman Center 2014).

In recent years, a synergy of economic, social, and environmental pressures have encouraged city planners to look to NYC waterfront spaces as the next frontier for development and revival (Baker 2013). To abate the estimated billions of dollars of costs in flood protection anticipated to increase due to climate change, the city has been engaging with private, high-end real estate developers as important players in revitalising waterfront property, combining green infrastructure with luxury apartment buildings (Dupuis and Greenberg 2019). A series of rezonings and upzonings have altered the character, use, and density of New York City's waterfront over the last two decades, including by raising average rents, eroding affordability, and displacing low income communities. In many cases, this economic development has been accompanied by the development of public areas, such as waterfront parks and promenades, with "green" and "blue" features such as salt marsh areas, shellfish reefs, and green stormwater infrastructure (basins, swales, rain gardens), which can provide a buffer against flooding and storm surge due to projected sea level rise (Harbor Estuary Program 2012). These spaces can further serve as places for social gathering and local recreation, but can simultaneously lead to processes of "green gentrification" if such urban coastal management and resiliency plans are not attentive to considerations of equity and justice (Curran and Hamilton 2012). In addition, starting in 2017, a subsidised citywide ferry service has facilitated commuting between waterfront neighbourhoods throughout NYC, increasing access to places that had previously been underserved via standard public transportation. However, ridership surveys found that the ferry service was largely being used by residents belonging to higher than average income brackets, which raises questions about whether the ferry could contribute to gentrification due to increasing rents in neighbourhoods serviced by the ferry (McGeehan 2019). These social, economic, and environmental forces have raised concerns about whose visions and values are prioritised when it comes to the rethinking of these waterfront spaces across NYC, and whether existing uses and meanings are threatened with erasure as a result.

3.2. Study location

Coney Island Creek (CIC) is a tidal creek located in southwestern Brooklyn, NYC, stretching 1.8 miles inland from its mouth at Gravesend Bay. NYC was once lined with hundreds of creeks, streams, and other waterbodies; CIC is one of the last remaining tidal creeks in the city (Kadinsky 2016). Prior to the 1920s, the creek was buffered by marshland and flowed between Gravesend Bay and Sheepshead Bay, separating Coney Island from the mainland (Immerso 2002). During the 1920s and 30s the eastern half of the creek and the surrounding tidal lands were filled for highway and other development projects.

Currently, CIC is lined by a mix of parks, capped landfills, industrial waterfront, and residential neighbourhoods (Figure 1). The community occupying the area surrounding the creek is highly

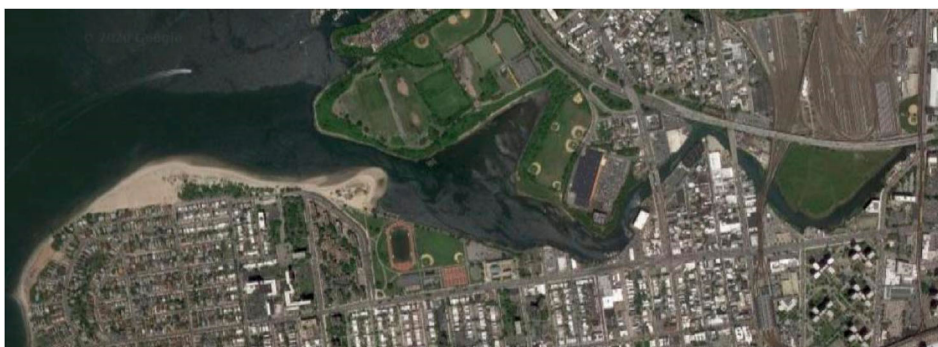


Figure 1. Aerial view of CIC (Google Maps).

diverse, multilingual, and has higher poverty levels compared to NYC on average (NYU Furman Center 2018). In addition, Coney Island as a whole has one of the highest proportions of immigrant-born residents (52% as compared to the citywide average of 37%), approximately a quarter of its residents are over the age of 65, and almost a third of renter households are severely rent burdened (ibid.). These demographic factors suggest that the local residency is vulnerable to increasing costs of living both as a result of possible gentrification and flood insurance.

Previous studies have indicated the water quality of the creek to be among the worst in the city, with fecal coliform counts deeming the water unsafe for most water-related activities (NYC-DEP 2018; McCann 2019). An active combined sewer outfall located midway along the creek discharges approximately 1098 million litres per year of combined sewage overflow (NYC-EDC 2016). In addition, there is a longstanding practice, dating back to 1884, of rerouting stormwater sewer mains from the Atlantic Ocean to outfalls that discharge into the creek, which results in higher quantities of untreated wastewater into this “less desirable” location (Raymond 1890; NYC-OEC 2013). The regular influx of sewage into the creek leads to nutrient loading and coastal eutrophication, where low oxygen zones limit the abundance and distributions of marine species, and can adversely affect the health of humans who consume fish and other aquatic life caught in these areas (Harbor Estuary Program 2012; McPhearson et al. 2013). Legacies of industrial contamination, dating back to the twentieth century when polluting industries such as a large gas manufacturer bordered the creek’s shores, additionally resulted in the presence of heavy metals and chemicals in the sediment of the waterbody (Kadinsky 2016).

Compounding existing water quality issues are the pressing threats posed by climate change, as increased precipitation and flooding are projected to further increase nitrogen loading and coastal eutrophication within the next century. In 2013, the storm surge from Hurricane Sandy caused the creek to flood and eroded some of the sandy beach at the mouth of the creek (Kensinger 2017). The flooding experienced by residents in close proximity to the creek was some of the most severe in the city, and broad concern exists that the area remains unprepared for future storms (NYC-EDC 2016). Thus, both water pollution and risks from flooding, as well as citywide resiliency proposals designed to mitigate these issues, are pressing topics for Coney Islanders, which will be further discussed in the Results section below.

3.3. Data collection

We collected data on how people use, make meaning of, and engage with CIC between October of 2018–November of 2019. We used three different data collection approaches, which we then triangulated for our analysis.

First, we used an established social assessment methodology that has previously been carried out in urban green spaces by an interdisciplinary team of researchers from NYC Parks, the USDA Forest Service, and the Natural Area Conservancy (Auyeung et al. 2016; Campbell et al. 2016). Social assessments are designed to gather information on a specified geographic area through quantitative counts of human activity and signs of human use, coded interview data tagged to specific locations, and qualitative field notes capturing participant observations (see Strehlau-Howay et al. 2019 and Appendix A for more detail on methods). The social assessment was completed between September and December of 2018 by field researchers working in pairs using three separate protocols to document social-cultural uses and perceptions of CIC. This included 49 “rapid” in-place interviews with adult waterfront users, observation of human activities along the waterfront site ($n = 1921$), observation of signs of human use ($n = 451$), and photographic documentation ($n = 716$) (Appendix B). People were counted throughout the parks during weekday, evening, and weekend visits. Observations of signs allowed us to detect uses that might occur over time, more slowly, or at different times of day or seasons than those in which our research team was on site. Although we did not ask for demographic information other than the age of the respondent, some rapid interview respondents self-reported being from a diversity of backgrounds, including Bangladeshi, Russian,

El Salvadorian, and Haitian. Research teams found that language was a barrier when conducting interviews, with some park visitors (10 out of 22 refusals) refusing interviews due to limited fluency in English. Field researchers also kept comprehensive debrief notes on a daily basis; pairs discussed observed patterns, exceptions, and memorable encounters. These debrief notes were used to inform analysis (described below).

