Environmental Equity: Case Studies on Easy Bay Creek Restorations

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ABSTRACT

Creek restoration projects provide a variety of both ecological and social benefits, and these benefits are not mutually exclusive but rather interconnected. This paper explores creek restoration projects throughout the San Francisco East Bay Area. The case studies focused on Strawberry Creek, Wildcat Creek, and Lower Codornices Creek. The goal being to take an integrated look at the creek restoration sites and determine the impact on community access and use. Site assessments were completed to identify the layout and features that each site had. Semi-structured interviews were held with the planners and community members involved in the projects to determine the emergent themes. The community's use and experience with the creek site was measured through activity snapshots and interviews. Each restoration project social connectivity and accessibility to its community members. Interviews held with those involved in the projects shared a variety of different perspectives with main themes that emerged were community involvement, creek interaction, socioeconomic inequity, as well as the long-term success of the project. Walking was the highest activity done at each site with sites also all displaying creek interaction with the public. Community members all appreciated and enjoyed the creeks restoration done to the sites, however there were some safety concerns brought up from the public at Lower Codornices and Wildcat Creek.

KEYWORDS

Environmental justice, Community action research, Urban green spaces, Water revitalization, Participatory process

INTRODUCTION

Rivers are tightly intertwined with human societies and managing rivers effectively has long been a goal of societies and nation states (Muhar et al. 2016). Rivers and creeks have also served as one of the founding features in determining human settlements, and the development of human civilizations as well as the planning of our cities (Castoguay and Evenden 2012). Rivers served as the first highways in connecting nations, as well as boundaries between them (Mauch and Zeller 2008). Modern Western cultures have historically worked to control rivers by channeling them for irrigation, raising and lowering them in canal systems, as well damming them for power generation (Mauch and Zeller 2008). Rivers not only have hydrological, biological and cultural uses but the role of rivers also create frameworks for social interactions and connectivity. The degradation of rivers and streams is a widespread and pressing issue, and successful restorations are key in combating this degradation (Wohl et al. 2005). Over 70% of the riparian forests in US rivers and streams have been lost, and more than one-third of the rivers are listed as impaired or polluted by the Environmental Protection Agency (Palmer et al. 2007). River restoration is viewed as a crucial aspect of conservation and resource management by government agencies and various stakeholders (Wohl et al. 2005). When rivers and streams are degraded, their vital ecological and social services are lost, and restoration aims to retrieve these benefits.

A defining factor that sets river restoration apart from other management actions is its core intent of enhancing ecological integrity (Wohl et al. 2005). Although all river and stream restoration projects are completed with varying objectives, the theme of ecological integrity remains consistent. There are a variety of different types of restoration projects and goals. The most common goals for restoration projects include improving water quality, riparian management, enhancing in-stream habitats, and channel re-configuration (Palmer et al. 2007). With such a wide variety of goals, values, perceptions, and use, sustainable stream restoration requires a diverse set of viewpoints. Restoration projects tackle technical issues and address scientific aspects to the project design and planning; however, restoration can be viewed as a social phenomenon as it is the result of social decisions to restore certain functions of the river (Kondolf and Yang 2008). The goals and implementation of restoration projects are both informed by science as well as social dimensions (Kondolf and Yang 2008). Improving social

connectivity of rivers improves the social benefits from the result of community building and environmental education (Kondolf and Yang 2008). As our society evolves and increases the level of feasibility of restoration projects, projects can aim for even higher levels of social connectivity and ecological services.

