SPECIAL FEATURE: ORIGINAL ARTICLE

Sense of place in social-ecological systems: From theory to empirical exploration

Place meanings on the urban waterfront: a typology of stewardships

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Abstract

Civic engagement in environmental management is often seen as linked to sense of place, sometimes with an assumption—explicit or implicit—that strong place attachment promotes a deeper stewardship commitment. This study challenges this idea by arguing that stewardship can develop along different pathways depending on people's place meanings. We investigate sense of place and stewardship practices by examining three types of civic groups engaged in protecting and restoring waterfronts and water bodies in New York City: environmental groups, community groups and recreational groups. Using semi-structured interviews and Likert scale surveys, we assessed stewardship activities, place attachment and place meanings that group members ($n = 31$) associate with their site. Our findings show that place meanings help differentiate between groups based on how they currently view the site (as a place of work, a place of home, or a place of use), and the goals of their stewardship. Some groups work to restore what the place was previously, others work to protect what it currently is, while others work to transform their place into something new. These findings demonstrate how stewardship can develop along different pathways, and by taking place meanings into account we can extend knowledge about how sense of place is linked to behavior as well as better describe the different pathways. Place meanings thereby provide a basis for a typology of stewardships that helps describe different roles that civic engagement can take in environmental management.

Keywords Civic engagement · New York City · Place attachment · Place meanings · Sense of place · Stewardship

Introduction

Civic engagement in stewardship sometimes seems like a panacea for addressing the many challenges with environmental management. It has been presented as providing

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ecosystem services (Connolly et al. 2013; Andersson et al. 2014), leveraging local ecological knowledge (Berkes et al. 2000; Buytaert et al. 2014), strengthening community cohesion and social capital (Tidball and Stedman 2012; Tidball and Krasny 2014), and building public support by connecting ecological and social concerns (Svendsen and Campbell 2008; Schultz et al. 2011). Naturally, initiatives driven by or involving local residents do not automatically deliver all of these benefits in every instance. But what determines what outcomes are more likely? Can stewardship lead in multiple directions, and if so, how do initial motivations matter?

Civic engagement is seen as particularly important in city environments, where most green spaces are heavily altered by human use and protection usually needs to allow for some continued presence of people (Ernstson and Sörlin 2009; Krasny and Tidball 2012; Andersson et al. 2017). Some have argued that these alterations limit inhabitants' opportunities to easily interact with and develop an attachment to natural areas (Nisbet et al. 2009; Beatley and Newman 2013), which risks undermining engagement in stewardship and other pro-environmental behaviors (Scannell and Gifford

2010; Chapin and Knapp 2015). However, civic engagement in urban environmental stewardship has been widely documented (Barthel et al. 2005; Ernstson 2011; Bendt et al. 2013; Enqvist et al. 2014; Connolly et al. 2014; Fisher et al. 2015; Romolini et al. 2016). Studies have also shown that stewardship can look different depending on people's relation to the sites they steward (Andersson et al. 2007), and that what meanings a place carries is particularly important (Stedman 2003). This suggests that people's engagement in environmental stewardship might have more dimensions than just strong or weak attachment to a place.

This study uses sense of place theory and methods to understand different pathways to civic engagement and develop a typology of environmental stewardship. Following recent investigations of sense of place's relevance for social–ecological systems research (Stedman 2016; Masterson et al. 2017a), we investigate stewardship by drawing in particular on a social psychology approach to sense of place (Shamai 1991; Jorgensen and Stedman 2001). We distinguish between two aspects of sense of place: place attachment, which is the strength of the bond one has to a place; and place meanings, referring to the interpretations and ideas one has about what kind of place it is or should be (Stedman 2008; Smith et al. 2011, 2012; Brehm et al. 2013). This means that two individuals feeling equally strong attachment to a place may have fundamentally different ideas of what is important about that place, and how it should be used and managed (Yung et al. 2003; Devine-Wright and Howes 2010; Masterson et al. 2017a, b). Further, pro-environmental behavior is multifaceted and can be expressed through, for instance, personal lifestyles, political activism or direct stewardship of land (Larson et al. 2015). Research on volunteering more broadly has shown that even actions that have similar outcomes can be driven by different psychological needs of the person performing them (Clary et al. 1998). The stewardship concept is itself often interpreted differently, sometimes describing outcomes, other times motivations (Enqvist et al. 2018). The connection between sense of place and environmental stewardship is, therefore, likely to include a range of different kinds of relationships (Masterson et al. 2017a).

Our paper aims to explore this range of relationships and begin to outline a typology of stewardship pathways. We base this on (a) the different goals that stewardship groups are working towards, and (b) how their members' relation to place influences these objectives. This builds on research by Andersson et al. (2007), who compared three types of "green space managers" (one being local residents managing allotment gardens) and found sense of place to be a predictor of protective norms as well as levels of local ecological knowledge. The study also extends recent work by Krasny et al. (2014), who examine how place meanings especially motivate volunteerism in environmental stewardship. More

generally, social–ecological systems scholars emphasize that stewards should be viewed as embedded in the system they try to influence, as opposed to formal managers who can be external and may not be motivated by personal concern (Chapin et al. 2009). This embeddedness implies a higher degree of normative decisions about what outcomes are preferable from a subjective viewpoint—something that systems-oriented research sometimes struggles to engage with (Hahn and Nykvist 2017). Here, sense of place offers a way forward by providing conceptual tools to measure and compare such normative preferences (Stedman 2016).

We focus our research on nine civic groups in New York City (NYC), USA. All groups have in a previously conducted survey by the NY-NJ Harbor and Estuary Program (HEP) reported involvement in stewardship activities for waterfronts and water bodies (Boicourt et al. 2016). That survey, and our study, defines stewardship as 'work to conserve, manage some area of, restore or transform, monitor the quality of, advocate for, or educate the public about the local environment' (see also Svendsen et al. 2016). Based on previous research (Svendsen and Campbell 2008) and consultations with HEP staff (Pirani and Boicourt, personal communication, 2016-03-28), we separate the groups into three sub-categories (see "Methods" for further details): environmental groups, where stewardship focuses on caring for and promoting a site primarily for the sake of its nature and ecology; community groups, where stewardship is carried out as part of a broader objective of improving the local neighborhood; and recreational groups, where stewardship is part of activities to promote access to and certain uses of a particular area. We note that these categories are not considered discrete or definitive; since they are suggested by HEP staff, they should be seen as a product of practical use in NYC. The initiatives we studied in this context were all easily associated with one specific group type, but often displayed some characteristics of another type. Our categories are tentative; they may or may not be sufficient for describing stewardship groups in other sociocultural and geographical contexts.

