RESIDENT ATTITUDES TOWARD STAPLETON’S STORMWATER PARKS

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1 ABSTRACT
The past few decades have experienced an increase in the implementation of multifunctional stormwater management systems. This emerging trend can, in part, be attributed to more recognition that stormwater infrastructure, when designed and engineered with utility and amenity in mind, can have added community values such as aesthetics, recreation, and wildlife (Echols and Pennypacker, 2008; Stahre, 2008; Meyer, 2008). Few studies, however, reveal user attitudes for large scale, multifunctional stormwater management systems. Stapleton, in Denver, Colorado, has multifunctional stormwater management systems in several of its community parks. Stapleton’s stormwater parks integrate native/naturalized vegetation, critical habitat, and passive recreation amenities alongside stormwater infrastructures. Given that stormwater parks are an atypical urban park typology, resident attitudes and use habits for these parks become important. By understanding the nuances behind resident attitudes, we can better plan and design communities that combine natural systems and stormwater infrastructure with amenity in parks. To understand how stormwater parks are perceived within the urban community of Stapleton, we conducted a structured mail survey in May 2011, followed by in-depth walking-interviews in May 2012. This paper presents findings from our in-depth walking-interviews, revealing why Stapleton residents enjoy their stormwater parks.

1.1 Keywords
Stapleton, preference, walking-interview, stormwater, parks, multifunctional
2 INTRODUCTION

The literature shows a paradigm shift in the planning, design, and management of urban stormwater systems (Echols and Pennypacker, 2008; Starhe, 2008; Wenk and Gregg, 1998). Rather than direct stormwater off-site and downstream as quickly and efficiently as possible, through buried pipes and concrete channels, new systems use natural hydrological processes and vegetative strategies to slow, filter, and treat stormwater on-site (Bernhardt, 2007; Starhe, 2008; Thompson and Sorvig, 2000). “Green” infrastructure, unlike conventional “gray” infrastructure, has many added environmental benefits, including improved water quality, erosion control, and groundwater recharge. When green infrastructure is integrated into parks and coupled with amenities like trails and seating alcoves, it can become a multifunctional asset, adding aesthetic, educational, and recreational benefits.

In this study stormwater parks are defined as landscapes with stormwater infrastructure that provide hydrological functions that protect public health, safety, welfare, and aquatic habitat, while also providing amenities, which can increase the landscape’s attractiveness or value (Echols and Pennypacker, 2008). As communities seek to improve environmental and human health, stormwater parks can play a role. However, resident attitudes will ultimately affect how stormwater parks are used and maintained over time (Nassauer, 1995; Mozingo, 1997; Spirn, 1998; Gobster et al., 2007). Therefore, to better plan and design parks that integrate park amenities alongside stormwater management systems, we must understand resident attitudes and use habits, as well as the factors that influence perception and use.

3 BACKGROUND

Located in Denver, Colorado, Stapleton is a 4,700 acre New Urban style infill community whose physical form and urban character are defined by its multifunctional stormwater management system. Planning for the Stapleton community began in the late 1980’s with a group of concerned citizens. Initial ideas about environmental responsibility, social equity, and economic opportunity laid the foundation for the 1995 Stapleton Development Plan (Stapleton Citizen’s Advisory Board, 1995). Recognizing that the community’s stormwater could be an asset, not a liability, a central component of the plan was to integrate conveyance, detention, and treatment structures into applicable parks. To ensure a cohesive overall parks system, the 2002 Stapleton Parks & Recreation Master Plan outlined how each park should function and look, including specific recreation amenities, planting palette, habitat types, and design character (Park Creek Metropolitan District, 2002). The parks with significant stormwater functions (Westerly Creek, Greenway, Sand Creek, and Bluff Lake) are physically located in areas most suitable for capturing, conveying, and treating local stormwater runoff (Figure 1). Collectively, Stapleton’s stormwater parks look and function differently than the community’s traditional parks, though individually, each stormwater park offers a unique set of amenities and aesthetic qualities. Stapleton’s stormwater parks encompass approximately 430 acres, or about 76% of the total developed park area in Stapleton South at the time of the study.
3.1 Stormwater Park Descriptions

Westerly Creek Park, designed primarily for flood protection, is approximately 105 acres and runs north-south through the heart of the community. While the airport was in operation, Westerly Creek flowed in culverts buried beneath its runways. The stream has since been daylighted and restored through two thirds of the park (Canfield, Cunningham, and Koehler, 2011). The landscape is mostly a mix of high-plains prairie grasses and shrubs. There are few trees outside the riparian zone along the stream’s edge. The park provides paved walks, gravel trails, seating, small gathering spaces, and public artwork.