Restoration projects provide a variety of both ecological and social benefits, and these benefits are not mutually exclusive but rather incredibly interconnected. In order to be successful on a long-term level, stream restoration projects must not only focus on the technical side but must also work with the community and gain public support (Kondolf and Pinto 2017). Projects also build a sense of community as they pull residents and neighbors together and give them pride in their new space (Wohl et al. 2005). This sense of local empowerment as well as the process of community building, and public environmental education are some of the greatest social benefits that can arise from restoration projects (Kondolf and Yang 2008). In 2005 a study was done in which volunteerism and spontaneous use of creeks were done and hypothesized that these spontaneous uses create a participatory culture of stewardship (Chanse and Yang 2005). Since the twentieth century, institutions, neighborhood groups, and individuals have increasingly used stewardship to address environmental concerns and deterioration (Chanse and Yang 2005). Participatory stewardship has taught members of the community about the ecology of their home and gives them a shared connection to the place (Chanse and Yang 2005). Spontaneous creek activities such as skipping rocks, swimming, or sitting and listening to cultivate volunteerism (Chanse and Yang 2005). Community powered approaches to stream restoration need to be the standard, however this is not a priority of restoration projects. Urban streams provide a variety of ecological and social benefits to the neighbors and communities surrounding them. When rivers degrade, they can potentially cause harm to community members (Scoggins et al. 2022). To aid these problems governments will invest their resources, however they often fail to have any meaningful involvement of the community members or other stakeholders (Scoggins et al. 2022). This leads to projects that may go against the communities' desires and needs as well as projects that may fail to achieve their goals (Scoggins et al. 2022). For restoration projects to occur equity in community involvement must be a priority. It is also important to consider historical injustices that may lead to a lack of trust between community members and decision-making institutions, and therefore a long-term approach is needed to build trust and create collaboration and inclusion (Scoggins et al. 2022).

For my research, I explored creek restoration projects throughout the San Francisco East Bay. My objective was to take an integrated look at the creek restoration sites to determine the impact on community access and use. To understand this, I first wanted to see what aspects of the restoration project impacted equitable access and measured the different features of each site, so I completed site assessment surveys. I expected to find that the neighborhood restoration projects, and newer projects have more connectivity and accessibility. I also wanted to speak with those involved in the restoration projects to identify the emergent themes. To collect this data, I interviewed the planners involved in the restoration sites as well as people involved in the maintenance and permitting of projects. Based on literature review I expected themes of socioeconomic inequity, community involvement and maintenance to be some takeaways from the interviews. Although projects usually contain some level of community involvement this is an area of management in which there is a gap. I therefore expect there may have been some voices from the community but overall, this will be an area for improvement. Then, to understand the community's use and experiences with the creek I will interview people at the sites and complete an activity snapshot. I expect to find that the creeks are used for a variety of different activities and that around the surveyed and interviewed people that those who use the and visit the creek regularly feel more connected to their communities.

Background

The Muwekma Ohlone were the first people in the California coastal area, and in the sixteenth century, just two hundred years ago more than 10,000 Indigenous peoples lived here (Margolin and Harney 1978). There were over forty tribes, consisting of about 100-250 members on the land now occupied by the cities of San Francisco, Oakland, Berkeley, Palo Alto, San Jose, Santa Clara, Santa Cruz, and Monterey (Margolin and Harney 1978). Over the past 200 years however, the Bay Area's environment has changed dramatically, with many animal species now either extinct or having different behaviors (Margolin and Harney 1978). In the days of the Ohlone, California had thousands of acres of freshwater swamps, and the San Francisco Bay was completely engulfed by massive saltwater marshes, rivers that flowed all year round, springs, natural lakes, ponds, and countless creeks (Margolin and Harney 1978). For centuries, the Ohlone lived on land brimming with life, but the landscape changed drastically after European explorers and the Spanish missions built in the late 1700s (Pyne 2016). Spanish colonization

brought about massive changes to the ecosystem. Pasteurization was introduced along with feral animals, and wild oats and mustard replaced native grasses (Pyne 2016). The livestock caused major damage to the creeks as cattle would gather there for shade and water (Hall, Shelby 1993). After the discovery of gold in 1848, the Bay Area's population boomed, and this urban development led to the gradual destruction of creeks and marshes (Hall, Shelby 1993). The streams became overwhelmed with pollution from trash, sewage, street grime, and toxins making the creeks serious health hazards (Hall, Shelby 1993). In order to combat these problems public works projects such as storm drains, flood control channels, and dams were done (Hall, Shelby 1993). Many of these early projects paid little attention to aesthetic or ecological values, however with today's rapidly growing urban creek restoration movement, advocates are now looking to transform and improve our streams for both ecological and social benefits (Hall, Shelby 1993).

Study sites

The three creeks that I will be studying are Strawberry Creek, Wildcat Creek, and Lower Codornices Creek. The creeks are in the East Bay of the San Francisco Bay Area. An area with wet cool winters, dry warm summers, and an annual water deficit (Riley 2016). All the case studies are in densely populated urban cities of Berkeley, Albany, and San Pablo where cities within blend into each other’s boundaries with no buffers between them (Riley 2016). The projects were all completed in poor to moderate income neighborhoods (Riley 2016).