In this study we explore the breadth of different kinds of engagements in waterfront stewardship, which means that instead of studying a sample representative of stewardship more broadly, we have selected for diversity (see "Methods"). We also focus explicitly on smaller, locally organized groups, based on the assumption that their members will have a more personal connection to the place they steward. Certain characteristics of urban landscapes—the heavy use of green spaces, abundant and diverse stakeholder groups—mean that we expect to find a relatively high diversity of people–place relationships (Ernstson and Sörlin 2009; Krasny and Tidball 2012; Campbell et al. 2016; Andersson et al. 2017). We focus on a site type that is receiving increased attention by planners and citizen, but where civic

stewardship is still under-researched: the city's waterfronts, waterways and water bodies (NYC DEP 2010, 2014; Boicourt et al. 2016).

The investigation is guided by a qualitative analysis of four propositions (P1-4), set up to structure interpretation of the findings (given the acknowledged overlap of our group categories and the non-random sampling of our study participants, we do not engage formal hypothesis testing). First, we explore the assumption that strong attachment means more stewardship: **groups where members indicate higher place attachment will expend a greater effort on stewardship activities (P1)**. We then turn to the role of the three types of stewardship groups: environmental, community and recreational. Previous work has demonstrated that local stewards can develop very specific place meanings related to the site and work that they do (Krasny et al. 2014); moreover, different entry points to that work can predict both what ecological knowledge gets drawn on, what protective norms are expressed, and what actions are taken (Andersson et al. 2007). We, therefore, propose **that group type will predict what place meanings group members associate to their site (P2)**. Group type could also have a more direct effect; our third proposition is **that group type will be associated with specific stewardship objectives (P3)**.

Finally, we explore the possibility that group type is not important and instead propose **that group members' place meanings will predict what stewardship objectives the group is working towards (P4)**. This is based on the view that because places are in part socially constructed sense of place and in particular place meanings can be renegotiated (Stedman and Ingalls 2014). Stewardship seeks to promote certain outcomes and prevent others; in other words, the steward enacts a preference for some place meanings over others (Masterson et al. 2017a).

Methods

Study area: New York City waterfronts

The waters of the New York–New Jersey Harbor Estuary constitute the largest public space in the United States' largest metropolitan area (Fig. 1). The past two decades have seen a growing number of public spaces along waterfronts, enabled by reduced industrial use and improved water quality. Still, many areas have limited access due to physical conditions, safety concerns, point source pollution, and a lack of facilities for boating or swimming (Boicourt et al. 2016). Water quality is not yet complying with Clean Water Act standards (NYC DEP 2010); a key reason is combined sewer overflow (CSO), where untreated wastewater is released into waterways when runoff from heavy rain or snowmelt mix

with sewage and flood the aging infrastructure (McPhearson et al. 2014).

NYC has invested several billion dollars in improving water quality, including improved grey infrastructure such as sewers, pumping stations and CSO tanks, and green infrastructure to reduce storm water runoff including green roof, sidewalk planters and 'bioswales'—i.e., gently sloping, usually vegetated drainage courses to increase infiltration (NYC DEP 2010). The city is also pursuing partnerships with civic organizations to inform them about and organize maintenance of green infrastructure retrofits both at the water's edge and in upland areas. Civic stewards have been shown to be early users and vocal champions for the restoration of urban waterways, and engage in a range of tactics including cooperation with government in shared projects: contestation, including litigation and advocacy, and direct use and engagement with the resource (Campbell 2006, 2007).

Selecting civic engagement groups

This study uses a primarily qualitative research approach in order to complement previous and ongoing research led by the United States Forest Service (USFS) studying urban environmental stewardship in NYC using more quantitative, large-N approaches (Svendsen et al. 2016). Our groups were selected from a list of 182 respondents to a 2015 survey of shoreline stewardship groups (Boicourt et al. 2016). All groups have one specific, physical site where they do environmental stewardship; all sites are on various waterfronts, waterways and water bodies in the NYC municipality. We selected groups that have fewer than ten full-time employees, and have been active at least 5 years, based on the assumption that smaller organizations with longer history are more likely to have members with a personal relationship with the site in which they work. The full selection process (see Supplementary material S1) resulted in a list of 28 groups, which was discussed with key informants at USFS and HEP and deemed appropriate for capturing key characteristics of the types of groups active in the area (Pirani and Boicourt, personal communication, 2016-03-28).

Of these 28 groups, ten were eliminated after initial contact revealed that three or more interviewees could not be identified, or that the group was working with multiple sites. Nine of the remaining 18 groups were included in the study, selected for (a) even representation of environmental, community and recreational groups, and (b) having no more than one group of each type in each NYC boroughs (Fig. 2). We also (c) opted for diversity in terms of group size (budget), group age (years), site size (acreage), levels of professionalization (number of paid staff), and for recreational groups, the type of activity (e.g., canoeing, rowing, sailing), based on HEP survey responses (Boicourt et al. 2016). Key metrics

Fig. 1 Locations of the sites that studied groups work with, and major water bodies of relevance for this study (in italics). Environmental groups are indicated by green symbols, community groups are purple, and recreational groups are yellow. New York City's five boroughs are indicated as follows: Brooklyn (orange), the Bronx (blue), Manhattan (green), Queens (red) and Staten Island (turquoise)
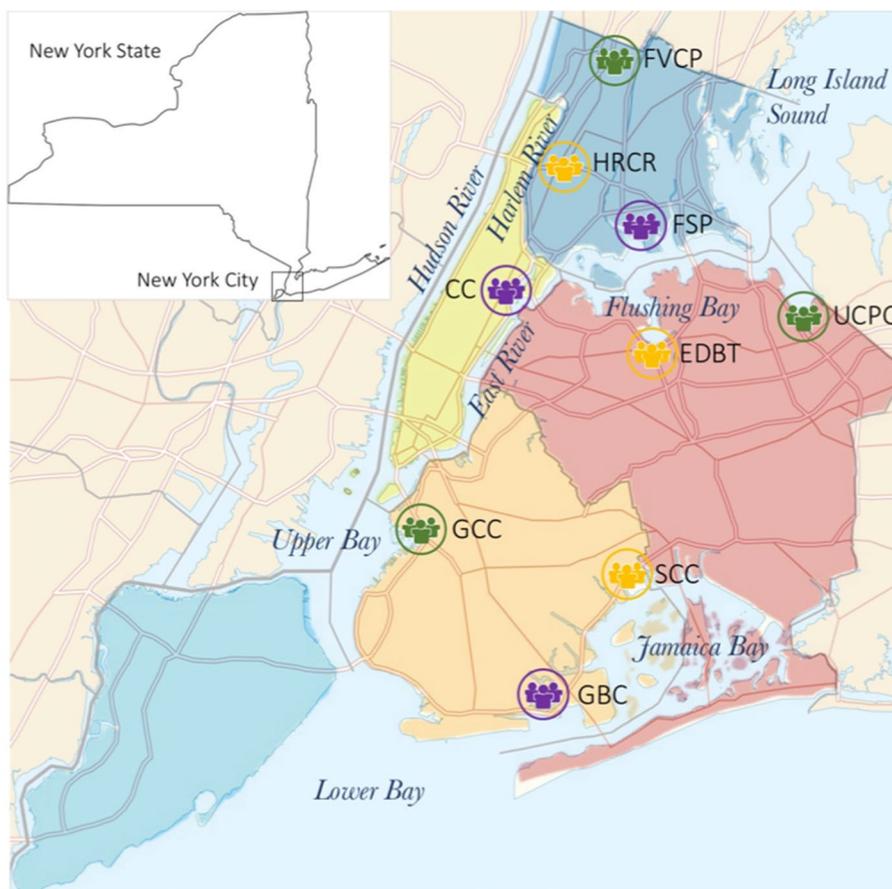
CC	CIVITAS Citizens	UCPC	Udall's Cove Preservation Committee
FSP	Friends of Soundview Park	HRCR	Harlem River Community Rowing
GBC	Gerritsen Beach Cares	EDBT	Empire Dragon Boat Team
FVCP	Friends of Van Cortlandt Park	SCC	Sebago Canoe Club
GCC	Gowanus Canal Conservancy		