Greenway Park runs east-west through the community, and is approximately 35 acres. Unlike Stapleton’s other stormwater parks, this park contains active recreation amenities, including a skate park, several play features, and an expansive play lawn, as well as restrooms, picnic tables, and barbecue grills. Like the other stormwater parks, Greenway Park has paved walks, gravel trails, and seating. The park’s drainage ways are lined with native/naturalized riparian vegetation, whereas the remainder of the landscape is irrigated lawn with swaths of ornamental grasses, shrubs, and shade trees.

Sand Creek Park is the largest stormwater park in the development at approximately 165 acres. This area was adopted into the Stapleton Parks system, and is part of a larger 14-mile regional greenway. This park sits on the northern edge of Stapleton South and borders a light-industrial area to the north. Sand Creek, a tributary to the South Platte River, runs through the center of this park. Its banks are lined with mature and overgrown riparian vegetation. After being adopted into the Stapleton Parks system, this area has undergone partial ecological restoration, and a trail now connects it to Westerly Creek Park.

Bluff Lake Park is adjacent to Sand Creek Park and includes a portion of the tributary. This approximately 125 acre site served as Stapleton Airport’s crash zone, and was inaccessible when the airport was in operation. The area has since undergone ecological restoration and been transformed into a destination park. At the center of the park is a 9-acre lake, ringed by a nature trail/boardwalk. The site also houses an official nature center with restrooms and paved parking lot, a small amphitheater, seating, and interpretive signage. Because of the park’s significant wildlife population and habitat, dogs are prohibited in this park.
4 METHODS

To learn how stormwater parks are perceived by Stapleton residents, we used a mixed-methods approach. We first conducted a structured mail survey in May 2011 to capture resident attitudes via a Likert-type scale questionnaire. Then, for further insight and clarification on reasons behind survey responses, in-depth walking-interviews were conducted in May 2012. This paper provides a brief summary of findings from the 2011 Canfield and Gibson Stapleton Parks Survey for contextual awareness, but focuses primarily on presenting the qualitative findings from the 2012 in-depth walking-interviews.

To first assess resident attitudes of Stapleton’s stormwater parks, as previously noted, a structured mail survey was sent to a stratified sample of 1000 Stapleton households, approximately one quarter (1/4) of all households in the community at that time. Participants received a labeled map of the Stapleton parks (listed in no particular order) and then, using a 1-5 Likert-type scale were asked to assess each park using three designated criteria: scenic quality, perceived safety, and frequency of use. To avoid bias due to demand characteristics, participants were not shown photographs, and the park typologies were not disclosed. Instead, participants were asked to evaluate the parks based on personal experience.

As a follow-up to the survey, in-depth walking-interviews were conducted as a way to expand and explore the initial survey responses (Morgan, 1997). The unit of analysis for the follow-up study was the same as in the initial survey: individual attitudes for differing parks. The sample frame included 50 respondents to the initial survey who indicated interest in participating in a follow-up interview, as well as other Stapleton residents. The sampling technique included emailing invitations and advertising in community forums. To accommodate participant schedules, five one-hour follow-up sessions were
offered, with a total of 9 participants. Segmenting groups by gender, age, ethnicity, education or other
demographic differences was not necessary because of the limited number of participants, although group
demographics were recorded and considered during analysis. To initiate conversation with participants
about the parks, the follow-up interviews took place outdoors in the parks themselves. However, spatial
constraints meant physically visiting each park was not feasible during any one given session. Therefore,
two one-hour walking routes were designed to allow discussion of all parks included in the survey. The
sessions consisted of predetermined, structured questions, building directly on the survey, and
unstructured dialog to explore unforeseen topics. Each walking-interview session was digitally recorded
and later transcribed.

5 FINDINGS & DISCUSSION

5.1 Mail Survey

From the initial 2011 survey, 263 were returned complete, securing a 26% response rate.
Demographic analysis revealed 63% of respondents were female and 37% male; 88% were White, non-
Hispanic, 4% were Black, 3% Asian, 3% Hispanic/Latino, and 2% did not indicate ethnicity. Nearly half of
all respondents held a graduate degree, and nearly all (98%) reported having at least some college
education. According to the 2010 US Census records for Census Tracts 41.06 and 41.07 (encompassing
all of Stapleton); the demographics are in line with the character of the community (United States Census
Bureau, 2010).

A summary of the findings from the 2011 Stapleton Parks Survey are provided for reference
(Table 1). Analysis of the Likert-type responses revealed that Westerly Creek Park is the most favored in
regard to scenic qualities, and it is most frequently used. Greenway Park rated highest in terms of
perceived safety. Sand Creek Park, on the other hand, rated lowest in terms of scenic qualities and
perceived safety. Bluff Lake Park was found to be the least used. To understand what factors may have
contributed to these responses we conducted the walking-interviews.