Secondly, we conducted in-depth qualitative interviews and focus group discussions with nine individuals who were selected based on their direct knowledge of and experience with locally-based environmental and governance efforts at CIC, herein referred to as “key informants” (Appendix C). Key informants included local community activists, staff of civic organisations whose work focused on CIC, as well as members of the local community board, which is the official municipal body tasked with advising government on district matters such as land use, zoning, and budgetary issues. Interviews with key informants lasted between 45 minutes and two hours and were recorded and transcribed with the permission of participants. We also attended key community events regarding the creek, including community reef oyster monitoring days, My Estuary Day (an event to celebrate the creek and conduct a beach cleanup), and a meeting organised to solicit public experiences and visions for CIC. All human subject research was performed in accordance with Pace University IRB approval (#1320846-2) to ensure confidentiality and minimise risk to participants. People under 18 were not interviewed, in accordance with our IRB protocol.

Third, we studied the media discourse related to CIC between 2010 and May of 2020. Using the search engine “Google News” and the search term “Coney Island Creek”, we found 218 articles between January 2009 and December 2019. We downloaded all articles deemed relevant in terms of pollution, infrastructure, usage, development, resiliency planning, educational programmes, stewardship, and governance, based on title. In addition, we mined the articles for links to further media deemed relevant, and did additional targeted searches for the same time period on specific local newspaper websites (e.g. Brooklyn Paper, Brklyner, CurbedNY). This process resulted in 119 articles, which we grouped by year and added to an Endnote library for further analysis. In addition, documents and reports from city agencies referring to waterfront-focused infrastructure and resiliency plans for CIC were consulted, such as the Coney Island Creek Resiliency Study (2016), PlaNYC (2013), and the NYC DEP’s CSO Long Term Control Plan for Coney Island.

3.4. Data analysis

For the social assessment dataset, we separated data into quantitative and qualitative categories, and analysed each through distinct processes. All quantitative data were entered into EXCEL spreadsheets. The quantitative data included counts of human usage of the waterfront area, including activities in real time (e.g. jogging, fishing) as well as signs and signals of human use (e.g. graffiti, campfires). The rapid interview protocol resulted in both quantitative data based on closed answer responses, as well as qualitative data from the open answer responses and debrief notes from field researchers. Of the rapid interview respondents, 73% were male and 27% were female. In total, 69% of participants fell in the age range of 18–65 and 31% were over the age of 65. We created pivot tables in EXCEL to generate descriptive statistics and analyse trends with regard to uses and perceptions found through the three protocols described above. Team debrief notes were used to identify emergent themes that were further explored in coding the semi-structured interviews with key informants.

Our semi-structured interviews elicited social use and meanings and perceptions of the creek, with a focus on relationships with governance and waterfront ecology. We used grounded theory to both develop qualitative interview strategies and conduct data analysis (Charmaz and Belgrave 2012). Similar to adaptive management, constructivist grounded theory is an inductive strategy for gathering and analysing qualitative data with an aim towards developing theory through “individual cases, incidents, or experiences” (Charmaz 2006, 496). It is qualitative and non-reductionist, seeking to uncover subjective perspectives rather than absolute truths (Levers 2013). While in

quantitative data, there is an established norm towards objectivity, the “subjective” plays an important role in qualitative social science research, which seeks to uncover the complex ways that individuals and social groups experience and understand the world (Levers 2013). We followed a process of emergent coding of transcribed interview reports and field notes in ATLAS.ti, and then analysed these themes together with the social assessment analysis and the media articles. This process of triangulated analysis revealed key findings in relation to existing sense of place concepts – including place attachments and meanings, place making, and place protection and disruption – which we describe below. In striving for reflexivity and accuracy, we conducted a “member check” by sharing our findings with key informants at multiple stages in the writing process (both through oral presentations as well as through dissemination of a publicly available “white paper”), which allowed us to revise the narratives as needed, and thereby strengthen the internal validity of the analysis (Lincoln and Guba 1985). As such, we do not argue that the place attachments and meanings presented are objective or even representative of the community around CIC; rather we discuss the insights gathered through the qualitative methods to shed light on how and why certain projects can be perceived as “making” or “disrupting” locally-held sense of place, as reported by key informants.

4. Results

4.1. *Uses, perceptions, and meanings associated with a polluted waterway*

Our findings demonstrate a wide range of uses and perceptions as well as deep place attachments held by local users with regard to CIC, which give insight into understanding how the meanings associated with the waterfront have changed over time. Observing behaviours is important because it draws attention to the direct, experiential ways that people use public spaces in addition to how they report place attachments and meanings (see, e.g. Campbell et al. 2016). Through triangulating across observations, rapid interviews with waterfront users, and semi-structured interviews, we found a diversity of place meanings related to CIC’s physical form; ecological characteristics; aesthetics; associated recreational, provisional, and spiritual uses; visitor demographics; and social-ecological memories. In terms of visitation to the space, we found that the majority of respondents to the rapid interviews (63.3%, $n = 31$) visited the creek on either a daily or weekly basis. In addition, we found a longevity of use, as the majority of respondents (67.3%, $n = 33$) reported coming to CIC for at least the last five years, and a substantial percentage (34.7%, $n = 17$) had been visiting the creek for over 20 years. Through interviews, we identified that local residents hold positively-focused and strong attachments to Coney Island Creek; one key informant reflected on the longevity of attachments to the place among local residents:

I see a lot of local community use. I think it’s not in the hundreds or thousands of people using it, but the community, from my experience, uses it and expresses care and interest in caring for this space. Especially the most local residents in proximity to the site, they have very long memories of this space so they hold a wealth of knowledge about how this place has been changing and what it used to be 20, 40, 50 years ago and that’s a part of the identity of the creek. (S6)

Key informants attributed the diversity of uses to the varied landscapes and ecosystems that the creek supports. For example, the soft edge, dunes, and sandy beach – rarities across the New York City shoreline, which is largely bulkheaded – support activities such as fishing and crabbing. Tides had a large influence on when people and wildlife would be present in certain zones; low tides opened up more shore to walk around and enjoy, exposed large beds of ribbed mussels, influenced when and what type of fish would be present for fishers, and created access to areas otherwise blocked with water. The “natural features” combined with the social demographics of the area were understood to be underpinning its perceived value to the community, as the following quote expresses:

