



Observations and Recommendations for the Delaware and Raritan Canal Master Plan Update

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By the Spring 2021 Graduate Planning Studio

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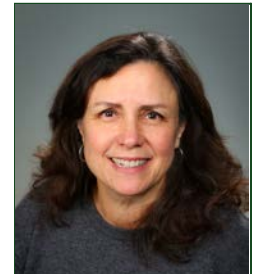
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Section I: Introduction

Executive Summary

Spanning over a 70-mile corridor, the Delaware and Raritan Canal State Park (D&R Canal Park) provides millions of New Jersey residents with invaluable access to a tract of pristine natural landscapes and a rich history directly from their (often literal) back door. The canal offers not only an aesthetic and recreational benefit to multiple New Jersey communities, but also a steady and reliable supply of drinking water for over one million people per day. Apart from its' benefits to people, the D&R Canal Park functions as the home to hundreds of species of plants and wildlife, including 160 species of birds alone¹. The region represents a respite from the larger suburban and urbanized state of New Jersey and offers a connection to the state's past. Protection of this jewel of Central New Jersey is not only for the sake of safeguarding our past or prolonging our enjoyment of the park at the present, but for the sake of preserving a natural treasure for future generations.

Presently, stewardship of the D&R Canal Park is mainly accomplished through the provisions of the Delaware and Raritan Canal Commission's (the Commission) Master Plan, enacted in 1989. While the document can be considered an overwhelming success, the challenges we face today – on environmental, historic, recreational and land use terms – only partially resemble those considered three decades ago. The D&R Canal Park faces new threats and new circumstances that require renewed planning efforts. This fact is only exacerbated by the uncertainty for the future that the COVID-19 pandemic has produced.

As the 50th year of the D&R Canal Park in 2024 approaches, it is necessary to look to the future and contemplate the kind of Delaware and Raritan Canal resource that New Jersey residents need for the 21st century. The following report was written with the intent of informing the basis for potential future master planning efforts for the Commission. In order to provide the context and information necessary for the start of deliberations on the question of updating the 1989 Master Plan, the following chapters are organized as follows:

¹ "D&R Canal State Park - About," <https://www.dandrcanal.com/about-d-r-canal-state-park>.

1. A reexamination of the D&R Canal's Principles and Goals, as originally identified in the 1989 Master Plan, and the impacts of trends and projections on the fulfillment of these objectives
2. A summary of data collection processes, including a review of comparable master plans and stakeholder outreach, as it pertains to the presented SWOT analysis and final recommendations
3. An analysis of the current conditions of the D&R Canal based upon the relevant SWOT (Strengths, Weaknesses, Opportunities and Threats) considerations to future master planning efforts
4. The identification of key opportunities and constraints pertaining to the planning of the D&R Canal and proposed recommendations to enhance these opportunities and minimize constraints

Background

This report represents a culmination of a semester's-worth of work by a team of seven graduate planning students from the Bloustein School of Planning and Public Policy at Rutgers University, aided by Professor Jeanne Herb, as part of a practicum studio. This studio was conducted between January and May 2021 in collaboration with the Commission for the purpose of researching and analyzing the conditions that necessitate an update to the Commission's three-decade old master plan. Constrained by the limitations of working remotely, due to the COVID-19 Pandemic, and the four-month schedule of an academic semester, the studio team prioritized providing the Commission with the information and groundwork necessary to inform the start of a thorough master planning effort, rather than creating a new master plan. To lay the foundation for the Commission to successfully create a master plan for the 21st Century, the studio team prioritized data collection and an analysis of the conditions that the D&R Canal Park and the Commission are now facing. The stark differences between the realities faced in 1989 and 2021 that this process revealed justify the continuation of master planning efforts into the future.

The work for this report began in January 2021, with an initial review of the general administrative framework of the Commission and the existing planning documents prepared by the organization. This effort was supplemented by in-class discussions with informed government and private stakeholders, including representatives for the Commission, the New Jersey Department of Environmental Protection, the State Historic Preservation Office, the New Jersey Water Supply Authority and a number of non-profit and advocacy “Friends groups.” Using the data collected through these efforts, the studio team identified key trends that were believed to have an influence on how the goals of the Commission have changed since 1989. These trend topics were used as the basis for Section Two of this report and highlight the significant evolution of challenges that the D&R Canal Park has faced over the past 30 years. As a follow-up to in-class discussions with stakeholders, each of the studio’s team members identified individual knowledgeable stakeholders to interview personally throughout March 2021. These interviews broadened the team’s understanding of the specific deficiencies and obstacles present in the governance of the D&R Canal Park and served as a basis for a subsequent SWOT analysis conducted by the team on March 23rd. This SWOT analysis marked the beginning of the final stage of the studio team’s analysis, in which the identified data and trends were organized under the categories of opportunities to be pursued and constraints to be overcome. Throughout the month of April, the team worked on developing its final recommendations for how the Commission can achieve a fruitful master planning process and create an updated master plan that is responsive to present-day needs. The team completed the process by presenting its analyses and findings to members of the Commission and representatives from partner agencies in the month of May. The following report is a compilation of the final recommendations and the team's previous analyses.

Section II: Reexamination of Goals & Objectives

Introduction

In 1974, the Delaware and Raritan Canal was established as a state park to preserve its integrity as a source of water supply, recreation, and natural beauty². To aid in these preservation efforts, the provisions of the Delaware and Raritan Canal State Park Law of 1974 created the Delaware and Raritan Canal Commission (the Commission) and empowered the entity with regulatory power in acknowledgment of:

- The function of the canal as a major water supply facility in the State
- The necessity to provide recreational activities to the citizens of the State
- Existing historical sites and potential restorations or compatible development
- The range of uses and potential uses of the canal in the urban environment of the older, intensively developed communities through which it passes
- Designated wilderness areas to be kept as undeveloped, limited-access areas restricted to canoeing and hiking

These important realities of the Delaware and Raritan Canal Park (D&R Canal Park) were later codified in the 1989 Master Plan as the governing goals for the future of the D&R Canal Park and the Commission. The 1989 goals and principles continue today as the guiding influences on the priorities for planning in the D&R Canal Park. By contextualizing these goals within the changes observed in and around the canal since 1989, planning for the future can be up to date and focused on what makes the D&R Canal Park special.

Goals of the 1989 Master Plan

Revised from the 1974 legislation, the goals and principles of the D&R Canal Park listed in the 1989 Master Plan were organized around ten central tenets – five of which were directly translated from the founding legislation³. Each of these ten goals were

²“Legislation -- 1974, 1991 & 2007” (D&R Canal Commission, n.d.), <https://www.nj.gov/dep/drcc/about-canal/history/legislation/>.

³“1989 D&R Canal Master Plan”(D&R Canal Commission, 1989),

<https://www.nj.gov/dep/drcc/pdf/Delaware%20and%20Raritan%20Canal%20Commission%20Master%20Plan%202nd%20Edition%201989.pdf>.

assigned their respective steering objectives. While these individual objectives were tailored to 1989 circumstances, they serve as useful guides for future planning efforts of the D&R Canal Park. In order to inform how the priorities of the Commission have influenced the region's evolution over the past thirty years, the ten central principles of the commission and their objectives are outlined below:

1. The Canal Park is a Linear Park
2. The Canal Park is a Connector
3. The Canal Park Must Retain a Degree of Serenity and Separation from the Man-Made world
4. As a Multiple-Use Resource, Each of the Canal Park's Primary Roles Must Be Given Equal Importance
5. **The Canal Park is an Outdoor Classroom to be Used for Public Education**
6. **The Canal is a Water Supply System**
7. **The Canal Park is a Site for Recreational Activities**
8. **The Canal Park is a Historic Resource**
9. **The Canal Park is an Area that Should Be Maintained in its Natural State**
10. **The Canal Park is a Means of Enhancing Urban Areas**

Five of the principles (bolded above) are specifically referenced in the 1974 authorizing legislation and are also highlighted in the Seventh Edition of the Regulations for the Review Zone of the Delaware and Raritan Canal Park (NJAC 7:45-1.4). As such, the studio team focused its research and analyses on issues specifically related to these five principles. For each step of the process in creating this report, the studio team considered its collected data in the context of these five principles and realities of the D&R Canal Park's existence. While a significant number of conditions have changed within the D&R Canal Park since 1989, these principles remain unchanged as integral aspects of the canal's primary functions. These specific principles, therefore, deserved a more in-depth consideration:

Guiding Goal #1: *The Canal is a Water Supply System*

As a source of about 75 million gallons of water per day to one million residents, this first guiding goal has implications for human health and public safety⁴. Throughout its continued existence, the Commission must continue prioritizing the integrity of the water conduit of the canal. This guiding principle is accomplished through three objectives:

1. “The integrity of the Canal as a structure that carries water must be protected.”
2. “The quality of the water that enters the Canal—whether from a point source, overland flow of stormwater runoff, or from groundwater exchange—must be suitable for a source of drinking water.”
3. “Other uses or development projects must be compatible with the need to operate and maintain the Canal as a water supply system.”

As the 1989 Master Plan recognized, the concerns for the canal’s water supply must include both the quality and quantity of surface water and groundwater. The 1989 Master Plan states that “[c]hanges in the quality or quantity of water—either surface water or groundwater—will have a dramatic effect on the biologic system in the Canal Park.”⁵

Guiding Goal #2: *The Canal is a Site of Recreational Activities*

With a corridor of more than 70-miles of recreational trails, the D&R Canal Park is home to the largest continuous trail within the state of New Jersey. From camping to hiking to cycling, the D&R Canal Park has optimal passive recreational opportunities for New Jersey residents and visitors to enjoy. A significant focus inherent in this goal is finding compatible recreational activities, rather than allowing all recreation.

1. “Recreational development should be aimed at encouraging the widest possible range of compatible recreational activities.”
2. “The types of recreational activities to be encouraged depend upon the “Canal Environment” as designated in the Master Plan.”

⁴ “D&R Canal State Park - About,” <https://www.dandrcanal.com/about-d-r-canal-state-park>.

⁵ “1989 D&R Canal Master Plan” (D&R Canal Commission, 1989), <https://www.nj.gov/dep/drcc/pdf/Delaware%20and%20Raritan%20Canal%20Commission%20Master%20Plan%202nd%20Edition%201989.pdf>.

3. “Recreational development and access are to be allocated to all parts of the Park in order to avoid concentrating use at a few locations.”
4. “Adjoining recreational resources should be connected to the Park for mutual enhancement. The development of additional recreational resources adjoining the Park is to be encouraged.”

As the canal has a linear orientation, simply placing recreation without consideration to their geographic concentration can create significant issues of equity. As part of this reality, the 1989 Master Plan notes that “the Commission also intends to be careful that recreational facilities that are needed in the central New Jersey region are given special consideration.”⁵ As a goal, recreation can be expanded geographically along the D&R Canal Park, and more activities like educational programs can be offered to visitors.

Guiding Goal #3: *The Canal is a Historic Resource*

Built in 1834 and serving as a significant economic force in early American history, the Delaware and Raritan Canal is a representative of nearly two centuries of New Jersey’s development and history. From 18 remaining historic canal houses to the canal’s locks, the D&R Canal’s inclusion on the National Register of Historic Places in 1973 only solidified the significance of the canal’s historic value⁶. Now, the continual challenge inherent in this status lies in the proper maintenance and restoration of these historic features and sites. Furthermore, the historic status of the D&R Canal makes education a natural component of the canal’s existence as a state park. In response to these observations, the following objectives were incorporated by the 1989 Master Plan as part of this principle.

1. All repair, maintenance, and development work on the Canal and its associated structures should respect and enhance the historic character of the Park.
2. “The Park’s historic character is derived as much from the context through which the Canal flows as from the Canal’s structures. That context—the

⁶ “History of the D&R Canal” (Canal Watch, December 3, 2020), <https://canalwatch.org/history/>.

area that can be seen from the Canal and its towpath—should be preserved in a manner that reflects its historic nature.”

3. “The role that the Canal played in the history of New Jersey should be interpreted for public edification.”
4. “The Park should provide an appropriate context for nearby historic structures, landscapes, or sites.”

The Commission, as exhibited in these objectives, is simultaneously responsible for an important part of New Jersey’s natural and historic heritage. By preserving these two realms, the Commission not only retains the character of the canal itself, but also how communities relate to their surroundings and past.

Guiding Goal #4: *The Canal is an Area that Should be Maintained in a Natural State*

The D&R Canal Park is an environmentally sensitive region among suburban and urban surroundings. Development pressures are a constant challenge for land preservation efforts and are the rationale behind the objectives for this guiding goal:

1. “The lands and water in the Park should be maintained to preserve wildlife habitats and the flourishing of natural vegetation communities.”
2. “The Park should be a means of connecting other natural areas in the region, thereby enhancing their ability to function.”
3. “Rare, endangered, or threatened species of plants and animals found in the park should be carefully preserved.”
4. “Landscape materials used in the Park or used on adjoining lands should be native to the region and appropriate for their specific habitat.”
5. “The greatest possible variety of habitats for plants and animals should be preserved.”
6. “The Park should serve as a migratory route for plants and animals.”

This goal serves not only park visitors and nearby residents, but also the well-being of the diverse plant and wildlife species that reside along the D&R Canal Park corridor.

Guiding Goal #5: *The Canal is a Means of Enhancing Urban Areas*

While the D&R Canal Park is seen as a natural area, it is also surrounded by developed, urban areas - most notably the cities of Trenton and New Brunswick. As a

greenway with a path directly through these urbanized areas, the D&R Canal Park offers critical open space amenities to residents. To achieve this, the following objectives were established under this principle:

1. “The recreational, historic, and natural conservation objectives are all applicable to urban areas through which the Canal flows and should be appropriately applied there.”
2. “The Park should serve as a transportation route within urban areas for non-motorized vehicles and pedestrians”
3. “The Park should be both a boundary for urban neighborhoods and means of connection among them.”
4. “Park should be a means of connecting urban areas with recreational areas, historic sites, and natural areas in the region beyond the urban boundary.”

This goal does not only incorporate the benefits of access and connectivity for urban spaces, but also the positive visual impacts that a canalscape can provide. As the 1989 Master Plan states, “[t]he canal offers an exciting addition to [urban area] elements. The textural quality of the water contrasts markedly with the textures of the roads, signs, buildings, fences, cars, and fireplugs in the urban area. Yet the water also reflects the images of these features, increasing their importance.” Due to the fact that the D&R Canal Park transects a variety of built environments – from rural to urbanized – the planning of the D&R Canal Park must be based upon the particular circumstances of each segment and its abutting communities.

While developed in 1989, these five goals were deemed to still be relevant for today. This conclusion was based upon an analysis of trends and projections in relation to their impacts on the continued relevance of the five goals. Through this process, the studio team was able to recontextualize these goals for 2021 challenges and conditions.

Trends & Projections

In preparation for an update to the 1989 Master Plan, the Commission will need to consider the major demographic, environmental, and cultural changes that have occurred in the D&R Canal Park region over the last four decades. The following section outlines

the analysis of crucial trends as they relate to the Commission's goals and objectives. These trends include demographics, the economy, land use, development and urbanization, the environment, water quality, recreation, and cultural and historic resources.

In conjunction with the individual data trends, this report also analyzes the concept of equity within the Commission's review zones. Equity, as a concept, is difficult to quantify or measure objectively using a set of parameters. However, despite challenges in measuring equity, it remains crucial to study how this concept measures against the data trends that this section includes, specifically in relation to income, development and its threats, sites of environmental concern, and access to park service points. As a result, most trends in this section include an assessment of whether aspects pertaining to the trends are equitably distributed within the Commission's review zones and, thereby, which municipalities are at a position of particular disadvantage and vulnerability.

Methodology

To understand the major trends identified above, the team collected and analyzed data from the time the 1989 Master Plan was last reviewed to present-day. Due to the nature of historical and current data available, the time frames and geographies studied for each analysis vary. Since preparation of the 1989 Master Plan occurred between the late 1970s and the 1980s, the oldest data collected and analyzed in each section dates as closely to this time period as possible. Data is also analyzed as it changes through the years and projected for several of the trends. The geographic area of interest for these analyses involve the surrounding region of the D&R Canal Park. For larger, regional-scale analyses, such as employment growth in the Economy section, data is analyzed for the D&R Canal Park's five adjoining counties. For smaller-scale analyses, such as overburdened municipalities in the Demographics section, data is analyzed for census block groups within the Commission's review zones. Additional information regarding each trend, including full analyses and methodologies, are detailed in this report's Appendix.

As mentioned above, equity is not a standardized or quantifiable aspect of measurement. However, McDermott, Mahanty, and Schreckenberg (2013) present a framework to analyze equity through three dimensions - distributive, procedural, and contextual. Distributive equity addresses the issue of allocation of costs and benefits among stakeholders and generally represents the economic aspect of equity. Procedural equity involves inclusion, representation, and participation in decision-making, and refers to fairness in the political processes that allocate resources. Finally, contextual equity incorporates pre-existing conditions that limit or enable people's access to decision-making procedures, resources, and benefits.⁷

For the purpose of this report, this Compendium of Trends and Projections chapter primarily studies the concept of equity through the lens of distributive justice. Using data on Overburdened Communities, Contaminated Sites, Sites of Immediate Environmental Concerns (IECs), and locations of Park Service Points, this chapter analyzes whether data trends studied under the sections of Demographics, Development, Environment, and Recreation are equitably distributed among residents within the Commission's review zones. This report later focuses on issues of procedural equity in the chapter entitled "Master Plan Review."

⁷ Melanie McDermott, Sango Mahanty, Kate Schreckenberg. 2013. "Examining equity: A multidimensional framework for assessing equity in payments for ecosystem services." *Environmental Science & Policy* 419-427.

Demographics and Equity

Demographics

Key Takeaways

- The region's population has increased over time, though its growth rate has gradually slowed down.
- The population is aging, with most entering middle to senior age.
- The population is becoming more racially and ethnically diverse.
- The average median household income has risen over time, but decreased slightly over the past two decades.
- 24 municipalities in the Commission's review zones can be classified as having census block groups that meet the state Department of Environmental Protection's criteria for being overburdened, with an uneven distribution of these municipalities in the central and Eastern parts of the review zones.

To understand how demographics and related socioeconomic factors have evolved since 1989, this section analyzes data from the U.S. Census Bureau's Decennial Census and American Community Survey (ACS).⁸ Tract-level data from the Decennial Census was collected for the years 1980, 1990, 2000, and 2010, while census tract-level ACS data for 2019 was collected from the 2014 to 2019 five-year estimates.⁹ The data are based on 2010 geographies and adjusted for inflation to 2019 dollars. In particular, this section looks at the key demographic data aspects of age, sex, race, ethnicity, and household income.

The population in the region of the D&R Canal Park has gradually increased from 438,338 in 1980 to 700,414 in 2019. Additionally, the population has naturally aged over time. The age-sex pyramids of the population demonstrate the expansion in population and the transition from young adult age to middle-age, with the most prevalent age group of 45 to 54 years old for both males and females in 2019.

⁸ US Census Bureau, "American Community Survey (ACS)," The United States Census Bureau, n.d., <https://www.census.gov/programs-surveys/acs/>.

⁹ US Census Bureau, "Decennial Census Data," The United States Census Bureau, n.d., <https://www.census.gov/programs-surveys/decennial-census/data.html>.

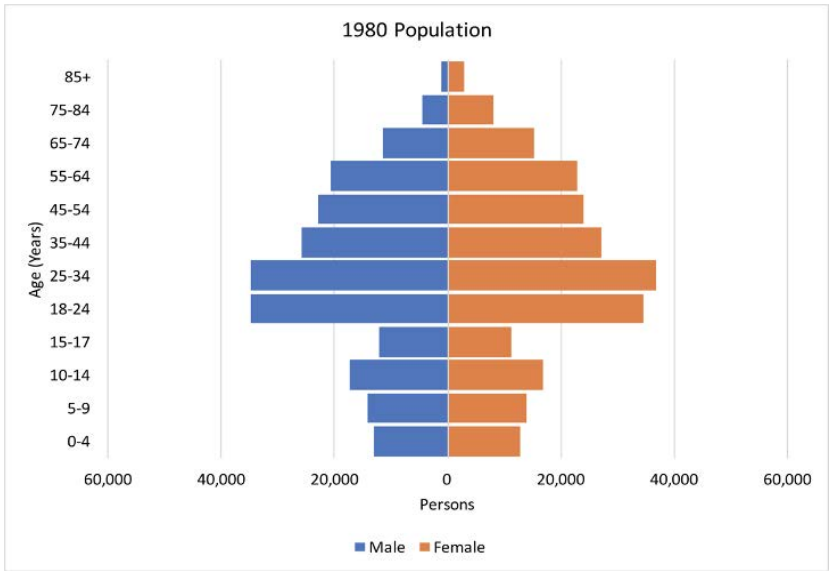


Figure 2.1. Age-sex pyramid of population in 1980
The region's population in 1980 was considerably young, with the most common age group in the region between 18 to 34. This population represents the Baby Boomer cohort
Source: US Census Bureau

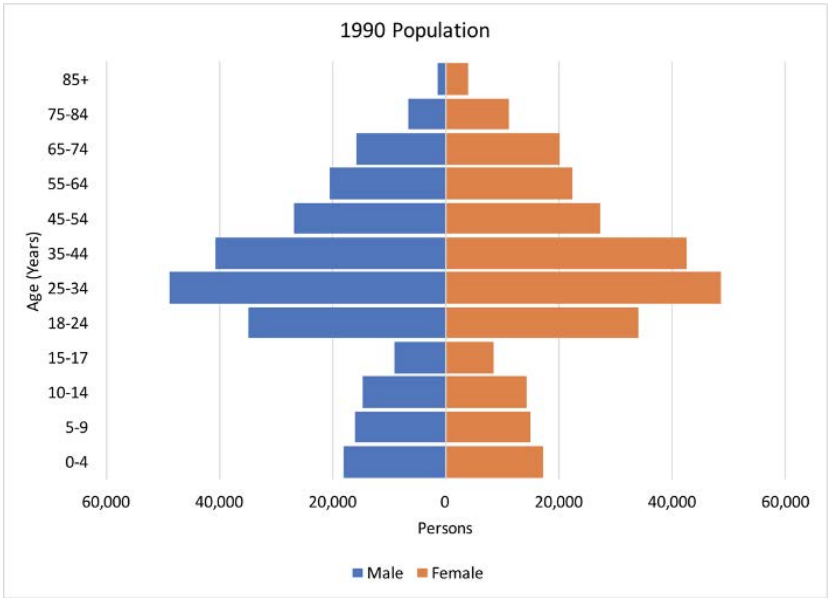


Figure 2.2. Age-sex pyramid of population in 1990
The Baby Boomer cohort in the region remained the prominent age group in the area around the D&R Canal Park by 1990, with a significant proportion of residents between the ages of 25 to 34 years and 35-44 years.
Source: US Census Bureau

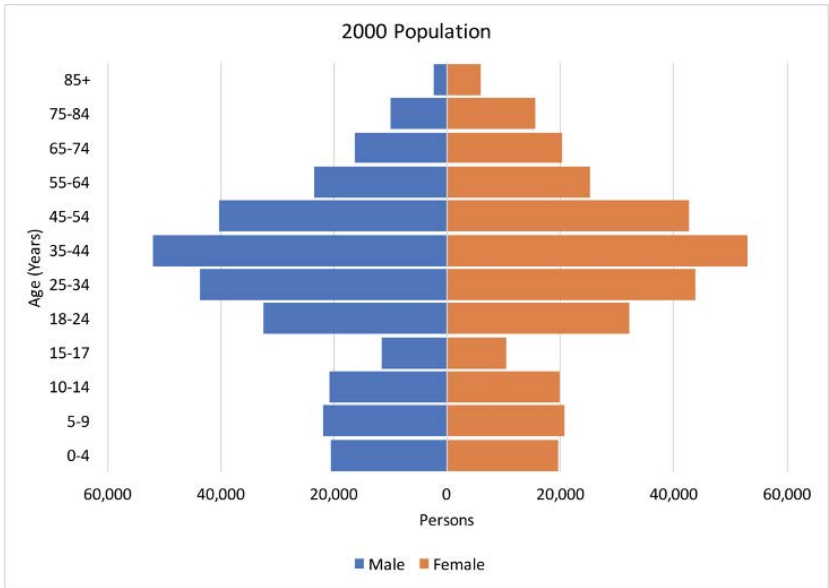


Figure 2.3. Age-sex pyramid of population in 2000
 By the turn of the century, the prominent Baby Boomer population in the area had begun to reach middle-age, while the Millennial Generation (aged 0-17) were becoming more prominent as the Baby Boomer and Generation X cohorts established families.
 Source: US Census Bureau

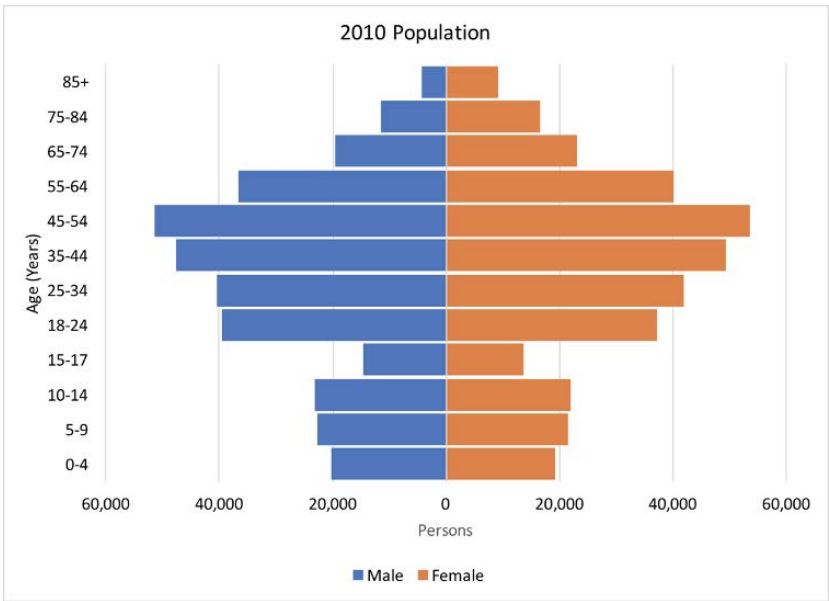


Figure 2.4. Age-sex pyramid of population in 2010
 By 2010, the general population within the D&R Canal Park's vicinity did not significantly change from 2000 proportions. The Baby Boomer cohort represented a significant concentration of middle age groups, while Millennials began to leave adolescence.
 Source: US Census Bureau

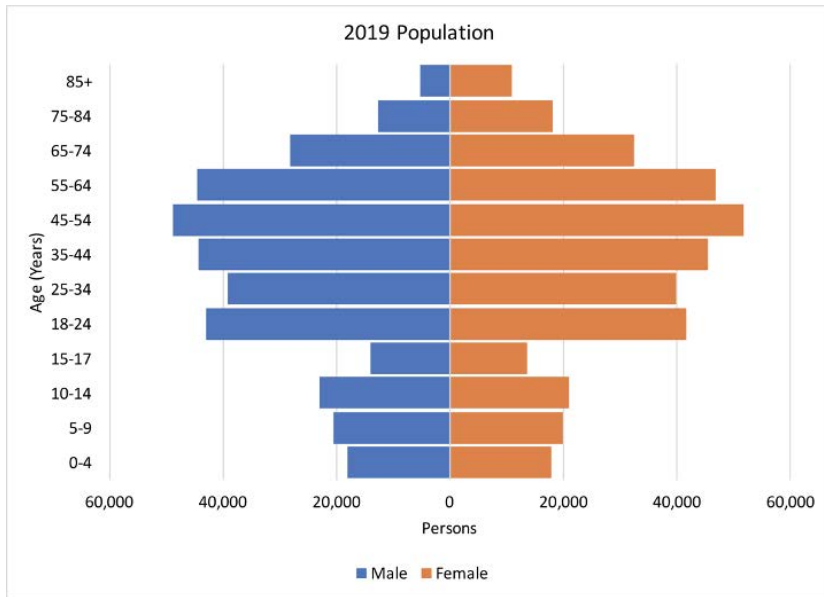


Figure 2.5. Age-sex pyramid of population in 2019
At the present time, the growing population in the region has a significant portion of older/middle age cohorts (Baby Boomers and Generation X), while Millennials begin to start families and Generation Z begins to enter young adulthood (18 to 24 years).
Source: US Census Bureau

The population in the region has become increasingly racially and ethnically diverse over time. In 1980, 81% of the population was White and 15% was Black, while less than 4% consisted of other races. By 2019, the percentage of the White population decreased to 60%, as the difference has dispersed across the other races. Similarly, in regard to ethnicity, the percentage of persons of Spanish, Hispanic, or Latino origin has increased over the last four decades - from 3.3% in 1980 to 13.9% in 2019.