Strawberry Creek Park

Strawberry Creek, the primary creek of Berkeley, flows through the University of California, Berkeley campus and then empties into the San Francisco Bay (Riley 2016). Restoration projects have been completed all along the creek starting in the 1980s. In 1982 a restoration project was done to remove the culverts that keep the creek running underground and bring the creek back to the surface and create a park around it (Riley 2016). This project, today known as Strawberry Creek Park, is now an international model (Riley 2016). Prior to the restoration, the Strawberry Creek neighborhood was a crime hotspot, but evolved into a middle-class neighborhood after the project was completed (Riley 2016).

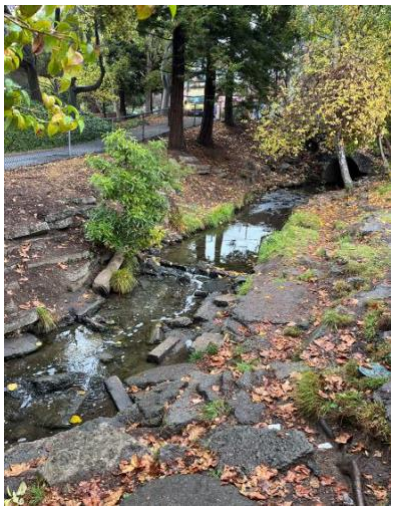

Figure 1. Stawberry Creek Park, Berkeley

Figure 2. Codorncies Creek, Albany

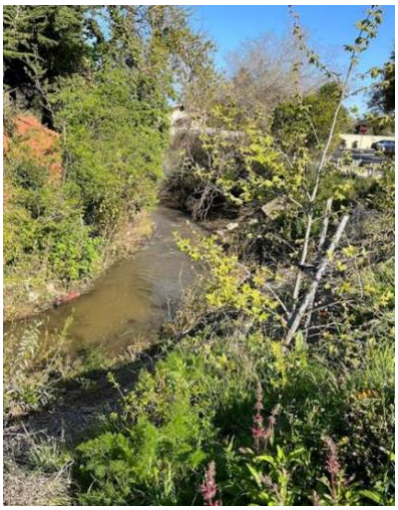

Figure 3. Wildcat Creek, San Pablo

Lower Codornices Creek

Codornices Creek is a perennial stream that flows through Berkeley and Albany. It is an important fish run and is home to the native Steelhead Trout ("Codornices Creek | City of Albany CA" n.d.). The restoration project was led by Restoration Design Group, and two of the five phases have yet to be completed ("Codornices Creek | City of Albany, CA" n.d.). The Lower Codornices Creek runs along University Village, which comprises apartments and townhouses for family student housing owned by UC Berkeley on the border of Berkeley and Albany. University village has a tumultuous history as a redevelopment project property owned by the University of California (Riley 2016). The restoration was funded by as by the City of Albany, City of Berkeley as well as the University of California ("Codornices Creek | City of Albany, CA" n.d.).

Wildcat Creek

Wildcat Creek restoration and the Greenway trail project is a state and locally funded project that restored 2,000 feet of Wildcat Creek ("Wildcat Creek Restoration & Greenway Trail Project | San Pablo, CA - Official Website" n.d.). The goals of the project included refuge areas for fish, modified floodplain, and re-planting of native plants on the restored bank ("Wildcat Creek Restoration & Greenway Trail Project | San Pablo, CA - Official Website" n.d.). In addition to the ecological benefits, the project also created a shared use path alongside the creek for

cyclists and pedestrians. ("Wildcat Creek Restoration & Greenway Trail Project | San Pablo, CA - Official Website" n.d.). Before the restoration was completed, Wildcat used to be an illegal trash dumping site ("Wildcat Creek Restoration & Greenway Trail Project | San Pablo, CA - Official Website" n.d.). The project was completed in 2021 by Restoration Design Group ("Wildcat Creek Restoration & Greenway Trail Project | San Pablo, CA - Official Website" n.d.).

METHODS

In fulfilling my study objections of evaluating East Bay creek restorations I will be completing site assessments of the creeks through surveying the features and amenities sites have. To achieve a better understanding of the projects I will also be interviewing the designers and planners as well as community members involved in the restoration projects on their perspectives and takeaways. To determine the community's use of the creek and an experience with the creeks, I will be completing an activity snapshot survey and interviewing people visiting the sites. The activity snapshot will contain a count for everyone visiting the site and the type of activity they are doing. I visited and collected data from sites on Saturday mornings in the Spring of 2023, on days in which the Sun was out and the temperature ranged from 60-70 degrees Fahrenheit.