It's a beautiful park, it's a beautiful waterway. It's sort of a gem in many ways; it's got these beautiful beaches, beautiful views. In some ways it's a luxurious ecological park, also nestled in predominantly poor communities so that (they) have walking or biking access to beautiful vistas. (S7)

These varied features influenced the diversity of perceptions and meanings associated with the creek. For example, some interviewees often referred to the creek as a “hidden sanctuary” or a “well-kept secret” and the most common reason expressed in rapid interviews for using the creek was due to the peacefulness and aesthetics associated with the area (30.5%). Others (28.8%) cited the proximity of the creek to their home or school, and 8.5% said that fishing was the main reason they came to these particular waterfront areas. Historical connotations were also viewed as important, and some people referred to specific historical landmarks present in the creek, such as sunken boats and Revolutionary War artifacts. Respondents referenced the relative privacy and remoteness of the creek from the rest of the neighbourhood, including the more popular oceanfront beach and amusement area, for which Coney Island is known worldwide. In particular, the sandy mouth of the creek is also a location for bathers, and religious activities (e.g. baptisms, ceremonies) were found to occur in this area. Perceptions of local ownership and belonging were also expressed by local users indicating deep, positive place attachment; as one rapid interviewee put it: “don't tell people about this place” (S1).

Fishing was the third most frequently observed activity ($n = 73$; [Figure 2](#)), after sports and recreation ($n = 365$) and dog walking ($n = 304$). For those engaged in fishing, we asked participants for details with regard to specific species they catch or eat to get a better sense of the range found in the creek during the field research season, as well as to have a better understanding of which species attract fishers. Respondents listed 10 different species of caught fish, with mullet, porgy, bluefish, and striped bass being the most frequently mentioned. Although some of the fishers said that they fished as a social activity, all said that they would eat the fish, and mentioned various methods for food preparation (e.g. stewing, BBQing, frying).

Through our observation of signs, we recorded many instances of dumping or significant littering/debris ($n = 49$), informal trails ($n = 46$), and evidence of fire pits ($n = 41$). Other notable, but less common, uses of the space were documented through observations of sleeping areas / homeless encampments ($n = 10$), evidence of fishing and/or crabbing ($n = 8$), and memorials, shrines and/or sacred symbols, such as a memorial cross hung on a tree near the fishing pier ($n = 7$). Awareness of pollution (or lack there-of) was entwined with perceptions of the creek in interesting ways. Our rapid interview protocol found that a majority of participants (67.4%) stated that the creek was “somewhat clean” or “very clean”, while a minority (25.6%) indicated they perceived it to be “somewhat” or

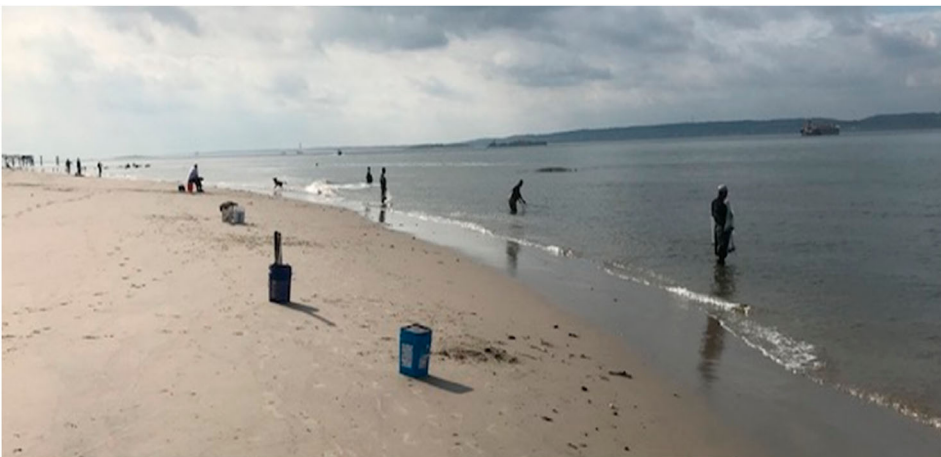


Figure 2. People fishing along the mouth of CIC.

“very” dirty. This was especially true among respondents who reported willingness to eat fish from the creek, 78.6% of whom perceived the water quality as clean as compared to only 62.1% of those who stated they would not eat the fish. People who stated that the park was dirty mentioned the presence of litter, illegal dumping, and nuisance wildlife (e.g. water rats) as limiting access to and enjoyment of the creek; few explicitly mentioned water contamination such as sewage.

Our findings demonstrated that despite longstanding and serious pollution issues, the unique physical form of the creek’s natural features and active ways that the creek is being used, along with strong place attachment and a diversity of place meanings, helps to explain why it would be a site that inspires civic engagement and activism. This additionally sheds light on why various place-making projects are perceived to be disruptive and lead to place protection, which will be further explored in the next section.

4.2. Place-making along a polluted waterfront

Key informants provided detailed information about the ecology, history, social-cultural dynamics, and potential threats to the creek that shape local engagement in stewardship and other place-making activities. For some, involvement in environmental cleanup and educational activities was prompted by the devastating flooding of Hurricane Sandy in 2012, when the creek overflowed and seeped into peoples’ homes and patios, as is expressed in the following quotes:

To be perfectly honest with you, I really never thought about the creek that much. It was beautiful, something to just take in and enjoy. It wasn’t until Sandy and that creek ended up in my living room, and I think that was when most people in Coney Island really started paying attention and realized that this is a big concern. S10

When the water was literally entering their homes and flooding their community, it was a wake up call for many that they need to be more involved in waterfront policy and sanitation. S7

Types of environmental stewardship, education, and cleanup activities that these individuals were engaged in include convening large public events such as “My Estuary Day” as well as more frequent activities such beach clean ups and various civic science projects (e.g. horseshoe crab monitoring) – all of which provide opportunities for local residents to meaningfully connect to each other (i.e. social cohesion) and to local ecosystems through engaging in caretaking. Much of the work of groups working in the area has focused on increasing messaging about both the value of and the risks associated with the creek to the local community, for example, by successfully pressuring the DEP to install signage about outfalls installed along the creek. Some framed this as making terms like resilience and environmental justice “kitchen table conversations” (S11), and pointed to the benefit of spreading awareness about how stormwater infrastructure affects the creek and subsequently, peoples’ lives. Educators, in particular, were focused on the importance of developing activities for the younger generations to enable them to more directly engage with the creek. These stewards play key brokering roles across different populations and actors engaged in governance – sharing information and building collaborative ties with public agencies, researchers, and local residents.