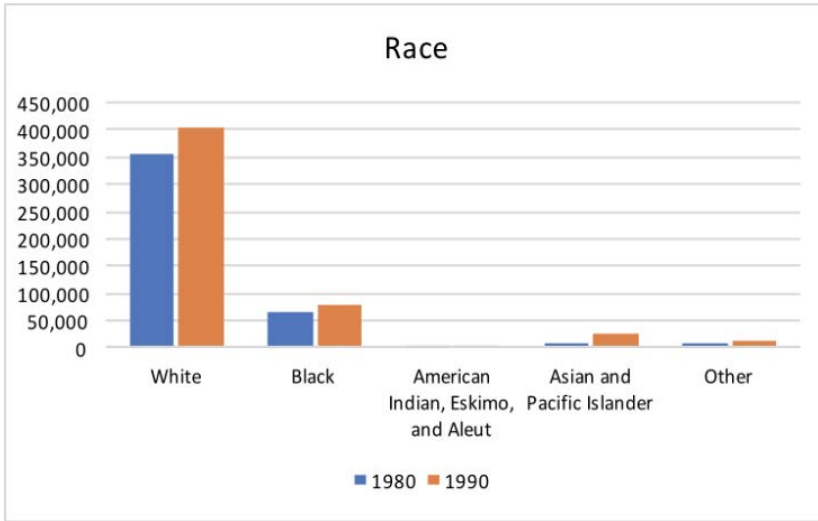


Figure 2.6. Race, 1980-1990
 Between 1980 and 1990, the population within the region increased considerably. While overwhelmingly white at the time, the period between 1980 to 1990 saw population increases among all races
 Source: US Census Bureau

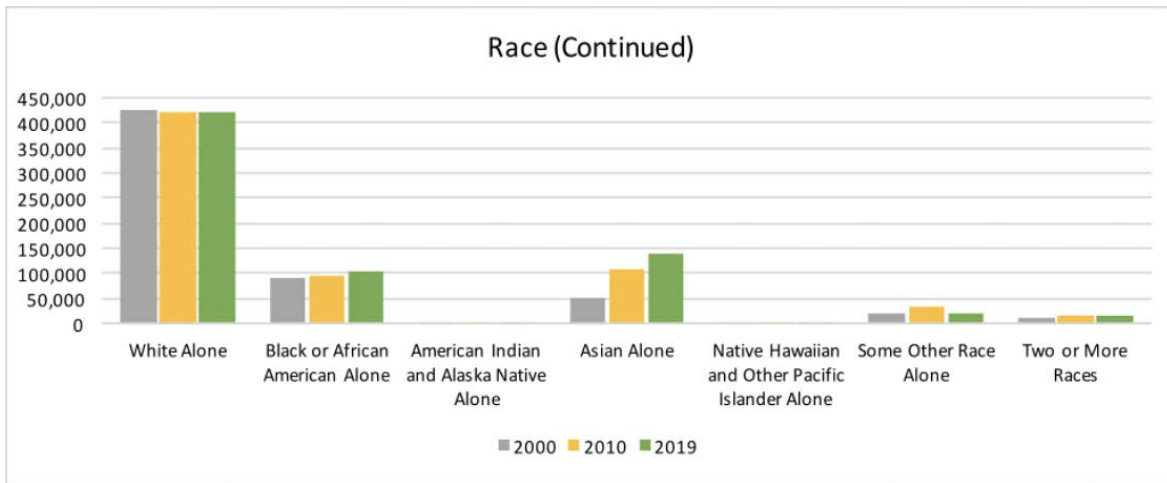


Figure 2.7. Race, 2000-2019
 Between 2000 to 2019, the number of White residents in the region remained stable, while the populations of Black/African American and Asian residents saw increases. By 2019, the percentage of the White population decreased to 60%, as the difference has dispersed across the other races.
 Source: US Census Bureau

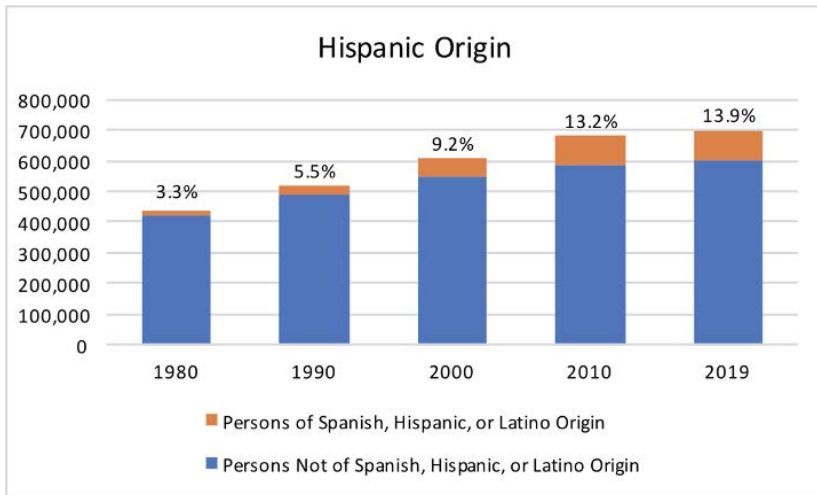


Figure 2.8. Population by Hispanic Origin, 1980-2019
Between 1980 to 2019, the proportion of Spanish, Hispanic or Latino origin had increased from 3.3 percent to 13.9 percent.
Source: US Census Bureau

Finally, in terms of income, this section uses the measure of average median household income to analyze trends. The average median household income (in 2019 inflation-adjusted dollars) has slowly increased over time, but slightly dipped from its 2000 high over the last two decades. In 1980, the average median household income was \$77,182. This number rose to \$104,537 in 2000 and finally reduced to \$102,247 in 2019.

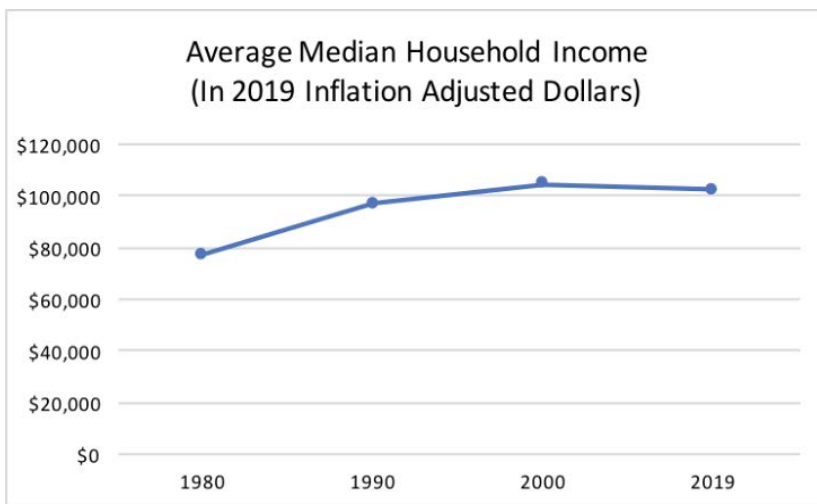


Figure 2.9. Average Median Household Income, 1980-2019
The median household income of the region saw considerable increases over time since 1980. When compared to 1980's average of \$77,182, households currently make, on average, \$102,247. The average median household income saw slight declines in the mid-2000's, a likely result of the 2008 Recession.

Equity

Although the current median average household income in the area is relatively high, there may still linger potential issues of poverty and inequality within these figures.

To understand these, this report also looks at the issue of equity. In relation to demographics, the New Jersey Department of Environmental Protection (NJDEP) maintains the Overburdened Communities under the New Jersey Environmental Justice Law Dataset. As per New Jersey Environmental Justice Law, an “overburdened community” is defined as any census block group, as determined in accordance with the most recent United States Census, in which¹⁰:

1. At least 35 percent of the households qualify as low-income households
2. At least 40 percent of the residents identify as minority or as members of a State recognized tribal community; or
3. At least 40 percent of the households have limited English proficiency.

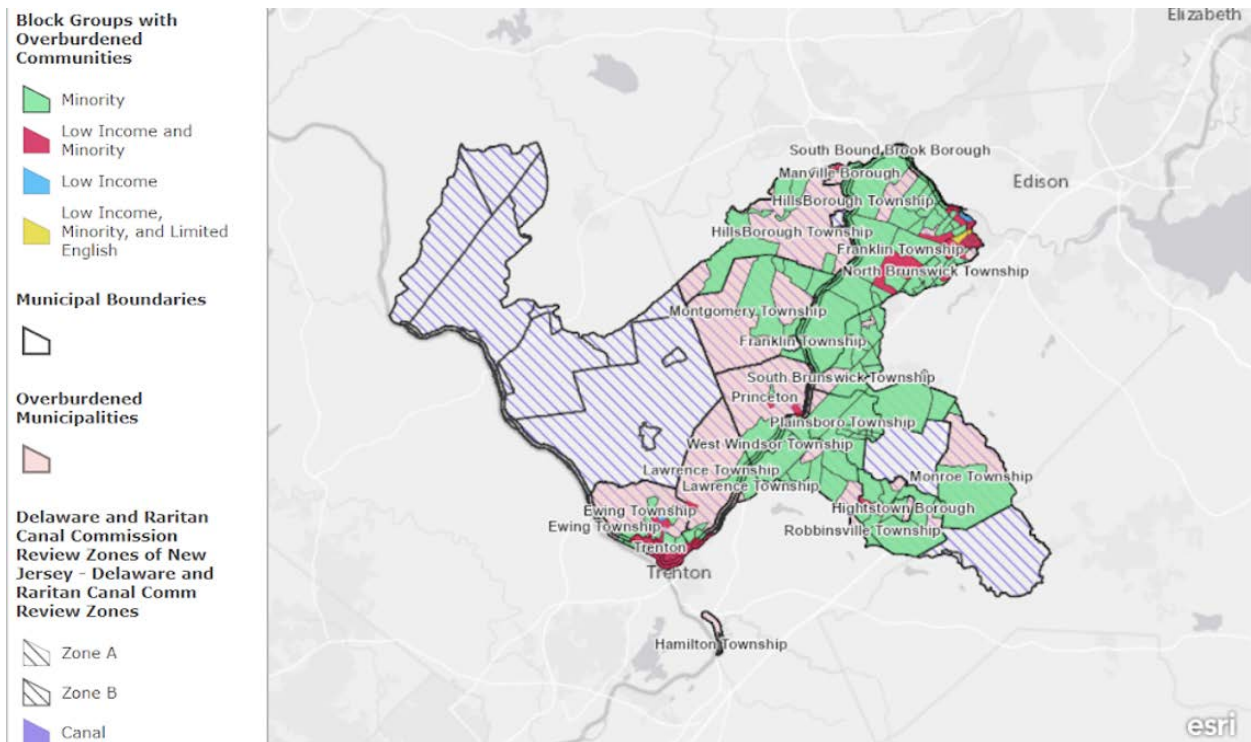


Figure 2.10. Municipalities with Overburdened Communities

The map above shows overburdened municipalities within the Commission’s review zones highlighted in red. As per this dataset, the following municipalities in the review zones meet the requirements to be described as municipalities with overburdened communities:

¹⁰ “Environmental Justice Overburdened Communities (OBC),” NJDEP | Environmental Justice, n.d., [https://www.nj.gov/dep/ej/communities.html#:~:text=Environmental%20Justice%20Overburdened%20Communities%20\(OBC\).-Signed%20into%20law&text=13%3A1D%2D157%2C%20](https://www.nj.gov/dep/ej/communities.html#:~:text=Environmental%20Justice%20Overburdened%20Communities%20(OBC).-Signed%20into%20law&text=13%3A1D%2D157%2C%20)

Bound Brook Township
Bridgewater Township
East Windsor Township
Ewing Township
Franklin Township
Hamilton Township
Hightstown Borough
Hillsborough Township
Lawrence Township
Manalapan Township
Manville Borough
Middlesex Borough

Monroe Township
Montgomery Township
City of New Brunswick
North Brunswick Township
Piscataway Township
Plainsboro Township
Princeton
Robbinsville Township
South Bound Brook Borough
South Brunswick Township
City of Trenton
West Windsor Township

Taking a more granular approach to the data reveals that while all of the aforementioned municipalities can be classified as being overburdened, vulnerable communities are not evenly spread across the municipalities and are restricted to certain block groups within them. Of the three criteria that the dataset takes into account, the majority of the overburdened block groups within the review zones include “at least 40 percent of the residents identif[ying] as minority or as members of a State recognized tribal community”. The large urban centers of New Brunswick and Trenton on the northern and southern tips of the review zones also include block groups that satisfy both the requirements of low-income and minority communities, while a few block groups in New Brunswick satisfy all three criteria. Data on overburdened communities provides the Commission with an understanding of where the most underserved and vulnerable communities lie within the review zones, and hence, which areas may need special attention as the Commission updates its master plan.

The Economy

Key Takeaways

- Middlesex County has the largest economy in the Delaware and Raritan Canal region and job growth will continue at a faster rate than in the other counties. Development pressure in Middlesex will likely continue as well, as Wholesale Trade and Transportation and Warehousing are dominant sectors in the county.
- The growth of the Arts, Entertainment, and Recreation sector and the Forestry, Fishing, Hunting, and Agriculture Support sector in Hunterdon and Somerset Counties signal that the overall economic impact of D&R Canal Park activities can be strongest in those counties and the effect will be multiplied.
- Employment in Middlesex, Mercer, and Somerset Counties is projected to grow the fastest in the next few years, while growth in employment is projected to be slower in Burlington and Hunterdon Counties.

Since the development of the 1989 Master Plan, much has changed in the regional economy. The current development pressures in the five-county region that the D&R Canal Park runs through can be best contextualized by understanding economic trends in the area. This report's economic analysis utilized County Business Patterns (CBP) data¹¹ produced by the U.S. Census Bureau for the five counties in the D&R Canal Park region. Total projected employment data for 2026 was provided by the New Jersey Department of Labor and Workforce Development and retrieved from the New Jersey State Data Center¹².

Each of the five counties surrounding the canal system has experienced different economic growth patterns since 1988, but the most relevant trends for the Commission to consider include job growth in Wholesale Trade; Retail Trade; Transportation and Warehousing; Arts, Entertainment, and Recreation; and Forestry, Fishing, Hunting, and Agriculture Support sectors. These sectors offer significant implications for physical and economic development in the region. Dominant sectors in Wholesale Trade and

¹¹ "County Business Patterns(CBP)" United States Census Bureau. (n.d)
<https://www.census.gov/programs-surveys/cbp.html>

¹² "Occupation Projections 2016-2021." New Jersey State Data Center (n.d)
https://nj.gov/labor/lpa/employ/indoccpj/indoccpj_index.html

Transportation and Warehousing mean that warehouse development is likely a strong economic force in this region, while the communities with emerging sectors in Arts, Entertainment, and Recreation and Forestry, Fishing, Hunting, and Agriculture Support are best positioned to take advantage of the economic benefits of the D&R Canal Park. Wholesale Trade is a dominant sector in Burlington, Middlesex, and Somerset Counties, while Retail Trade is a dominant sector in Burlington and Hunterdon Counties.

Transportation and Warehousing is a basic sector in Middlesex and Burlington Counties. A basic sector is a sector that has a location quotient (LQ) above 1.0 and could be considered an “exporting sector.” These sectors have been basic sectors from 1998 through 2018, signaling a dominance in the region and a major impact on both historical and future development patterns.

Job growth in basic sectors can also have impacts on employment in other sectors. Hunterdon and Somerset Counties are experiencing growth in sectors relevant to the D&R Canal Park and the future master plan, specifically Forestry, Fishing, Hunting, and Agriculture Support and Arts, Entertainment, and Recreation which have base multipliers of 5.56 and 4.78, respectively. The base multiplier is a measure of how many jobs will be created for every job created in a basic sector. The growth of these sectors in Hunterdon and Somerset Counties signal that the overall economic impact of the D&R Canal Park can be strongest in those two counties. In the other counties, the dominance of Wholesale Trade and Transportation and Warehousing and emergence of the Utilities sector demonstrate past, present, and future development pressures that the D&R Canal Park and the Commission will have to face in order to conserve open space and protect the natural environment.

The total number of people employed has grown in all counties except for Somerset, which experienced a slight dip between 2008 and 2018. Growth in employment between 2008 and 2018 was lower in all other counties than it was between 1998 and 2008. Middlesex County has the largest number of jobs and employees in the five-county study area by nearly twice as many as Mercer County, the county with the second highest number of employees. Burlington, Mercer, and Somerset are all similarly sized, while Hunterdon has the smallest number of jobs and employees.

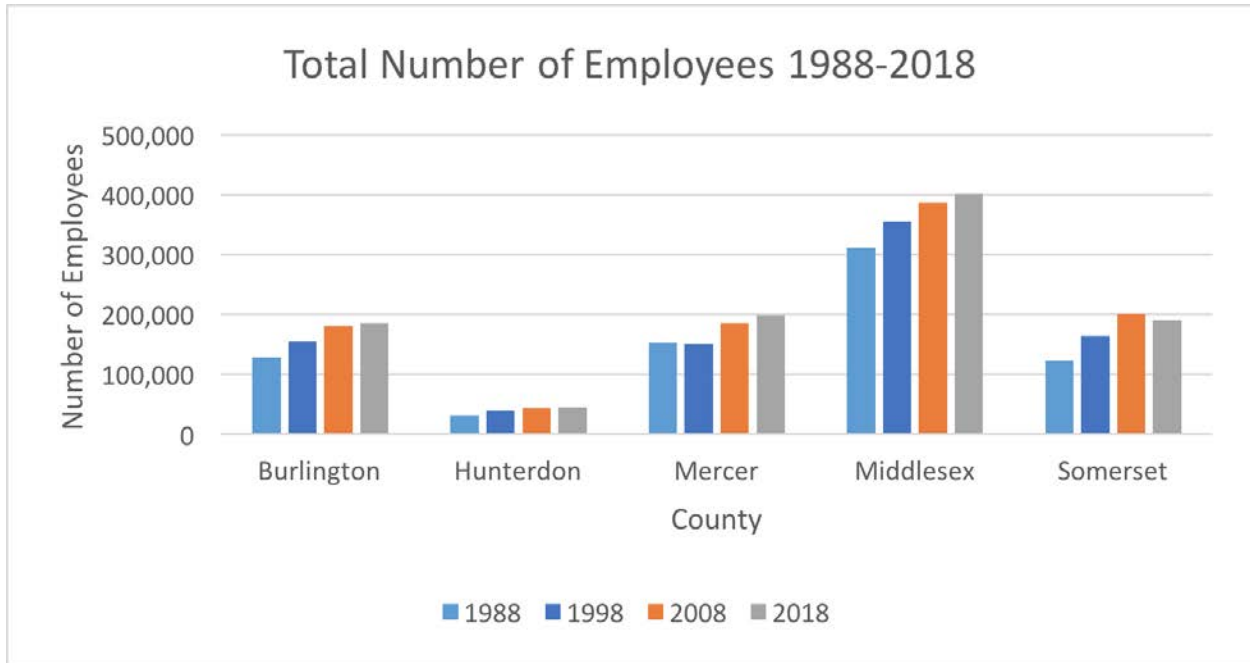


Figure 2.11. Number of employees

Job growth and development in Middlesex County are likely to slow as it reaches its full economic potential, although it remains the economic driver of the region. Hunterdon and Somerset Counties could likely benefit from economic development activities surrounding the D&R Canal Park.

Projected Total Employment by County 2016-2026			
County	2016	Projected 2026	Percent Change
Burlington	226,170	238,370	5.4%
Hunterdon	52,070	54,150	4.0%
Mercer	270,990	289,750	6.9%
Middlesex	474,010	518,240	9.3%
Somerset	208,610	224,550	7.6%

Table 2.1. Projected Total Employment, 2016-2026

As the Commission reexamines the 1989 Master Plan’s goals and objectives, this economic analysis can inform the economic development strategies surrounding the D&R Canal Park, as well as provide context for preventing development that could harm it. The counties are positioned to have different successes and challenges, depending on the context. For the Commission, it is important to understand the potential impacts of using

the D&R Canal Park as an economic development driver and how the impact will vary among the counties.

Land Use, Development and Urbanization

Land Use

Key Takeaways

- Land use data has become significantly more detailed since the 1989 Master Plan. Current data shows a concentration of residential, commercial, and industrial uses in the central and eastern parts of the review zones.
- In 1986, agriculture was the most prominent land use, while in 2015 it was urban use.
- Between 1986 and 2015:
 - Agriculture has declined from 32.6% to 18.8%.
 - Urban land has risen from 24.8% to 38.8%.
 - Residential, industrial, and commercial land uses have increased.

The Commission recognizes that the land use and development of the D&R Canal Park's surrounding communities should be in harmony with the use of the Canal and State Park. As outlined in the 1989 Master Plan, the D&R Canal Park is a natural and historic resource that has the means of enhancing urban areas. Data on land use and patterns of growth can help the Commission further its understanding of demographic and economic trends in the area. This data can also help inform decisions about environmental and public health concerns, such as contaminated sites and areas with high impervious cover. Knowledge of land use and development patterns will also help assess and estimate the needs of different areas in the Commission's review zones, while planning and providing for different contexts accordingly.

To compare the patterns of land use within the area of interest, land use and land cover data for New Jersey were collected from New Jersey Geographic Information Network (NJGIN) Open Data and mapped in ArcGIS. As the presented land use maps display, most of the urban land use within the review zones in 1986 are dispersed along the Canal itself and are mainly on the central and eastern parts of the region.

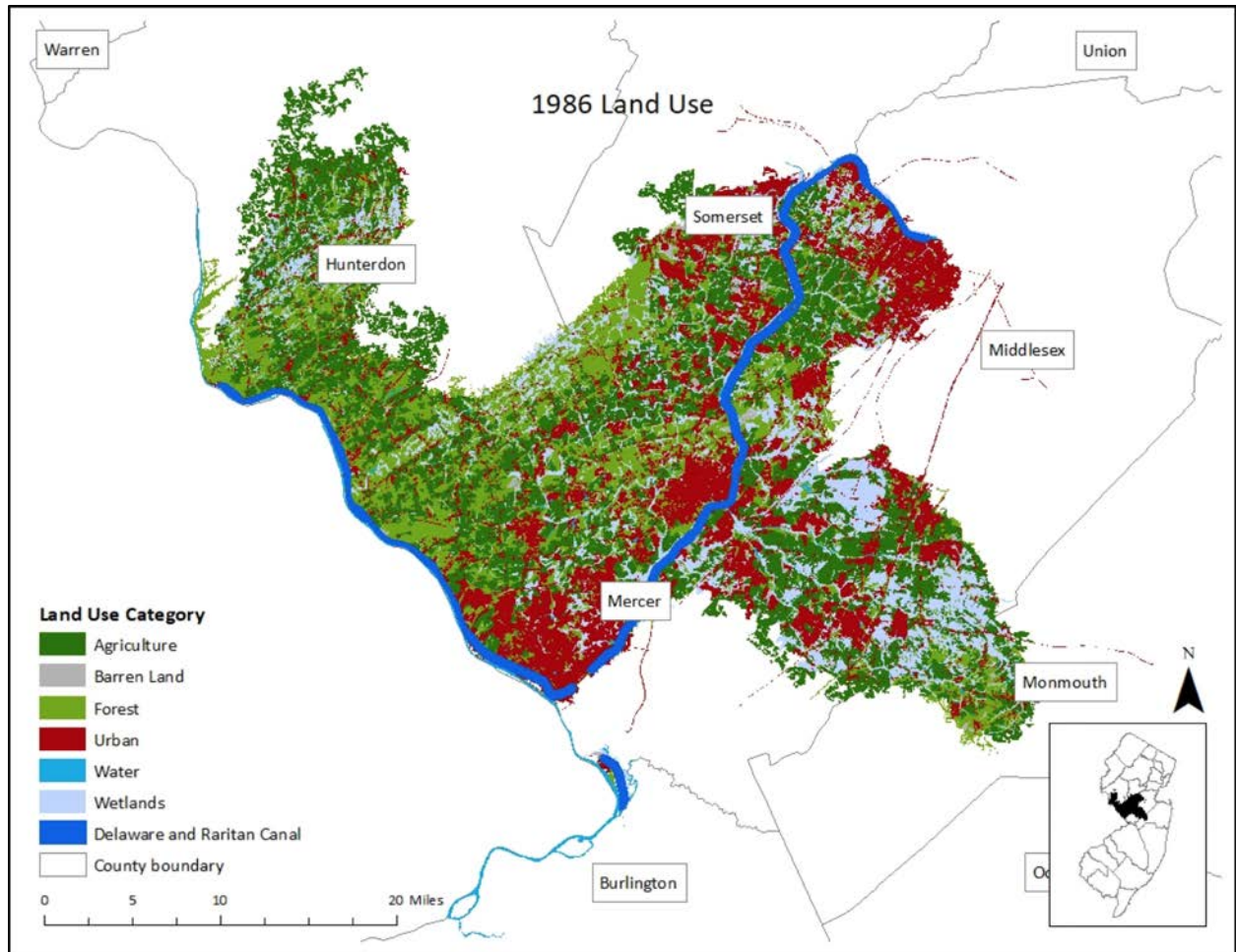


Figure 2.12. Land Use, 1986

The overall land use patterns in 2015 mimic the 1986 plan in terms of the locations of urban and rural areas, but there has been a 14% increase in urban areas within the review zones. Much of the growth in urbanization has centered along the Canal itself, especially in the stretch of the Canal from New Brunswick to Trenton.