<table>
<thead>
<tr>
<th>Table 1. Attitudes toward and use of Stapleton's stormwater parks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park Name</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Westerly Creek</td>
</tr>
<tr>
<td>Greenway</td>
</tr>
<tr>
<td>Sand Creek</td>
</tr>
<tr>
<td>Bluff Lake</td>
</tr>
<tr>
<td><strong>TOTAL AVERAGE</strong></td>
</tr>
</tbody>
</table>

Notes: N=263 respondents; Values for scenic qualities: -2=very low, -1=low, 0=unsure, 1= high, 2=very high; Values for perceived safety: -2=very unsafe, -1=somewhat unsafe, 0=unsure, 1=somewhat safe, 2=very safe; Values for use: -2=never, -1=annually, 0=monthly, 1=weekly, 2=daily.

5.2 Walking-Interviews

Walking-interview participants included a mix of males and females, ranging in age from 25 to
55+. All were professionals, and about half were retired. Again, this sample is an analogous
representation of the Stapleton community at large. One third had young children, and all but one
participant owned their homes in Stapleton. Three participants had experience in park design and
planning, and all were park advocates. (Table 2).
Table 2. Demographic profile of walking-interview participants

<table>
<thead>
<tr>
<th>Route &amp; Session</th>
<th>Gender</th>
<th>Age Range</th>
<th>Profession</th>
<th>Live with kids under age 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>M</td>
<td>55+</td>
<td>Professor</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>55+</td>
<td>Park Planner</td>
<td>yes</td>
</tr>
<tr>
<td>A-2</td>
<td>F</td>
<td>25-34</td>
<td>Landscape Architect</td>
<td>yes</td>
</tr>
<tr>
<td>B-1</td>
<td>M</td>
<td>55+</td>
<td>Retired (Lawyer)</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>55+</td>
<td>Retired (Social Worker)</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>45-54</td>
<td>Lawyer</td>
<td>no</td>
</tr>
<tr>
<td>B-2</td>
<td>F</td>
<td>25-34</td>
<td>Doctor</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>25-34</td>
<td>Doctor</td>
<td>yes</td>
</tr>
<tr>
<td>B-3</td>
<td>F</td>
<td>35-44</td>
<td>Landscape Architect</td>
<td>yes</td>
</tr>
</tbody>
</table>

5.3 Westerly Creek Park
Survey participants rated Westerly Creek highest in scenic qualities and frequency of use, and walking-interview participants confirmed this sentiment. The wildlife in the park seemed to add to the park’s overall scenic appeal. However, several participants noted seeing coyotes in the park, which generated some concern for the safety of their dogs.

*I think the prairie dogs are pretty cool. They don’t bother me. They don’t seem to have many predators, and are happy here.*

*I love the prairie dogs in Westerly Creek.*

Westerly has all sorts of birds, which is nice. Swallows live under the bridge. You can hear toads at night. Beavers take down some of the trees.

*This park helps us connect with nature in the city.*

*I love the naturalized look and experience, it’s a tranquil escape.*

The lack of pedestrian lights, occasional litter, and post-storm debris were mentioned as negative aspects of the park, but these comments were tempered by several other positive sentiments.

*There aren’t lights, but it doesn’t seem dark out. I prefer to walk at dusk because there are fewer people.*

*Trash is a big issue. A large area of Aurora drains into the creek and trash gets hung up in the vegetation. City crews come out after storms and do a wonderful job of cleaning up branches and weeds.*

*The community does a wonderful job of picking up the trash, a neighbor runs a volunteer cleanup group.*

Most participants use Westerly Creek for its trails, for walking and bicycling, but they noted seeing other activities occur in the park as well. One participant noted regularly seeing children play along the stream, while another noted seeing adults using the space as an extension of their private yards.

*Once our daughter gets older we will probably go look for tadpoles along the stream. We see parents and kids in there all the time.*

*I’ve seen neighbors walking through at dusk with a glass of red wine.*
People like to make their own trails, and don’t seem to stay on actual trails. Several walking-interview participants remarked they had not known Westerly Creek Park provided flood protection until seeing a significant flood event in June 2011. Knowing the park’s infrastructural purpose seemed to strengthen fond sentiments.

We didn’t know it [Westerly Creek] was manmade until last summer when we saw it flood. We were surprised because it doesn’t seem deep enough to be a flood zone. I always thought it was a nice park, but once we saw it “work,” it changed our perceptions. It’s even cooler to know it is not natural and has an important function.

People don’t know that Westerly Creek Park is manmade. When we first moved in we could see the stormwater ponds, but it has grown in and now you can’t really tell anymore.