I remember I think maybe the second cleanup we did there was a researcher who told me there are high levels of coliform bacteria in the water and it might not be a great idea to swim in it. That made me more motivated to understand the science of the creek and also to become an advocate to clean the creek because I feel like water should be available for people in the community to swim in ... The majority of our students don’t know how to swim, but they get such a thrill doing the activities, especially the seining. They love to put on waders and go in waist-deep and pull out the net. S2

Civic science projects, in particular, have been seen as a way to raise awareness of both the value of the creek as well as the problems associated with it, exchanging knowledge in a co-learning model. For example, citizen water quality testing contributed to the discovery in 2016 that a set of apartment buildings was illegally dumping 757,000 litres of raw sewage on a daily basis directly into

the creek. This finding, and the subsequent fining of the apartment building by the New York State Department of Environmental Conservation (DEC), raised citywide awareness both about the pollution problems affecting the creek as well as community efforts to clean it up. Significantly, two-thirds of the \$400,000 fine went directly into supporting organisations along the creek, rather than to the DEC, in part due to local pressure to incorporate community input in how the money should be spent, and this was considered a major win for local civic groups (S10).

Meetings where stormwater infrastructure issues were discussed underlined the importance of situating the pollution problems facing the creek within a larger context of stormwater and sewage infrastructure on a citywide scale. As such, motivations for engaging in various types of stewardship activities can be understood to be supporting existing uses and values while simultaneously working towards improving the ecological condition of the creek. One example of this was a coordinated effort by some community members (including educators, community leaders, and members of the local community board) to advocate for the installation of a community oyster reef in the creek. The permit for the reef was initially denied by the DEP due to high levels of pollution, based on concerns that the oysters could be inadvertently consumed and lead to sickness (McCann 2019). However, local advocacy efforts put pressure on the DEP and were ultimately successful in getting approval for the permit, which was seen by many as a win for the creek (Figure 3). As one key informant expressed:

I think the biggest thing is that it's easy to turn your back on a space like this that people think oh there's no life in there, it's not worth taking care of, it's a big sewage dump, the ecosystem is done ... but if we turn our back we aren't going to change anything. Just bringing more usage and more attention is the way forward. S6

These place-making efforts point not only to the desire of local groups to support existing uses and values associated with the creek, but they additionally suggest a demand from these groups to be seen as relevant and vital actors in the way the creek is stewarded, managed, and governed. Thus, such place-making can be understood as a call for shared governance, where city and/or state agencies conduct their work in collaboration with local groups to support their efforts, rather than to curtail them. However, these negotiations are complex and conflict-ridden due to perceived "place-disruptions", which we explore further in the next section.



Figure 3. Billion Oyster Project staff and volunteers gather to install a community oyster reef, while creek users engage in activities such as bathing and fishing in the background.

4.3. Place-disruptions and place protection along the waterfront

In addition to the threats posed by water pollution and flooding mentioned above, key informants identified place-disruptions that were perceived as potentially altering the existing uses, meanings, and place-making efforts associated with the creek. These include resiliency and “reconnection” proposals to be implemented at CIC that have been designed at the city level. As previously mentioned, Coney Island is among the most vulnerable areas in NYC to sea level rise and storm surge, and various resiliency and revitalisation plans have been proposed that incorporate both grey (e.g. armour stone revetments, tidal gates, bulkheads) and green (e.g. restored wetlands, beach renourishment, plantings) infrastructure solutions (NYC-EDC 2016). Although there is much local support for the various projects proposed, local protests have focused on how the specifics of the proposals could affect the current social-ecological uses and meanings associated with the creek. For example, one of the flood mitigation proposals would build an in-water barrier across the mouth of the creek with the aim of reducing flood risk to the neighbouring community (NYC-EDC 2016). However, the proposal has been protested by residents due to concerns such as limited access, increased pollution, and damage to the creek (Ellefson 2015).

Another potential source of place-disruption is related to economic development proposals that seek to revitalise and remake the whole of Coney Island as a year-long destination. Many of these proposals pre-date Hurricane Sandy, when a large swath of Coney Island coastline was rezoned. This was connected to citywide proposals, including a commuter ferry service and shoreline promenades, that were aimed to “reconnect everybody to the waterfront” (then-Mayor Bloomberg, quoted in Baker 2013). As is the case in other waterfront neighbourhoods across the city, Coney Island has been experiencing increased rents as luxury developments go up around the area (NYU Fulman Center 2018). Similarly, a planned ferry line with direct service to Wall Street in Manhattan could further change the economic character of the neighbourhood, as well as the creek itself, as the ferry landing is currently designated to be built on the southern shore of the creek.

While the larger Coney Island community is largely supportive of the ferry, as it would greatly reduce travel time for commuters and bring in new economic opportunities through tourism (Maisel 2019), there is significant concern at the proposed location of the ferry landing. These include ecological concerns due to the dredging required, as well as threats to existing social and cultural uses of the creek. At a meeting organised by the NYC Economic Development Corporation (EDC) to allow for public comment about the ferry landing proposal, community members voiced their opposition to the planned location of the landing along the creek, recommending that the EDC representatives physically go to the creek to better understand why the creek is not an appropriate location for a ferry. In July of 2019, a small protest against the proposed landing was organised, during which some local fishers carried signs that read, “Fishing, not Ferries!” And in February of 2020, a petition was circulated to call on city agencies to bar construction of the ferry landing inside of the creek:

CIC is one of South Brooklyn’s last wild nature areas! ... The ferry at (the proposed) location, with its construction call for dredging and operation activities, will reverse years of volunteer work and destroy the relationships the community has forged over the years with its waterfront.

Key informants suggested that much of the opposition to the proposals is not about the projects themselves, but rather how they are seen as being carried out. Prior experiences with city and state agencies, including the DEC and the DEP, have led to distrust and fraught relationships, often underlining stark differences in the way the creek is perceived by city and local actors. Media reports indicate that community members often feel unheard and left out of key governance discussions regarding the creek (i.e. Spivack 2016, 2017). As a potential solution, one community leader stressed the importance of engaging with the local knowledge that exists in the community and connecting that knowledge to city resiliency and infrastructure plans:

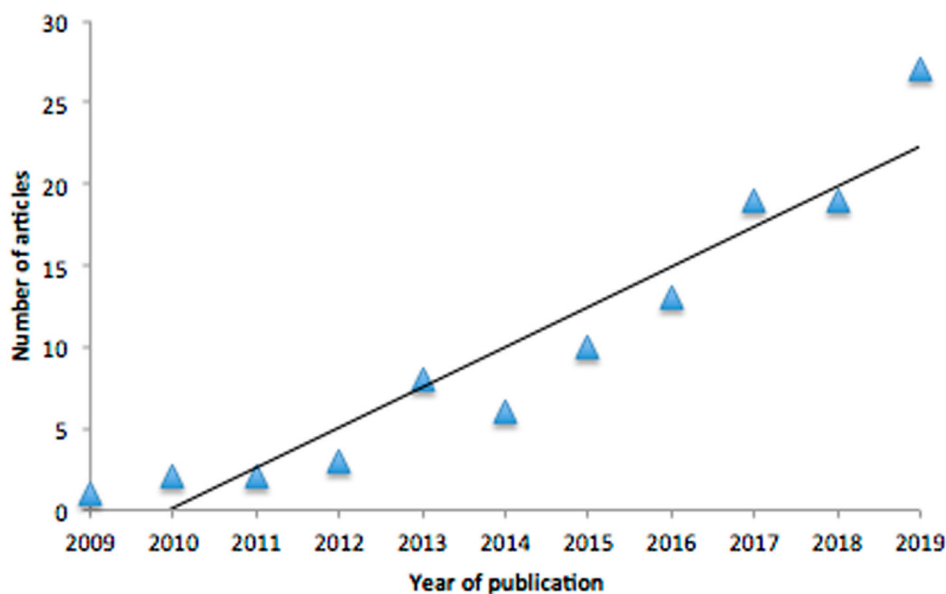


Figure 4. Articles published between 2009 and 2019 that refer to CIC. Regression line shows an increasing trend.

One of the things that we do with government agencies is we let people know that the people that live here, all of them have value, they have an understanding, a history of the creek ... We love our architects and our engineers, but they go home at 5 o'clock. The people that live here, they can tell you which way that water's gonna flow, how it's gonna turn, which street is gonna flood, and you can't really put in a plan without talking to the community because it's invaluable. S10

The importance of incorporating local knowledge as a way of promoting shared governance was something frequently mentioned in interviews and meetings, as well as media articles consulted for this study. For example, several key informants organised a “walk through” of the proposed ferry site with EDC employees, with the hope that by doing so would make space in the development planning for critical perspectives rooted in the lived experience of local residents (see also Toolis 2017). At the same time, key informants were also realistic about how the threats from sea level rise and storms necessitated change to the creek. One key informant pointed out that Hurricane Sandy increased the costs of flood insurance, and these costs are projected to increase exponentially over the next few years, which could have a major impact on the economic demographics in the area (S3).

As such, the local community board is struggling with different visions of a “future” Coney Island during a time of increasing waterfront gentrification across the city. These tensions – between seeking ways to improve local conditions and resisting projects seen as disruptive, and between enjoying the benefits of the creek in its current state and addressing the risks posed by it– underlies much of the way the creek is talked about by Coney Islanders. The place-making, place-disruptive, and place protection efforts described above have attracted increasing media attention (Figure 4), attesting to their importance in shaping debates regarding not only the future of the governance, planning, and management of CIC, but of waterfront sites around the city. The case of CIC raises the question of whether city-wide goals to make urban waterfronts more resilient and accessible can find ways to incorporate local values and meanings associated with specific waterfront sites.

5. Discussion and concluding remarks – place protection of an urban waterfront

Our research sought to explore place attachments and meanings associated with a heavily-polluted waterbody and to unpack the various ways that planning and development projects can be

perceived as enhancing or disrupting the existing sense of place held by local residents, and thus why some of these result in place-protective actions, as depicted in our place-protective framework (Figure 5). This framework builds on related concepts in the literature, such as Devine-Wright's (2009) conceptualisation of place change, which presents various stages of individual interpretation to place change to explain responses over time. While prior literature has examined the relationship between sense of place – including both place attachment and place meanings – and environmental stewardship (Murphy, Enqvist, and Tengö 2019; Enqvist et al. 2019; Gottwald and Stedman 2020), this study advances our understanding of how stewardship actions can be used as place-making and place-protection strategies aimed at amplifying local voices and suggesting pathways toward shared governance, such as through organising neighbours to engage in collective decision-making, fostering social cohesion, exchanging knowledge across domains, and collaborating in planning across sectors and scales (see also Connolly et al. 2013; Campbell et al. 2021). Most importantly, the framework stresses that place-disruption is not necessarily about change per se, but rather how change is interpreted and initiates place-protective actions by the community (Anton and Lawrence 2016). This last point emphasises the value of transparency, communication and negotiation between local actors and more powerful external ones, where change is mediated through shared governance. In this sense, place-protective actions need not be seen as impediments to progress, but rather emphasise the importance of incorporating local knowledge and values developed through place making and sense of place into waterfront governance and decision-making (Dürr and Jaffe 2010). Similar importance of shared governance and place-protective actions by local communities has been demonstrated in urban parks, where some residents articulate desires to have a space be “just green enough” to support and enhance existing community uses while limiting the gentrification pressures that green spaces can bring (Curran and Hamilton 2012). Our study, situated in a waterfront context, demonstrates that local uses and values as related to a “blue space” can have similar justice implications.

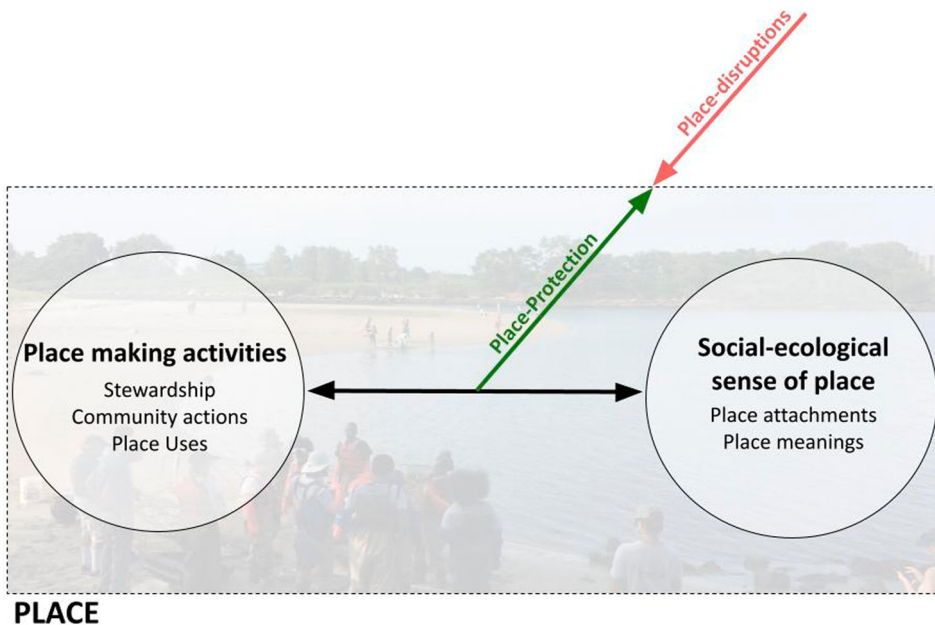


Figure 5. In this framework, sense of place (place attachments and meanings) is directly shaped by (and in turn helps shape) place-making activities (e.g. stewardship and uses) for a given place. Place disruption threatens this relationship, and place-protective activities seek to resist such disruptions.