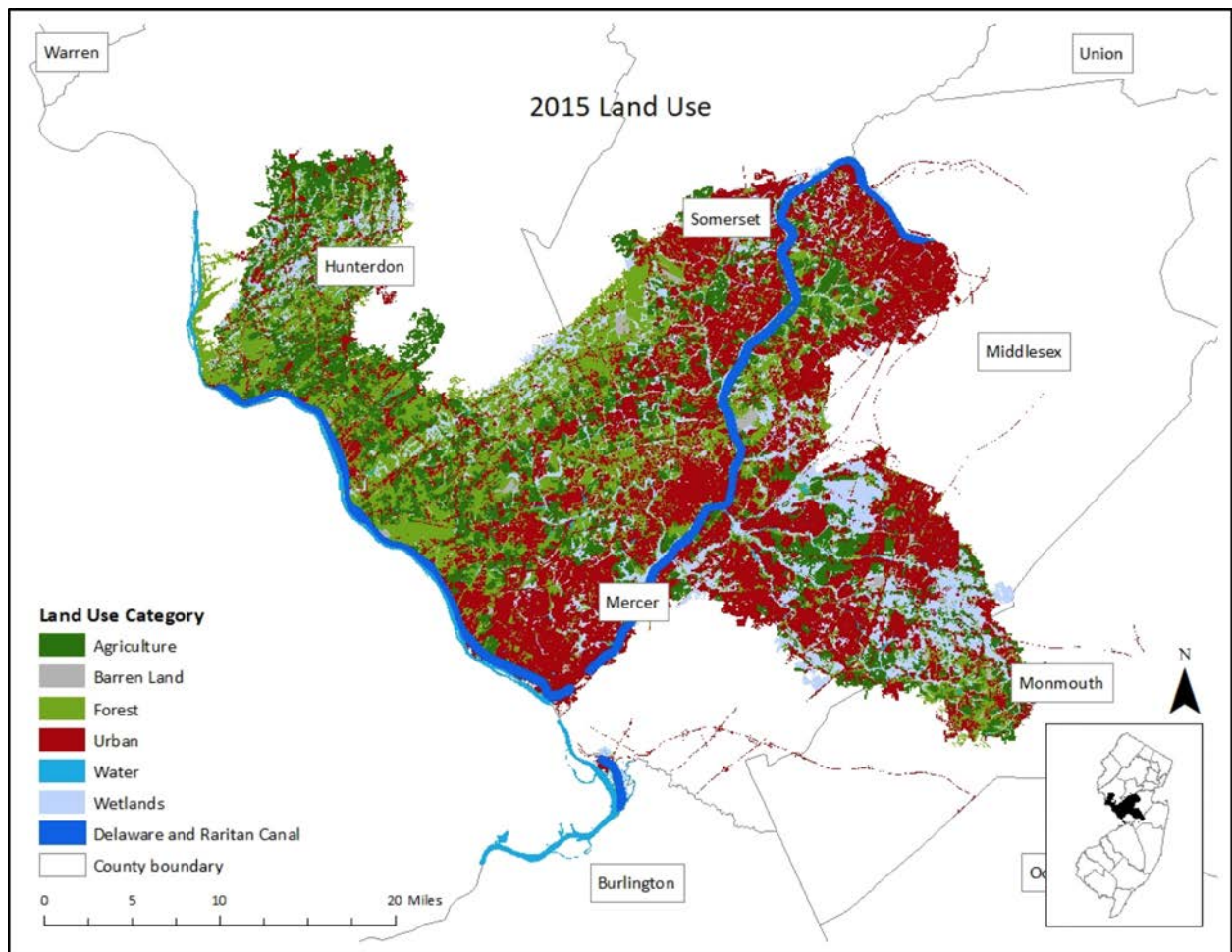


Figure 2.13. Land use, 2015

In 1986, the predominant land use was agriculture, totaling 32.6% of the land area. This even surpassed urban land use at 24.8%. Forest and wetlands closely followed at 23.0% and 16.6%, respectively. By 2015, agricultural land had decreased to 18.8% and urban land use had climbed to 38.8%. This trend is visibly apparent between the two land use maps and further confirms the urbanization trend of the population.

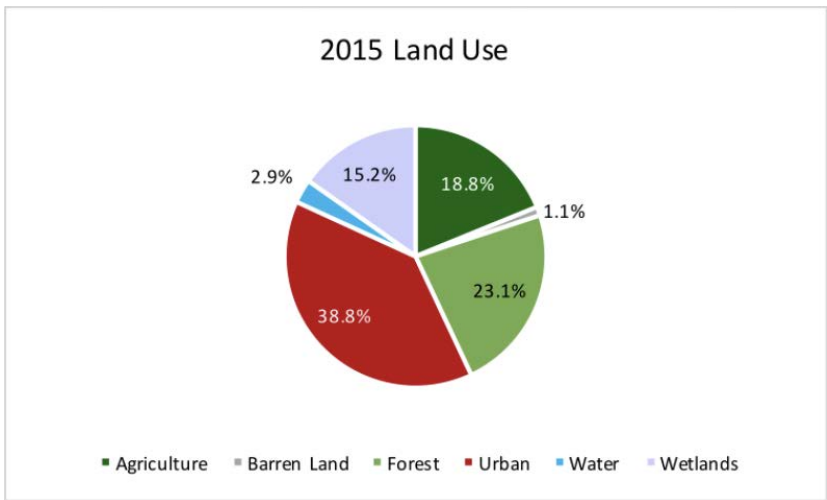
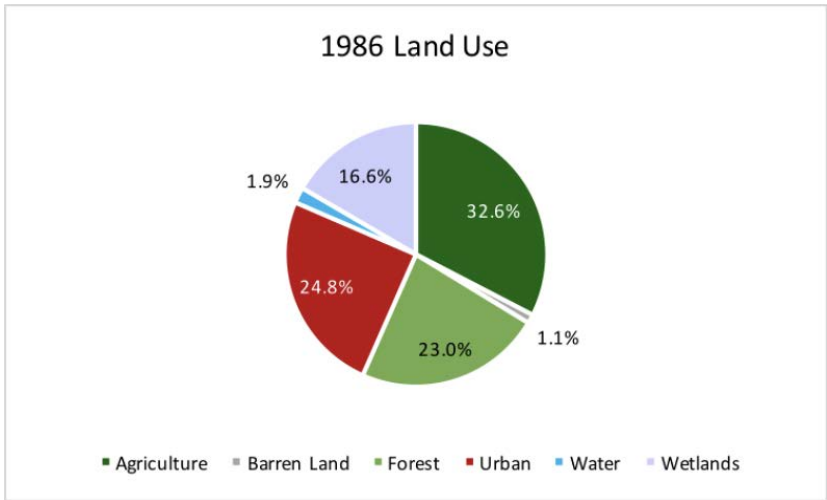


Figure 2.14. Proportion of Land Uses, 1986-2015
Between 1986 and 2015, agricultural land uses, the predominant land use in 1986, decreased from 32.6 percent to 18.8 percent. Simultaneously, in light of the above discussed population increases, urban land uses increased from 24.8 percent to 38.8 percent.

In terms of residential, industrial, and commercial development, the table below shows these changes in their respective percentages of the region’s total acreage. Most notably, residential land use has increased from 15.2% in 1986 to 24.1% in 2015. This includes detailed land use categories of Mixed Residential; Residential; Residential, High Density, Multiple Dwelling; Residential, Rural, Single Unit; Residential, Single Unit, Low Density; and Residential, Single Unit, Medium Density. Industrial and commercial land uses have also increased slightly.

Land Use	Percentage of Land Use in 1986	Percentage of Land Use in 2015
Residential	15.2	24.1
Industrial	1.0	1.4
Commercial	2.5	3.5

Table 2.2. Residential, industrial, and commercial land use change between 1986 and 2015

As the most recent 2015 land use data highlights, development is constant and ongoing. The most recent land use data reflects greater urbanization of the area surrounding the D&R Canal Park. In 2015, agricultural land made up only 18.8% of the total area while urban land made up 38.8%. Since 1986, residential land use has also remarkably increased to 24.1%. It is worthwhile to study how these various uses may determine development near the D&R Canal Park as they may impact the system physically, economically, and culturally.

Development and Urbanization Patterns

Key Takeaways

- The D&R Canal Park serves a population that is increasingly living in urban areas.
- Urban areas are concentrated in the central and eastern parts of the review zones, whereas open spaces and farmlands are more evenly distributed throughout the area.
- New Brunswick (designated as an Opportunity Zone) and Hightstown Borough (designated as an Area in Need of Redevelopment) are likely to see increased construction and development activities, which may potentially impact the D&R Canal Park and its services as well.
- All the municipalities within the review zone contain at least one contaminated site, with the highest concentration of these sites in Trenton and New Brunswick.

As much as the D&R Canal Park faces natural and environmental complexities, it also faces limitations and challenges caused by human development. In particular, increasing urbanization processes are a key concern. To analyze the impact of

urbanization, data from the U.S. Census Bureau's Decennial Census were used to study the percentage of the population living in urban areas rather than rural areas. This includes data presented by Social Explorer for the years of 1980, 1990, 2000, and 2010. The surrounding area of the D&R Canal Park has greatly urbanized over time. As Figure 2.15 displays, the percentage of people that lived in urban areas in 1980 was under 70%. This has remarkably increased to 92% in 2010.

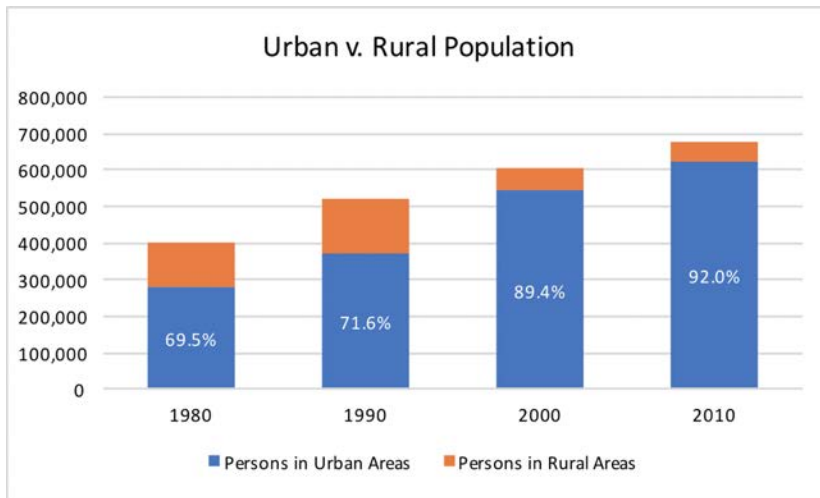


Figure 2.15. Population by urban and rural areas from 1980 to 2010

Datasets containing information about urbanized areas, open spaces, Areas in Need of Redevelopment (ANRs), Urban Enterprise Zones (UEZs), and areas with Opportunity Zone (OZ) designations can be important indicators of development in the area. These were collected from the New Jersey Department of Transportation (NJDOT), New Jersey Department of Environmental Protection (NJDEP), New Jersey Office of GIS (NJOGIS), and New Jersey Department of Community Affairs (NJCA). The urban areas, marked in grey, coincide with the residential and industrial areas shown in the 2015 land use map.

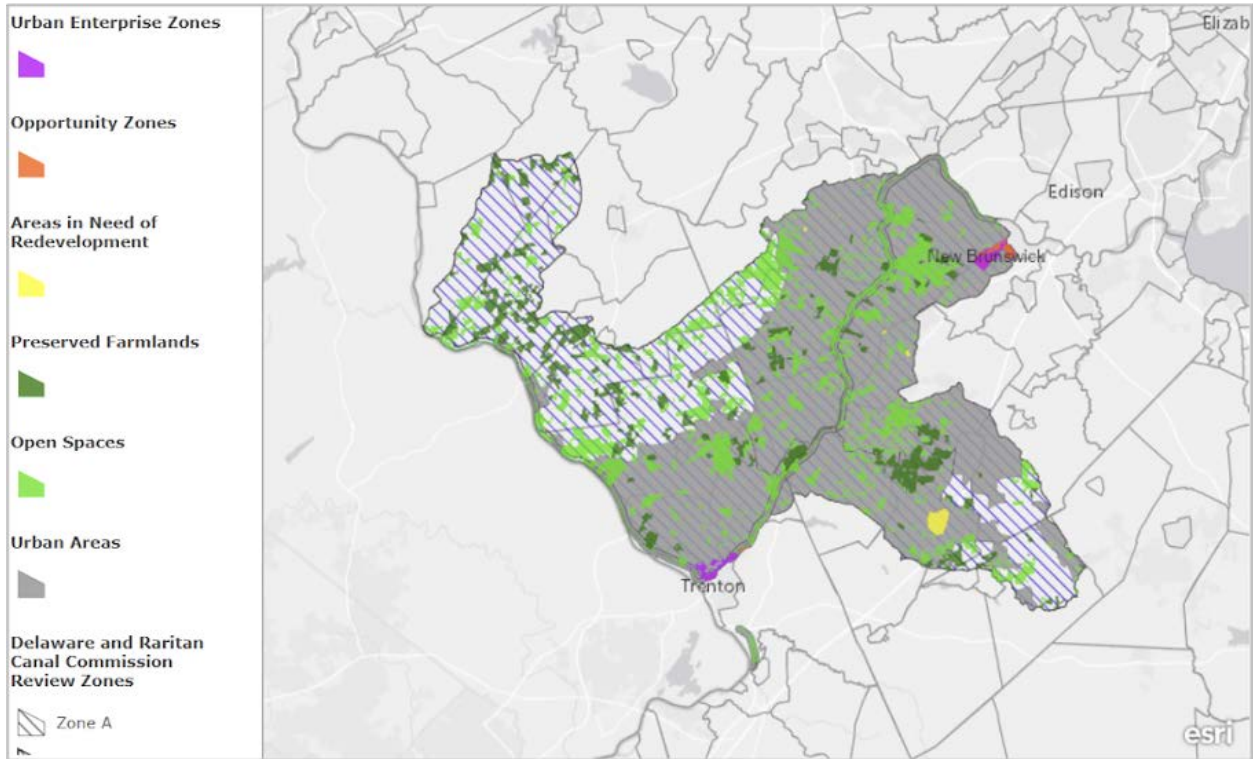


Figure 2.16. Designated Areas in the D&R Canal Review Zone

This map includes the designations of Urban Enterprise Zones, Opportunity Zones, Areas in Need of Redevelopment, Preserved Farmlands, Dedicated Open Spaces, and Urban Areas.

Within these urban areas, New Brunswick (marked in orange) is designated as an OZ and Hightstown Borough (marked in yellow) is designated as an ANR. Both these municipalities can expect development in the coming years. While the urban areas are concentrated in the central and eastern parts of the review zones, the open spaces and preserved farmlands are spread more evenly across the area.

Many of the Commission’s goals revolve around the critical functions of the Canal. It is an important water supply system that must be well preserved. The D&R Canal Park is an area that must be maintained in its natural state, but also act as a means of enhancing urban areas. The comparative analysis of land use in the Commission’s review zones show the urbanization of the area over the last three decades and where certain uses of the surrounding areas may threaten or strengthen the vitality of the Canal. Mapping the locations of ANRs and OZs within the review zones can help point towards future trends of growth and increased urbanization and development. The Commission can use this

information to identify points along the Canal itself that may be at threat of contamination due to increased construction, commercial, and/or industrial activity. In conjunction with current and projected demographic data trends, this information can also help estimate increased demand for drinking water, recreational spaces, and other park amenities in the area.

An increase in urbanization and related development in the review zones comes with its set of disadvantages. The issue of contamination is one that impacts the health and public safety of the residents of the municipalities in the D&R Canal Park. Moreover, the presence of contaminated sites threatens the safety of the Canal itself, especially in relation to its goal of serving as a source of drinking water. Mapping out the locations of contaminated sites and analyzing where clusters lie can help anticipate which communities are in a more dire situation and where the Commission should focus its efforts.

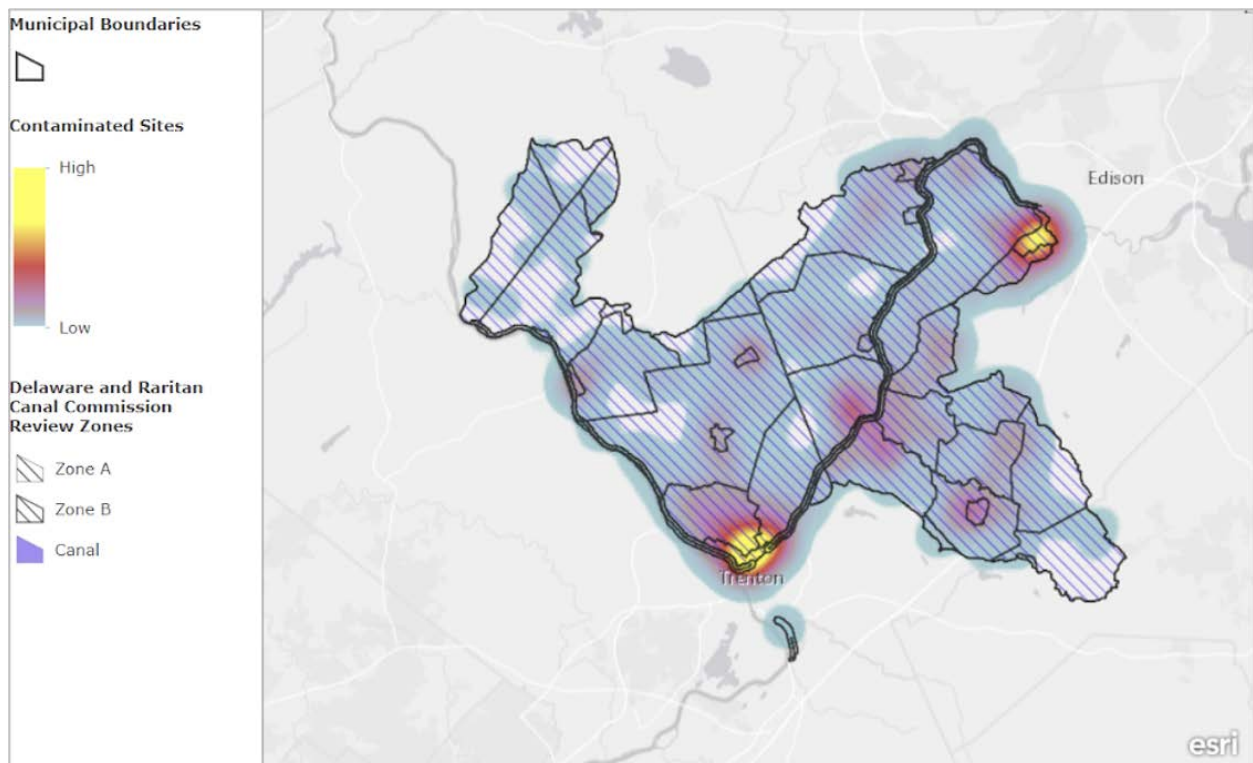


Figure 2.17. Locations of Known Contaminated Sites

This map uses data from the Known Contaminated Sites List for New Jersey (KCSNJ) dataset on NJDEP that contains information on the sites and locations of areas in

the state where contamination of soil and groundwater is confirmed at levels equal to or greater than applicable standards. Unfortunately, all municipalities within this area include at least one known contaminated site. However, the concentration of contaminated sites is highest near the bigger urban centers of Trenton and New Brunswick.

Closely related to the land use analyzed in the previous section, the development and urbanization patterns presented in this section highlight the changing uses and needs of the surrounding areas of the Canal Park. The population is increasingly living in urbanized areas and residential, industrial, and commercial uses have grown. Since the Commission recognizes that the D&R Canal Park is a means of enhancing urban areas, as stated as its fifth goal, it will need to more closely examine these trends to understand where new development may occur and potentially impact the livelihood of the D&R Canal Park. Collaboration with the D&R Canal Park's adjacent municipalities would serve to align the goals and visions for this valuable resource.

The Environment and Water

Natural Resource Protection

Key Takeaways

- Open space in the D&R Canal Park nearly doubled between 1989 and the present, including the completion of the 70-mile trail, thereby creating new boundary and jurisdictional issues.
- While no wildlife surveys were conducted at the time of the 1989 Master Plan, recent surveys have revealed the extent of the wildlife diversity and concentrations of habitats within the D&R Canal Park, allowing for greater planning and strategic wildlife protection.

First and foremost, the D&R Canal Park is a natural resource in need of protection – a task that has largely been met by the Commission and collaborating agencies over the past 30 years. In terms of land stewardship, the 1989 Master Plan estimated that the D&R Canal Park consisted of approximately 3,550 preserved acres and, per its linear

orientation, spanned more than 60 miles¹³. Since 1989, progress has been made in the pursuit of acquiring additional land for preservation, thereby expanding on the D&R Canal Park's open space buffer. From the original listed size of 3,550 acres, the D&R Canal Park today spans an estimated 6,500 acres¹⁴. As evidence of this additional land preservation, the D&R Canal Park's preservation corridor has increased from 60 miles to nearly 70 miles over the past three decades.

Many land professionals have predicted final build-out for the entirety of New Jersey by 2050¹⁵. Combined with President Biden's recent commitment to preserve 30 percent of U.S. land and seas by 2030, there likely will be a predicted need and pressure of land preservation¹⁶. In response to this, the Commission¹⁶ may need to target new lands for acquisition for creating a larger buffer to protect the D&R Canal Park and to preserve pristine lands otherwise under threat.

Stewardship is not only necessary for the land of the D&R Canal Park, however, but the species of wildlife and vegetation that call the D&R Canal Park home. At the time of the 1989 Master Plan, an accurate count of the number of wildlife and vegetation species inhabiting the D&R Canal Park was not possible, as a field survey had yet to be conducted¹⁷. Since 1989, wildlife and bird surveys have been conducted; finding, for instance, "160 species of birds, almost 90 of which nested in the park"¹⁸. However, it has been several years since these surveys have been conducted. As a wildlife corridor, the D&R Canal Park is in need of a comprehensive assessment of the species – including vegetative species – that are in the park to build upon the surveys that have been done since the 1989 Master Plan.

¹³ "1989 D&R Canal Master Plan" (D&R Canal Commission, 1989), <https://www.nj.gov/dep/drcc/pdf/Delaware%20and%20Raritan%20Canal%20Commission%20Master%20Plan%202nd%20Edition%201989.pdf>.

¹⁴ "State Park Service Areas" (NJDEP, 2013),

<https://s3.amazonaws.com/img.stateparkhq.com/files/Hunting%20Areas%202012-2013.pdf>.

¹⁵ Rohan Mascarenhas, "Rowan, Rutgers Study Says N.J. Is Running out of Open Space, Renews Urban Sprawl Debate," April 1, 2019, https://www.nj.com/news/2010/07/rowan_rutgers_study_says_nj_is.html.

¹⁶ Bruce Lieberman, "Details behind Biden's '30 by 30' U.S. Climate Goal" Yale Climate Connections, Yale Climate Connections, April 24, 2021, <https://yaleclimateconnections.org/2021/03/details-behind-bidens-30-by-30-u-s-lands-and-oceans-climate-goal/>.

¹⁷ "1989 D&R Canal Master Plan" (D&R Canal Commission, 1989), <https://www.nj.gov/dep/drcc/pdf/Delaware%20and%20Raritan>

¹⁸ "D&R Canal State Park - About," <https://www.dandrcanal.com/about-d-r-canal-state-park>.

Anthropogenic Impacts

Key Takeaways

- Climate change, only a new concept in 1989 among the public, has become a central threat today and for the future. Observed annual temperatures have increased from 51.96 degrees Fahrenheit in the 1980s to 54.26 degrees Fahrenheit in the 2010s, causing increases in extreme weather events, most notably Hurricane Sandy and Irene.
- Warming temperatures have also allowed invasive species to thrive, with Hydrilla and Emerald Ash Borer emerging in the D&R Canal Park only within the last ten years and threatening the D&R Canal Park's environment.
- With complete buildout of New Jersey predicted by 2050, renewed acquisition efforts are encouraged on behalf of the Commission in order to protect threatened pristine lands and meet federal efforts of land preservation.

At the time of writing the 1989 Master Plan, anthropogenic climate change and the general impacts that humans have on our natural environments were significantly less known and prioritized than they are today. As a result, the 1989 Master Plan has insufficient mechanisms to address recent environmental trends produced by human activity. In terms of our observed changing climate, the D&R Canal Park (and the state of New Jersey) saw an annual average temperature of 51.9 degrees Fahrenheit and an annual average precipitation of 44.9 inches through the 1980s¹⁹. Today, the average annual temperature has increased to 54.26 degrees Fahrenheit, with three of the five warmest years on record having occurred over the past ten years¹². The observed annual precipitation has similarly increased from an annual average of 44.9 inches to 49 inches during the 2010s¹².

¹⁹ "Historical Climate Summary Tables" (Office of the New Jersey State Climatologist, n.d.), https://climate.rutgers.edu/stateclim_v1/nclimdiv/.

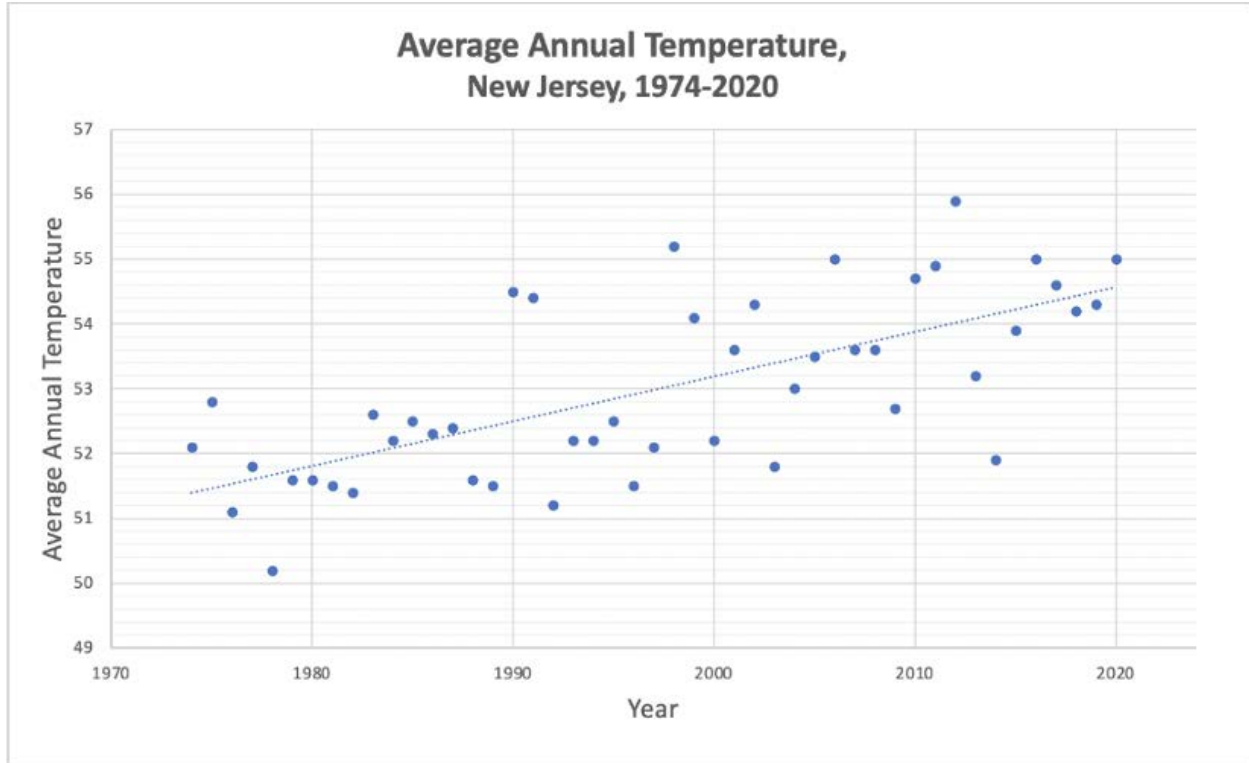


Figure 2.18. Average Annual Temperatures, 1974- 2020

As a result of human-caused climate change, the D&R Canal Park and New Jersey have witnessed a steady rise in average annual temperatures since 1974, the year of the State Park’s establishment.