Fig. 2 Out of 18 groups identified from the HEP survey, 9 were selected (circled) for equal representation of environmental (green), community (purple) and recreational groups (yellow) in different boroughs of the city

from this survey, including how much effort groups spend on environmental stewardship compared to other activities, are presented in Table 1.

Capturing meanings, attachment and stewardship activities

We interviewed three to four people in each group, selected based on the main contact person's view of who were the most active staff or members. Interviewees were promised anonymity, but all agreed that the name of their group could be used in this publication. We refer to interviewees using the acronym of their group (Fig. 1) and a randomized identity number. We met one interviewee at a time, to capture individual-level responses. Meetings were held at a time and place convenient to the interviewee, often at the groups' site and always with printed site maps for reference. Interviews ($n = 31$) were semi-structured and focused on three main topics: the group and its activities, the place where it works, and the respondent's personal involvement in the group. Interviews lasted about 30–120 min. After the interview, each participant was asked to complete a survey with Likert-scale items to measure place meanings, place attachment and group dynamics (Supplementary material S2). Place attachment items are derived from previous studies (see Jorgensen and Stedman 2001; Stedman 2003), and after three pilot interviews, two new items were added to capture respondents' sense of pride for their site (Q & R in survey). Respondents scored these items on a 1–5 scale, which was subsequently used to calculate average place attachment for each group.

We coded interview transcripts for stewardship activities, achieved outcomes, factors that influence members' perception of their site, views on mixed uses of the site, and the groups' relationship with the local community. Sections coded for stewardship activities were categorized as conservation, management, monitoring, restoration, advocacy and/or education (Svendsen et al. 2016).

We also coded for different place meanings, using the same categories as were included in the survey (Supplementary material S2). These categories had no precedent in literature, as it is crucial that they emerge from the particulars of the place and the people engaging with it. They were developed and tested through "member checks" (Creswell 2014) in three pilot interviews with other stewardship group members, and subsequently adjusted to capture the range of place meanings described during the face-to-face interview. We have intentionally chosen to focus these categories on place meanings that give 'direction' to stewardship activities by indicating a specific aspect or quality of a site that groups might try to influence, as opposed to more abstract meanings such as personal identity or community resilience. For brevity in this text, the place meaning categories are

referred to as 'aesthetic qualities', 'physical form', 'natural features', 'environmental quality', 'resources/produce' (e.g., fish caught, seashells collected, reeds harvested), 'community events', 'group work', 'private visits' and 'memories' (full description in Supplementary material S2). An 'other' category was also included in the survey, where respondents could enter additional place meanings they felt were missing. In the interview transcripts, we coded for place meaning categories and used the frequency of code occurrence at the group level to assess whether members conceive of their site primarily as one defined by its aesthetic qualities, one with certain physical features, one having a specific type of nature, or something else.

Results

Comparing the three group types, our survey results show that community groups have stronger place attachment than all other groups while the difference between environmental and recreational groups is negligible (Fig. 3). This pattern is observed for all items used to measure place attachment (items K-R, Supplementary material S2). Contrary to our first proposition (P1) place attachment, therefore, seems to be a poor predictor of stewardship effort, which according to previous data is highest for environmental groups and highly variable among community groups (see Table 1 above).

Compared to place attachment, our findings on place meanings provide a richer source of data to understand group differences and similarities. Environmental groups stand out in that their members refer to specific place meanings they associate with their site more often (on average, 27 times per interview) than people in community groups (17 times) and recreational groups (16 times). Quotes about physical features, type of nature and group work are commonly discussed by environmental groups, while resources, community events and personal memories are more likely to be mentioned by community group (Fig. 4). To discuss proposition 2–4, the following sections provide further details about what characterizes the three group types in terms of (a) stewardship functions performed, (b) key place meanings associated with the site's current condition, and (c) place meanings invoked to describe kind of place they strive to promote through their stewardship efforts. For reference, all groups' mission statements can be found in Supplementary material S3.

Stewardship by environmental groups

Friends of Van Cortlandt Park (FVCP), Udall's Cove Preservation Committee (UCPC) and Gowanus Canal Conservancy (GCC) are all engaged in stewardship focusing on urban environments and their living ecosystems, such as

Table 1 Summary of studied groups' responses to the HEP Survey (Boicourt et al. 2016), with our categorization ("Group type") added