The framework challenges sense of place concepts and language to be more explicit in the different ways that planning and development projects are perceived and may impact local communities and their relationships to place. Promoting the use of language such as “place-disruption” and “place-protection” can attract attention to the ways that marginalised communities respond to fear of loss and/or erasure through projects perceived to disrupt existing sense of place (Anguelovski 2013). Our framework is consistent with Toolis (2017), who advocates for enhanced understanding of place-making as a means towards helping communities retain ownership over public spaces.

In the context of urban waterfronts, a great deal of literature has explored how waterfront revitalisation in industrialised and industrialising countries creates sense of place (Shamsuddin et al. 2011; Sepe 2013; Palermo and Ponzini 2014). However, this literature still assumes that urban environments that have been “degraded” by pollution or industrial use and abandonment are not considered to hold value for local communities. Our research challenges this assumption by demonstrating the ecological, social, cultural, and livelihood uses, attachments, and meanings associated with the creek by local users. While some place meanings aligned with those identified in prior studies with waterfront stewards in NYC (Enqvist et al. 2019), we found additional meanings created by social aspects of place (e.g. socioeconomics of park users, spiritual practices) as well as sustenance from eating fish caught in CIC. These findings support previous research suggesting that even polluted urban waterways can support activities considered to be important to human well-being, even as shared governance is needed to initiate improvements in water quality, and this can be especially important for more vulnerable populations (Palta et al. 2016). Attesting to the importance of this point, local activists and civic organisations circulated a white paper based on some of the findings described in this paper (Strehlau-Howay et al. 2019) to advocate for an extended environmental impact assessment for the proposed ferry landing, citing the white paper as evidence of the existing place attachments and meanings associated with the creek.

Increasingly, it is recognised that waterfront development and revitalisation projects that are designed and managed collaboratively can help to preserve and restore social, cultural, and natural elements that are of value to local populations as well as support the ecological health of the system (Wagner, Chhetri, and Sturm 2014). This additional requirement for collaborative management poses important questions for the social-ecological dynamics that underpin urban sustainability policy-making, such as how to integrate a broader set of actors into processes of urban waterfront governance. Our study, while focused on a single stretch of NYC waterfront, raises universal questions about the future of urban waterfronts in a time of emphasis on resiliency planning, revitalisation, and reconnection around the world (Leitner et al. 2018). What will happen to existing uses and values associated with waterfront spaces as cities move to “reconnect” their residents to their waterfronts? How can urban planners engage more with existing social-ecological connections when developing green infrastructure approaches to address climate change resilience? Future research could further explore the links between values, risks, and governance in terms of how urban waterfronts are perceived and managed, and develop approaches that support and strengthen existing place attachments and meanings. As city planners look towards their waterfronts, it is essential that proposed revitalisation and resiliency projects attend to justice and equity issues associated with residents’ sense of place, recognising the unique relationships that communities have with their local green and blue spaces.

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References

- Adger, W. N., J. Barnett, F. S. Chapin III, and H. Ellemor. 2011. "This Must Be the Place: Underrepresentation of Identity and Meaning in Climate Change Decision-Making." *Global Environmental Politics* 11 (2): 1–25.
- Altman, I., and S. M. Low. 2012. *Place Attachment*. Vol. 12. New York: Springer Science & Business Media.
- Angelovski, I. 2013. "From Environmental Trauma to Safe Haven: Place Attachment and Place Remaking in Three Marginalized Neighborhoods of Barcelona, Boston, and Havana." *City & Community* 12 (3): 211–237.
- Anton, C. E., and C. Lawrence. 2016. "The Relationship Between Place Attachment, the Theory of Planned Behaviour and Residents' Response to Place Change." *Journal of Environmental Psychology* 47: 145–154.
- Ardoin, N. M., R. K. Gould, H. Lukacs, C. C. Sponarski, and J. S. Schuh. 2019. "Scale and Sense of Place among Urban Dwellers." *Ecosphere* 10 (9): e02871.
- Auyeung, D. N., L. K. Campbell, M. Johnson, N. F. Sonti, and E. Svendsen. 2016. Reading the Landscape: Citywide Social Assessment of New York City Parks and Natural Areas in 2013–2014. Social Assessment White Paper No. 2. Vol. 69, 1–69. New York, NY: New York Department of Parks and Recreation.
- Baker, K. 2013. "City of Water." *New York Times*. <https://www.nytimes.com/2013/10/13/opinion/sunday/city-of-water.html>.
- Basso, K. H. 1996. *Wisdom Sits in Places: Landscape and Language among the Western Apache*. Albuquerque, New Mexico: UNM Press.
- Bunce, S. 2009. "Developing Sustainability: Sustainability Policy and Gentrification on Toronto's Waterfront." *Local Environment* 14 (7): 651–667.
- Campbell, L. K., E. S. Svendsen, M. Johnson, and L. Landau. 2021. "Activating Urban Environments as Social Infrastructure Through Civic Stewardship." *Urban Geography*, 1–22.
- Campbell, L. K., E. S. Svendsen, N. F. Sonti, and M. L. Johnson. 2016. "A Social Assessment of Urban Parkland: Analyzing Park Use and Meaning to Inform Management and Resilience Planning." *Environmental Science and Policy* 62: 34–44.
- Chamlee-Wright, E., and V. H. Storr. 2009. "There's No Place Like New Orleans': Sense of Place and Community Recovery in the Ninth Ward after Hurricane Katrina." *Journal of Urban Affairs* 31 (5): 615–634.
- Charmaz, K. 2006. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. London: Sage.
- Charmaz, K., and L. Belgrave. 2012. "Qualitative Interviewing and Grounded Theory Analysis." In *The SAGE Handbook of Interview Research: The Complexity of the Craft*, edited by Jaber F. Gubrium, James A. Holstein, Amir B. Marvasti, and Karyn D. McKinney, 347–365. London: Sage.
- Connolly, J. J., E. S. Svendsen, D. R. Fisher, and L. K. Campbell. 2013. "Organizing Urban Ecosystem Services Through Environmental Stewardship Governance in New York City." *Landscape and Urban Planning* 109 (1): 76–84.
- Courage, C., and A. McKeown, eds. 2018. *Creative Placemaking: Research, Theory and Practice*. New York: Routledge.
- Cox, M. E., R. Johnstone, and J. Robinson. 2006. "Relationships Between Perceived Coastal Waterway Condition and Social Aspects of Quality of Life." *Ecology and Society* 11 (1).
- Cresswell, T. 2014. *Place: An Introduction*. Oxford, UK: John Wiley & Sons.
- Curran, W., and T. Hamilton. 2012. "Just Green Enough: Contesting Environmental Gentrification in Greenpoint, Brooklyn." *Local Environment* 17 (9): 1027–1042.
- Devine-Wright, P. 2009. "Rethinking NIMBYism: The Role of Place Attachment and Place Identity in Explaining Place-Protective Action." *Journal of Community and Applied Social Psychology* 19 (6): 426–441.
- Devine-Wright, P., and Y. Howes. 2010. "Disruption to Place Attachment and the Protection of Restorative Environments: A Wind Energy Case Study." *Journal of Environmental Psychology* 30 (3): 271–280.
- Doucet, B., R. Van Kempen, and J. Van Weesep. 2011. "Resident Perceptions of Flagship Waterfront Regeneration: The Case of the Kop van Zuid in Rotterdam." *Tijdschrift voor economische en sociale geografie* 102 (2): 125–145.
- Dupre, K. 2019. "Trends and Gaps in Place-Making in the Context of Urban Development and Tourism." *Journal of Place Management and Development* 12: 102–120.