Source: Office of the New Jersey State Climatologist

Increases in precipitation and temperature have been accompanied by more frequent storms of greater intensity. The destructive storms of Hurricane Irene in 2011 and Hurricane Sandy in 2012 produced extreme flooding and damage along the D&R Canal Park trail²⁰. For instance, the flooding of Hurricane Irene not only inundated the hiking trail, but damaged infrastructure near the area of Port Mercer and opened a breach between the Canal and the Delaware River near Hopewell, NJ¹³.

²⁰ Alex Zdan, “Hurricane Irene Damage in Hopewell Undermines Route 29, Breaches D&R Canal,” August 29, 2011, https://www.nj.com/mercer/2011/08/d_r_canal_flows_wrong_way_rout.html.

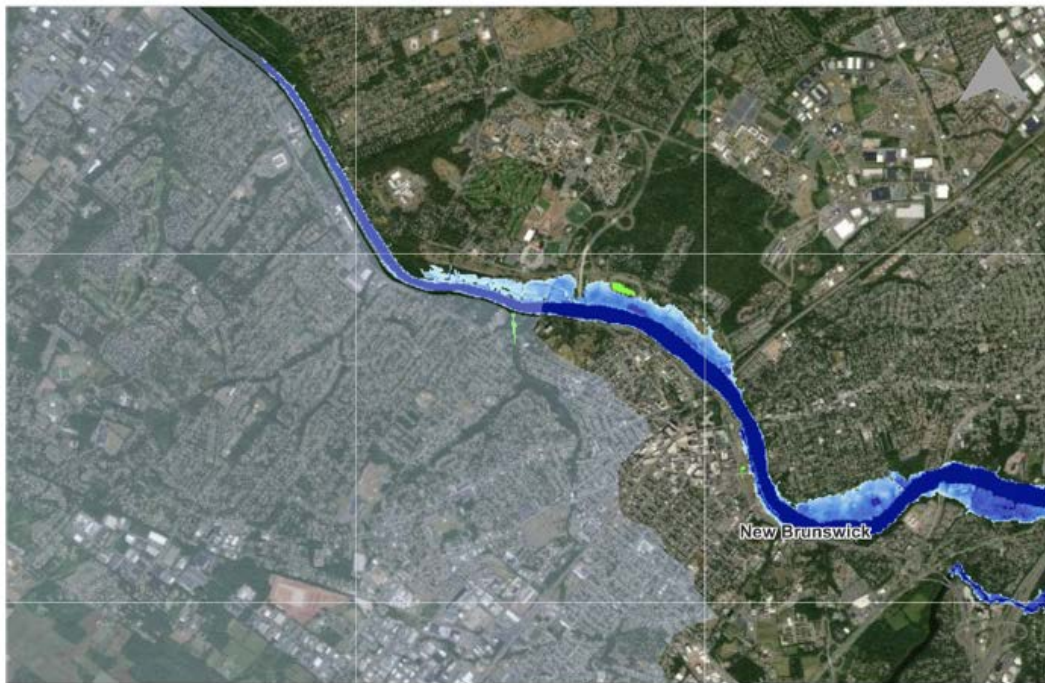


Figure 2.19. Flooding of the D&R Canal Trails after Hurricane Irene

In the future, New Jersey is predicted to experience a two-foot rise in sea level by 2050 and six-foot sea level rise by 2100 (from 2000 levels), according to recent studies²¹. While six-foot flooding does not directly impact the borders of the D&R Canal Commission's jurisdiction, the inundation of the D&R Canal Park directly south of the commission's review zone near Trenton and adjacent to the review zone near New Brunswick is expected to be significant and may potentially impact future development patterns as well as the integrity of recreational trails along the Canal. The inundation of the New Jersey Coast may similarly impact the Canal, as development and residents are driven further in-land. Along with this, it is expected that climate change will bring continued intensified flooding and precipitation, with estimates that annual precipitation in New Jersey is expected to increase by 4% to 11% by 2050¹⁴.

²¹ "DEP Presents New Study Predicting Dramatic Increase in Sea-Level Rise Along Jersey Shore by 2050," NJDEP - News Release 19/P098 (NJDEP, December 2019), https://nj.gov/dep/newsrel/2019/19_0098.htm.

Projected Sea-Level Rise Inundation
Six Foot Inundation Modeling, New Brunswick, NJ



LEGEND

- Water Depth
- Level of Inundation
- Canal Review Zone Boundary
- Low-Lying Area

Source: NOAA

0 1 2mi

Figure 2.20. Sea-Level Rise Inundation Models

Models predict a six-foot rise in sea level by 2100. This rise in sea level would inundate areas directly on the borders of the Canal Commission's Review Zones. Near New Brunswick, this would cause flooding on the northern side of the Raritan River.

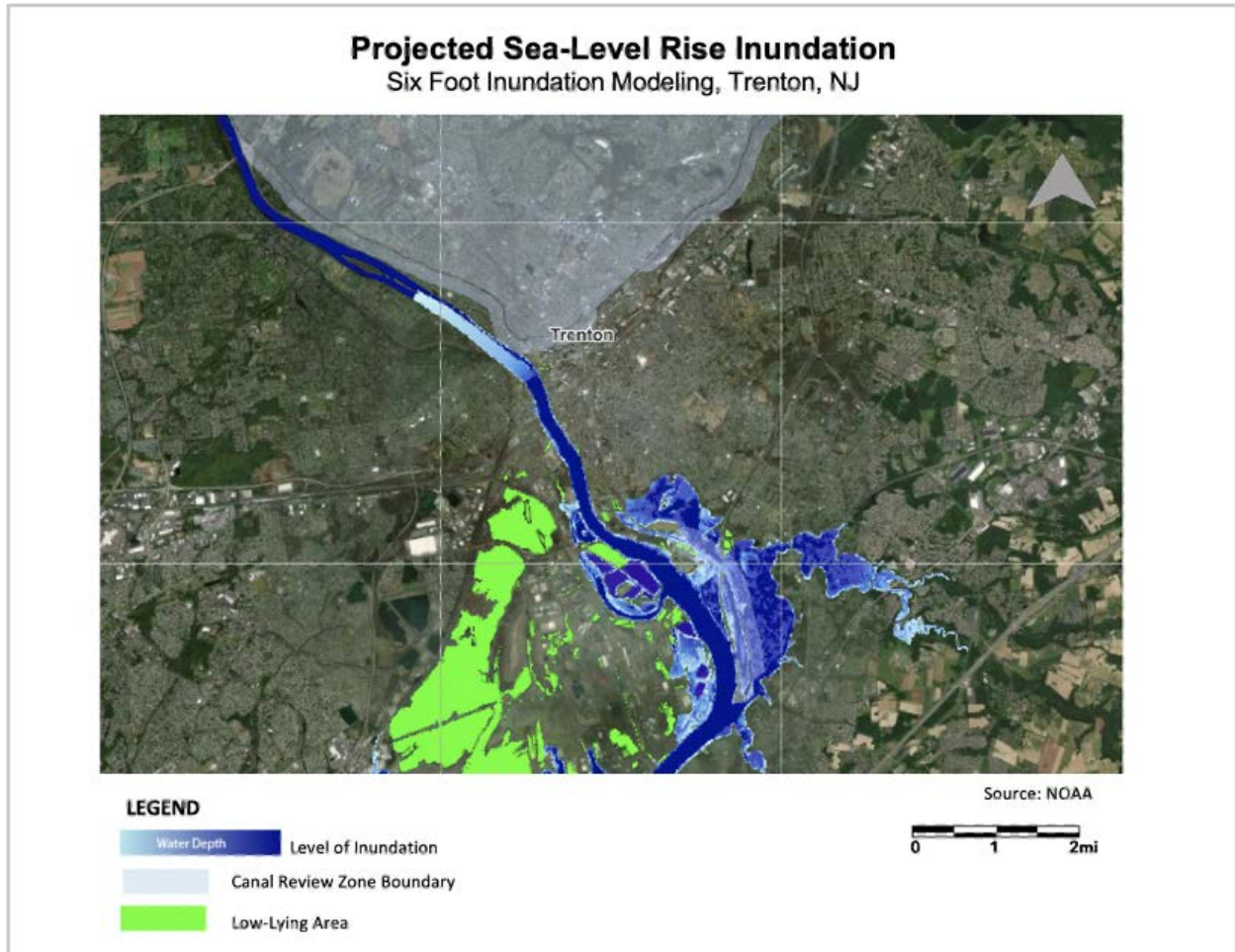


Figure 2.21. Sea-Level Rise Inundation Models

A six-foot rise in sea level would similarly inundate low-lying areas directly south of the Commission's Review Zone near Trenton, as well as affect the edge of the southern tip of its Review Zone.

Another observed emerging trend that was non-existent at the time of the formation of the 1989 Master Plan has been the growth in invasive species in the D&R Canal Park. Most notably, the aforementioned rise in average annual temperatures has enabled the growth of the aquatic vegetative species known as Hydrilla and the spread of Emerald Ash Borer. Hydrilla - *Hydrilla verticillata* - was introduced in the Canal in 2016 and has been found to outcompete all other aquatic vegetation, thereby threatening the Canal ecosystem²². In terms of the rapid spread of Hydrilla, a study conducted in late 2016 found that 56 percent of all surveyed sites along the Canal contained a presence of Hydrilla¹⁵. The emergence of this invasive species has required mitigation efforts and

²² "Hydrilla - An Invasive Water Weed" (NJ Water Supply Authority), <https://www.njwsa.org/dr-canal-project.html>.

removal through recommended strategies of fluridone herbicide injections and hydroraking¹⁵.

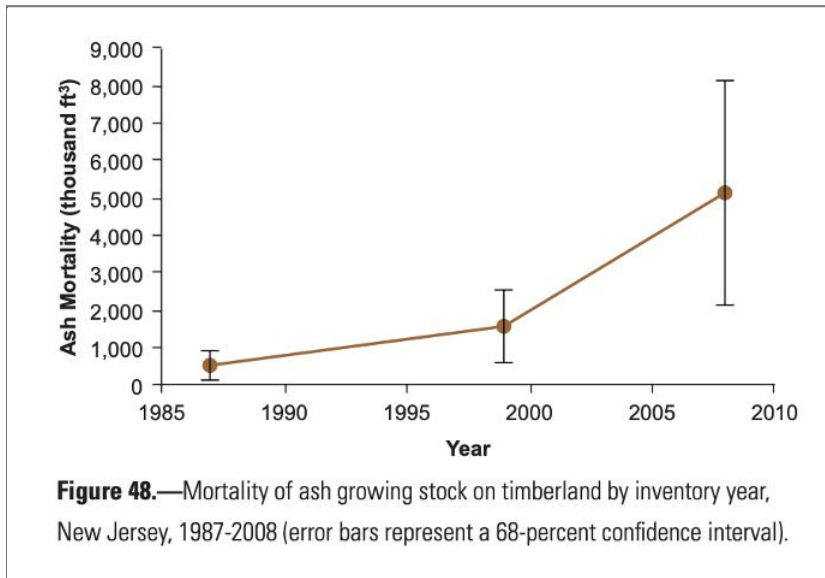


Figure 2.22.

Equally concerning, rising temperatures have also contributed to the rise of the invasive species known as Emerald Ash Borer, which has significantly decimated ash tree species within the D&R Canal Park²³. EAB was first found in New Jersey in 2014 and has since destroyed a significant stock of ash trees in and around the D&R Canal Park – with nine percent of New Jersey’s total forested area estimated to be susceptible to EAB infestation¹⁸. The rise of EAB sped up a worrying trend that had already been observed along the Canal in recent decades. A 2008 report from the US Forest Service found that, “ash mortality has more than tripled since 1987...”²⁴

As a mitigation method, hazardous ash trees have started to be removed from the D&R Canal Park. The project led by NJDEP targeted approximately 1,550 dying or dead trees along the Canal path to be removed in an effort to slow the spread of EAB²⁵. However, with the continued rise in temperatures, it is expected EAB will be a permanent presence contributing to further decline of ash trees in the D&R Canal Park.

²³ “What Is Emerald Ash Borer?” (NJ Department of Agriculture), <https://www.nj.gov/agriculture/divisions/pi/prog/whatiseab.html>.

²⁴ Susan J. Crocker et al., “New Jersey’s Forests, 2008” (USDA, 2008), <https://www.nrs.fs.fed.us/pubs/39842>.

²⁵ “Hazard Ash Removal and Restoration” (NJDEP-Office of Natural Resource Restoration), <https://www.nj.gov/dep/nrr/restoration/hazard-ash.html>

Impervious Coverage

Key Takeaways

- The Commission has prioritized limiting impervious surface coverage within its review zones in an effort to protect water quality and reduce run-off since 1980.
- Across the review zones, percentages of impervious surfaces have generally remained stable.
- There have been notable increases of impervious coverage in select areas, including the City of New Brunswick and the eastern portion of the Review Zone near Jamesburg.

Since 1980, the Commission's land use regulations have targeted the cumulative impervious surface coverage of a site when considering a development application. This effort is designed to protect the D&R Canal Park by preventing excessive water run-off from significant impervious surfaces which leads to water pollution. "Examples of impervious surface include but are not limited to asphalt, concrete, graveled surfaces, metal, synthetic turf, buildings, sidewalks, driveways, tennis courts, swimming pools and most structure"²⁶. Within the Commission's review zone, the highest concentrations of impervious surfaces are located directly along the route of the Canal, with coverage rates as high as 90% directly adjacent to the waterway. This condition creates a higher tendency for water runoff to enter the Canal.

Between 1995 and 2015, while impervious coverage has remained stable in many areas, there has been a notable increase in the impervious coverage in certain areas. These areas include urban areas such as the City of New Brunswick as well as the area of Jamesburg and the entire eastern portion of the commission's review zones.

²⁶ "1989 D&R Canal Master Plan "(D&R Canal Commission, 1989),

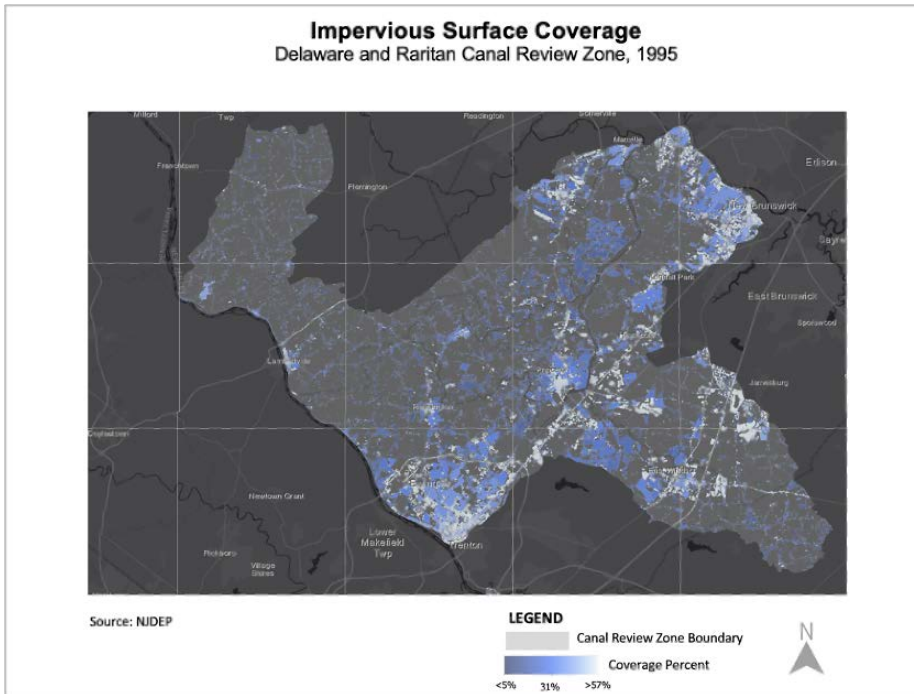
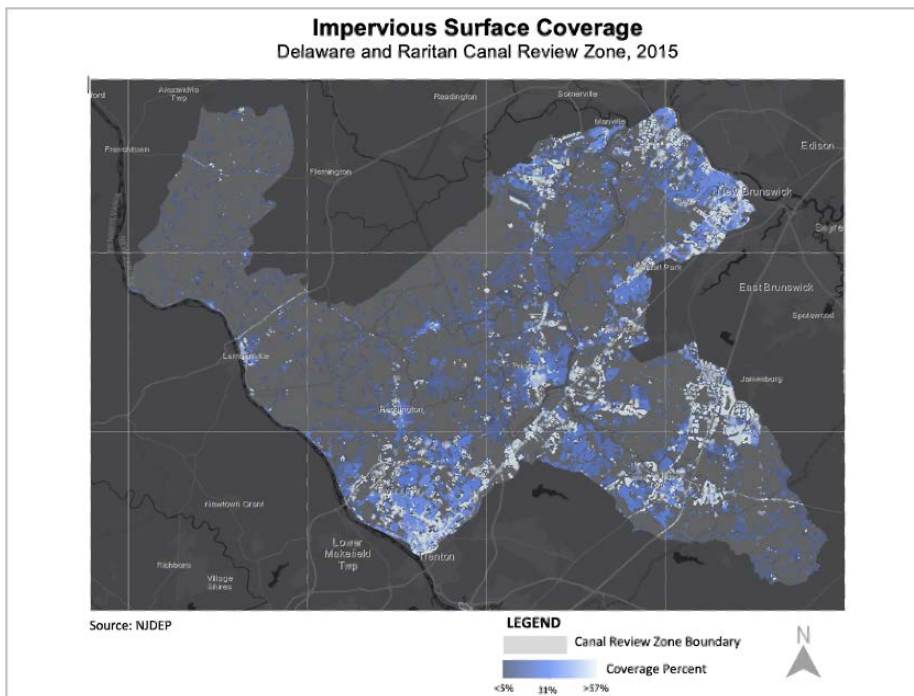


Figure 2.23.
Impervious Surface Cover, 1995-2015
Between 1995 and 2015, there has been a notable increase in the impervious coverage in urban areas like the City of New Brunswick and the entire eastern portion of the commission’s review zone.



This increase is an expected trend, due to the development pressures in the area, but still contributes to run-off and contamination concerns. In response, according to interviewed stakeholders, green infrastructure technologies have often been added to

development proposals within the area, per the stakeholder interviews with the NJ Water Supply Authority, in order to minimize this run-off. In the future, in accordance with continued development pressures, the impervious surface coverage is expected to increase.

Water Quality

Key Takeaways

- The flow of the Canal has remained fairly consistent (between ~ 84-97 MGD) and within the required flow level of up to 100 MGD.²⁷ Turbidity levels have also remained low over time, with one exception during 2014.²⁸
- There is little available data on the water quality of the Canal.
- Climate change may pose threats to the Canal's water quality and the Commission may wish to work with other agencies and organizations to study the current conditions and future projections.

The Canal was rehabilitated for use as a public water supply transmission system by the New Jersey Water Supply Authority (NJWSA) during the 1950s. The current system is 60 miles long and includes 43 miles of the main canal and 22 miles of feeder canal.²⁹ The D&R Canal Park itself has a 400 square mile watershed and the Canal is also part of the larger Delaware River Basin and the Raritan Basin.³⁰ To help prepare and inform the Commission on the changes of the Canal water system and analysis of current protection strategies, this section of the report provides data on the water quality/quantity levels of the Canal and offers insights as to how the Commission might move forward.

A 2001 report prepared by the United States Geological Survey (USGS) in cooperation with NJWSA summarizes the findings of a 1998-99 water quality analysis of

²⁷ "USGS 01460440 Delaware and Raritan Canal at Port Mercer NJ." National Water Information System: Web Interface, United States Geological Survey, accessed March, 2021, https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=01460440.

²⁸ "USGS Current Conditions for USGS 01460595 Del & Rar Canal at Landing La at New Brunswick NJ." National Water System: Web Interface, United States Geological Survey, accessed May, 2021, https://waterdata.usgs.gov/nwis/uv/?site_no=01460595&PARAMeter_cd=00010%2C00095%2C00300%2C00301%2C00400%2C63680.

²⁹ "The Raritan Basin System." New Jersey Water Supply Authority, accessed 2021, <https://www.njwsa.org/raritan-basin.html>.

³⁰ "General Information." D&R Canal State Park, D&R Canal Watch, accessed 2021, <https://www.dandrcanal.com/about-d-r-canal-state-park/general-information>.

the Canal. This study found that the chemical composition of the Canal water was not statistically different from water near the Delaware River intake during non-storm conditions. It also did not identify any specific locations in which statistically significant changes in water quality occurred in association with storms.³¹ According to a NJWSA Fact Sheet, the 1998-99 findings regarding turbidity levels near Ten Mile Lock helped prompt the Delaware & Raritan Canal Nonpoint Source Management Project, which aimed to develop a watershed restoration plan, identify infalls, delineate drainage areas, estimate pollutant loads, and recommend best management practices between 2002-2005.³²

More recent water quality and quantity data is available on the USGS online portal. Though the information is limited, the portal does contain records on the canal's discharge levels at Port Mercer³³ and more detailed water quality indicators at Landing Lane.³⁴ As per the Delaware and Raritan Canal State Park Law of 1974, the (NJWSA) is responsible for the operation and maintenance of the water supply system of the Canal and must ensure that the Canal maintains a safe yield of 241 MGD and a flow up to 100 MGD, in order to adequately supply the 1.5 million people in central New Jersey that rely on the Raritan Basin System.³⁵ According to the USGS Port Mercer portal data, these levels have been maintained relatively consistently since the creation of the 1989 Master Plan.³⁶ The turbidity levels of the canal have fluctuated since the Landing Lane station started recording data in 2012. These levels reached a peak of 500 FNU in 2014, with a few smaller peaks near 100 FNU throughout 2015 to 2019. However, 2020 levels remained below 100 FNU.³⁷

³¹Jacob Gibbs et al., "Water quality of the Delaware and Raritan Canal, New Jersey, 1998-99," *United States Geological Survey*, 2001, <https://pubs.usgs.gov/wri/2001/4072/report.pdf>.

³² Kathy Hale. "New Jersey Water Supply Authority Watershed Protection Programs Fact Sheet #10 Delaware & Raritan Canal Nonpoint Source Management Project Franklin Township & South Bound Brook Borough, Somerset County." *New Jersey Water Supply Authority*, n.d., <https://static1.squarespace.com/static/57c82cc1197aea831defd88b/t/57c9870ad2b85798712b2a72/1472825106176/canalPollutionReduction.pdf>.

³³United States Geological Survey, "Port Mercer"

³⁴United States Geological Survey, "Landing Lane"

³⁵ Marc Brooks, Michael Sellar, and Julie Shelley, "D&R Canal Operations Overview." *New Jersey Water Supply Authority*, 2021.

³⁶ United States Geological Survey. "Port Mercer"

³⁷ United States Geological Survey. "Landing Lane"

The section on water quality corresponds to the first of the five goals outlined by the Commission which states that “[t]he Delaware and Raritan Canal is a water supply system.”³⁸ Monitoring the quality of the water that enters the Canal can help ensure adherence to the standards of suitability for a source of drinking water.

Environmental Concerns and Groundwater Contamination

Key Takeaways

- Immediate Environmental Concern sites (IECs), in the form of potable well contamination and vapor intrusion, exist in 16 municipalities.
- Five municipalities contain sites of groundwater contamination.

This section uses data from the Currently Known Extent of Groundwater Contamination (CKE) for New Jersey and Immediate Environmental Concern Sites (IEC) in New Jersey managed by the New Jersey Department of Environmental Protection (NJDEP). CKEs are areas within which the local groundwater resources are compromised because the water quality exceeds the maximum allowable amount of specific contaminants, per drinking water and groundwater quality standards. On the other hand, IEC cases involve exposure to contaminants that may pose a risk to human health. This dataset includes points that represent different kinds of IECs (potable well, vapor intrusion, and direct contact).

³⁸ “1989 D&R Canal Master”

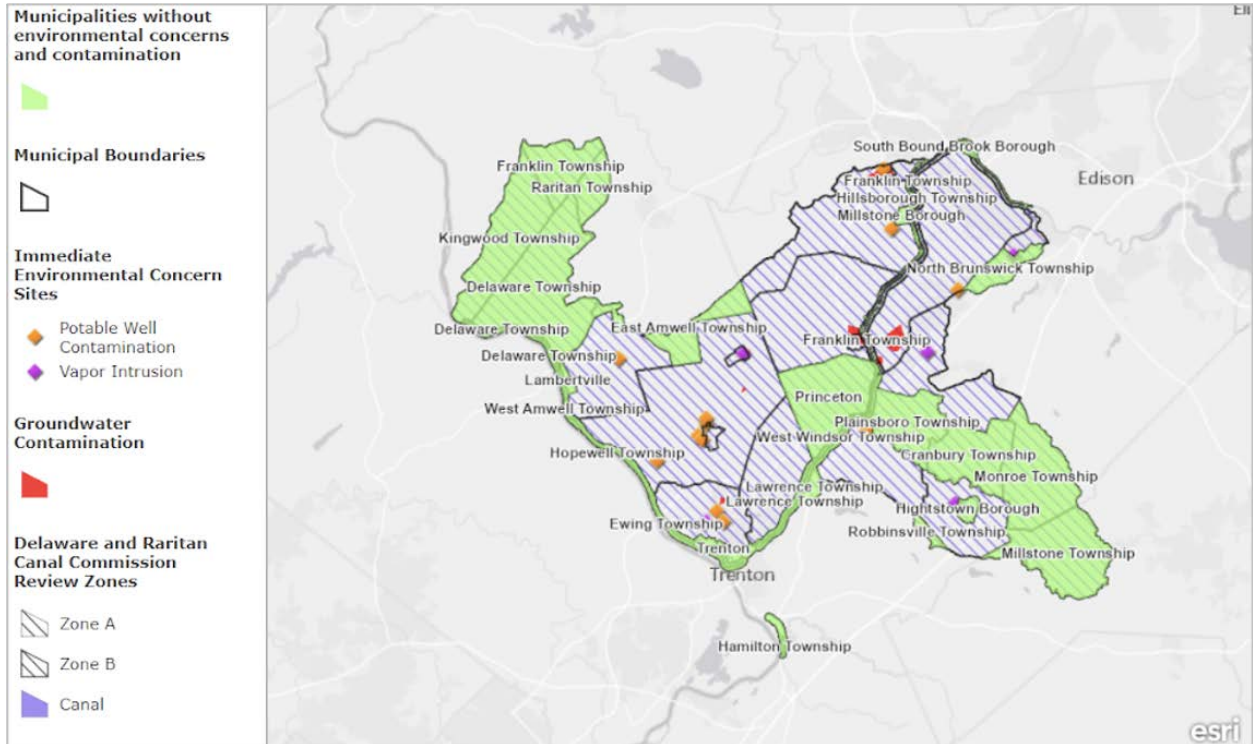


Figure 2.24. Locations of groundwater contamination and sites of immediate environmental concerns

The map above shows locations of groundwater contamination and sites of immediate environmental concerns. Municipalities that do not include any sites with possible groundwater contamination and IECs:

- | | |
|----------------------|------------------------|
| Cranbury Township | Millstone Township |
| Delaware Township | Monroe Township |
| East Amwell Township | New Brunswick Township |
| Franklin Township | Plainsboro Township |
| Hightstown Borough | Princeton |
| Kingwood Township | Raritan Township |
| Millstone Borough | Robbinsville Township |

This section analyzing the environmental trends in the Canal State Park aligns most closely with the fourth goal laid out by the Commission that states that “[t]he Park is an area that should be maintained in its natural state.” Collecting and analyzing data on the land cover and vegetation in the park will not only help document these data trends, but it will also go a long way in enhancing the Commission’s understanding of the current state

of the D&R Canal Park’s natural resources and ways to help preserve them in their natural state.