5.4 Greenway Park
Survey participants rated the Greenway Park highest in perceived safety and second highest in scenic qualities. Walking-interview participants reaffirmed both of these sentiments, especially those with children. The park’s wide variety of passive and active recreation amenities seem to attract the most diversity, including non-Stapleton residents. Participants noted feeling comfortable walking, jogging, bicycling, and playing lawn games in the park, even in the evening. Though the park is lower in elevation than the adjacent urban grade, pedestrian lights, and open sight lines within the park likely provide residents with a sense of security.

I like the big green lawn—I see people flying kites and playing lacrosse. The skate park attracts all kinds of people, and even ones from outside the community.

The Greenway is one of the coolest parks, it has all sorts of activities and attracts all different people, especially at the skate park.

Having kids changes your desires and needs for amenities, you can use this park in so many different ways.

Most walking-interview participants appreciated seeing manicured lawn paired alongside the more “wild” looking vegetation found in the drainage ways. One participant explained that while the community was under construction many residents complained about the aesthetics and safety of the park’s drainage ways, stating they looked “weedy” and like a “mud puddle.” Many expressed concerned about mosquito infestations and the threat of West Nile virus, and some even expressed regret about purchasing a home bordering the park. This participant noted that over the past few years, as the park has matured, complaints have lessened, and perceptions seem to have changed. Participants with children especially appreciated the shallow drainage way and riparian vegetation adjacent to the playground. This area of the park offers children opportunity for structured and nature play. Additionally, the trees in this area are some of the largest in the park, offering ample shade.

Residents seem to really like the shade that the riparian vegetation offers—especially around the children’s play area.

The water in the swale is normally just a trickle, however sometimes in big storms the playground mulch gets washed downstream.

I don’t think people have any idea that this park manages stormwater. It would be nice if there were little signs that talked about it.
5.5 **Sand Creek Park**

Survey participants rated Sand Creek lowest in terms scenic qualities and perceived safety. Walking-interview participants were surprised by this finding. They speculated that lingering pre-conceived notions of the park, based on its prior condition, likely were the cause of any low ratings. Since the park is not centrally located within the community, its “remoteness” seems to influence perceptions as well.

*There used to be a homeless population here, but it is cleaned up now. Initial connections to Sand Creek were weak, but they have improved.*

*The park feels removed from the community.* (expressed as a negative sentiment)

*The park is not as well maintained as the others. Sometimes there is a lot of litter, especially after storms, but there are volunteer cleanups all the time.*

Participants who use Sand Creek regularly do so for bicycle commuting and/or for dog walking. Formal access to this park from within the community has not yet been established, though there is a temporary connection via Westerly Creek Park.

*The park feels removed from the community.* (expressed as a positive sentiment)

*Sand Creek and Bluff Lake create nice buffers for the community, helping keep the area quiet.*

*I see a lot of joggers and bicyclists using the park.*

5.6 **Bluff Lake Park**

Survey participants rated Bluff Lake lowest in terms of use, and second lowest in scenic qualities and perceived safety. Most walking-interview participants had not visited the park, which limited further clarification on our initial findings. Though adjacent to Sand Creek Park, Bluff Lake Park is a separate entity, open daily from sunrise to sunset. Limited access, distance from the center of the community, and a no dog policy seemed to be significant deterrents.

*We don’t go because dogs aren’t allowed.*

*It’s a long walk to get to the front gate of Bluff Lake.*

*It’s a nice place to take visitors.*

Though our studies found Stapleton residents use Bluff Lake Park less than Stapleton’s other parks, its nature center, amenities, and educational programs have a regional draw. In 2011, the park hosted 7,500 area students and 40,000 visitors (Brown, 2012).

7 **CONCLUSION**

In summary, we found that Stapleton’s stormwater parks were perceived more favorably than not, given certain physical contexts. A park’s location within the community seemed to have the most influence on perceptions of safety and frequency of use. Stormwater parks located along the periphery were less favorably perceived than those more centrally located within the community. In some cases, knowing a park’s stormwater function seemed to improve residents’ overall attitudes of a park. Participants especially enjoyed the wildlife, tranquility, and sense of escape that the stormwater parks offered. The riparian vegetation was highly regarded, particularly for its shade. Residents could overlook occasional litter/debris, because they knew the stormwater parks were well cared for and maintained. Interestingly, the quantity and type of amenities found within each stormwater park seemed to have little influence on resident attitudes.

Participants of the walking-interviews, though in keeping with the demographic profile of Stapleton, were clearly passionate about their parks, and likely why they volunteered for this study. It would be of interest to interview residents who think poorly of their parks, and to understand what factors
influence their attitudes. A limitation of this study is that attitudes can be influenced by social factors, such as the presence of a companion or dog while in a park. We did not collect detailed data, other than frequency, on how the residents use the parks. This study could be further expanded to understand specifically how residents use stormwater parks. Additionally, another study could be developed to see if residents from a similar type of community have similar sentiments about their multifunctional stormwater parks.

8 REFERENCES


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