Site assessment

To understand the sites, I visited them and completed a site assessment survey by creating a count system to represent what features the restoration project contains. The four categories I surveyed were accessibility, supportive facilities, safety and maintenance concerns, as well as aesthetics. I gave a point to each feature that was displayed within the four categories and then created a graph displaying the level of features each site has. The assessment was modeled after the Parks Assessment Tool from the New Brunswick Parks Action Plan. The assessment was given to understand each feature the site has or does have. The point system of the assessment does not determine if a site is better or worse, but rather provides a quantitative lens to view the assessment from.

Interviews with creek experts and volunteers

Semi-structured interviews were held with experts and those involved with creek restoration to learn more about the projects and determine the key takeaways. Interviews were held with the restoration planner Rich Walkling of River Restoration Design, a private company who worked on both the Wildcat and Lower Codornices projects. Susan Schwartz, the president of the all-volunteer citizens group Friends of Five Creeks. Friends of Five Creeks mobilizes volunteers to understand, maintain and restore creeks in the East Bay. Juliet Lamont from Creekcats Environmental Consulting Group as well as Erin Diehm who is a part of a voluntary citizen group advocating for creek restoration were also interviewed. Questions were asked specifically pertaining to what interviewees involved with creeks, the importance of restoration, the process of collaborating with the community, and barriers to community involvement. The information compiled from these interviews was an important part of the study because it provided insight and details regarding the planning and implementation of the projects.

Community use and experience

To capture the true uses of the creek when visiting the restored sites, I filled out an activity snapshot in which I counted the number of people at the site and detailed what they were doing and how they were using and interacting with the space. I used this data to determine the percentage of each activity done at the sites. I also completed semi-structured interviews with people that I surveyed in my snapshot to learn more about why they visited the site, how they perceived it, and whether they enjoy it.

RESULTS

Site assessment

Every restoration project displayed connectivity and accessibility to its community members. Strawberry creek park had the highest feature score as it fulfilled every point on the assessment. A crucial differentiating factor that impacted the results of the assessment was the type of restoration that had been completed. At Strawberry Creek, the creek runs through the neighborhood park and is surrounded by businesses, schools, churches, and residential homes. Wildcat and Codornices are not in a park but instead the creeks are the primary attraction with a

bike and pedestrian path next to it. Therefore, Codornices and Wildcat did not have all the same amenities and features that are displayed at Strawberry. The restoration at Lower Codornices, is next to University Village, a daycare center, softball, and soccer fields, as well as commercial buildings. The fields were put in place as flood protection for the creek, functioning as a buffer between the creek and University housing. There is also a large homeless community living on the streets perpendicular to the creek on the Berkeleyside. While Wildcat Creek is also near a library, school, and residential housing, it is also directly across from the one medical center and has a lot of commercial buildings. At Codornices there was helpful signage, however most of it was hidden or had been graffitied. This issue with signage turning into litter was not lost on Restoration Design group, as they made a point to be more selective with their signage and used alternatives at the Wildcat creek restoration. As at Wildcat, they chose to use GIS mapping on the pavement.