Sense of Place

Recreation and Equity

Key Takeaways

- Recreational use of the D&R Canal Park has increased since 1989, with the D&R Canal Park now the second most-visited park in New Jersey, according to interviewed stakeholders. The COVID-19 pandemic has shown an even greater surge in attendance.
- Although most municipalities have a D&R Canal Park service point, 10 municipalities in the Commission’s review zones do not have a single D&R Canal Park service point.

In 1989, as a relatively young park, the D&R Canal Park’s main recreational challenges lied with completing the continuity of its trails and expanding the recreational opportunities available. As a linear park, acquiring and connecting a contiguous pathway was an essential objective to ensuring a continuous recreational system.

Over the past three decades, this path has made great progress. The D&R Canal Park reached a milestone in 2009, when the final 1.5 mile “missing link” near Trenton of the Canal’s 70-mile trail corridor was completed³⁹. This trail system, since 1989, has also been designated a National Recreation Trail (1992) and has been a part of the NJ State Long Trail⁴⁰. All the while the capacity and length of the trail system expanded, the attendance to the Canal has similarly expanded, with the D&R Canal Park named one of the most visited state parks in New Jersey. Furthermore, the Canal recreational trail is proposed to be connected to the planned 55-mile Capital to Coast Trail – opening up the D&R Canal Park to new potential visitors. This trail, around 14 percent completed as of 2017, currently has a presence in Mercer and Monmouth Counties and has received \$3.5

³⁹ Veronica Slaght, “DEP to Complete Missing Link in 70-Mile Delaware & Raritan Canal Path,” October 14, 2009, https://www.nj.com/news/local/2009/10/dep_to_complete_missing_link.html.

⁴⁰ “A Historic Place” (D & R Canal State Park.), <https://www.dandrcanal.com/history>.

million from New Jersey State⁴¹. While a long-term goal, this proposal to connect two trails should be considered for its potential future impact on recreational access to the D&R Canal Park.

As the D&R Canal Park is linear, it is necessary to strategize and identify the official entrance points. The 1989 Master Plan not only inventoried these access points, but identified needed improvements, including lavatories, pedestrian upgrades and parking lot upgrades. This is projected to be a future challenge for the D&R Canal Park, in terms of accurately ascertaining visitors to the linear park (see more in Obstacles & Constraints).

Since 1989, the main challenges for access have been disruptions of recreational opportunities due to public safety concerns. In 2012, for instance, a visitor died at Bull's Island Recreation Area when a weakened tree fell while he was camping⁴². The NJDEP initially announced a temporary closure of the campground for a tree health assessment, but the permanent closure of the camp was announced in 2019. This closure was to avoid future fatalities due to erosion and flooding that have weakened trees along the canal system.

In conjunction with access and trails, it is crucial to understand that access to the D&R Canal Park and its amenities is not equitable to all municipalities that lie within its review zones. In order to determine which municipalities within the Commission's review zones lack access to any park service points, the locations of these points were mapped. These points of interest include features like park offices, picnic areas, campgrounds, restrooms and more, which may relate to trails, services, buildings, places of interest, waterbodies, camping, and picnicking. The State Park Service Points of Interest dataset is available through NJDEP and contains points of interest on lands owned and managed by the New Jersey State Park Service (NJSPS).

⁴¹ Sara Grillo -, "Capital To The Coast Trail Hopes To Expand" (Jersey Shore Online, August 28, 2017), <https://www.jerseyshoreonline.com/howell/capital-coast-trail-hopes-expand/>.

⁴² Kurt Bresswein , "Bull's Island Campground Closes Permanently Following Death from Fallen Tree" (Lehigh Valley Live, March 18, 2012), https://www.lehighvalleylive.com/hunterdon-county/express-times/2012/03/bulls_island_campground_closes.html

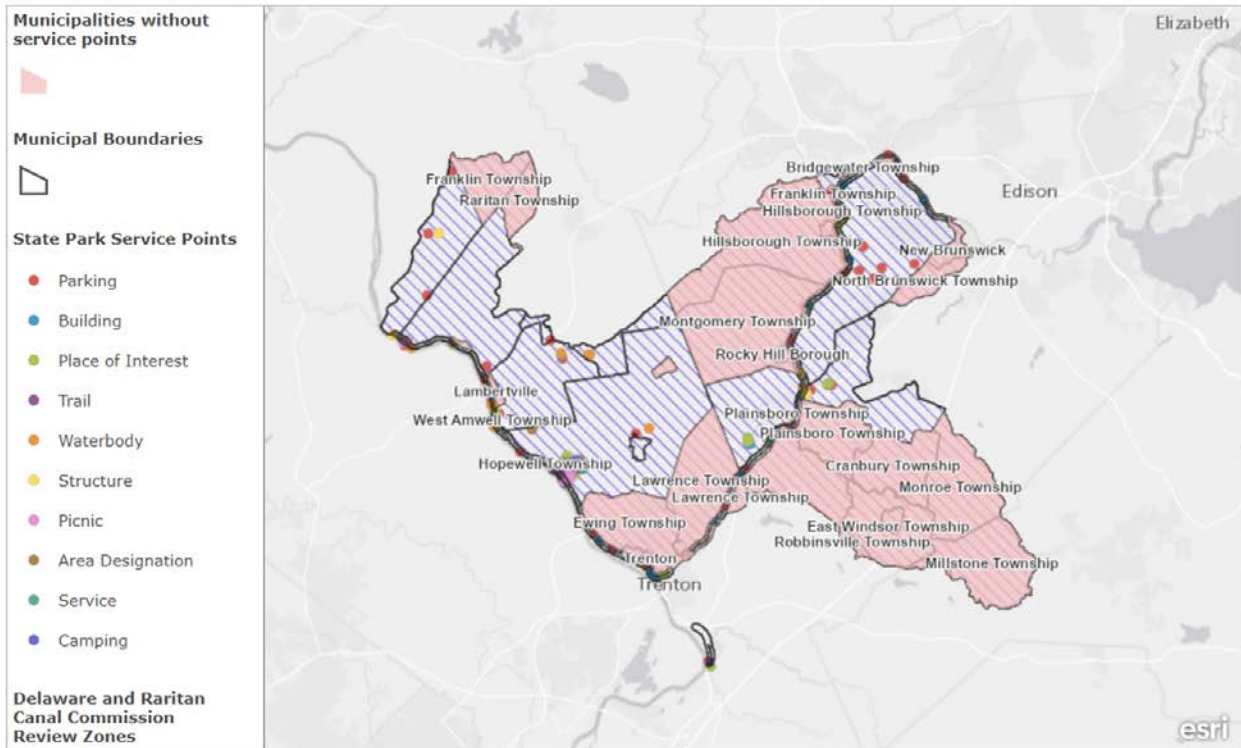


Figure 2.25. Locations of State Park service points

The map above shows the locations of state park service points along the Canal in the Commission’s review zones. Different kinds of service points are highlighted in different colors, as is reflected in the index. Municipalities marked in red are those that do not include a single service point:

- | | |
|-----------------------|-----------------------|
| Cranbury Township | Millstone Township |
| East Windsor Township | Monroe Township |
| Franklin Township | Plainsboro Township |
| Hightstown Borough | Raritan Township |
| Hopewell Borough | West Windsor Township |

This section on recreation aligns with the Commission’s second goal - “The Park is a site for recreational activities.” This goal elaborates on the need for all recreational development and access points of the park to be located such that it avoids concentration at a few locations. The goal also encourages the provision of the widest possible range of recreational activities in the D&R Canal Park.

Crime

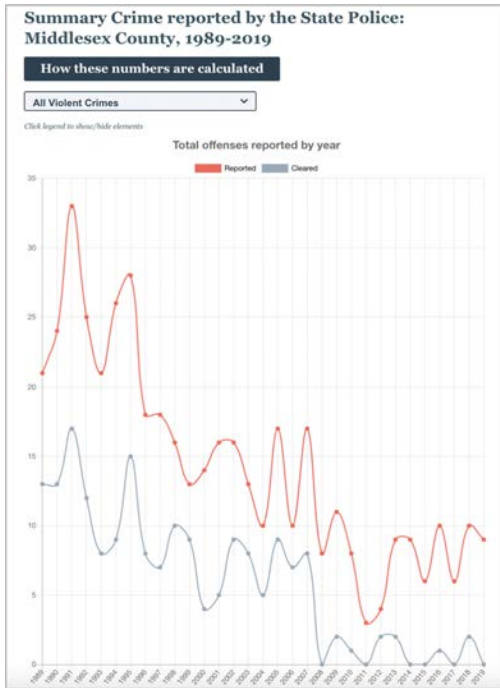
Key Takeaways

- Crime statistics and information may be helpful to include in the Commission's future master plan.
- If trends continue, it is likely that all five counties will continue to see reductions in crime rates, which could be beneficial for planning of the D&R Canal Park.

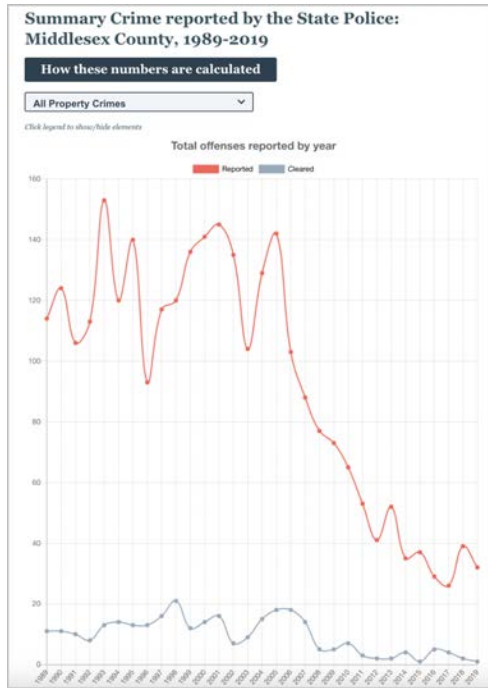
Crime data can help the Commission understand the conditions in the areas surrounding the D&R Canal Park. Some areas of the D&R Canal Park might need renovation or programs to encourage the public to visit the park. If the area is not safe, it might discourage visitors. While crime could be perceived as a constraint, by working to further reduce crime, it could be seen as an opportunity to improve the overall community. All of the crime data has been collected from the Federal Bureau of Investigation (FBI) Crime Statistics reports. This data has been taken from the Crime Data Explorer page, which includes graphs dating back to 1985. This report analyzes data from 1989 to 2019.

For all five counties, crime has significantly decreased since 1989⁴³. For example, in Middlesex County, both violent and property crime rates have decreased since 1989. This information can guide planning of the D&R Canal Park, as it may lend insight into visitor counts. People are more likely to visit the D&R Canal Park if they feel safe in the area. It is possible that there is a connection between the lower crime rates and more visitation at the D&R Canal Park. Additionally, reduced property crime could mean fewer actions like vandalism and dumping at the park. In 1989, there were about 115 instances of property crimes; while in 2019, there were around 30 instances of property crimes. Learning how property crimes were reduced could help reduce property crimes even more and keep the D&R Canal Park clean.

⁴³ "FBI Crime Statistics." *Crime*, www.crime-data-explorer.fr.cloud.gov/explorer/agency/NJ0030000/crime



Middlesex County Violent Crime, 1989-2019



Middlesex County Property Crime, 1989-2019

Figure 2.26.

In Trenton, which the D&R Canal Park runs through, perceived crime has been noted as a factor that prevents visitors from visiting the park. Therefore, the below figures show the crime statistics of Trenton from 1989-2019 as collected by the Trenton Police Department.

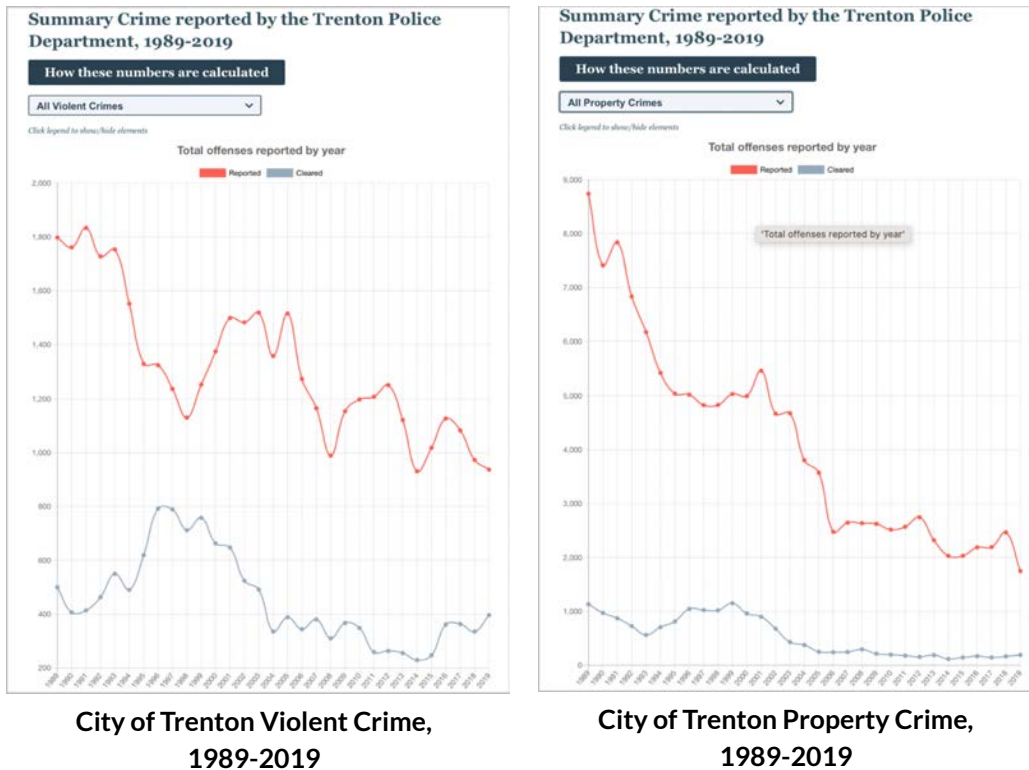


Figure 2.27.

Both violent and property crime reports from Trenton reflect that crime rates have greatly reduced since 1989. However, news reports have shown that the year 2020 saw a major spike in violent crime reports. According to NBC, there were at least 39 homicides in Trenton in 2020, which passed the earlier record of 37 homicides in 2013⁴⁴. The pandemic could be a large factor in the spike in homicide rates in the city. It is unclear how the pandemic will change the trajectory of both real and perceived crime in Trenton and how that may impact visitation of the D&R Canal Park.

Although the 1989 Master Plan does not discuss crime around the Canal, it is an important factor to consider as nearby crime can prevent people from visiting the Canal due to safety concerns. In order to uphold its goals and objectives of protecting the Canal as a natural, recreational, and historic resource, the Commission must address threats of crimes in the area. Criminal acts, such as vandalism or dumping, can interfere with the

⁴⁴ Chinchilla, Rudy. 2020. "Homicides Reach Record High in Trenton, New Jersey." *NBC10 Philadelphia*, NBC 10 Philadelphia. www.nbcphiladelphia.com/news/local/homicides-reach-record-high-in-trenton-new-jersey/2614464/.

overall aesthetic beauty of the Canal. Therefore, crime should be examined and reduced in the surrounding areas in order to ensure that the Canal remains healthy and safe to visit.

Cultural and Historical Resources

Key Takeaways

- Culturally significant sites nearly doubled in every county since the 1989 Master Plan was developed.
- The preferences of elected historic sites have changed since 1989 in each county. Most sites being of educational significance are now of architectural significance.
- New sites get added to the list regularly, including some from 2020. Therefore, it is important to review these sites when updating the master plan.

The sense of place of the Delaware and Raritan Canal is largely shaped by its cultural and historical significance. Local historic and cultural resources can show how the area and its priorities have changed over time. This can help the Commission decipher what kinds of local structures are important to the community. Historic and cultural resource data has been gathered from the National Parks Service's National Database Register for Historic and Cultural Sites. An extensive list of historic and cultural sites is included in this report's Appendix⁴⁵.

Historic and cultural sites are analyzed for the five counties intersecting the Canal. Before 1989, there were 55 historic sites in Burlington County. During 1989, there were two historic sites added. After 1989, there were 42 historic sites added. The most recent site was added in 2019, the Ridgeway William House in Springfield. This is an architecturally significant site. Before 1989, there were 38 historic sites in Hunterdon County. During 1989, one historic site was added. After 1989, there were 50 historic sites added. The most recent site was added in 2020, the Thatcher House in Kingwood. This is an architecturally significant site.

Before 1989, there were 71 historic sites in Mercer County. During 1989, there were two historic sites added. After 1989, there were 38 historic sites added. The most

⁴⁵ "National Register Database and Research." *National Parks Service*, U.S. Department of the Interior, www.nps.gov/subjects/nationalregister/database-research.htm.

recent site was added in 2020, the V. Henry Rothschild- F.A. Straus and Co. Atlantic Products Corporation Mill Complex in Hamilton Township. This is an architecturally significant site, as it used to be an industrial building. Before 1989, there were 50 historic sites in Middlesex County. During 1989, there was one historic site added. After 1989, there were 23 historic sites added. The most recent site was added in 2020, the Mary Wilkins House in Metuchen. This site is listed as a literature area of significance. Before 1989, there were 41 historic sites in Somerset County. During 1989, there were two historic sites added. After 1989, there were 42 historic sites added. The most recent site was added in 2019 the Moses Craig Limekilns, in Peapack Gladstone. This is an architecturally significant site, as it used to be an industrial structure.

The collection of historic and cultural sites in the Canal region exemplifies the Commission's principle of the Park as a historic resource. The region's sense of place is greatly uplifted by its historic and cultural character, which depends on the Commission's commitment to preserve and promote the historic nature of the Canal. The accumulation of sites of significance over the years poses opportunities for additional educational and recreational activities that highlight the Canal and its rich history.

Conclusion

Key Takeaways

1. **Demographics:** The population has gradually increased and has become more racially and ethnically diverse with time. Median income has shown dips and rises in the last three decades, but some municipalities are more burdened than others.
2. **The Economy:** Continued economic growth within the surrounding five counties is key to contextualize and guide economic development strategies for the Canal Park, while recognizing that development pressures will persist in the region.
3. **Land Use, Development, and Urbanization:** Increasing urbanization and development in nearby communities pose both threats and opportunities to the vitality of the D&R Canal Park.
4. **The Environment:** Climate change, invasive species, and areas of contamination are critical areas of examination that have newfound importance since 1989.
5. **Sense of Place:** The beauty and vibrancy of the D&R Canal Park stem from its role as a natural resource and site for recreational activity that is full of rich history.

This section outlines the major trends of the D&R Canal Park and its surrounding communities since the Commission's master plan was last updated. Despite these changes, it is crucial to note that the importance of the D&R Canal Park has not wavered. It remains a fundamental water supply system and naturally beautiful site that is full of recreation, culture, and history. Understanding how interrelated trends, including demographics, the economy, land use, the environment, and overall sense of place, impact the D&R Canal Park is vital to the Commission's commitment in maintaining and preserving the health and beauty of the D&R Canal Park.

Section III: Strengths, Weaknesses, Opportunities & Threats

Introduction

The drastically different conditions that the Delaware and Raritan Canal Park (D&R Canal Park) finds itself in at the present time, compared to the time of its 1989 Master Plan's adoption, necessitates the formulation of a new master plan. While the presented trends and projections reveal that the identified five goals from the 1989 Master Plan still retain their relevance as priorities for the administration of the D&R Canal Park, these goals can not be the sole guidance on how to navigate the challenges of the future. As a result, it is worthwhile to inventory the aspects of the Canal and its administration that have continued to work and that are in need of improvement. To do this, a SWOT analysis that categorizes the canal's conditions into Strengths, Weaknesses, Opportunities and Threats was deemed appropriate. This categorization helps to define the new scope of an updated master plan and identify any new priorities that the Delaware and Raritan Canal Commission (the Commission) should consider in conjunction with the identified original five guiding goals.

Data Collection

To adequately assess the potential areas of focus for a new master plan, the studio team first collected data that would help inform the current best practices of the master planning process and the unique context that the D&R Canal Park faces. As more than thirty years have passed since the last master plan update, the team first reviewed comparable master plans from neighboring local and regional government agencies, as well as private entities, that have gone through the master planning process within the past fifteen years. This analysis of comparable plans revealed a number of new strategies that could be employed by the Commission in its master planning process in order to create a more successful and responsive master plan. The studio team additionally engaged key public and private stakeholders to supplement the presented data trends with on-the-ground context. Through both the review of comparable master plans and engagement with stakeholders, the studio team's supplementary data collection helped to

frame the identification of strengths, weaknesses, opportunities and threats of the D&R Canal Park around the most pertinent issues and priorities for the present day.

Master Plan Review

The studio has identified 12 master plans that were chosen because the parks have similar physical characteristics and challenges to the D&R Canal Park. For example, many of these parks have a linear shape, are located along a waterfront, provide drinking water to nearby residents, or overlap with the jurisdictions of multiple local governments. While these plans were created by a variety of public or non-profit stakeholders and involved multiple organizations, none of the plans that have been reviewed were created by or created for agencies with the power to grant land use permits. After describing several key takeaways that other organizations have successfully incorporated into their master plans, the report will provide a general overview of each plan individually. A more detailed description of each plan is available in the Appendix. The studio would advise that the Commission consider incorporating these key takeaways as part of its approach to the master plan update.

Key Takeaways

- **Public Engagement:** Most of these plans detail an extensive public engagement process as a part of the master planning process. There tends to be a large number of focus groups, charettes, and public meetings in which the public can get involved. A few of the plans offer a way for constituents to stay involved after the master plan is completed by giving their opinions through various standing committees and volunteer opportunities.
 - The New Jersey Highlands Master Plan includes a variety of ways to keep the general public and stakeholders engaged after the completion of the master planning process, including Technical Advisory Committees, the Partnership, and the Network.
- **Implementation and Governance:** Most of the plans have clearly defined the roles and responsibilities of each organization involved and engaged officials from the relevant government agencies. In addition, many of the plans had recommendations for relevant state and federal agencies, even though the agency writing the plan typically has a local jurisdiction. As for implementation,

multiple plans called for project stages or delineated between long and short term goals.

- The New York State Canal Recreation Plan, decided to implement their plan in three five-year stages in order to adequately complete all the goals set for the massive amount of land under the plan's jurisdiction. Timelines were also set for short, medium, and long-term goals.
- **Supportive studies:** Research for many of the master plans often involved a variety of additional studies and analyses. The most frequent studies were economic impact analyses, which were used to determine best use and inform whether projects were worth the investments. Some plans also included local needs and market assessments to help inform the types of amenities needed.
 - The Seaside State Park Master Plan performed assessments of the park's historic properties, feasibility studies for adaptive reuse, and a feasibility study of the existing seawall.
- **Environmental Sustainability:** Almost every plan mentioned some type of environmental challenge, such as shoreline erosion, invasive species, habitat reclamation, etc. Many plans outlined concerns about stormwater management, referencing recent data collection about flooding or contamination. Each plan contains its own strategies for mitigating their relevant environmental challenges and some include more robust sustainability practices.
 - The Greenpoint-Williamsburg plan discusses the importance of adaptive reuse, sourcing local, green building materials, and including renewable energy in the park.
- **Funding and economic impact:** Most of the reviewed plans discussed the use of innovative and diverse funding methods and did not rely solely on state budgets. Some plans called for a variety of local, state, and federal funding measures and many relied on private-public partnerships and/or fundraising efforts. Additionally, several plans mentioned the beneficial economic impacts of their projects, which included goals for encouraging local development and job creation.
 - The Buffalo Bayou Master plan included a detailed financing section that outlined possible income sources for the creation of the new park.
 - In Reclaiming the Highline, the private-public partnership between the Friends of the Highline and the NYC Parks Department was noted as the key to successful funding for the park.

	Plan Element				
	Public Engagement	Implementation and Governance	Supportive Studies	Environmental (Sustainability)	Funding and Economic Impact
Gowanus Canal Draft Master Plan	✓	✓			
Burlington Parks, Recreation and Waterfront Master Plan		✓			✓
New Jersey Highlands Master Plan	✓	✓			
Greenpoint-Williamsburg Waterfront Open Space Master Plan	✓	✓		✓	
Seaside State Park Master Plan	✓	✓	✓	✓	✓
New York State Canal Recreationway Plan	✓	✓	✓	✓	✓
Reclaiming the High Line	✓	✓	✓	✓	✓
Bordentown Master Plan - Open Space Element		✓		✓	
Asbury Park Master Plan				✓	
Master Plan for the Central Delaware: Transforming Philadelphia's Waterfront		✓			✓
Bronx River Greenway Master Plan	✓		✓	✓	✓
Buffalo Bayou Park		✓			✓

Table 3.1 Summary of Master Plans

Master Plan Summaries

Gowanus Canal Draft Master Plan (2019)⁴⁶: The Gowanus Canal Draft Master Plan was created in 2019 by the Gowanus Canal Conservancy (GCC) based out of Brooklyn. Like many other plans in this document, the process included a substantial amount of public outreach. The GCC even created the Gowanus Lowlands Steering Committee, a board made up of local stakeholders, that would guide the development of the canal. The draft plan is long and reaches far beyond the jurisdiction of the GCC, making recommendations to the State of New York, the U.S. Forest Service, the New York State Department of Environmental Conservation, and other relevant agencies.

Burlington Parks, Recreation and Waterfront Master Plan (2015)⁴⁷: The Parks, Recreation and Waterfront Department of Burlington, Vermont (abbreviated as BPRW) adopted the Burlington Parks, Recreation and Waterfront Master Plan in 2015 to guide the development of the 43-park system located along the city’s waterfront. The plan is organized around seven “system themes,” similar to the four purposes of the previous master plan. The most notable of these is the Impact section, which analyzes the economic impacts of the city’s park system. BPRW manages to fund 70% of the department’s budget through internal revenue, in comparison to the national average of 28%. Further examination of this budget could give the Commission more ideas for additional funding sources. This master plan also has a section entirely about strategies for partnering with other agencies and stakeholders. The BPRW defines itself as a “behind-the-scenes catalyst” for various community groups. It would be beneficial for the Commission to have a section in which the relationships between them and other stakeholders are clearly defined.