Group type	Group name	Steward-ship effort (%)	Conserve	Manage	Monitor	Advocate	Educate	Site features	Borough	Staff	Volunteer hours/year	Annual budget	Year founded
Environmental	Friends of van cortlandt park	60–79	✓	✓	✓	✓	✓	Watershed	Bx	6	3700	$200 K–$500 K	1992
	Gowanus canal conservancy	80–100	✓	✓	✓	✓	✓	Watershed, waterway, waterfront	Bk	6	3685	$200 K–$500 K	2006
	Udalls cove conservation committee	80–100	✓	✓	✓	✓	✓	Watershed, waterway, waterfront, bay	Q	0	500	$10 K–$50 K	1969
Community	CIVITAS citizens	40–59	✓		✓	✓	✓	Waterway, waterfront	M	4	100	$200 K–$500 K	1981
	Friends of sound-view park	80–100	✓	✓		✓	✓	Waterway	Bx	N/A	2650	Prefer not to answer	2010
	Gerritsen Beach Cares	20–39	✓	✓	✓	✓	✓	Waterfront, bay	Bk	4	800	$10 K–$50 K	1997
Recreational	Empire dragon boat team	20–39	✓		✓	✓	✓	Watershed, marina, bay	Q	0	400	$50 K–$100 K	2009
	Harlem river community rowing	0–19	✓			✓		Waterway	Bx	2	N/A	$10 K–$50 K	2006
	Sebago canoe club	20–39	✓		✓		✓	Waterfront, bay	Bk	N/A	3400	$10 K–$50 K	1934

Boroughs are abbreviated: Bk/Brooklyn, Bx/the Bronx, M/Manhattan, Q/Queens. "Stewardship effort" refers to what percentage interval the respondents selected to indicate how much of their group's activities is devoted to environmental stewardship
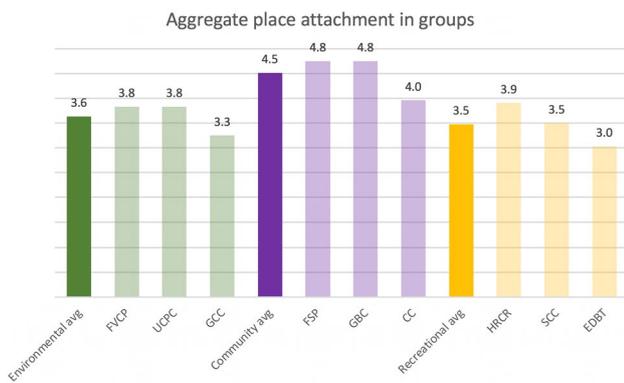
Fig. 3 Aggregate place attachment in studied groups on a scale from 1 to 5, averaged from eight survey items (items K-R, see Supplementary material S2). Environmental groups are shown in green, community groups in purple, and recreational groups in yellow
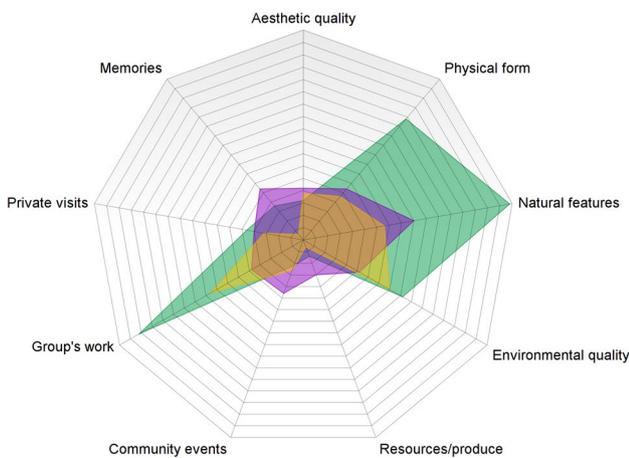

Fig. 4 Polygons indicate the average number of times that respondents in each group type referred to their site using one of the nine studied place meanings. The green field represent the average for environmental groups, purple represents community groups, yellow represents recreational groups

parkland, watersheds, and wetlands. UCPC is run by local volunteers residing in the vicinity of their site, while FVCP and GCC have a core of paid staff living both nearby their site and elsewhere.

Stewardship functions The three groups all do the same type of stewardship work: management, education, and advocacy. In Van Cortlandt Park in the Bronx, FVCP primarily educate visitors about its ecology and environment, and also make considerable efforts to manage trails, waterways and vegetation. UCPC does similar work but prioritize management over education, as the watershed of Udall's Cove in eastern Queens receives fewer visitors and little maintenance by city authorities (Fig. 5). In the densely built-up neighborhood around Gowanus Canal

in Brooklyn, GCC's management focuses on maintaining street trees and bioswales set up to reduce storm water runoff; its ambitious education program aims to spread the idea of the Gowanus watershed as a cohesive area to be stewarded to prevent sewers from overflowing. All groups actively advocate for the city to do more for their site: FVCP for addressing waterway pollution, UCPC for expanded parkland boundaries, GCC for a new development vision that acknowledges how both ecological and industrial production has shaped the canal and its vicinity.

> Our primary purpose was to make sure that all of this remaining, undeveloped land would be protected and preserved. Almost all of it is—… and the city has a commitment to acquire [the four or five acres that remain], but until there's really a threat of development they just don't do it.
> UCPC-83

Current meanings In terms of place meanings, all environmental group members talk about their sites primarily in terms of its various natural features, and the work that the group has done there (Table 2). However, the exact type of nature and work differs; for example, respondents talking about Van Cortlandt Park and Udall's Cove typically refer to and appreciate the more undisturbed and 'wild' ecosystems. Visitors and some human activities are welcome, but also seen as potential threats. When asked about a golf course located within Van Cortlandt Park, one interviewee responded:

> I guess in your funny outside perspective you could see it as part of the park, [but] when you are inside of the park working, and you are aware of the difficulties like fertilizer usage … I see [the golf course] as something that is impinging on what I feel the park is. Which for me is the forested areas, … the waterways. So I know it's a part of the park, but … it doesn't have the essence of what I would believe a park should be.
> FVCP-14

In comparison, at Gowanus Canal—located in a dense and partly industrial area in Brooklyn—interviewees more often describe natural features that are not only modified by human activities, but also intertwined with the built environment, such as community gardens, bridge bulkhead habitats, and street trees.

Envisioned meanings FVCP and UCPC share similar ideas of what their respective sites should be: both seek to primarily *preserve* it in its current form, while also promoting access to the extent it can be done without harming the environment. To this end, they work to promote people's understanding of and care for nature in an undisturbed 'pristine' state. FVCP respondents link this to their shared

Fig. 5 Solitary fishing at Udall's Cove, Queens

training in ecology and other natural sciences; in UCPC, members instead refer to childhood memories and personal bonds from working with a site so close to home: "You reconnect, and I guess you feel closer to nature. … And when you go back and you see … a tree that you planted that's [now] 40 feet high. That's, you know, … there's something to it" (UCPC-92).