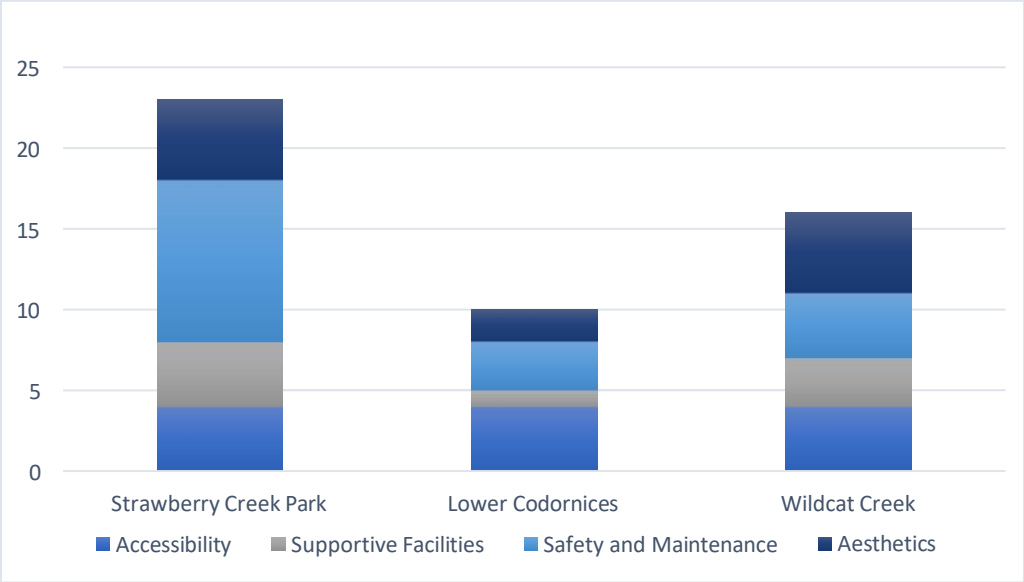

Figure 4. Displays the number of features each creek restoration site has. Refer to site assessment for detailed description of each feature.

The shared bike and pedestrian path alongside Codornices were made of permeable asphalt. It was originally chosen because it was a more sustainable option as it does not run off when it rains. However, after less than ten years the path is full of loose pavers and is severely deteriorated. The aesthetics of the Codornies are quite different from the other restoration sites, as it is more unkempt with a lot of fallen foliage. This loose foliage was done with intention and

ecological reasoning. There were two trash bins located along the creek, and despite the bins being empty, there were still a few pieces of trash in Codornices creek. At the Wildcat restoration there were six trash bins along the path. While most of the bins were empty, the trash bin closest to the road and nearby bridge was severely overflowing and trash was also placed alongside the bin. Strawberry creek had three trash cans alongside the creek, and two of them were overflowing. All the sites provided multiple seating areas next to the creek, Strawberry had picnic tables, and Codornices and Wildcat had benches and alternative seating areas. It was clear that Wildcat creek was the most recent restoration out of the three as evident though the fresh path, and doggy trash bags were provided along the trail. Wildcat creek did contain lots of litter and trash scattered throughout the creek, appearing to still be used as a trash dumping site even after the restoration.

Interviews with creek experts and volunteers

The interviews held with those involved in creek restoration revealed a variety of perspectives and opinions. However, the main themes that emerged were community involvement, creek interaction, socioeconomic inequity, as well as the long-term success of the project. The circle of people involved in the East Bay creek restoration is small, and despite them all having different perspectives on restoration, they all wanted what was best for the community and the creeks. All of the interviewees had grown up near creeks or nature and wanted others to have those same experiences with nature.

"I feel a deep connection with nature, and I think everybody should have access to nature."

-Erin Diehm, Strawberry Restoration Group

Community involvement was a priority for everyone I interviewed, as they all made a point to discuss how integral it is for the success of the project. People have different stories and experiences with creeks that are a product of where they grew up, where they live now, and what

role the creek has played in their lives. There are varied reasons as to why some people are drawn to creeks and others are turned off. Rich Walkling spoke to the importance of respecting that there are a diverse set of opinions and cultural elements that play into whether people support urban restoration. People have full lives and may prioritize other projects such as fixing the pothole in their street or addressing safety concerns over creek restoration. A key aspect to having the community involved is to have a relationship with one of the community leaders, someone who people trust, and who can stand up and speak for the neighborhood. This helps balance out the technical skills with other insightful perspectives.

"A lot of the success that we enjoyed on planning for the restoration projects was because we had a really strong neighborhood group" *-Rich Walkling, Restoration Design Group*

Those involved in creek restoration projects know how to work with and manipulate bureaucratic processes and city institutions to get things done. However, it can be challenging understanding how the neighborhood works and how it makes decisions. The messaging of the creek project as well as understanding how different people value the creeks early on in the project plays a role in how successful the projects are. Collaboration is also happening between the urban restoration groups and voluntary groups. The barriers involved in creek restoration are interconnected but can be seen through the lens of the city and regulatory requirements, resource availability, trust, and power differences, as well as differing ideas.