New Jersey Highlands Master Plan (2008)⁴⁸: The Highlands Council (the Council) adopted the New Jersey Highlands Master Plan in 2008 in order to protect the

⁴⁶ *Gowanus Lowlands*. Gowanus Canal Conservancy. (2021, February 4). <https://gowanuscanalconservancy.org/gowanuslowlands/>

⁴⁷ “Burlington Parks, Recreation and Waterfront Master Plan” (City of Burlington, VT, 2015), <https://enjoyburlington.com/wp-content/uploads/sites/10/2015/10/2015-BPRW-Master-Plan-FINAL-LOW-RES.pdf>.

⁴⁸ “New Jersey Highlands Council: Regional Master Plan (RMP)” (New Jersey Highlands Council, 2008), <https://www.nj.gov/njhighlands/master/>.

859,358-acre Highlands Region. In addition to the focus groups and public outreach that is typical for the master planning process, the Council also created Technical Advisory Committees. These are groups created for dedicated topics, like regional development, land use planning, or sustainable agriculture, that serve as voluntary consultants that use their expertise to aid the overburdened staff of the Council. The Council also describes the Network, a collection of efforts to inform the public on the progress the Council has made on the commitments made in the master plan, and the Partnership, a network of representatives from counties and municipalities in the Highlands that send feedback and receive communication from the Council.

Greenpoint-Williamsburg Waterfront Open Space Master Plan (2005)⁴⁹: The Greenpoint-Williamsburg Waterfront Open Space Master Plan was created through collaboration between the New York City Department of Parks and Recreation, the Office of the Mayor, the Department of City Planning, and the New York City Economic Development Corporation. Multiple community groups also drafted their own plans, which were used to inform the master plan. It calls for a variety of parkland, esplanades, and other public areas and amenities with goals for promoting the health of the East River, increasing shore access, and reinvigorating the local neighborhoods. The park is to be owned and maintained as a public-private effort, with the park's department responsible for 30 acres of parkland and one mile of waterfront walkway, while private developers are responsible for four Supplemental Open Spaces areas, their adjoining waterfronts, and two miles of walkway. The private developers may also be involved in reconstructing the pier and may transfer the Open Space areas to the parks department after their completion. Challenges for the project include shoreline erosion, invasive species and dilapidated structures. Many of these structures will be part of efforts for adaptive reuse, as the project is intended to reflect the local culture and history of the Greenpoint-Williamsburg area.

⁴⁹ Greenpoint-Williamsburg Waterfront Open Space Master Plan (New York City Department of Parks and Recreation, 2005), https://www.nycgovparks.org/sub_your_park/greenpoint_williamsburg_waterfront/images/greenpoint_williamsburg_waterfront_masterplan.pdf

Seaside State Park Master Plan (2016)⁵⁰: Drafted by the Connecticut Department of Environmental Protection in June 2016, the Seaside State Park Master Plan combines the best elements of three alternative proposals for the development of the shoreline. The 32-acre site is to provide for a variety of recreational activities with trails, a boardwalk, fishing pier, and visitor center, as well as many other improvements. The three draft plans were evaluated in a public engagement process including 2,000 people through surveys, meetings, and workshops. Additionally, an assessment of the historic buildings, an evaluation of the existing seawall and environmental features, and a feasibility study for adaptive use were all completed to help inform the plan. Some of the major challenges of this project include the danger of category 3 and 4 hurricanes, as well as balancing compliance with regulations and the authority of multiple jurisdictions.

New York State Canal Recreationway Plan (1995)⁵¹: The New York State Canal Recreationway Plan was prepared in 1995 for the Recreationway Commission to submit to the New York State Thruway Authority and the New York State Canal Corporation. The plan oversees a 524-mile canal system, which includes the Erie, Champlain, Oswego, and Cayuga-Seneca Canals as well as their various waterways. The plan intends to create a linear park, which can support boating and other recreational uses. It also intends to take advantage of historic heritage and conserve local beauty and natural character. Similar to the D&R Canal Park, this plan faces the challenges of conflicting uses, private property owners, and cost and lack of facilities. The system runs through four metro areas, 13 cities, 57 villages/hamlets, 136 towns and 25 counties; and 73% of the state's population live within two miles of the system's waterways. To help account for this massive land cover, the plan includes 15 region-specific land use and conservation guidelines and is broken into three five-year phases for short, medium, and long-term goals. This plan is currently

⁵⁰ Seaside State Park Master Plan (Connecticut Department of Energy and Environmental Protection, 2016), <https://portal.ct.gov/-/media/DEEP/stateparks/parks/SeasideStateParkMasterPlanAug22016Reducedpdf.pdf>

⁵¹ *New York State Canal Recreationway Plan*. New York State Canal Recreationway Commission. (1995, August). <https://www.canals.ny.gov/news/crc/plan.html>

undergoing reexamination and following that process could prove useful to the commission.

Reclaiming the High Line (2002)⁵²: Reclaiming the High Line is a project created in collaboration between The Design Trust for Public Space and Friends of the High Line. The park itself is a 1.45-mile greenway created as an adaptive reuse of the elevated railroad line between Gansevoort Street and 34th Street in Manhattan. The High Line project was advocated for by Friends of the High Line; and while the New York City Parks Department owns the park, the Friends of the Highline is now financially responsible for its programming, maintenance, and operations⁵³. The plan's creation included exploration of four potential options for the abandoned rail line and an economic impact analysis of each option, as well as an ideas competition, advisory meeting workshops, and presentations throughout the process. The project was completed with staged implementation and received funding from a variety of local, state, and federal sources in addition to private fund-raising. Some challenges of the project were the structure's vulnerability to wind and flooding, as well as zoning and private property ownership. Ultimately, a new zone was created specifically for the High Line. Two phases of extension projects are currently being proposed and according to the park's designers, the High Line has helped stimulate massive economic and urban development. However, these increasing developmental pressures have created equity issues which the plan did not address.

Bordentown Master Plan - Open Space Element (2005)⁵⁴: The Bordentown Master Plan - Open Space Element was adopted in 2005 and drafted by the City of Bordentown Planning Board and the Burlington County Department of Economic Development and Regional Planning. This plan focuses primarily on environmental and open space within Bordentown. It is broken down into three main parts: Goals and Strategies, Existing Open

⁵² *Reclaiming the High Line*. Design Trust for Public Spaces and Friends of the High Line. (2002, February). <https://www.solaripedia.com/files/1048.pdf>

⁵³ *The High Line*. New York City Department of Parks and Recreation. (2012, July 25). <https://www.nycgovparks.org/parks/the-high-line/dailyplant/22715>

⁵⁴ *Bordentown Master Plan-Open Space Element*. Bordentown City. (2005, February 2). <http://sj-site-persistent-prod.s3.amazonaws.com/fileadmin/cicbase/documents/2016/8/28/14724018182215.pdf>

Space, and Recommendations. Some key goals include promotion of trails and open space, expanding walkways and accessibility, and educating residents about the importance of preservation and open space protection. The plan also discusses the creation of overlay zones in order to help restrict development on environmentally sensitive lands.

City of Asbury Park Comprehensive Plan (2017)⁵⁵: The City of Asbury Park, NJ adopted their new Comprehensive Plan update in 2017. The plan heavily emphasizes the use of “green” infrastructure, such as rain gardens and bioswales, over “gray” infrastructure, such as stormwater pipes. The plan also recommends the creation of a Historic preservation Commission and prioritizes the creation of new parks and recreation facilities for underserved communities.

Master Plan for the Central Delaware River (2012)⁵⁶: When creating the Master Plan for the Central Delaware River, the Delaware River Waterfront Corporation (DRWC) envisioned a waterfront place that would economically sustain itself and contribute to the economic development of the city. The plan would target public investment in degraded, vacant waterfront land and encourage private development as well. The plan also included a timeline in which projects were implemented in phases.

Bronx River Greenway Master Plan (2006)⁵⁷: The Bronx River Greenway Master Plan was created by the Bronx River Alliance and their partner organizations to establish a collective vision for the reclamation and improvement of the Bronx River Greenway. The Alliance itself evolved from grassroots advocacy efforts for reclaiming the waterfront and the organization continues to utilize a variety of public engagement processes for the ongoing restoration and development efforts, including the creation of this master plan. The plan itself includes a variety of elements, such as design guidelines for specific

⁵⁵ *City of Asbury Park Master Plan & Master Plan Reexamination Report*. City of Asbury Park. (2017, December 11).

<https://www.cityofasburypark.com/DocumentCenter/View/398/City-of-Asbury-Park-2017-Master-Plan-and-Master-Plan-Re-Examination-Report>

⁵⁶ *Master Plan for the Central Delaware: Transforming Philadelphia’s Waterfront*. City of Philadelphia. (2012, March). <https://www.delawariverwaterfront.com/planning/masterplan-for-the-central-delaware/full-plan>

⁵⁷ Bronx River Greenway Alliance. “Bronx River Greenway Plan.” New York. (June 2006).

http://www.bronxriver.org/puma/images/usersubmitted/greenway_plan/BronxRiverGreenwayPlan.pdf

sections of the park, environmental sustainability concerns, and funding options. Equity concerns are thematic in the plan, as the reclamation efforts are seen as a way to reinvest in the local communities.

Buffalo Bayou Park (2002)⁵⁸: In 2002, the Buffalo Bayou Partnership (BBP), in cooperation with the City of Houston, created the master plan for the newly-created Buffalo Bayou Park in downtown Houston, Texas. The plan lists a variety of ways the BBP can fund park maintenance, including revenue from Tax-Increment Reinvestment Zones (TIRZ) near the park, real estate transfer taxes, and grants from state and federal programs related to flood management. The BBP plan also clearly describes how the organization itself will have to grow and change in order to maintain the park and guide nearby development. The plan explicitly states that if the BBP doesn't gain the ability to inform development standards in a meaningful way, the result will be "development as usual, accompanied by a continued degradation of the quality of place".

Stakeholder Engagement

An essential part of gathering data for the purposes of reexamining the 1989 Master Plan was to connect and engage with relevant stakeholders, including the Commission Staff, Commissioners, staff from pertinent programs and agencies, stakeholders from key municipalities, and members of friends groups. These knowledgeable and invested stakeholders have informed and guided this studio's understanding of the D&R Canal Park, perspective on the working relationships between agencies, and the necessary elements that the new master plan should include. Their contributions, documented in the subsequent chapter, fell primarily into two distinct categories: the Importance of a New Master Plan and Stakeholder Priorities. The first section documents the expressed and interpreted reasons for the development of a new, more comprehensive master plan, while the second section highlights the key concerns from stakeholders and their actionable priorities for the new plan.

⁵⁸ *Master Plan for Buffalo Bayou and Beyond*. Thompson Design Group Inc., EcoPLAN. Prepared for Buffalo Bayou Partnership. (2002, August). <https://issuu.com/buffalobayou/docs/bbpmasterplan2002?e=13332866/13696999>

Importance of a New Master Plan

The 1989 Master Plan developed ten guiding principles. While all ten remain relevant, the following five principles have become especially critical in the time since the master plan was last updated in 1989. To reiterate, these five principles are:

1. The Canal is a Water Supply System
2. The Canal Park is a Site for Recreational Activities
3. The Canal Park is a Historic Resource
4. The Canal Park is an Area that Should Be Maintained in its Natural State
5. The Canal Park is a Means of Enhancing Urban Areas

Stakeholders described that changes in the region have placed even greater pressure on the D&R Canal Park and its ability to adequately achieve the 5 goals. The three biggest changes in the region identified by stakeholders are **climate change, population increase in urban areas, and development pressures along the Canal**. In the years since 1989, these changes have placed strains on the canal system and the function that it provides. The risks of climate change present threats to the natural environment, resources along the Canal, and communities that reside within the floodplain, while the demands of an increasing urban population tax the system's ability to serve as a source of drinking water and recreation. Finally, the consequences of development threaten the very existence of the Canal as a natural greenway and a refuge from the urban environment that surrounds it.

While changes in the region present a challenge to the physical resource, the various agencies whose authorities intersect to maintain the Canal's integrity(including the Commission, the Department of Environmental Protection's (DEP) Division of Parks and Forestry, DEP's Green Acres Program, the New Jersey Water Supply Authority, the Department of Transportation, and the State Historic Preservation Office) are tasked with coordinating these increasingly complex and interrelated operations necessary for maintaining the D&R Canal Park. Stakeholders advocated that the planning process and resulting master plan take into consideration this interconnected system of governance and reflect mutual needs and goals. The Commission can play an important role in coordinating (not directing) activities and the planning process associated with the D&R

Canal Park, but the only way to do this successfully and without an information bottleneck is to ensure that the Commission has sufficient resources to conduct a robust process. In talking with interest groups, it is clear that they are interested in improving their working relationships with the Commission. The development of a more comprehensive master plan would benefit from a diversity of voices, including those of the Commissioners, other state agencies, local agencies, friends groups, users, and residents. Public engagement and engagement with relevant agencies and municipalities should be a high priority during the planning process. Ultimately, the treatment of the D&R Canal Park as a “whole system” with multi-jurisdictional coordination is needed to ensure both a successful planning process and the continued vibrancy of the resource for generations to come.

In addition to improved collaboration, an updated master plan that is inclusive of all issues associated with stewardship of the D&R Canal Park can contribute to streamlining decision-making among and between state agencies and local governments to foster greater alignment between various master plans. Addressing this challenge will position the Commission to guide decision-making associated with the D&R Canal Park for the next decade. Several stakeholders mentioned the need to clarify the maintenance responsibilities and approval processes for use of the Canal, especially with regard to responsibilities of local government versus the state. These concerns impede community and group efforts to maintain and make use of the resource. The confusion also affects developers and other agencies that have a vested interest in the approval and review process. Lack of clarity can also prove a vulnerability to the Commission, opening them to litigation which would consume their already limited time and resources. In addition to clarifying review procedures, establishing siting and design standards can offer clarity for the regulated community and consistency in the review of projects over time. Ultimately, clarity on these procedures can support cooperation among governing bodies, support essential maintenance and programming efforts, and reaffirm the Commission’s strength as a regulating body.

While clarity is an essential piece, a master plan with an inclusive scope can not only ensure that the current conditions of the D&R Canal Park are reflected, but that it is also positioned to better balance competing and compatible uses. Many interviewees

described the desire for more and different types of recreation that present potential conflicts with the five stated goals. The most significant of these potential conflicts is the desire for increased boating, which could cause conflicts with the drinking water supply function of the Canal. Professionals noted the consideration of a “recreational capacity study” of this resource as a way to balance uses and understand if the Canal is currently equipped to handle recreational demand without environmental degradation. From a regulator’s perspective, the most relevant water quality indicators are Turbidity and Total Suspended Solids (TSS) which may be impacted by recreational demands. In addition to considering whether certain uses are appropriate, additional recreation raises concerns about safety and access to the Canal during the event of an emergency. Preserving water quality for one million residents is a main function and goal of the Canal and should be protected and prioritized in decision making regarding other potential uses.

Finally, the new master plan must consider the significant changes in the region as well as future changes, in addition to the increased demands that are being placed on the Commission. Climate change is a major concern for both professionals and officials, particularly in the lower Canal area. Trails, roadways, and towns experience flooding during wet weather events, and although wetlands act as a buffer, there are major safety concerns for residents in the area. Additionally, demands on the Canal including development patterns, like warehouse development and municipal redevelopment, and increased recreational use threaten the natural resources and functions of the D&R Canal Park. One solution discussed by professionals was to develop siting and design guidelines to ensure a sustainable future and balance uses of the D&R Canal Park. In terms of the Commission’s operations, financial sustainability was raised as a major concern. Currently, development in the area is high, which funnels additional financial resources to the Commission in the form of application fees. If development slows down, this revenue will decline and the Commission will not have the capacity to deliver on the additional functions that the public wants it to be involved in. The Commission no longer receives funding from the state, but since it is housed within a state agency and is not an independent authority, it must adhere to the agency’s requirements, including procurement, HR rules, and staffing, among others.

Stakeholder Priorities

Stakeholders indicated that the Commission could benefit from an increase in staffing and funding to carry out its regulatory functions. The Commission mainly receives revenue from development applications, but there is a small staff responsible for implementing the goals of the Commission. A commissioner informed the studio that the Commission does not receive funding from the state, but the Commission still needs approval from the state for new hires and to use state technology. The influence of the state, without sufficient funding, can create barriers for the Commission and limit the work the Commission is able to do. Additionally, the lengthy process of appointing commissioners can lead to an inability to make decisions, particularly if the Commission does not have a quorum. If the Commission had more resources, specifically staff and financial, they would be able to coordinate with counties and municipalities more effectively, proactively identify priorities for acquisition, establish a publicly accessible easement database aligned with the Department of Transportation and other easements, develop siting and design guidelines, and establish an electronic permit approval system. With more funding, the staff would have the ability to hire more staff, which would assist the Commission with managing the number of projects and reviews that are being conducted. As of March 2021, the Commission was managing a queue of 40 applications due to the significant development pressure in the region. With adequate staffing and funding, the Commission could expand its capacity to carry out its goals.

Additionally, a coordinated set of priorities for property acquisition is needed. One stakeholder informed the studio that an inventory of Green Acres properties within the D&R Canal Park does not currently exist. Furthermore, another stakeholder suggested the need for a coordinated set of priorities for land preservation for all state and local agencies operating within the D&R Canal Park. At one Commission public meeting, Commissioners discussed an ongoing priority to establish a database of easements to ensure transparency for future property owners as well as to ease compliance efforts by state and local agencies. Acquisition and inventory priorities for the Commission could include connecting to other trails and amenities, such as the Tulpehaking Nature Center; improving access in cities like Trenton and New Brunswick; providing access to and

protecting cultural and historic sites; improving water quality; and creating a database of easements.

The D&R Canal Park spans a 70-mile corridor throughout five counties in New Jersey, and stakeholders from across the region indicated that enhanced signage, wayfinding, and interpretation is needed at many access points. One stakeholder informed the studio that the lower part of the D&R Canal Park needs to be highlighted on maps and brochures. Generally, there have been remarks from stakeholders and studio members indicating that access points of the D&R Canal Park are difficult to find and identify, particularly in New Brunswick and Trenton. A stakeholder proposed utilizing or renting historic properties to generate revenue, as done at the Chesapeake & Ohio Canal State Park, which would potentially increase interest in the Canal and provide an alternative source of funding. Several stakeholders also indicated that the D&R Canal Park could benefit from a visitor's center or museum to help the public find different access points and locate interpretive resources. Many communities along the D&R Canal Park have expressed an interest in a museum or educational center and were willing to dedicate resources towards this project.

Several stakeholders also mentioned the need for a deliberate focus on the unique needs of larger cities along the Canal, specifically Trenton and New Brunswick, and indicated that targeted investment is needed to ensure equitable access to the D&R Canal Park's resources. Stakeholders pointed to several opportunities and challenges that can be addressed to increase access in these regions. One key way to increase access is to connect the greenway to other trails and improve the D&R Canal Park's function as a transportation network. State officials noted this disparity in Trenton, as park users must traverse roadways to utilize the path network. This highlighted equity issues in trail provision and user safety in urban areas. Crime issues, particularly the perception of crime, also impede park use. It would benefit the Commission to consider Crime Prevention Through Environmental Design (CPTED) strategies (lighting, trash, loitering, pruning, ATV use) as potential solutions to mitigate the negative perceptions of the D&R Canal Park in cities. Additionally, the Commission would benefit from incorporating an oversight presence in the park. One commissioner described the challenge as "how to

police without policing,” meaning that the D&R Canal Park is a peaceful area and that an overwhelming police presence could change that character, although they recognize the safety concerns in the park. Potentially, encouraging more visitation at the D&R Canal Park could create the presence of “eyes on the streets.” In other words, having other people in the park could discourage problematic behaviors like littering or dumping.

Another challenge noted by stakeholders is the need for more dedicated maintenance. Actions like pruning and maintaining access points can help make trails more accessible and identifiable. In addition to dedicated maintenance and beautification, the D&R Canal Park could develop and implement educational programming, which has been mentioned previously as a point of interest. This could help spark interest and accessibility for the D&R Canal Park. Building partnerships with local community-based organizations can support programming and education about the Canal as a resource. Identifying and removing the barriers that exist to collaboration can promote appropriate and innovative uses of the D&R Canal Park and draw in residents from these communities. Similarly, there are opportunities to connect D&R Canal Park enhancements in urban areas to local economic development, through avenues like educational programming, which can raise funding for enhancements.

Finally, a more comprehensive master plan can position the Commission to be more proactive by recognizing the need for greater restoration and stewardship of natural systems and cultural and historic resources. Creating opportunities to align the priorities of stakeholders and the Commission can magnify the efficacy of resources deployed in the area. For example, the Commission could consider the kinds of invasive species that threaten the D&R Canal Park and its surrounding area. More specifically, the Abbott Marshlands has not had its invasive species inventory fully completed since 2010 and uniting over this priority could be mutually beneficial. By identifying areas that are a priority for acquisition, the Commission could position itself to respond quickly when acquisition opportunities present themselves. Being more proactive can also help guide consistent decision making in approving or denying development. For new and future Commissioners, clarification of onboarding procedures could be helpful in clarifying roles and responsibilities. Lastly, proactive alignment of goals and concerted outreach can

facilitate coordinated planning priorities and stewardship efforts in New Brunswick and Trenton, supporting reinvestment in those cities.

Conclusion

Key Takeaways

- The Commission is facing challenges, pressures, and issues that the 1989 Master Plan does not take into consideration and, therefore, the current master plan no longer provides adequate guidance for Commission decision making processes.
- With the development of a new master plan, the Commission will be better positioned to proactively address the challenges presented by multi-jurisdictional governance and coordination between state agencies, local governments, and other planning documents.
- An updated master plan will better reflect the current conditions of the D&R Canal Park and address the needs and desires of constituents, including local governments, users, and friends groups.

This analysis highlights the key findings of the stakeholder interviews conducted by the studio team. As previously mentioned, these findings fall into two categories, the importance of having an updated master plan, the scope of which is inclusive of issues associated with stewardship of the D&R Canal Park as a canal system, and the priorities of stakeholders. Interviews and conversations conducted with these stakeholders reaffirmed that the five goals of the Commission have become more important in the time since the development of the 1989 Master Plan. These conversations have also highlighted that the scope of the master plan can inform and support cooperation among regulating agencies, prioritize engagement with various agencies in the production of the new plan, balance the uses of the D&R Canal Park, and reflect the changes in the region and the resource in the over 30 years since the last plan was developed.

Stakeholders also advocated for their unique needs and interests to be taken into account when developing the new master plan. They indicated that their priorities included allocating adequate resources to the Commission to successfully carry out their goals and regulatory duties, developing and coordinating acquisition priorities, enhancing

signage and interpretation resources, prioritizing equity in access and resources for the larger cities, and supporting the Commission to be proactive rather than reactive. This section documents the findings of a preliminary stakeholder engagement process conducted by the studio class, but also emphasizes the importance of further engagement and conversations with a variety of constituents of the D&R Canal Park.

SWOT Analysis

Having collected information on the past of the D&R Canal Park, the trends that are affecting it today and the projections for the future, a SWOT analysis was conducted in order to process this information into an actionable framework that the Commission could base a new master plan on. This method – looking at the strengths, weaknesses, opportunities and threats (SWOT) inherent in both the Canal in itself and the administration of the Commission – identified the positive aspects of the D&R Canal Park and the Commission that should be enhanced and pursued and the negative aspects that should be mitigated and avoided. Conducted on March 23rd, during an in-class meeting of the studio team, this SWOT analysis focused on characterizing the most impactful changes of the D&R Canal Park and the Commission since 1989 on the basis of:

- **Strengths:**
 - What does the Commission do well?
 - What are the positive features of the D&R Canal Park?
- **Weaknesses:**
 - What parts of the D&R Canal Park need improvement?
 - What aspects of the Commission's work need improvement?
- **Opportunities:**
 - What external factors can help the Commission in its objective?
 - What are the favorable trends that impact the Commission and D&R Canal Park?
- **Threats:**
 - What are the negative external factors beyond control of the Commission?
 - In what ways, is the integrity of the D&R Canal Park in danger?

- What should the Commission create a contingency plan for?

As a collaborative effort, the studio team spent time considering each of the four categories individually as they relate to the conditions found within the D&R Canal Park and realities of the Commission's ability to carry out its mission. Through this effort, the trends and conditions found in the D&R Canal Park and with the Commission were categorized in the following ways:

Strengths:

- 1. Sense of commitment** - There is a strong belief in the importance of preserving the D&R Canal Park, despite challenges and limited resources.
- 2. Same five goals from 1989 to the present** - The five main goals outlined in the 1989 Master Plan are still relevant. The Commission can still use them as a starting point for the master planning process.
- 3. Good financial situation** - The Commission is not dependent on appropriations from the general fund, which can change from year to year. The operation is self-funded and not in debt.
- 4. Continuous open space** - The Commission was able to complete its goal of assembling a continuous open space that is completely connected.
- 5. Good relationships with strong allies** - For example, the Water Supply Authority was able to take care of the hydrilla problem fairly quickly, and the various friends groups have a treasure trove of historical photos.

Weaknesses:

- 1. Insufficient access points and missing signage** - Lack of access points to the D&R Canal Park, especially in urban areas, renders the park virtually invisible to visitors who do not live along the Canal itself. Moreover, the linear orientation of the park makes it particularly difficult to plan access points and amenities along it.
- 2. Lack of funding and staff** - A lack of funding and a dire shortage of staff significantly lower the Commission's capacity.

3. **Lack of an inventory of resources** - The Commission lacks an electronic repository of the various easements, preserved sites, number of park visitors, and Green Acres sites located within the review zones.
4. **Lack of clear jurisdiction and regulations** - Overlapping jurisdictions and review zones, lack of clear and cohesive regulations, and lack of clarity on the responsibilities and role of the Commission adds layers of avoidable bureaucracy to the Commission's operations
5. **Lack of diversity of voices** - The previous master plan didn't seem to involve as many stakeholders or maximize community involvement
6. **Difficult to balance the various uses of the canal** - For example, allowing motorized boats on the Canal would be great for recreational use, but terrible for a drinking water source.
7. **Too many websites create confusion** - If a person new to the community wanted to search for "D & R Canal", there is no way to tell which website they would land on, or whether that website suits their needs. Would one go to the DEP website, the Canal Commission website, or one of the various friends groups? How would I figure out which friend group is closest to where I live?
8. **Paper permitting** - Developers aren't able to submit applications electronically, which could make the process much longer and more of a hassle for the developer and the Commission.

Opportunities:

1. **50th Anniversary** - The 50th anniversary of the D&R Canal Park is coming up, which is a good opportunity to renew public focus on the park.
2. **Increased awareness of inclusivity** - Cultural understandings of equity and accessibility could help bolster public appreciation for a free public resource and generate interest in improving access in urban areas.
3. **Access to better technology** - Technological advancements, such as light detection and ranging (LIDAR) for more accurate maps, online permitting systems, or smartphone apps for self-guided historical tours, could open the door for more innovative programming.

4. **Increased park patronage due to COVID-19** - The ongoing COVID-19 pandemic has contributed to a national increase in outdoor recreation and as such, the D&R Canal Park has likely seen an increase in visitation.
5. **Increased development** - Increased development in the Commission's review zones could lead to extra funding for the Commission to hire enough planners to cover the amount of new work coming in.