- Dupuis, M., and M. Greenberg. 2019. "The Right to the Resilient City: Progressive Politics and the Green Growth Machine in New York City." *Journal of Environmental Studies and Sciences* 9 (3): 352–363.
- Dürr, E., and R. Jaffe. 2010. *Urban Pollution: Cultural Meanings, Social Practices*. New York: Berghahn Books.
- Ellefson, A. 2015. "Residents Don't Like the Smell of Coney Island Creek Resiliency Study." *Bklynr*. <https://bklynr.com/residents-dont-like-smell-coney-island-creek-resiliency-study-sheepshead-bay/>.
- Enqvist, J. P., L. K. Campbell, R. C. Stedman, and E. S. Svendsen. 2019. "Place Meanings on the Urban Waterfront: A Typology of Stewardships." *Sustainability Science* 14 (3): 589–605.
- Foo, K., D. Martin, C. Wool, and C. Polsky. 2014. "The Production of Urban Vacant Land: Relational Placemaking in Boston, MA Neighbourhoods." *Cities* 40: 175–182.
- Gottwald, S., and R. C. Stedman. 2020. "Preserving Ones Meaningful Place or Not? Understanding Environmental Stewardship Behaviour in River Landscapes." *Landscape and Urban Planning* 198: 103778.
- Gould, K. A., and T. L. Lewis. 2017. *Green Gentrification: Urban Sustainability and the Struggle for Environmental Justice*. Abingdon: Routledge.
- Grau, D., and Z. C. Kekez. 2010. "Where Water Meets the Land: The Rediscovery of the Waterfront." In *Building with Water: Concepts Typology Design*, edited by Z. Ryan, Basel: Birkhäuser, 23–39.
- Harbor Estuary Program. 2012. *The State of the Estuary 2012: Environmental Health and Trends of the New York-New Jersey Harbor Estuary*. http://www.harborestuary.org/pdf/StateOfTheEstuary2012/SOE_Rprt.pdf.
- Immerso, M. 2002. *Coney Island: The People's Playground*. New Brunswick: Rutgers University Press.
- Jorgensen, B. S., and R. C. Stedman. 2006. "A Comparative Analysis of Predictors of Sense of Place Dimensions: Attachment to, Dependence on, and Identification with Lakeshore Properties." *Journal of Environmental Management* 79 (3): 316–327.
- Kadinsky, S. 2016. *Hidden Waters of New York City: A History and Guide to 101 Forgotten Lakes, Ponds, Creeks, and Streams in the Five Boroughs*. New York: The Countryman Press.
- Kensinger, N. 2017. "Five years after Hurricane Sandy, NYC's Coastal Communities Remain Vulnerable." *Curbed NY*. <https://ny.curbed.com/2017/10/26/16551182/hurricane-sandy-nyc-brooklyn-queens-storm-barriers>.
- Kudryavtsev, A., M. E. Krasny, and R. C. Stedman. 2012. "The Impact of Environmental Education on Sense of Place among Urban Youth." *Ecosphere* 3 (4): 1–15.
- Kurlansky, M. 2006. *The Big Oyster: New York in the World, a Molluscular History*. New York: Random House.
- Leitner, H., E. Sheppard, S. Webber, and E. Colven. 2018. "Globalizing Urban Resilience." *Urban Geography* 39 (8): 1276–1284.
- Levers, M. J. D. 2013. "Philosophical Paradigms, Grounded Theory, and Perspectives on Emergence." *Sage Open* 3 (4): 2158244013517243.
- Lew, A. A. 2017. "Tourism Planning and Place Making: Place-Making or Placemaking?" *Tourism Geographies* 19 (3): 448–466.
- Lewicka, M. 2011. "Place Attachment: How Far Have We Come in the Last 40 Years?" *Journal of Environmental Psychology* 31 (3): 207–230. doi:10.1016/j.jenvp.2010.10.001.
- Lincoln, Y. S., and E. G. Guba. 1985. "Establishing Trustworthiness." *Naturalistic Inquiry* 289 (331): 289–327.
- Lyth, A., A. Harwood, A. J. Hobday, and J. McDonald. 2016. "Place Influences in Framing and Understanding Climate Change Adaptation Challenges." *Local Environment* 21 (6): 730–751.
- Maantay, J., and A. Maroko. 2009. "Mapping Urban Risk: Flood Hazards, Race, and Environmental Justice in New York." *Applied Geography* 29 (1): 111–124.
- Maisel, T. 2019. "Ferry Very Good for Coney Island, Residents Say during Visit with Mayor." *Brooklyn Reporter*. <https://brooklynreporter.com/2019/01/ferry-very-good-for-coney-island-residents-say-during-visit-with-mayor/>.
- McCann, M. 2019. *Restoring Oysters to Urban Waters: Lessons Learned and Future Opportunities in NY/NJ Harbor*. New York, NY: The Nature Conservancy.
- McGeehan, P. 2019. "A Ferry Subsidy of \$24.75 a Ride? New York City's Costs Are Ballooning." *New York Times*. <https://www.nytimes.com/2019/04/17/nyregion/new-york-ferry.html>.
- McGranahan, G., D. Balk, and B. Anderson. 2007. "The Rising Tide: Assessing the Risks of Climate Change and Human Settlements in Low Elevation Coastal Zones." *Environment and Urbanization* 19 (1): 17–37.
- McPhearson, T., D. Maddox, B. Gunther, and D. Bragdon. 2013. "Local Assessment of New York City: Biodiversity, Green Space, and Ecosystem Services." In *Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities*, edited by Elmqvist et al., 355–383. Dordrecht: Springer.
- Mohai, P., D. Pellow, and J. T. Roberts. 2009. "Environmental Justice." *Annual Review of Environment and Resources* 34: 405–430.
- Murphy, A., J. Enqvist, and M. Tengö. 2019. "Place-Making to Transform Urban Social-Ecological Systems: Insights from the Stewardship of Urban Lakes in Bangalore, India." *Sustainability Science* 14: 607–623.
- NYC-DEP. 2018. *2018 New York Harbor Water Quality Report*. New York, NYC Department of Environmental Protection.
- NYC-EDC. 2016. *Coney Island Creek Resiliency Study*. New York: NYC Economic Development Council.
- NYC-OEC. 2013. *Water and Sewer Infrastructure. Final Environmental Impact Statement Seaside Park and Community Arts Center*. New York, NYC Mayor's Office of Environmental Coordination.