Community use and experience

To understand how the creek sites are being used by the people in the community, I collected data as activity snapshots. Strawberry creek had the most people at the site and given its historic restoration and its proximity to schools, businesses, and homes it had a higher usage Fthan the other sites. Strawberry Creek also had a high percentage of people using the site for socialization at 27%, with people coming to the creek for birthday parties and picnics. At all the sites, walking was the biggest use of space taking up 30.8%, 63.5%, and 56% of the count at Strawberry, Codornices, and Wildcat respectively. All the sites also displayed some percentage of creek interaction with 13.7% at Strawberry, 7.7% at Codornices, and 5.6% Wildcat. The type of creek interactions varied from people sitting at the creek's edge and resting their feet, to skipping rocks, or wadding. There were also activities done that I had not anticipated which were

unique to the site's neighborhood demographic. At Strawberry Creek, there was a neighborhood "garage" sale happening in which community members were selling some clothes and other items. While at Lower Codornices, there were unhoused people living in tents nearby who used the creek to wash their plates.

From my visit to Strawberry Creek Park, it was clear that every aspect of the creek and the connectivity it provided was being used. The easy accessibility and centrality of the creek makes it easy for families and kids to stop by on their way to the park, playground, tennis courts or to the nearby school. The primary demographic of people taking advantage of the creeks were kids. They ran through the creek playing games, jumped off the rocks, and tied cut up hot dogs to wood sticks to fish with. Parents would wander over to watch, some telling me they were concerned as their child was not the best swimmer but the shallowness and screams of glee allowed them to relax and they often end up enjoying the creek themselves. I watched as parents sat next to their child on the rocks and shared moments of silence together just taking in nature. I saw a woman take off her shoes and dip her feet in the water while reading a book on the creek's edge. A child placed a toy boat into the creek and walked alongside it, holding it by a string that she had tied to it while her father worked a picnic table. Kids and people flowed continuously and the encouragement of parents letting their children play in the creek indicated their trust and safety of the water quality.

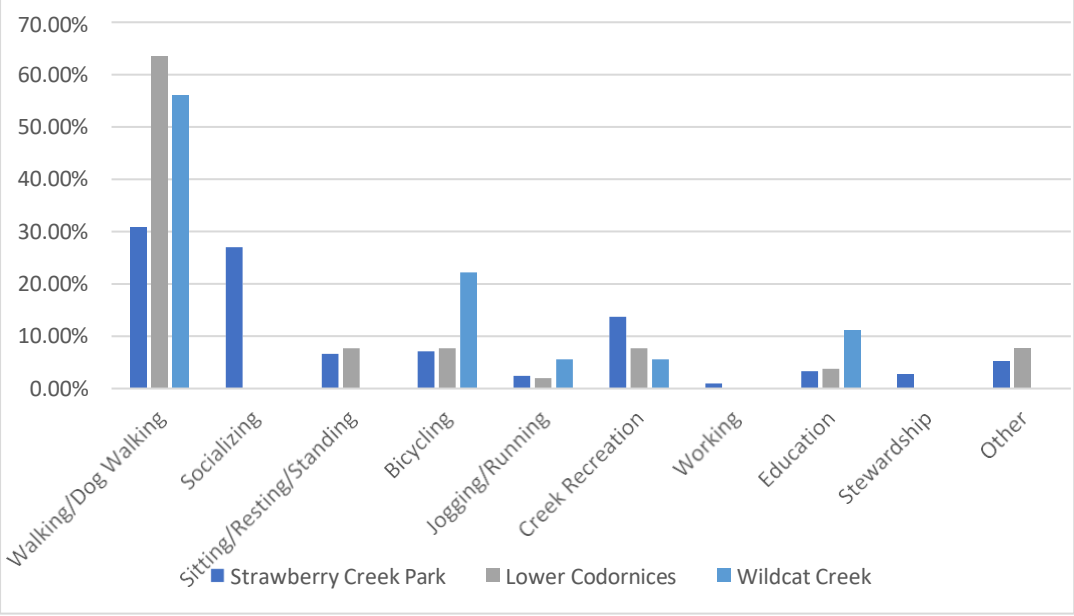

Figure 5. Displays activity percentage breakdown results from the activity snapshot data.