Threats:

1. **Overlapping/unclear regulations** - Complex dynamics between governing bodies lead to inconsistent decision-making and weak legislative standing. This also impacts the public perception of the Commission and their ability to successfully get resources that they need to function well.
2. **Changing development patterns** - Increase in development, especially warehousing, along the D&R Canal Park may contribute to increasing pollution levels in the area. Coupled with deteriorating historic resources and missed acquisition opportunities, changing development patterns could have negative impacts on the D&R Canal Park.
3. **Climate change** - Drastic change in climate and its impacts, such as the presence of invasive species along the Canal, can prove very detrimental to the D&R Canal Park's ecological health.
4. **Lack of a sense of place** - Residents and visitors may not feel the need to support or defend the D&R Canal Park if there is not a cohesive sense of place along it.
5. **Management structure** - The law that created the D&R Canal Park and the Commission also restrains the Commission on what actions can be taken to improve the park.
6. **Litigation** - Existing lawsuits greatly impact the Commission's capacity.
7. **Post-COVID-19 park patronage is hard to predict** - Considering the effects of the pandemic are ongoing and still largely unknown, it will be difficult to plan ahead regarding the D&R canal Park's needs and uses.
8. **Safety** - Dead trees and open areas along the road may be a threat to public safety and perceptions about crime can influence visitor use of the park.

Section IV: Opportunities, Constraints & Recommendations

To further expand upon the perceived strengths, weaknesses, opportunities and threats present in the Delaware and Raritan Canal Park (D&R Canal Park), the studio conducted an Opportunities and Constraints Analysis. In the field of urban planning, an Opportunities and Constraints Analysis is often conducted to identify limitations and development potential of a given site. These identified opportunities and constraints serve as the preliminary parameters in which the Commission is recommended to work upon. For the purposes of this studio, the Opportunities and Constraints Analysis was intended to identify:

1. The current challenges facing the Commission as it positions itself to initiate a master plan update.
2. The potential benefits that the Commission may be able to take advantage of within an updated master plan and/or as part of the process to update the master plan.

The Studio found that several opportunities offer specific advantages for the Commission to build upon, both with regard to an updated master plan as well as the process of updating the master plan. Likewise, the Studio found that the Commission faces several constraints that have the potential to be addressed as part of an updated master plan and/or the process of updating the master plan. As a result, the Studio identified a set of recommendations that the Commission may use to help address the identified opportunities and constraints and guide the master planning process. One such recommendation is an additional list of three guiding goals that can help position the Commission to proactively develop a shared vision for the next ten years of the D&R Canal Park, as well as create an actionable document that supports the operations of the Commission and other state and local agencies in overseeing the D&R Canal Park's management for the benefit of the people who live adjacent to it and all who visit it.

Opportunities

Based upon an analysis of existing conditions, five key opportunities exist that should be a central focus of the Commission as it plans for its future:

- 1. The five goals laid out by the Commission in the 1989 Master Plan still hold true today.** Central New Jersey has changed dramatically since the creation of the original master plan; however, the D&R Canal Park has continued to be an ecological, recreational, and water supply resource for the region. This is largely due to the dedicated efforts of the Commission and its partner agencies and organizations in fulfilling the five goals and ensuring that no single use of the Canal has been neglected in order to fulfill the others.
- 2. The Commission currently maintains collaborative relationships with its various partner organizations.** Together the agencies that have oversight of various aspects of the D&R Canal Park have created successful systems of collaboration for achieving the preservation of the park and its five goals. However, these relationships rely on the individuals involved in each organization and are not guaranteed to continue when staffing changes. As such, it would be beneficial to formalize these systems so that there is a greater chance for successful collaboration in the future.
- 3. There has been an observed increase in visitors to the D&R Canal Park since the creation of the original master plan.** According to multiple stakeholders, the D&R Canal Park is one of the most visited parks in the state. Increases in New Jersey's population over the past few decades have led to an increased need for green spaces, as on average park and recreation agencies try to provide 9.9 acres of parkland per 1,000 residents⁵⁹. Additionally, the ongoing COVID-19 pandemic has led to dramatic increases in urban park visitation across the country⁶⁰. As a linear park that runs through a majority of Central New Jersey and several urban areas, the D&R Canal Park is uniquely positioned to serve these increased recreational needs. The park will likely continue to experience increased use and the Commission may be able to leverage this as needed for both an updated master plan and additional funding.

⁵⁹ "NRPA Park Metrics: Research: National Recreation and Park Association: NRPA," National Recreation and Park Association (NRPA), n.d., <https://www.nrpa.org/publications-research/ParkMetrics/>.

⁶⁰ Pregitzer, C. C., S. Plitt, T. O'Connell, and S. Charlop-Powers, *Impacts of COVID-19 on Natural Areas in American Cities*, Natural Areas Conservancy, 2020, https://naturalareasnyc.org/content/national/final-covid-national-report_7.28.20.pdf.

4. **The increases in development in and around the Commission’s review zones both increases the Commission's source of revenue and its opportunity to exercise its regulatory authority.** The D&R Canal Park contains an extensive variety of assets that benefit the public: recreation, water supply, natural and cultural resources. Given this variety of assets and the development pressures in the region, the role of the Commission is important now more than ever to ensure the compatible management and protection of those assets This reinforces the need for the Commission and the vital role it plays in ensuring the vision for the park is achieved.
5. **The D&R Canal Park is a unique natural, historical, and cultural resource which serves as an important connector throughout central New Jersey.** Although the park is already a popular destination, the abundance and variety of assets held by the park could be better utilized. This is particularly true for the park's historic and cultural assets, which could serve as museums, visitor centers, campsites, etc. to help provide more educational and recreational services to park visitors. The natural areas could also serve as a more educational resource with increased signage and programming.

Constraints

As the Commission looks ten years into the future and beyond, there are four identifiable constraints that could serve to disrupt the Commission’s mission and ability to adequately plan for the benefit of the D&R Canal Park:

1. **Environmental and climate change will affect every aspect of D&R Canal Park operations.** Invasive species, bank erosion, and increased reliance on reservoirs may threaten the Canal’s ability to provide drinking water for a growing population and support the present ecosystem. More frequent and intense flooding can also cause historic resources and portions of the trail to deteriorate much faster than anticipated.
2. **The ability of the Commission to serve as a coordinating agency for managing and protecting the D&R Canal Park is hindered by the lack of resources and the**

current organizational structure. The Commission has reported a significant increase in its workload and a decrease in its resources and funding to adequately handle that workload. The Commission's poorly-defined relationships with other organizations hinders efficient operations. For example, the New Jersey Department of Environmental Protection (DEP) does not provide funding for the operation expenses of the Commission, but still has final say over hiring and firing decisions. Since the Commission doesn't have the resources, it lacks the ability to be more proactive in its preservation activities. This can result in missed opportunities such as one reported by several stakeholders regarding the preservation of lands on Duck Island near Trenton.

3. **The Commission is constrained from fostering proactive engagement of stakeholders.** The process for development of the previous master plan involved a limited amount of public outreach, and, given its resource limitations the Commission is currently constrained from engaging a wide variety of stakeholders. Updating the master plan presents an opportunity to hear from stakeholders (visitors, residents, local businesses, local governments), especially those that are underrepresented in regional planning and decision-making.
4. **The municipalities surrounding the D&R Canal Park are facing an unprecedented level of development.** Development activity in the review zones has increased dramatically and shows no signs of slowing down. Since the current plan often leaves Commissioners with insufficient guidance for many regulatory decisions, the larger number of developers is also a larger number of potential plaintiffs in court. In addition, the lack of a coordinated database of easements or a clear set of land acquisition guidelines may hinder the Commission in its attempt to purchase land for open space preservation.

Recommendations

As previously stated, the objective of the studio team was to provide the Commission with ample information that will serve the basis for the start of its master planning efforts, rather than create a formal master plan draft. Based upon a semester's

worth of data and analyses of conditions, the studio team is confident in recommending that the Commission consider pursuing the following courses of action to begin planning for the future of the D&R Canal Park:

Recommendation #1: Adopt Guiding Goals for the Master Planning Process

Recognizing the master planning process as a long process that requires consideration of a variety of competing issues and interested stakeholders, three comprehensive guiding goals are provided which the Studio team recommends adopting as part of the Commission's approach to creating its master plan:

1. A new master plan will be drafted through an inclusive and responsive process that prioritizes the voices of the residents who live near and within the Commission's review zones for envisioning what the future of the D&R Canal Park should look like for the next ten years and beyond.
 - A. Equal opportunity will be given to each of the communities surrounding the D&R Canal Park to contribute to the commission's master planning process.
 - B. A new master plan will prioritize the amplification of resident voices through both new outreach initiatives and citizen advisory groups.
 - C. A new master plan will take into account projections for the future in terms of population changes, demographic changes and socio-economic changes.
 - D. A new master plan will work to benefit not only the residents of today, but those of tomorrow through a multi-generational approach.
2. A new master plan will recognize the continued relevance of the goals set forth in the 1989 Master Plan and retain them, while accommodating the new trends and conditions that have emerged over three decades.
 - A. Emerging external threats, such as climate change, will be incorporated throughout the master plan's considerations and projections for the future.
 - B. A new master plan will evaluate analyses and recommendations on the basis of equity, including their effect on equitable access to the D&R Canal Park.
 - C. A new master plan will acknowledge and incorporate digital and other technology developed since 1989 into its approach.

3. A new master plan will reflect the essential function that the Commission serves as a coordinating entity.
 - A. The various government stakeholders with jurisdiction over the D&R Canal Park(i.e., the New Jersey Water Authority, New Jersey Department of Environmental Protection, and New Jersey Historic Preservation Office) will be invited to participate in a collaborative master planning process.
 - B. A new master plan will seek the input of non-profit and private stakeholders with interests in the D&R Canal State Park.
 - C. A new master plan, to the greatest extent possible, will seek to support the missions of other partner agencies in the implementation of programs for the benefit of the D&R Canal Park.

Recommendation #2: Incorporate the Canal State Park’s Milestone 50th Anniversary into the Framing for an Updated Master Plan

In 2024, it will have been five decades since the 1974 Delaware and Raritan Canal State Park Law was passed. This offers an opportune time to assess the D&R Canal Park’s and the Commission’s successes and failures. By centering the master planning process around the 50th anniversary, more active public participation can be encouraged. To do this, all branding and outreach efforts should promote the master plan as a document that serves to plan for the next ten, 50, and 100 years of the D&R Canal State Park.

Recommendation #3: Improve the Commission’s ability to measure the levels of visitation to the State Park in order to help guide access and recreational capacity considerations

As a linear oriented park, developing an accurate estimate of the number of visitors to the D&R Canal Park has been difficult. While the D&R Canal Park has been referenced as the second most visited park in New Jersey due to the sheer number of visitors who use the park as part of their daily routine, the true level of park use is unknown. By either identifying key access points along the D&R Canal Park to survey or introducing counters at the park’s formal entrance points, improving the measurements for visitor levels will help to shed light on the specific geographic distribution of visitors and direct the Commission to areas that are underserved or overserved.

Recommendation #4: Quantify the economic and health benefits that the D&R Canal Park generates in order to provide measurable evidence of the positive regional influence that the Canal represents

Recent studies have shown the positive impact that green open spaces not only have on adjacent property values, but on local economies as non-resident visitors to park areas often shop or eat at local businesses. Recreational open space, like the D&R Canal Park, similarly offers extensive health benefits as a source of fresh air and destination for exercise. As half of all Americans are estimated to receive less than the recommended amount of exercise, natural areas like the D&R Canal Park provide fitness opportunities that may otherwise be absent from local communities⁶¹. To ascertain the economic value of the D&R Park, the Commission should study the property tax value and revenue increases due to the presence of the park, stormwater capture benefits and local business impacts. The physical fitness impacts of the park may also contribute to reducing hospital and medical visits, thereby decreasing the medical care costs of surrounding communities.

Recommendation #5: Create a formal public outreach plan prior to the start of the master planning process for the purposes of identifying relevant stakeholders and assessing the best practices for creating an equitable process for public involvement

The studio team initiated a preliminary outreach effort through its communications with involved stakeholders. Building upon this, the Commission would benefit from continuing to collect input from knowledgeable public and private stakeholders in order to determine ways to improve its capacity as a governing partner. In addition, the Commission should develop strategies for collecting input of nearby residents of the D&R Canal Park that are based upon the best practices identified in the Review of Master Plans section prior to beginning the master planning process. Any public outreach plan should incorporate visioning and informational meetings conveniently scheduled and geographically well-distributed. In-person meetings can be supplemented through surveying – both online and in-person. The Commission should utilize community and

⁶¹ Jamie Ducharme, "Most Americans Still Don't Get Enough Exercise, CDC Says," Time, June 14, 2019, <https://time.com/5606583/americans-not-enough-exercise/>.

holiday street events to set up outreach tables that inform the community about the planning of the D&R Canal Park.

Recommendation #6: Utilize digital and other technological advancements to aid both the master planning process and the Commission's day-to-day functions

Over the past 30 years, technological advancements, especially in terms of digital and wireless accessibility, have provided new resources that can be integrated into the Commission's work. These technologies can help alleviate some of the Commission's considerable workload and improve its abilities to reach out to the D&R Canal Park's constituents. In terms of master planning outreach, the Commission should use the internet as a resource by creating online public informational materials and creating a presence on social media outlets to better inform the public about the Commission's work and the significance of planning for the future of the D&R Canal Park. As previously noted, the internet should also give the Commission the opportunity to provide greater informational materials on its website that will help development applicants navigate through the Commission's regulations. In the long term, wireless technology can be incorporated throughout the D&R Canal Park itself, with WIFI, wayfinding, and electronic visitor counters to tailor the recreational experience of visitors and improve user satisfaction.

Section V: Conclusion

The preceding report intended to offer the analyses and suggested approaches that are thought to most effectively serve the Delaware and Raritan Canal Commission (the Commission) in its efforts to update its master plan. At the time of this report's creation, the Delaware and Raritan Canal Park (D&R Canal Park), the state of New Jersey and the world face challenging times, as COVID-19 creates uncertainty for the present and threats such as climate change represent uncertainty for the future. In light of these challenges, it has become apparent that the tools and approaches relied upon in the past are no longer sufficient. The Commission and its highlighted guiding goals first inscribed five decades ago in the 1974 legislation that created the State Park hold greater importance than ever before. The stewardship of natural environments have never been more essential than the present time, amidst urbanization and development pressures, increasing population and other key demographic, social, economic, and environmental trends. This fact is reinforced through the insights provided by the public and private stakeholders dedicated to the stewardship of the D&R Canal Park. A new master plan, therefore, must recognize these realities.

A responsive, contemporary master plan similarly necessitates the incorporation of new approaches and priorities that the current version of the master plan, as a product of 1989, fails to address. The example of master plan efforts in comparable and neighboring communities and entities exemplify new emphasis on collaborative public participatory processes, supplemental studies, sustainability - both financial and environmental - and economic impacts and equity. The models provided by these master plans were deemed adaptable for the D&R Canal Park, dependent upon the careful consideration of the strengths, weaknesses, opportunities and threats that it faces. Recognizing the limitations inherent in the creation of this report, specifically a limited timetable and reliance upon remote work, the observations and conclusions subsequently drawn from this SWOT Analysis were presented as recommendations intended for further consideration by the Commission. Rather than purport these recommendations as fixed and final, the studio team hopes the information contained in this report will serve to jump start future and

prolonged discussions that will form the basis for a successful master planning process and final guiding document.

Section VI: Appendices

Appendix A: Master Plan Reviews

- I. Gowanus Canal Draft Master Plan (2019)
- II. City of Asbury Park Comprehensive Plan (2017)
- III. Seaside State Park Master Plan (2016)
- IV. Burlington Parks, Recreation and Waterfront Master Plan (2015)
- V. Master Plan for the Central Delaware River (2012)
- VI. New Jersey Highlands Master Plan (2008)
- VII. Bronx River Greenway Master Plan (2006)
- VIII. Greenpoint-Williamsburg Waterfront Open Space Master Plan (2005)
- IX. Bordentown Master Plan - Open Space Element (2005)
- X. Reclaiming the High Line (2002)
- XI. Buffalo Bayou Park (2002)
- XII. New York State Canal Recreationway Plan (1995)

I. Gowanus Canal Master Plan

BACKGROUND

Type of organization and mission

The Gowanus Canal Conservancy (GCC) created a draft master plan for the Gowanus Lowlands in 2019. The GCC's goal is to aid the development of an open space network on the Gowanus Canal through community engagement along the Gowanus Watershed. Since 2006, the Gowanus Canal Conservancy has led volunteer grassroots projects; educating about environmental concerns; and working with elected officials, agencies, and the community to advocate for, build, and maintain green infrastructure around the canal. The Gowanus Lowlands provide the community with accessible green space through increased flood resilience, mitigation of impacts of urban heat island effect, creation of habitat, stormwater management, and reduction in pressure on the sewer system.

Focus area (Water quality, recreation, etc.)

The Gowanus Lowlands draft plan builds on numerous planning and clean-up processes to get investments towards the "creation of accessible, vibrant, and resilient network of parks and public spaces centered on Gowanus Canal and connected to the surrounding watershed".

Major challenges

The Gowanus Watershed has three main challenges: contamination, coastal flooding, and heat island/lack of tree canopy. The major contamination issues occur due to a combined sewer system that overflows and discharges about 363 millions gallons of combined sewer overflow (mix of stormwater runoff and raw sewage) each year into the Gowanus Canal. Additionally, the area experiences flooding due to a high groundwater table that causes street flooding during rain events. Also, the surrounding streets experience coastal flooding. As sea level rises, the area will see more frequent high tide and flooding events. Lastly, during dry seasons, the Gowanus area is an urban heat island due to the lack of tree cover in the industrial and mixed-use neighborhood surrounding the canal. The area's contamination, flooding, and lack of tree canopy presents issues as the area seeks to further develop.

Issues of authority (Regional, state park, etc.)

The Gowanus draft plan makes recommendations to numerous departments in order to create improvements in the area. First, in regards to the Gowanus Waterfront Access Plan, the recommendation is made to the Department of City Planning. Second, in regards to the policies around stormwater and sewage, design and programming priorities for CSO tanks, and investment in green infrastructure, the recommendation is made to the Department of Environmental Protection. Third, in regards to investment in new and existing parks, the recommendation is made the Department of Parks and Recreation. Lastly, in regards to the priorities and design guidelines for remediation and restoration, the recommendation is made to the State of New York, the New York State Department of Environmental Conservation, the Department of Environmental Protection, the National Oceanic and Atmospheric Administration, and the U.S. Forest Service. All of these recommendations can help the Gowanus Canal Conservancy in reaching their goals as well as notifying various departments of the issues in the area.

PLAN ELEMENTS

Public engagement process

Developing the master plan has been and will continue to be a multi-year process. The current published Master Plan for the Gowanus Canal is still a draft from 2019. The GCC has created 13 public workshops in neighborhoods around the canal. The GCC has also created a Gowanus Lowlands Steering Committee made up of local stakeholders to guide the development of the community's vision for the area. GCC believes that the public engagement process is crucial to the development and change of the area.

Funding sources

The GCC utilizes the Waterfront Access Plan which aims to improve the DEP Water Reuse Grant funding to include incentives for CSO reduction. Additionally, the Waterfront Access Plan establishes the Gowanus District Tree Fund to direct payment in lieu of tree planting.

APPLICABILITY TO D&R PLAN

Strengths or weaknesses of the plan

The plan has numerous strengths. First, the plan is very detailed and contains 208 pages of material that break down context, community outreach, sites, streetscape, stormwater and sewage, maintenance and programming, plants and ecosystems and materials and details. While the plan is long, the table of contents includes an interactive element that makes it easy for the reader to simply jump to the page that they are interested in. The organization of the plan makes the material both digestible and easy to break apart. The plan includes colorful graphics that help explain to the reader the issues in the area. The graphics emphasize certain issues that should stand out to the reader among the text.

Key takeaways or lessons learned

Key takeaways from the plan are the importance of community engagement, networks, and the importance of having an organized plan with detailed solutions. The GCC has been able to create numerous solutions through speaking with members of the community to figure out what issues are from their scope. The GCC has also made recommendations to numerous departments in order to engage them in the process of renewing the Gowanus area. Lastly, the organization of the plan has made it easy for readers to understand the area as well as help in the implementation of solutions for the area.

II. City of Asbury Park Master Plan and Master Plan Reexamination Report

BACKGROUND

Type of Organization and Mission

In 2017, the City of Asbury Park Planning Board adopted the City's Master Plan and Master Plan Reexamination Report. The City's master plan implements policy for land use within the municipality, considering development, redevelopment, conservation, and preservation. In compliance with the New Jersey Municipal Land Use Law, the Planning Board must conduct a reexamination of its master plan and development regulations at least every 10 years. The primary purpose of these collective master plan elements is to ensure that the zoning ordinance is consistent with the current land use plan and determine what changes to the master plan may be necessary to improve the overall City of Asbury Park. The 2017 Master Plan states that the vision of the City for 2027 is "of a safe and vibrant community with a balance of land uses, diverse housing options, a thriving arts community, a diversified and expanding year-round economy, modern and well-maintained infrastructure, expanded community facilities and an outstanding quality of life." This vision and the planning goals outlined in this report thus replace that of the preceding 2006 Master Plan.

Since the Master Plan and Reexamination Report regard the overall municipality, the City identifies key challenges that it faces, especially over the time since the last master plan. Notably, many state, regional, county, and local planning-related events have occurred since 2006. Some of these events and issues include affordable housing legislation, Coastal Zone Management rules, the Flood Hazard Area Control Act, requirement of the Green Buildings and Environmental Sustainability Element, open space preservation, renewable energy legislation, New Jersey's State Development and Redevelopment Plan, and Superstorm Sandy. The City considers the impacts of these changes since 2006 on its 2017 Master Plan and future planning efforts.

The 2017 Master Plan does not extensively draw comparisons to its relationship with other plans from surrounding jurisdictions, however, the City examines demographic and labor trend data for three study areas: The City of Asbury Park, Monmouth County, and the Monmouth-Ocean Primary Metropolitan Statistical Area (PMSA). This analysis includes data about population, age, income, housing, education, (un)employment, and earnings.

Community Character

Located in Monmouth County, the City of Asbury Park is a beachfront city home to about 16,000 people. The 1.5 square-mile City borders the Village of Loch Arbour and Interlaken Borough to the north, Ocean Township to the west, and Neptune Township to the south and southwest. Asbury Park is well-known as a family-friendly coastal city and center for performing arts. It also serves as a major commercial destination for many surrounding municipalities. Its most prominent commercial zones include the Waterfront, Central Business District, Main Street corridor, and Springwood Avenue corridor.

The Master Plan's demographic and labor trend analysis finds that the projected growth in non-family households will outpace family households, while there is an aging adult population. Asbury Park also has lower educational attainment levels and a significantly lower median household income when compared to both Monmouth County and the

Monmouth-Ocean PMSA. The City is primarily a renter community, with an ownership rate of only 15%, compared to 66% in Monmouth County and 64% in the PMSA. Asbury Park's retail is dominated by eating and drinking places, which make up 40% of all retail businesses in the city. This characteristic attracts and serves many residents, including those that live outside of the city. In addition to the fundamental use of commercial business, the City also has nine redevelopment areas. All of these areas have adopted Redevelopment Plans.

PLAN ELEMENTS

Planning Process

In relation to its planning efforts and vision for the city, the City recognizes the value of public input engagement from people who live and work in Asbury Park. As part of their extensive planning process in preparing the Master Plan and Reexamination Report, the City conducted stakeholder meetings as well as public community input meetings throughout various phases within the process. In November and December of 2016, the City held five stakeholder meetings with City officials, community and business groups, economic development initiators, and developers. At each of these meetings, the attendees discussed the challenges and opportunities that Asbury Park faces in terms of development and redevelopment. They also identified land use policies that may hinder the progress of these efforts.

In February and March of 2017, the City held two public community meetings to illicit input. It also distributed an online survey to reach more residents. In a successful turnout, a total of 567 participated in the survey, as well as 94 who completed it at the two community meetings. The stakeholder and community input formed the basis of the master plan's recommendations. In 2017, the City presented a preliminary draft of recommendations to the community at a public meeting. It received comments and feedback which were further incorporated in the Master Plan and Reexamination Report. The draft of the plan and report was the subject of two public meetings, during which the public community and City of Asbury Park Planning Board were able to ask questions and provide comments.

Sustainability

A key element of Asbury Park's Master Plan and Reexamination Report is sustainability. As of 2008, the state Municipal Land Use Law was amended and now requires the Green Buildings and Environmental Sustainability Element as part of the master plan. Since this was not included in the 2006 Master Plan, the 2017 Master Plan acknowledges the impact of climate change as well as the direct relationship between sustainability and resiliency, land use, and transportation policies outlined in the plan. One of the fundamental planning goals for the City is to "promote sustainability that reinforces and advances the City's character and reduces the environmental footprint of existing and future development and redevelopment."

The Sustainability Plan Element lists the objectives from the 2006 Master Plan's Conservation and Recycling Elements and addresses their relevance in the current age. A general but critical objective is to improve public access to the waterfront, including parking needs through the City's redevelopment efforts along with the promotion of public waterfront activities. The Sustainability Plan also provides several recommendations that target pressing environmental concerns, such as water quality,

green infrastructure, stormwater management, climate change monitoring, coastal edges, flood resiliency, and tree canopy coverage.

Implementation

In terms of its implementation, the Plan highlights a number of ongoing processes. As a key component of the plan, the Sustainability Element proposes several innovative recommendations in addition to improving public access to the waterfront. An essential one is to promote the use of green infrastructure over gray infrastructure. Green infrastructure may include bioswales, tree plantings, and rain gardens. These forms of infrastructure may often be more beneficial and attractive than gray infrastructure, such as stormwater pipes and treatment systems.

In addition to the innovations within the Sustainability Element, there are notable aspects of the Historic Preservation Element, Open Space, Lakes, Parks and Recreation Element, and Community Facilities Element. To recognize and preserve Asbury Park's rich historic character, the City makes recommendations to create a Historic Preservation Commission, require the preservation and adaptive reuse of historic buildings and landmarks, and consider the creation of an Asbury Park History Museum. To improve its open space, lakes, parks, and recreation, the City recommends developing new parks and recreation activities, particularly for underserved communities, while preserving existing ones. Building upon these recreation facilities and opportunities, the City also aims to provide community services that address all demographic sectors of the population. This involves both places, such as schools, daycare facilities, recreation facilities, senior centers, as well as activities, such as recreation and social services provided by many non-profit groups in the city.

APPLICABILITY TO D&R PLAN

Comparability

While the City of Asbury Park is considerably smaller in terms of area and population than the serviced area of the Delaware and Raritan Canal, the 2017 Master Plan and Master Plan Reexamination Report presents reasonable opportunities for the Delaware and Raritan Canal Commission to update their master plan. This planning process is especially crucial as both Asbury Park and the Canal serve thriving communities that surround a valuable water resource and attraction.

Strengths and Weaknesses of the Plan

Asbury Park's Plan is highly comprehensive in regard to critical issues, such as development, redevelopment, sustainability, and resiliency. While it does well in gauging the population within the municipality and recognizing that it attracts people outside of its boundaries, the City could accomplish more by further understanding how its planning efforts and processes impact the surrounding communities. By coordinating with other municipal government agencies and eliciting input from residents beyond its 1.5 square-miles, it may be able to foster valuable partnerships and achieve its goals more efficiently.