- NYU Furman Center. 2014. *The Price of Resilience: Can Multifamily Housing Afford to Adapt?* New York University School of Law and Wagner School of Public Service, New York, NY.
- NYU Furman Center. 2018. *State of New York City's Housing and Neighbourhoods in 2018*. New York University School of Law and Wagner School of Public Service, New York, NY.
- Oakley, S., and L. Johnson. 2013. "Place-Taking and Place-Making in Waterfront Renewal, Australia." *Urban Studies* 50 (2): 341–355.
- Palermo, P. C., and D. Ponzini. 2014. *Place-Making and Urban Development: New Challenges for Contemporary Planning and Design*. London: Routledge.
- Palta, M., M. V. Du Bray, R. Stotts, A. Wolf, and A. Wutich. 2016. "Ecosystem Services and Disservices for a Vulnerable Population: Findings from Urban Waterways and Wetlands in an American Desert City." *Human Ecology* 44 (4): 463–478.
- Palta, M. M., N. B. Grimm, and P. M. Groffman. 2017. "'Accidental' Urban Wetlands: Ecosystem Functions in Unexpected Places." *Frontiers in Ecology and the Environment* 15: 248–256.
- Pritchard, S. 2018. "Place Guarding: Activist Art against Gentrification." In *Creative Placemaking: Research, Theory and Practice*, edited by Cara Courage, and Anita McKeown, 140–155. New York: Routledge.
- Raymond, J. 1890. "Treatment of Sewage by Chlorine, Precipitation, and Sedimentation." *Public Health Papers and Reports* 16: 132.
- Røe, P. G. 2014. "Analysing Place and Place-Making: Urbanization in Suburban Oslo." *International Journal of Urban and Regional Research* 38 (2): 498–515.
- Sepe, M. 2013. "Urban History and Cultural Resources in Urban Regeneration: A Case of Creative Waterfront Renewal." *Planning Perspectives* 28 (4): 595–613.
- Shamsuddin, S., N. S. Abd Latip, A. B. Sulaiman, N. Ujang, N. A. Alias, and N. A. Azlan. 2011. "Historic Waterfront and the Sense of Place: The Case of Two UNESCO World Heritage Sites of Malaysia." *International Journal of Arts & Sciences* 4 (17): 191.
- Shamsuddin, S., N. A. Latip, and A. Sulaiman. 2008. "Waterfront Regeneration as a Sustainable Approach to City Development in Malaysia." *WIT Trans. Ecol. Environ* 117: 45–54.
- Smith, J. W., M. A. Davenport, D. H. Anderson, and J. E. Leahy. 2011. "Place Meanings and Desired Management Outcomes." *Landscape and Urban Planning* 101 (4): 359–370.
- Spivack, C. 2016. "Info Dump! Locals Demand Answers from Silent Dep on Coney Creek Sewage Spill." *Brooklyn Paper*. <https://www.brooklynpaper.com/info-dump-locals-demand-answers-from-silent-dep-on-coney-creek-sewage-spill/>.
- Spivack, C. 2017. "Heavy Metal: City Cleared to Dump Millions of Gallons of Partially-Treated, Contaminated Water into Coney Island Creek." *Brooklyn Paper*. <https://www.brooklynpaper.com/heavy-metal-city-cleared-to-dump-millions-of-gallons-of-partially-treated-contaminated-water-into-coney-island-creek/>.
- Stedman, R. C. 2002. "Toward a Social Psychology of Place: Predicting Behavior from Place-Based Cognitions, Attitude, and Identity." *Environment and Behavior* 34 (5): 561–581.
- Strehlau-Howay, L., B. Manziolillo, T. Graham, C. Thomas, L. Campbell, M. Johnson, and A. Toomey. 2019. *The NYC Social Assessment: Understanding Waterfront Users Coney Island Creek Waterfront Profile*. New York: USDA Forest Service.
- Tibbetts, J. 2002. "Coastal Cities: Living on the Edge." *Environmental Health Perspectives* 110 (11): 674.
- Toolis, E. E. 2017. "Theorizing Critical Placemaking as a Tool for Reclaiming Public Space." *American Journal of Community Psychology* 59 (1-2): 184–199.
- Toomey, A. H., L. Strehlau, B. Manziolillo, and C. Thomas. 2020. "The Place-Making Potential of Citizen Science: Creating Social-Ecological Connections in an Urbanized World." *Landscape and Urban Planning* 200: 103824.
- Trentelman, C. K. 2009. "Place Attachment and Community Attachment: A Primer Grounded in the Lived Experience of a Community Sociologist." *Society and Natural Resources* 22 (3): 191–210.
- Tuan, Y. F. 1977. *Space and Place: The Perspective of Experience*. Minneapolis: University of Minnesota Press.
- von Glasow, R., T. D. Jickells, A. Baklanov, G. R. Carmichael, T. M. Church, L. Gallardo, C. Hughes, et al. 2013. "Megacities and Large Urban Agglomerations in the Coastal Zone: Interactions Between Atmosphere, Land, and Marine Ecosystems." *Ambio* 42 (1): 13–28.
- Wagner, M., N. Chhetri, and M. Sturm. 2014. "Adaptive Capacity in Light of Hurricane Sandy: The Need for Policy Engagement." *Applied Geography* 50: 15–23. doi:10.1016/j.apgeog.2014.01.009.
- Williams, M. 2004. "Sustainable Place Making in Waterfront Revitalisation: Balancing the Interests." *Australian Planner* 41 (2): 30–31.
- Williams, D. R. 2008. "Pluralities of Place: A User's Guide to Place Concepts, Theories and Philosophies in Natural Resource Management." In *Understanding Concepts of Place in Recreation Research and Management*, edited by L. E. Kruger, T. E. Hall, and M. C. Stiefel, 7–30. PNWGTR-744. Portland, OR: USDA Forest Service, Pacific Northwest Research Station.
- Williams, D. R. 2014. "Making Sense of 'Place': Reflections on Pluralism and Positionality in Place Research." *Landscape and Urban Planning* 131: 74–82.
- Wyckoff, M. A. 2014. "Definition of Placemaking: Four Different Types." *Planning & Zoning News* 32 (3): 1.