When visiting Lower Codornices, one parent that I spoke with told me their family walks by the creek every weekend on their way to a local cafe. He mentioned that he was not sure if the water was safe for his kids to play in, and he looked for aquatic life as an indication to whether the water quality was good. While completing my activity snapshot a family walked by to stop and watch the creek for a few minutes, and as they continued the walk their young child exclaimed "Isn't nature beautiful?" One mother I spoke to at Codornices told me she lived at a homeless shelter down the block, and both her and her daughter really appreciate the creek as there are not nearby public green spaces for them to escape to. The daughter told me how much enjoys playing in the creek, and both said they wished there were picnic tables or even a barbeque. The mother did share that she has a lot of safety concerns when bringing her daughter as she has seen people living or resting in various parts of the creek. Similar safety concerns were brought up in another interview conducted with a parent at Wildcat creek.

DISCUSSION

The East Bay creeks have historically shaped life around them, from providing water, food and other needs to the people living along them. As the population increased creeks became degraded and polluted with many being placed in culverts underground. Today, East Bay creeks run through many different parks, backyards, and culverts. The East Bay is home to many historic restorations, trailblazing and building the foundational tools to understand how restoration projects can be accomplished. Creek restoration is difficult as there are many different factors impacting them, and monitoring and maintenance is key to its long-term success. There are also different opinions on how to approach and complete restoration projects. The design and layout of these restoration sites are crucial to facilitating the community's relationship and experience with the creeks. Case studies of restoration projects are important to do but come with a set of limitations. The future of creek restoration in the East Bay is optimistic, as new, and exciting projects are emerging.

The "right" way

Creek restorations are still relatively new, and while the foundation has been paved there are still lots of discussions to be had on the "right way" to approach projects and there are many

areas for improvement. There are a diverse set of opinions on the East Bay creeks regarding its history, ecological health, the correct tools for their restoration, and successfulness of the projects. When completing projects there will always be a difference of opinions, and mistakes that will be made, and this is acceptable and a part of the process. As with all challenges we faced, hindsight is twenty-twenty, with restoration projects being no different. There is a universal understanding among the professionals and those involved in restoration that the correct way to complete a project may vary from person to person. Restoration projects aim to solve an interconnected web of problems, and these projects may not perfectly meet all its goals. However, being upfront and honest in reviewing these sites is important to move forward to make the future processes better. Creek restorations are still a "new" field, and we are now face with the awkward teenage years as we reflect on earlier projects, however this process should be done through an optimistic lens as creek restoration is a widely exciting and encouraging field. As new voices come up into space slight disagreements may arise, but it is never forgotten that everyone is fighting for creeks in fighting on the same side.

Community involvement

Community involvement is at the heart of restoration. The East Bay creek restorations are not only for the health of the creeks, but for the community as well. When designing these restorations, the community is kept in mind and environmental justice is taken seriously. Rich Walkling, a planner at Restoration Design Group is a board member and very involved in the non-profit Urban Tilth. Urban Tilth is a nonprofit located in North Richmond that hires and trains residents to serve the community. They have a variety of projects to improve watershed ecosystems and have worked extensively on Wildcat Creek. One of their current projects is the "Wildcat Creek Visioning Project". The project's primary goal is to gather community input on ways to make Wildcat Creek Trail more inviting, improving community access to the SF Bay Shoreline and Bay Trail, and improving recreational opportunities for North Richmond residents.

Community members are often the ones fueling the fire of restoration projects. Rheem Creek for example is a creek that runs through Richmond and San Pablo and has been flooding neighborhoods for the past twenty years. This flooding has a severe impact on the quality of life for people living alongside the creek. A multiphase restoration project has been spearheaded by community members who are staying involved at every stage of the project. Local high school students canvassed door to door to speak with neighbors about the project and ask about their

experience with flooding, as well let inform them on how they can get involved in the project. The Rheem Creek restoration is a great example of how to get communities involved and be included in projects. People want their voices to be heard but are not always asked to share or cannot participate due to time and availability constraints. While doing participant observation and semi structured interviews with the public, everyone I spoke with expressed their appreciation for being asked questions on their creek experiences and wanted to share their perspectives. It is crucial that those working on restoration projects involve the community, to design the project to best serve the community. Restoration projects also need monitoring and maintenance and involving people early in the process allows for more people to be invited to help.

Importance of creek case studies

Before the first restoration in the 1980s, restoring creeks was not a topic of conversation. The first daylighting project of Strawberry Park was a groundbreaking project, setting new standards and inspiring future creek restorations. Our health and well-being are dependent on ecosystem health, and it is crucial that work is done to take care of the freshwater systems as they have a direct impact on all of us. River and creek degradation is a widespread issue, and management of creeks ensures that communities are safe while enjoying all the benefits that creeks provide. Restoration projects provide a variety of benefits from flood management, clean water, habitat for fish and wildlife as well as providing a place for recreation. Other benefits include creating a sense of community, a place of belonging, local empowerment, and environmental education.