Rather than protecting a pristine environment, GCC embrace the industrial and urban component of the ecosystem. Their vision is more *transformative*, to establish a new idea of what Gowanus is:

> We needed to … stop having the community think of … the environmental issues of the canal being bulkhead-to-bulkhead. … We stopped talking about just the canal, and we broadened the conversation to represent the full watershed. … It's not just the 68,000 people who live in …–what is referred to as Gowanus neighborhood—but it is the 210,000 people who live in the watershed, who are the constituents, who should be concerned about the canal, … green space connectivity, about tree canopies, about permeable surfaces, bioswales, storm water management. We want to educate all of those.
> GCC-76

Stewardship by community groups

CIVITAS Citizens (CC), Friends of Soundview Park (FSP) and Gerritsen Beach Cares (GBC) are all engaged in activities to promote and improve local neighborhoods and communities near the NYC waterfronts. CC is run by several paid staff, GBC is run by community members volunteering

to improve their neighborhood. FSP is also run by volunteers, most of whom live elsewhere, but engage to promote specific activities in Soundview Park.

Stewardship functions Unlike environmental groups, community groups vary in their stewardship activities. GSP conserves the treasured waterfront neighborhood of Gerritsen Beach in southern Brooklyn, advocates for the city to maintain wetlands and waterways, and organizes ongoing management such as beach cleanups. In Soundview Park in the Bronx, FSP's stewardship includes management in the form of cleanups, but primarily they work to educate nearby residents about the park and creating a more positive image of it. CC's work for the East River Esplanade in Manhattan focuses on advocating for waterfront restoration, and educating the public to raise support especially in nearby East Harlem:

> [Pier 107 is] 90% closed right now because it's got a pavilion on top with a deteriorating and collapsing roof. So we got behind the … advocacy to take down the roof and temporarily reopen it in a nice way … just to bring people back out on the waterfront, let them experience it, feel excited about it, and end up creating, we hope, some momentum for funding for a permanent pier.
> CC-20

Current meanings The natural features form a central part of the place meanings expressed by community group interviewees, often as a general appreciation for the living nature at their site, including vegetation and various avian, terrestrial and aquatic vegetation, avian and marine creatures (Table 2). The staff at CC further refer to their site's physical features that they deem essential for improving

Table 2 Types of place meanings most often invoked by interviewees to describe their site, and examples of specific words used by respondents in their interviews

		Natural features	Group work	Physical form/environ. quality	Other place meaning
Environmental groups	Friends of van Cortlandt Park	Wetlands, invasives, natives, amphibians, dragonfly, crayfish, aquatic habitats, old growth	Removing invasives, work by hand, teaching, collect data, getting other people excited, planted	–	–
	Gowanus Canal Conservancy	Community gardens, industrial, urban ecology, estuary, rich ecosystem, bioswales, street trees, herons, crabs	Fundraising, educating the folks, built [...] bioswales, clean and green events, urban ecology lectures, propagating plants	–	–
	Udalls Cove Preservation Committee	Mud flats, wooded uplands, red fox, wild and wonderful, bald eagle, wild rose bushes, invasives	Manual labor, build the footbridge, make habitat, forest restoration, designed water runoff program	*Physical form*: deep ravine, gravel path, footbridge, platform, kayak ramp, woodchip trails, pier	–
Community groups	CIVITAS Citizens	Ecological edge, marsh grasses, living shoreline, fiddler crab, sea gulls, natural waterfront, oysters	–	*Physical form*: platforms, bulkhead, pavilion, collapsing roof, railing, the pier, hard edge	–
	Friends of Soundview Park	Waterfront, life down there, birds, trees, butterfly, wildlife in the river	Clean up the river, planting, made a difference, hard-forking people in the area, got a plaque for the work	–	*Community events*: theater, arts, picnics, summer festival, parties, barbecuing, our event
	Gerritsen Beach Cares	Marshland, birds, salt water, sea air, possums, crabs, salt hay grass, mussel beds, ticks, snakes, black skimmer	–	*Environmental quality*: so much garbage, toxins, dump stuff, environmental quality, water's been cleaned, clean ups, water quality	*Memories*: [Sandy] hurt us, 3.5 years ago, played ball there, girlfriend back there once, [dad] took me swimming, clammed here
Recreational groups	Empire Dragon Boat Team	–	–	*Environmental quality*: sewage overflow, plastic bottles, condoms, dead animals, highly contaminated, scent along could kill you, feces	–
	Harlem River Community Rowing	–	Equipment is in order, maintain relationship with the park, make sure everyone's safe, recruiting students [from] the area	*Physical form*: fence, cement wall, no access, gentle shore, fairly calm river, protected from the wind, like a canal, [few] docks	*Aesthetic quality*: beautiful view, some really ugly terrain, nicer stretch is up here, aesthetically pleasing, ugly stretches
	Sebago Canoe Club	Clam and oyster beds, eels, crabs, oysters are filterers, high tide, marsh, water birds, oyster catchers	Maintaining the fleet, giving back, schedule cruises, maintain the facility, take [inner city kids] out on the water	–	–

The same words were sometimes coded under more than one type of place meaning. "Natural features" and "Group work" were most common types of place meanings and have their own columns to facilitate cross-group comparison. Empty cells indicate a type of place meaning that was not common in interviews with that group

Fig. 6 The Butterfly Meditation Garden in Soundview Park, the Bronx

use and access; volunteers at FSP associate their site to the group's work and numerous social events taking place there, including community gardening, meditation classes and music festivals (Fig. 6); GBC members reference their personal memories of growing up in the area, as well as environmental issues following Hurricane Sandy which devastated the area in 2012 (Fig. 7):

> Unfortunately, we got sidetracked by Sandy, and you know, our efforts were applied elsewhere. But now we're looking to get back to what we originally were set out to do: … cleanups and … family togetherness, neighborhood, community gathering.
> GBC-79

Envisioned meanings Just like for current stewardship functions, community groups are more heterogeneous than other stewardship group types in terms of the end goals of their work. CC wants to *restore* degraded waterfront infrastructure and accessibility, including partly reinventing it as a recreational and social meeting point. GBC expresses a strong desire to protect and *preserve* Gerritsen Beach environment in its current form, for their children to steward in the future. FSP members instead see their activities as an effort to *transform* Soundview Park into something new and improve local residents' wellbeing in the process. The areas' history of crime and garbage dumping is a thing of the past:

> We try to not to talk about the old, bad times. Everything's about the good times, the potential: the potential of the park, the potential of the neighborhood, you know, getting more people involved. That's what we really want to concentrate on, getting these people out of the house and come into here for our monthly meetings, and work together.

Fig. 7 Dragon boaters at practice in Flushing Bay, Queens

FSP-70

Stewardship by recreational groups

Empire Dragon Boat Team (EDBT), Harlem River Community Rowing (HRCR) and Sebago Canoe Club (SCC) do stewardship as part of their work to promote water-based recreation. Apart from a few paid trainers, the groups are all run by volunteers; most members (all of the most active ones) live in other neighborhoods than the one where their site is located.