Limitations of case studies

Considering the importance of completing case studies on creek restoration, the limitations also need to be discussed. Case studies are used as an observation technique to extract established principles and values. Case studies are a valuable way to prompt new research, as they can illuminate new insights, but there are some disadvantages to them. It is important to note that the chosen sites for the study are not representative of all creeks, and therefore the conclusions made cannot necessarily be applied to every creek. It is also vital to note that my exposure to the sites may be biased and have an impact on the interpretation and findings. Case

studies also pose a challenge as the full study cannot be replicated, and therefore the results found from this case study will only be valid from this research.

The future of urban creek restoration

The future of East Bay creek restorations is bright with so much already having been accomplished, and with big goals to come. There are many strong community volunteer-based groups fighting for the creeks, working to maintain projects, and advocating for new ones. Restorations in the East Bay are designed with the members of the community in mind, and the goal is to be enjoyed and used by the community. A lot of work goes into restorations, as they are multiyear projects of planning, collaborating, and implementing. There is an array of problems that arise during the projects which allow those involved to learn and improve techniques. All the restoration projects in the East Bay are completed by the same groups and this consistently allows them to build their knowledge of the East Bay creeks to create more effective and impactful restorations. This also helps build trust and long-term relationships with the community members throughout the East Bay. Community members then know that these projects were made with them in mind, and the full social benefits of creeks are achieved. The outlook is optimistic and exciting as more restoration projects are completed. When Rich Walkling was asked about the future for resilient creek restorations, he stated that his vision can be equated to an old Italian story. The story goes, “An old man goes for a walk in the Alps, and he has a pocket full of acorns. Every day he goes for a walk and drops acorns, and twenty years later there’s a forest.” This story creates a perfect metaphor for creek restoration efforts in the East Bay. All the time and work that has been put in by restoration groups, volunteer groups, and community members had a purpose that can be seen by the impact that restoration projects have on the community and ecosystem. The work that is being done now will continue to build upon the success and help creeks and communities continue to flourish.

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APPENDIX A: Site Assessment

Site Assessment

Creek:

Location:

Date and Time:

Weather:

Site Assessment

1. Creek Access

- Well-designed entrances
- Signage (as appropriate)
- Bicycle path
- Roads/path (no cracks, loose pavers, deterioration)

Sum of Score

Notes:

2. Supportive Facilities

- Permanent restrooms, not portable toilets (usable, not locked)
- Sufficient number of trash and recycling bins (not overflowing)
  COUNT**:** Functional drinking fountains
- Benches (Good condition, no broken/protruding parts, or potential for splinters)

Sum of Score

Notes:

3. Safety and Maintenance Concerns:

- No adjacent derelict land or buildings
- No graffiti, vandalism, or broken windows adjacent to the part or visible from inside the park
- No evidence of alcohol/substance abuse in the areas adjacent to the park
  No evidence of unauthorized camping in areas adjacent to the park
- No graffiti, vandalism, broken windows or furniture
- No litter
- No animal waste
- Vegetation is maintained (no overgrown grass, weeds, bushes, or dirt patches in green areas)
- No evidence of alcohol/substance abuse
- No evidence of unauthorized camping or vagrancy at the creek

Sum of Score

Notes:

4. Aesthetics

- Natural Areas (free from litter, debris, unobstructed if accessible, managed for ecosystem health)
- Pleasant Sounds (no roaring highways/industrial sounds)
- Presence of vegetation
- Vegetation and trees are well cared for, not overgrown, alive
- Attractively designed and coordinated signage

Sum of Score

Notes:
TOTAL SUM OF SCORES:

OBSERVATIONS:

Figure 1A: Site Assessment Survey

APPENDIX B: Activity Snapshot

Activity	Count	Percentage
Walking/dog walking		
Socializing		
Sitting/Resting/Standing		
Bicycling		
Jogging/running		
Creek Recreation (skipping rocks/wadding ect.)		

Working		
Education		
Stewardship		
Other:		
Total:		

Figure 1B. Activity Snapshot Survey