Stewardship functions Compared to other groups, stewardship activities are a low priority for recreational groups, but all three have at least some members that do management by participating in annual cleanups. EDBT also advocates for the city to address the severe CSO problems in Flushing Bay, and monitors water quality as part of an oyster farming project. HRCR and SCC are less engaged in stewardship, but do educate the public about the waters they use, including its marine life:

> Because we're on public land, we have an obligation to the community. So our mission is to teach people about watersports—not just kayaking: canoeing, sailing, kayaking. … And to, you know, to protect the water.
> SCC-84

Current meanings Recreational groups invoke different types of place meanings, each seemingly stemming from the physical conditions of their site and the needs of the specific activities the groups engage in (Table 2). Both the rowers in HRCR and the sailors and paddlers in SCC link their site to work they do for the group, primarily equipment maintenance and teaching students. SCC members are the only ones attaching significance to the natural features of their site, in positive descriptions of Jamaica Bay's tidal marine environment. For Harlem River, HRCR respondents instead refer mostly to physical features of the shorelines, since these influence wake and thereby rowing conditions, and aesthetic qualities, which vary with the location on the river. EDBT members describe Flushing Bay almost exclusively referring to its (poor) environmental qualities. The group is highly critical of currently highly polluted waters, and this group has the lowest average place attachment observed in this study (3.0). However, some also view the current problems as a call to action:

> On some level I feel like it's very symbolic as that I'm trying to get myself in better shape. I feel like it's important to get the water in better shape, and I just feel like … when you know something, you have a responsibility to take action.
> EDBT-1

Envisioned meanings Recreational groups have comparatively modest visions for their sites, seeing as their stewardship efforts are secondary to the main recreational activities. They all want clean waters and adequate access, both for themselves and other users, but depending on existing conditions this means different things. EDBT respondents express direct disgust at current conditions and desire a significant *restoration* to create a new and more attractive space. SCC on the other hand prefer to *preserve* and use Jamaica Bay in its current state, while HRCR sees a need to reduce the number of speeding vessels on protect Harlem River and *restore* access that has been lost to urban development. One interviewee considers this to be the group's major environmental contribution:

> I don't think the club itself is doing anything for the environment. But it is exposing people to one of the natural features of New York City, and so in that way people might, it might raise awareness and raise concern [for the water], and then someone might do something, independently.
> HRCR-38

Place meanings and stewardship pathways

To facilitate a comparison of and understand differences between the studied stewardship groups, we use the information in the previous sections to classify groups according to dominant place meanings (i.e., what kind of place their site is to them) and the 'trajectory' of the stewardship work (i.e., what they are trying to achieve for their site). We distinguish between three basic categories of place meanings based on how groups came to work with their respective sites: as a place of *home* (where interviewees have a personal bond to the site, typically from living nearby for a long time), a place of work (where interviewees are often trained professionals hired to carry out a task), or a place of use (where interviewees primarily see instrumental use in the site, without living or doing paid work there). It should be noted that these categories were primarily applied at the group level; individual members sometimes diverged from the majority in what meanings were most distinctive. For instance, GCC interviewees have been recruited for their professional skills but several also live in the area currently or did so previously. Similarly, while all recreational groups fit in the 'place of use' category, there are also two community groups that partially share this notion of what their sites mean to them. In Fig. 8, the three place meaning categories (dividing the disc into thirds) illustrate different 'entry points' to stewardship; due to the 'fuzziness' of the categories, several groups straddle the boundaries between multiple place meanings.

The figure's three concentric fields represent 'stewardship trajectories' embodied in the activities and goals described

Fig. 8 A typology of place-based stewardship, based on different entry points to and trajectory of stewardship efforts. Entry points, indicated on the circumference of the figure, are based on groups' initial relationship to their site: as a place of work, use, or home. Trajectories, indicated in the three concentric fields, reflect current stewardship efforts: *preserving* a site's current state, *restoring* previous quality of and access to it, or *transforming* the site into something new. The studied groups are placed to illustrate the findings of our analysis, with environmental groups in green, community groups in purple, and recreational groups in yellow. Several groups do not fit neatly into these categories and thus straddle the boundaries between different fields. Circles around each group indicate average place attachment expressed among its members, ranging from 3.0 (one ring) to 4.8 (five rings) on a 5-point scale (see Fig. 3)
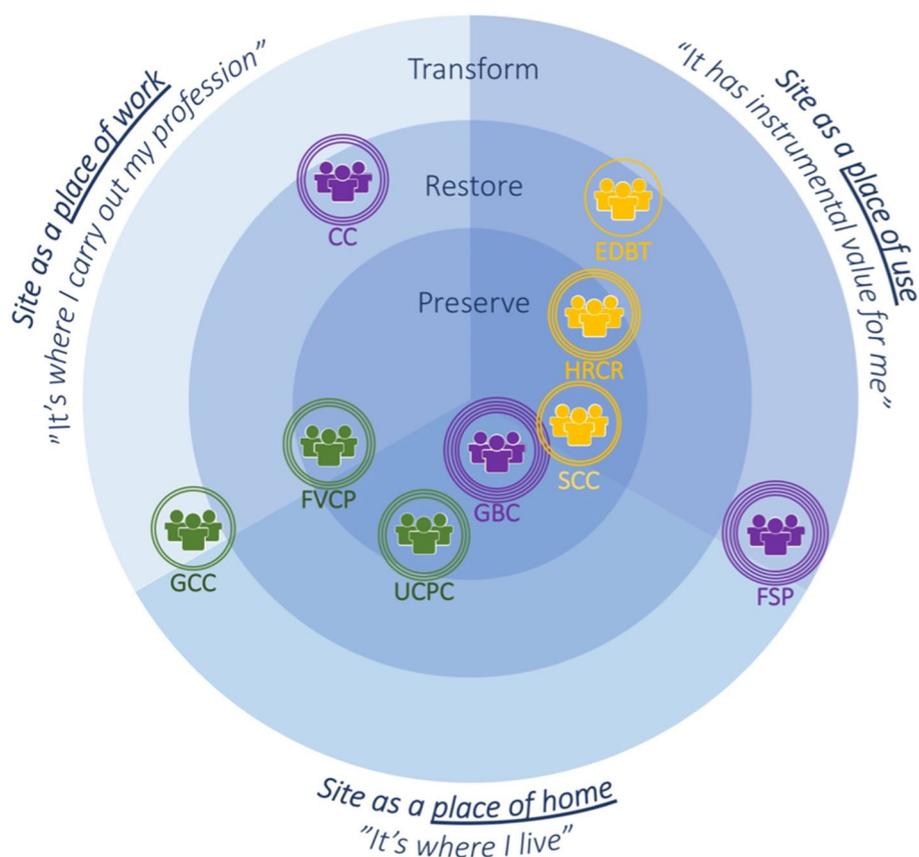
by interviewees. At the center are groups that seek to preserve sites in their current state, protecting them from external threats or changes. Further out are groups that restore the quality of and access to their sites by addressing disturbances or harm that has already happened to them compared to some previous state. In the outermost circle are groups that try to transform their sites into something new by envisioning a future state. Again, these categories are not discrete, and several groups have multiple objectives; GCC simultaneously works to transform their site but also wants to acknowledge its industrial past: "It needs to feel rough, and industrial in the way that the Gowanus does. And it needs to provide public space for the people that live here and work here already, as opposed to just the new people that are moving in" (GCC-39).

These different entry points and trajectories are used here to highlight different expressions of stewardship, based on our qualitative assessment of primarily interview data, and unpack our propositions for how sense of place relates to stewardship (P2-4). There is some support for the proposition that **group type will predict members' place meanings (P2)**, primarily for recreational groups that mostly describe their sites in terms of use; all environmental groups also have at least some members with a personal 'home' connection to their site. Community groups on the other

hand all have different relations to their sites. The proposition that **group type will predict stewardship objectives (P3)** has little support in the data. There are examples of at least some level of preservation, restoration, and transformation work across all three group types (Fig. 8). There is some support for the proposition that **place meanings will predict stewardship objectives (P4)**, since groups whose members express a 'home' sense of place (e.g., GBC, UCPC, and to some extent SCC and FVCP) generally want to preserve the place as it currently is.

It should also be noted that place attachment (indicated by circles surrounding group icons in Fig. 8) can also help in understanding stewardship trajectories. For environmental groups and recreational groups, stronger place attachment seems to be associated with working at least partly to preserve sites in their current state. In community groups, FSP stands out as a clear exception, expressing strong attachment despite wanting to transform their site. A possible explanation could be that the attachment is expressed for the site that is already taking shape—for other groups with transformative visions (EDBT, CC, and GCC), their sites still need considerable work before their visions are reached and the expressed attachment often relates to the site's potential rather than current state:

The waterfront I think presents something that's unifying, to both neighborhoods [Upper East Side and East Harlem] and to the whole city. And I think that, that has huge potential, in having a natural resource that is available to everyone and, well, there are no boundaries.

CC-88

Discussion

Stewardship as enacted in the nine NYC groups comes in different shapes and varies in the actual work done, the reasons for being initiated, and the objectives it strives towards. This demonstrates a diversity of pathways along which stewardship can develop.

Sense of place helps describe these pathways; in particular, our findings support previous arguments that place attachment alone does not effectively predict stewardship, but needs to be complemented by place meanings, representing people's ideas of what a place is (Stedman 2003, 2008; Huber and Arnberger 2015; Masterson et al. 2017a). Strong attachment to place exists both in groups that devote great effort on environmental stewardship, and those doing almost nothing; it can be found in groups that work to preserve a site in its current state, restore a site to a prior state, or transform it into something it has not yet been. As such, attachment alone does not discern; it does not capture these differences, but place meanings do. Examining place meanings also offers the potential of tracing the origin of a particular groups' current direction; for instance, all groups that view their site primarily as a 'place of home' seek to preserve its current character rather than allowing it to change. This form of engagement is captured in Fig. 8 by groups like GBC and UCPC in the bottom third of the central disc. This represents a type of '**conservation stewardship**', where people work to protect and preserve something in their neighborhood. Previous examples has been described as 'memory work,' whereby stewards are working to preserve knowledge or leave a legacy about a particular site or place (Svendsen and Campbell 2010, 2014).

Importantly, however, most of the nine groups studied here are not involved with this kind of conservation stewardship, which suggests that a broader typology could help understand different ways that civic engagement can impact a specific site in ways that deviate from status quo rather than maintain it. For example, the groups that have the lowest place attachment in each of the three group types (GCC, lowest of environmental groups, CC, lowest of community groups, and EDBT, lowest of recreational groups) all have a primary or secondary focus on restoration work. These groups all work with the most degraded sites in our sample, with very noticeable impact from previous or ongoing human activities such as industry, CSOs, or just poorly maintained infrastructure. Their efforts represent a type of '**restoration stewardship**', characterized not by strong attachment to a site as it is but by a desire to alter the physical form of a site to revive a previous ecological or social function.

One environmental group (GCC) and one community group (FSP) are transforming their sites into something new. For both, stewardship work involves a crucial component of actively shaping perceptions among the general public, i.e., influencing place meanings. This suggests a form of stewardship more directed towards placemaking or place-shaping (Horlings 2016; see also Murphy et al. this issue), which also groups like CC and EDBT engage into some extent. This puts the three low-attachment groups mentioned earlier (GCC, CC, EDBT) also in this '**placemaking stewardship**' category, suggesting that transformative work may be facilitated by a certain level of detachment from the site in question. As a counter-example, FSP works to transform Soundview Park while having the highest place attachment observed in this study. Interviewed members emphasize the benefits of having multiple different perspectives and park users involved, indicating that this community group is capable of appreciating a more diverse set of place meanings. Previous research has shown that locally based civic groups increasingly include both environmental and social issues in their work (Svendsen and Campbell 2008), and since both form part of the notion of 'place' they consequently influence how attached one may be to a site (Stedman and Ingalls 2014). This is supported by our interview data, where community groups in general refer to their site less often than environmental groups do, but tend to refer to a broader range of place meanings (Fig. 4). Community groups' stronger attachment to place could, therefore, be related to a richer understanding of what those sites mean, not just in terms of natural features and environmental quality but also for community events and creating shared memories. If a group has internal disagreement on place meanings it can imply more dispute and conflict, but if differences can be overcome it can promote innovative or integrated management solutions that engage with a place's multitude of meanings and uses (Stedman 1999; Yung et al. 2003). Recent research has found that over time, members of stewardship groups tend to appreciate more aspects of their site than they do initially (Murphy et al. this issue). This is promising especially in cities, where conventional management focusing on single-purpose uses risk failing to acknowledge the multifunctionality of urban greenery. The Soundview Park example indicates that diverse place meanings could be particularly important for placemaking stewardship that aims at transforming and reinventing a site into something that is both a

functioning ecosystem and caters to the preferences of the local community.

Recreational groups offer yet a different perspective of sense of place and stewardship, as they all view their sites as places of use. They primarily invoke place meanings about physical features and aesthetic qualities rather than community development (Table 2), as they engage with waterways and adjacent open space for the diverse activities that they enable (see also Campbell et al. 2016). The physical properties of sites not only affect what sports are possible to exercise there, they also influence the environmental qualities—for instance, Harlem River's water can flow more freely than the water trapped in Flushing Bay, which is likely to reduce its CSO problems. This demonstrates how sense of place is not only socially constructed, but mutually constituted by human perception and interpretation, in tandem with biophysical realities (Freudenburg et al. 1995; Stedman 2003; Masterson et al. 2017a, b). Recreationally related sense of place is also interesting from the perspective of scale: virtually all interviewees from recreational groups had visited other sites that were equally suitable—often better—for their respective activity, but located too far away to replace their site in NYC. While these respondents were often highly dependent on one specific site for their activity, their attachment was often more described in terms of the *kind* of place it was (i.e., one with calm waters, little boat traffic, easy access to the waterfront) rather than a specific, unique locality. This further enriches our typology with an '**activity-oriented stewardship**'. While pro-environmental action is at best a secondary priority, this type of stewardship could be important for future research on how to elicit civic engagement from increasingly transient urban residents (Chapin and Knapp 2015). People who are more mobile can in fact display a higher commitment to local issues (Gustafson 2001, 2009a, b), and the Dragon Boaters example (EDBT) shows that exposure to previously unknown environmental issues can trigger stewardship engagement even among non-local people without strong attachment to the site in question.

Lastly, the groups that view their site as a place of work reflect the growing professionalization of environmental stewardship (see, e.g., Fisher et al. 2012) and demonstrate a range of trajectories—transformation, restoration, and preservation—depending on the mission of the group. Similar to the activity-oriented version, '**professionalized stewardship**' is interesting because it can inform us how care for the environment can be promoted more broadly in society. Specifically, GCC, CC and FVCP combine objectives to serve a common good with a stronger dependence on paid staff and greater fiscal responsibility than other groups (Table 1), making them more similar to formal management by public agencies or private trusts.

As the reader will note, the stewardship typology described above—consisting of conservation, restoration, placemaking, activity-based, and professionalized stewardship—both overlap with each other and fail to include all studied groups. While an exhaustive list of distinct categories may not be realistic, we still argue that a typology can be useful; it demonstrates how place meanings can measure and describe how stewardship varies, to better understand what role different manifestations of it can play in coping with, adapting to or transforming in response to environmental challenges. Preserving the status quo is not always the most sustainable option, when external drivers such as climate change can require adaptation that challenges people's sense of place (Adger et al. 2011; Fresque-Baxter and Armitage 2012). At the same time, place attachment and a diversity of place meanings can be drawn upon in efforts to protect and steward a site in the context of disturbance (McMillen et al. 2016). This is particularly relevant in cases where people want to preserve a site that is also threatened, for instance Gerritsen Beach, which has already been severely impacted by Hurricane Sandy in 2012. Here, sharing experiences and ideas with a different community organization with the same strong place attachment but a focus on reinventing a place (e.g., FSP) may provide important lessons for how to envision a different but still desirable future.

While we believe that our typology can be useful in its current state, we also encourage further refinement, broadening and revision. The sample in this exploratory study was not aimed at being representative of all stewardship groups in NYC, or at generating generalizable insights; the objective was instead to target a heterogeneous set of groups to explore diverse place meanings and stewardships. We hope that our study can inspire further exploration of the utility of the stewardship types and sense of place measures among researchers and practitioners; in particular, linking place meaning and attachment to more direct and objective measures of stewardship efforts rather than secondary, self-reported data (Boicourt et al. 2016). This should also include stewardship of land-based sites, which may differ from water bodies in terms of places' permanence and fluidity, or how they act as barriers or connecting spaces—all of which is likely to influence people–place relationships. This study has focused on civic groups as the unit of analysis, thereby excluding analysis of individuals, networks, or entire societies. Firstly, due to the number of groups we have not been able to explore individual members' more personal, sometimes intimate relations to place. Relational values are critical for understanding the care dimension of stewardship (West et al. 2018), and one of the lessons from this study has been to adjust the methodology to better capture how sense of place develops and shapes stewardship over time (Murphy et al. this issue). Secondly, the focus on civic groups has excluded the broader set of actors that play a role in urban

environmental governance, such as public authorities, larger non-profit organizations, private businesses and contractors (for a study comparing sense of place and management across such sectors, see Andersson et al. 2007). This is a crucial research gap, since even seemingly personal relations to and engagement for a place can be influenced by actions taken at higher level—for instance, public policies and programs to train residents as street tree stewards (McPhearson 2011; Campbell 2014), federal funding to support grassroots initiatives (Jelinek Boman 2017), or umbrella organizations aiming at supporting local groups (Boicourt et al. 2016).

Our research highlights the different forms that stewardship can take and can thereby inform processes of negotiation and collaboration between different stakeholders that share a common space—both to identify mutual interests as well as potential conflicts. While a shared sense of place (strong attachment and shared meanings) can help build social cohesion—often assumed to be positive for civic action (Uzzell et al. 2002; Lewicka 2005; McMillen et al. 2016)—a lack of diversity can also mean imposing ideas and visions on those who are not empowered to articulate their own (Stedman and Ingalls 2014; Ingalls et al., this issue), and impede new ideas and innovation. Here, different forms of stewardship engagement that operate in parallel might better serve the broad range of interests that exist in urban landscapes.

Conclusions

Sense of place theory and methods provide tools to examine stewardship both through the reasons why people choose to work with a certain site, and the visions they hope to achieve through their efforts. This is important for theory since it helps us outline a typology of different stewardships by drawing attention to different pathways that stewardship can take. Among waterfront stewardship groups in NYC, we find examples of conservation stewardship, restoration stewardship, placemaking stewardship, activity-oriented stewardship, and professionalized stewardship.

Distinguishing between different types of stewardship groups also has practical importance for cultivating effective pro-environmental partnerships and programs. The groups studied here differ in what outcomes they promote and how likely they are to adapt to new challenges. We believe these to be important factors for determining how local residents can form partnerships with other actors seeking to promote sustainable urban ecosystems. Given the complexity of environmental challenges and uncertain links to human wellbeing, especially in diverse urban landscapes, no single pathway toward sustainability is likely to be the 'correct' one (Moore 2007; Muñoz-Erickson et al. 2016; Andersson et al. 2017). By continuing to develop

a stewardship typology, efforts to promote and coordinate a broader range of stewardship activities are more likely contribute to building and sustaining healthy urban environments.

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