Key Takeaways

- Take inventory of the many planning-related events that have occurred over the last decade, which directly impact the preparation of a master plan as well as the communities of interest.

- Prioritize the use of green infrastructure over gray infrastructure.
- Ensure that recreation and other community facilities address all demographic groups of the community.

The City of Asbury Park Master Plan and Master Plan Reexamination Report show the complexities and challenges of planning for a waterfront community that attracts a variety of people outside of its municipal boundaries. While this plan comprehensively lays out vital recommendations for development and redevelopment, it also shows how these processes may be safely and sustainably implemented. The Canal Commission may find many useful aspects of this plan to address pressing environmental concerns as well as the needs of community members.

III. Seaside State Park Master Plan

BACKGROUND

Type of organization and mission

Following Governor Dannel P. Malloy's designation of the former Seaside Sanatorium in Waterford, Connecticut as a state park in 2014, the state's Department of Environmental Protection drafted the Seaside State Park Master Plan in June 2016. In particular, Connecticut's Department of Energy and Environmental Protection - State Parks Division works towards the goal of providing natural resource-based public recreational and educational opportunities through their state parks, forest recreation areas, environmental centers, and nature centers. The Master Plan is a part of the department's continuing work towards achieving this goal and providing an improved understanding of, access to, and enjoyment of Connecticut's historic, cultural, and natural resources.

What are they planning?

Through a process of community engagement and participation, the final draft of the Master Plan reflects the best and most feasible elements of three alternative proposals that helped inform the planning process. Ideas of designing varied landscapes, incorporating tidal pools, a boardwalk, a heliotropic nature trail, kayak launches, a fishing pier, and unpaved paths and trails gained traction among the public. Concepts of a dynamic shoreline experience and restoring the ecological ingenuity of the park that were reflected in the alternative preliminary plans have been integrated into the final draft of the Master Plan as well.

The Master Plan lays out the different activities and infrastructure to be developed in the 32-acre site. Recreational activities on the site include walking, diving, wildlife watching, fishing, and boating. Multiple trails through the park and open lawns will provide visitors with access to the park's various ecological zones. The park will also include a visitor center with interpretive displays of the rich history and natural features of the site.

To preserve the natural ecological balance of the park, the ecological restoration of wetlands, streams, and land will work to support wildlife habitat conservation and protect rare and endangered species. The Plan proposes the retention of the original stone jetties and the repair of the seawall along with the placement of offshore reef balls to provide further stabilization to the shoreline and provide fish habitat.

Moreover, a public-private partnership will support the adaptive reuse and restoration of historic buildings on the site, such as the State Park Lodge.

Focus area

In keeping with the history, cultural heritage, and delicate ecological balance of the site, the Department of Energy and Environmental Protection (DEEP) expressed the desire to prioritize the preservation of the site's historic features and buildings. This helped inform the five goals that helped guide the process of and proposal set forth by the Master Plan.

The five goals set by the Plan are as follows:

Goal 1: Promote and improve recreation and public access to Long Island Sound

Goal 2: Restore, preserve, and reuse historic assets where feasible

Goal 3: Preserve and improve the site's ecology and habitat

Goal 4: Create an implementation and operating plan that is financially feasible

Goal 5: Engage the public in helping shape the future of Seaside State Park

Major challenges

Parts of the park's area fall within the hurricane surge inundation map developed by the National Hurricane Center. This map highlights areas of potential risk from a combination of hurricane, landfall, location, speed, and direction of each storm category. The park could potentially become inundated during Category 3 and 4 hurricanes and adjoins areas that could become inundated during a hurricane of any scale. As a result, it is of utmost importance to ensure that the park's shoreline is part of a protection system to ensure minimal damage to the park in the event of a particularly severe hurricane season.

Issues of authority (Regional, state park, etc.)

Relationship to surrounding jurisdictions/other plans

The Master Plan planning process took into consideration existing federal and state-owned outdoor recreation infrastructure in the area and consulted Connecticut's Statewide Comprehensive Outdoor Recreation Plan 2011-2016 to identify existing gaps in the region's infrastructure. The Plan intends to meet unmet state-wide demand for recreational activities without oversupplying existing infrastructure and resources. Through their analysis, the Master Plan identified a shortage of multi-use trails, wildlife observation, and waterfront activities in the state-wide plan. The Master Plan incorporates these activities to bridge the gap between the demand and supply of these amenities within the state park system.

Further, all redevelopment and reuse of the site need to be in compliance with required approval from federal, state, and local authorities. Rehabilitation and reuse of historic structures will also need to be in accordance with federal and state historic preservation regulations and compliant with local zoning provisions for the Seaside Preservation District.

COMMUNITY CHARACTER

Geography and land use

The Seaside coastline is an undulating landscape made up of rocky headlands, coastal beaches, bays, and tidal marshes. The Seaside site has a wide variety of ecological conditions - from rocky reefs and shoals to open sandplain grasslands and coastal woodlands. Critical and rare habitat areas, such as tidal marshes, coastal dunes, and eelgrass beds, lie adjacent to the site. Coastal Connecticut and the landscape setting of Seaside is composed of a mosaic of coastal woodlands, urban development, freshwater lakes and wetlands, and estuarine wetlands.

PLAN ELEMENTS

Planning process

The planning process to create the Master Plan for the Seaside State Park involved the participation of nearly 2,000 people in an 18-month long public process that included numerous surveys, public meetings, and workshops. In addition, conditional assessments of historic buildings, evaluation of the existing seawall and environmental features on the site, and feasibility considerations for the adaptive reuse of existing buildings on the site all formed part of the planning process behind the Master Plan.

Before finalizing the current and final version of the Master Plan, three alternative plans were compared. These plans ranged from passive to active use, low to high investment, and non-revenue generating to revenue-generating. The collective outcome of this

process prioritizes public access to the land and water on the site, ecological restoration of the site's environmental features, and proposed adaptive reuse of the historic buildings on the site.

Public engagement process

A robust public outreach and engagement strategy was at the heart of the planning process behind the Seaside State Park Master Plan. This took place in the form of a public outreach campaign that began in December 2014. This was supported by a social media campaign, a website, and two online surveys that were also used to gather public feedback and ideas. In all, 400 people participated in the public meetings and the surveys received 1,360 responses. In the surveys and public meetings, community members were asked to evaluate the three alternatives on how well each met the overarching goals of the planning process. Respondents and participants also shared their opinions on proposed park features.

Financial

Financial sustainability was a critical consideration in the planning process. The three alternatives were assessed on the basis of their financial feasibility in terms of revenue generations, operating costs, and state investment in the project. Additionally, a detailed market analysis was conducted to determine the economic viability of developing historic buildings via private or public investment. The analysis concluded that of the options that align with DEEP's mission for state parks, small-scale lodging and conferencing presented the most potential. The region generates a high demand for these uses. As a result, the revenue generated by these uses could successfully offset the initial investment costs.

Environmental (climate change)

The Master Plan emphasizes reliance on sound environmental outcomes based on a coordinated and holistic approach to reducing the environmental impact and resource demands. To achieve environmental sustainability, waste reduction, low energy consumption and water use, and Green Lodging Certification will be components of the park's operation.

Implementation

Funding sources

In the implementation stage, the project was phased keeping in mind the financing structure of the development partners. A preliminary cost estimate and financial analysis highlighted the need for a development subsidy to ensure a financially feasible project. Examples of similar subsidies would include historic tax credits, but could also be in the form of private fundraising, preservation organizations, and state or federal grant programs. This analysis was based on broad assumptions about costs for building fit-outs, project deal structures, and project revenues on the basis of precedent projects and analysis of local comparable supply.

Innovations

The Master Plan incorporates several innovative technologies, especially in terms of ensuring environmental sustainability. For instance, Seaside's shoreline is stabilized with hardened, man-made structures including a stone seawall, stone groins, a concrete deck, and revetments. However, hardened structures like these contribute to coastal erosion, disrupt the shoreline's ecological functioning, and impact the habitats of estuarine species.

To mitigate this, an alternative approach called a Living Shoreline provides the same protection as hardened structures but without the ecological drawbacks. Under this approach, the shoreline is restored to its original state by using organic materials, like wetland plants, submerged aquatic vegetation, and oyster reefs.

APPLICABILITY TO D&R PLAN

Comparability

Similarities and differences

Although varying widely in scale, the Seaside State Park Master Plan is similar to the D&R Canal in terms of the threats it faces and issues it needs to address. Problems of environmental sustainability, historic preservation, and multiple, overlapping jurisdictions exist in both plans. The D&R Canal Commission can find use in the way that the Seaside State Park resolved these issues, through the use of innovative technologies, adaptive reuse, and market analysis, as it proceeds to update its Master Plan.

Strengths or weaknesses of the plan

The plan's biggest strength lies in its ability to effectively engage the public in its planning process. A robust outreach program led to intensive public engagement in the process that helped identify the problems faced by and the needs of different communities. Further, the ability to compare three proposals for the area, understand their respective pros and cons, and mix-and-match features to create one consolidated outcome that draws from the needs of the area adds to the strengths of the Master Plan.

The planning process also involved conducting needs and market analyses to determine the demand for different features and amenities in the area. This helped ensure that the Master Plan was not contributing to any redundancy in the area. Conducting such an analysis also helped form an understanding of the potential returns on the investment of partners in the creation and functioning of various park features.

Key takeaways or lessons learned

A unique feature that set the Seaside State Park apart was the ability to compare alternate proposals, measure their pros and cons, and pick features from each plan that would work best on the site. Community members played an important role in this process and added their invaluable inputs to the Master Plan. In addition, officials conducted several market analyses in the area to avoid repetition and redundancy. The combination of these three factors helped in the creation of a plan that caters to the needs of its users while adding to the larger network of state park amenities and infrastructure in the state of Connecticut.

IV. City of Burlington Parks, Recreation & Waterfront Master Plan

BACKGROUND

The City of Burlington, Vermont's Parks, Recreation and Waterfront Master Plan incorporates many of the issues and considerations relevant to the future planning of the Delaware and Raritan Canal. Balancing the often-conflicting needs of water quality, open space protection, recreation, accessibility and development, Burlington's 2015 plan marked the first parks and waterfront plan for the city. The document was drafted through the leadership of the city's Parks, Recreation and Waterfront Department and the efforts of two consultant firms. Similar to the importance of the D&R Canal, the Burlington Waterfront is held in high regard by the city's residents and the Burlington Park's Department acknowledged this legacy as a reason for the necessity of a clear vision for the future. Consisting of 43 parks, the Burlington park system further resembles the issues facing the D&R Canal due to its linear orientation. As Burlington's plan states, "...this unique, geographically linear orientation limits the distribution of services in terms of facility locations and presents access challenges". While the Burlington Parks Master Plan pertains to a specific municipality, the significant portion of open space along Burlington's waterfront represent a comparable example to the planning efforts of the D&R Canal.

PLAN ELEMENTS

The Burlington Parks, Recreation and Waterfront Master Plan uniquely organizes itself around seven "system themes", with each theme representing a significant aspect of planning in Burlington's parks and a priority for the plan. The themes were identified as 1) People, 2) Wellness, 3) Connection, 4) Stewardship, 5) Service, 6) Community and 7) Impact. These themes are a way to publicly communicate the overarching goals of the department. Per these identified goals, the plan organizes each of its sections based upon these themes. For **People**, the plan noted the growing diversity of the area and espoused the values of improving accessibility for all people and to partner with the community, in the form of volunteerism, to work within the city's parks. Under the section of **Wellness**, the plan addressed ways of increasing recreational opportunities and programming to support the community's well-being. Prior to the plan, Burlington Parks had issued a user satisfaction survey, which found that residential participation in Burlington's recreational programs lagged behind the national average (35% of respondents). Most notably, the master plan identified the objective of creating a "new brand identity" for the parks in order to increase the public's awareness of their parks system. Before the drafting of the plan, the parks department had already adopted a new name, logo and brand standards to help identification in wayfinding and public materials. The third service theme of **Connection** related to the issue of public access, with a significant prioritization of integrating the concept of "the ten-minute walk" for residents to access the parks. These plans included bike path rehabilitation efforts as well as wayfinding improvements. The fourth theme of **Stewardship** focused on planning for new innovations that protect the environment of the city's parks and open space. These innovations include green infrastructure systems, lot coverage regulation adjustment, and protecting trees – both in parks and the urban canopy. The fifth theme of **Service** began with the department's calculation of level of service for each section of the City of Burlington. The type of

services that the plan considered ranged from amenities like playgrounds to the availability of bathrooms in the city's parks. The Burlington Master Plan considered both the level of service on the city scale as well as service levels on a park by park basis. The theme of **Community**, similar to wellness, analyzed the positive effects that the park can have on the city's residents. Specifically, the plan set objectives to create more community gardens and community events in order to invite greater community participation and enjoyment out of the city's park system. The final theme, **Impact**, concludes the majority of the plan by analyzing the economic impacts of the city's park system. These impacts include a reference to the recent findings of the economic value inherently found in open space and parks, the employment created from the parks, as well as the financial support required for the parks, most notably through internal revenues from the parks' programming. As the report notes, "BPRW funds 70% of the department's annual budget from annual internal revenues – an outstanding feat when compared to the national average of 28%. While these sources of funding and economic impacts are unique the Burlington, the importance that the city places on the consideration of economic impacts is an example worth learning from.

Through all of these seven themes, much of the informing data originated from the master plan's intensive public outreach strategy. The beginning of the master plan details this process. From focus groups to meeting with key leaders, Burlington dedicated itself to collecting as thorough of public opinion data as possible. This public outreach serves as just one example with the potential to be applicable to other potential master plans, including that of the Delaware and Raritan Canal Commission.

RELATION TO D&R PLAN

Based upon the content of the Burlington Parks, Recreation and Waterfront Master Plan, a number of strategies and plan components can serve as a model for the potential drafting of a new D&R Canal master plan. In terms of how the master planning effort incorporates and accommodates the public, the most applicable examples comes out of Burlington's community outreach efforts – both before and after the creation of its parks master plan. Prior to the master plan's creation, the city conducted a variety of public outreach efforts. One such effort was the scheduling of community bike rides around the city's parks in order to collect the on-site thoughts of residents. For a linear park like the D&R Canal, community bike ride efforts may be a feasible strategy for covering the entirety of the commission's jurisdiction and ensuring that resident concerns pertaining to all of the park are considered. Following the creation of their plan, the City of Burlington continued considering itself with accommodating its residents by creating a shortened, four page primer on the plan. This document helped the public understand the basic contents and goals of its significantly lengthy original plan by listing the seven system themes, its implementation guidelines and initiatives, its values and overarching goals. Above all, this primer informs the public that Burlington's plan strives to "foster a supportive & constructive environment that embraces equity through inclusive decision making and mindful daily actions."

In terms of the content published with the master plan, Burlington's example in terms of its strategic initiative and recommendations list is recommended to be replicated. The last section of the Burlington parks plan refers to the short and long term initiatives that the city hopes to accomplish based upon the discussion contained in the plan. This helps to not

only organize the goals of the parks department, but easily track when an initiative has been fulfilled. The plan sets a goal of conducting a thorough review of the initiatives every three years to ensure the document still maintains relevance to the issues faced by the parks system.

In terms of specific initiatives, one of the most notable of Burlington Parks' initiatives is its "green machine" green infrastructure system. In order to reduce run-off, the city developed an interconnected system of sites around its parks that "collect, temporarily store and treat stormwater". As the plan states, "Green Machine strategies include green streets, green bike paths, rain gardens, bioswales, infiltration parks, green walls, green roofs, green plazas, pervious parking lots, habitat restoration, rainwater harvesting..." This type of innovative system is advisable for maintaining the integrity of environments like Burlington's waterfront and the D&R Canal. Another replicable initiative present in Burlington Park's master plan is its focus on wayfinding improvements. As part of its aforementioned rebranding efforts, the Burlington Parks Department created new designs for an entire sign system installed throughout its parks. This wayfinding not only increased the user experience, but helped to create a uniform system of identification for the parks.

Lastly, and perhaps most importantly, BPRW dedicated a section to discussing its commitment to partnering with citywide entities. As the plan states "BPRW strives to support many local and regional partners in countless recreational events and programs often acting as a behind-the-scenes catalyst, frequently and invisibly providing space, resources and support". In this effort, the BPRW Department commits to supporting programming and events of the parks in a capacity beyond its initial mission. These type of partnerships are a necessity in facing the financial and resource constraints that local and regional governments face nationwide.

Key Takeaways

Based upon this discussion, the example of the Burlington Parks, Recreation and Waterfront Master Plan can potentially be duplicated by the D&R Canal Commission in the following identifiable ways:

- Creating a primer/summary of a master plan can improve the public's comprehension of the plan's goals and initiatives greatly
- Events like community bike rides are effective public outreach tools for covering a wide geographic region like the D&R Canal
- Regional entities can act like "behind-the-scenes catalysts" by partnering with other governmental agencies or non-profit groups to hold programming that brings the public into the park
- Providing a list of strategic initiative at the end of a plan helps to maintain accountability and prioritize a plan's goals. These initiatives should be reviewed and updated every three to five years
- To address climate change, green infrastructure systems like the "green machine" can be effective means of protecting the environment, reducing runoff and protecting valuable waterway resources like the D&R Canal
- Wayfinding improvements and re-branding for the 21st century can help attract visitors and improve the user experience

V. Master Plan for the Central Delaware: Transforming Philadelphia's Waterfront

BACKGROUND

Type of Organization and Mission

The Master Plan for the Central Delaware, as prepared by the Delaware River Waterfront Corporation (DRWC), strives to transform Philadelphia's Central Delaware River waterfront. DRWC is a nonprofit corporation that exclusively organizes for the benefit of the city of Philadelphia. It acts as a steward to the Delaware River waterfront and serves both the city's residents and visitors. The fundamental goal of the 2012 Master Plan for the Central Delaware is "to transform a six-mile length of Philadelphia's Central Delaware River waterfront into an authentic extension of the thriving city and vibrant neighborhoods immediately to its west."

DRWC stresses that a major challenge is bringing back the livelihood of an abandoned industrial waterfront that used to be the heart of the city's economy. Thus, it strives to implement a long-term plan for the transformation of the waterfront. This plan also acts as a framework for open space, cultural and environmental resources, transportation, and economic development. These elements address additional, interrelated challenges of modernization, accessibility issues, and overall equity.

The plan was funded by a \$1 million grant from the William Penn Foundation to DRWC in the spring of 2009. DRWC selected a team of members from a number of firms in the fields of urban planning, architecture, landscape architecture, and real estate economics. Additional sub-consultants are included with expertise in community outreach, waterfront policy, historical and archaeological resources, transportation, civil engineering, and park programming. This Master Plan for the Central Delaware is designed to support *Philadelphia2035*, the city's first new comprehensive plan in 60 years.

Community Character

In comparison to *Philadelphia2035*, the city's overall comprehensive plan, the Master Plan for the Central Delaware covers a relatively small, however, critical part of the city. DRWC expresses that the city of Philadelphia is "informal, innovative, proud, relaxed, walkable, resilient, and vibrant," and that these qualities should extend to the Central Delaware River waterfront. The Plan's project area covers the city of Philadelphia's waterfront, from Interstate 95 to the Central Delaware River, and from Allegheny Avenue in the north to Oregon Avenue in the south. In total, the area makes up nearly six linear miles of waterfront and over 1,100 acres of property. 150 of these acres are underwater. Only 10% of the land is publicly owned or under public control, so DRWC emphasizes that the successful implementation of the Plan requires coordinated public and private planning, design, and investment.

PLAN ELEMENTS

Planning Process

Preparation of the Master Plan for the Central Delaware involved a number of public members and stakeholders. A highly successful citizen engagement process was funded by the William Penn Foundation and led by PennPraxis. This process created a civic vision

that has gained momentum and informed various city planning processes. It established a set of core principles to guide the development of the Central Delaware waterfront.

Sustainability

One of the guiding principles for the waterfront is to incorporate best practices in sustainability. This includes: (1) creating a waterfront place that will not only economically sustain itself, but also contribute to the overall economic development of the city, (2) contributing to the sustainability goals set forth in the *Greenworks Philadelphia* plan, and (3) using best practices in sustainability for architecture, landscape architecture, and city planning to insure that the built environment achieves multiple goals.

As part of its Sustainability strategy, the Plan outlines a strategy for design, energy, and water policies, which become more stringent over time. As time progresses, technology advances and sustainable measures become less costly. Therefore, more robust policies can be enacted to achieve higher, more sustainable goals. Some of the Sustainability strategy's other recommendations include encouraging local and regional use of renewable energy, improving ways of access from the Center City-waterfront area into neighborhoods, and incorporating historic buildings, landmarks, and resources within open space or development plans.

Implementation

As mentioned earlier, funding for the Plan came from a million-dollar grant from the William Penn Foundation to DRWC. Funding for implementation of the various plan elements is fairly transparent in the Plan and detailed throughout. In addition to the core principle for sustainability, another guiding principle is to "create a plan that can be implemented in discrete increments over time." In order to incentivize private investment in the waterfront, public funding must be carefully targeted and phased over the 25-year span of the plan.

Parallel to phasing out funding, DRWC plans to conduct a high-level financial analysis of development revenues and infrastructure costs so that it may identify and solve potential funding gaps. In terms of infrastructure funding, DRWC acknowledges that the transformation of the waterfront requires substantial investment. A total of \$770 million is needed to make the necessary infrastructure improvements. This includes \$356 million, devoted to public funding that will spur private development. The remainder of \$414 million is dedicated to completing the public realm system of streets, parks, and trails. These amounts are further analyzed in the Plan in great financial detail.

The Master Plan also outlines a short-term plan for DRWC, the City of Philadelphia, and partner organizations. The 18 months of comprehensive work done on the master plan, along with stakeholder input and lessons learned from early-action projects, have collectively led to a list of projects to be completed within the next five years. These include both policies to be implemented within 12 to 18 months after adoption of the master plan, as well as physical improvements to the public realm, transportation, and development sites.

APPLICABILITY TO D&R PLAN

Comparability

As this master plan addresses the needs of communities near the Delaware River, it is highly relevant to the Delaware and Raritan Canal's future master plan update. The

Master Plan for the Central Delaware goes into great detail about the implementation of its plan, including the phasing and funding of projects. Like the Delaware and Raritan Canal Commission, DRWC must collaborate with a variety of agencies, stakeholders, and communities to ensure the success of its planning efforts. As the Canal Commission works with different actors to make sure that the canal system operates safely and smoothly, it may be inspired by some of the governance and funding mechanisms highlighted in this master plan.

Strengths and Weaknesses of the Plan

This master plan is highly comprehensive in envisioning the transformation of Philadelphia's river waterfront over the next 25 years, as it lays out many important plan elements and projects that are ongoing and may be practically implemented over time. It details how the vision of a thriving waterfront community can be realized. Most importantly, it exemplifies how a strong, civic vision can be achieved through the coordination of interrelated interest groups at all different levels of expertise and with all sorts of individual experiences. As the Canal Commission prepares its new master plan, it may consider utilizing some of the techniques outlined in the Master Plan for the Central Delaware, while understanding that adjustments and monitoring of results are also key to planning and policy implementation.

Key Takeaways

- Target public investment in public infrastructure, as this creates value in degraded, vacant waterfront land and ultimately catalyzes private development.
- Take an incremental planning approach that allows projects to be completed on a relatively scheduled and planned timeline, while also allowing investments to occur as unplanned funding and development opportunities arise.

The Master Plan for the Central Delaware portrays the many difficulties but opportunities of revitalizing an abandoned but once prosperous waterfront area. It considers critical issues of development, accessibility, and equity by establishing a framework that serves all residents and potential visitors of the waterfront. The Canal Commission may benefit from implementing many of this master plan's highly intentional and proactive planning efforts, such as following an incremental planning approach.

VI. New Jersey Highlands Master Plan

BACKGROUND

The New Jersey Highlands represents one of the most sensitive ecosystems in the State of New Jersey, much like the Delaware and Raritan Canal. The NJ Highlands Master Plan was created following the 2004 Highlands Water Protection and Planning Act and serves as a guiding document for the NJ Highlands Water Protection and Planning Council. The Highlands Council created the master plan in 2008, at the direction of the 2004 legislation, in order to fulfill its responsibilities to “protect, restore and enhance water quality and water quantity in the Region and includes important goals relating to the protection of agricultural viability, ecosystems, species and communities, as well as scenic and historic resources.” The legislation created the Highlands Protection Fund, managed by the NJ Department of Treasury, in order to provide financial support for the implementation of the Master Plan. As a state entity like the Delaware and Raritan Canal Commission, the NJ Highlands Council has unique jurisdictional powers over lands contained within its Preservation Area and Planning Area. While the NJ Highlands Region is significantly larger of a region than the Delaware and Raritan Canal, with 859,358 acres, the two regions face many of the same planning challenges. “Of the 859,358 acres of land in the Highlands Region, 25 percent are developed and 32 percent are protected through open space preservation. The remaining lands are forested (63 percent), submerged and barren (15 percent), and agricultural (13 percent).”

A major stated purpose of this master plan is to “determine the amount and type of human development and activity which the ecosystem of the Highlands Region can sustain”. Similar to the Delaware and Raritan Canal, the main issue at the heart of the planning of the NJ Highlands is finding a balance between competing uses. With more than 821,000 people living within the Highlands Region, residential development pressures are a significant land use challenge. Roughly 57 percent of developed land in the Highlands is zoned for low intensity, single family residential areas. These residents are distributed across 88 municipalities and parts of seven counties, all of which have their own community character and vision. Despite these varying municipalities, the Highlands’ Master Plan supersedes local regulations, with projects having to receive approval for development from the New Jersey Department of Environmental Protection- due to the fact that the “Highlands Council shares jurisdiction with the New Jersey Department of Environmental Protection, which is the permitting agency in the Highlands.” Similar to the D&R Canal Commission, the Highlands Council namely works to protect the sensitive drinking water contained within the region. The New Jersey Highlands overlies the drinking water source for more than half of all New Jersey residents and yields an estimated 379 million gallons of water daily. These water resources and more were a central focus through the entirety of the master plans’ elements and are familiar treasures similar to those contained within the Delaware and Raritan Canal.

PLAN ELEMENTS

Following an introduction and background into the Highlands and the community character, as reviewed above, the Highlands Master Plan inventories its resources and infrastructure. The basic format of this section of the Highlands Master Plan is organized around the region’s identified resource types: natural, water, agricultural, historic and

transportation resources. The inventory of natural resources consists of forests, open waters, steep slopes, critical habitats, land preservation, carbonate rock topography, and lakes, ponds and reservoirs. The most notable component of this section was the analysis of forest resources on the subwatershed level, based upon the recognition of the role that forests play in protecting water quality and quantity. The Highlands Master Plan further used subwatersheds in order to study the open water resources in the region by classifying each subwatershed on the basis of their value (for quality of habitats, etc). For looking at slopes, the Highlands Council committed to utilizing more LIDAR technology in order to create mapping of the slopes within the region. Critical habitats were studied using the New Jersey Landscape Project data, which the council updated for ranking habitats within the Highlands based on status of species, with federally listed threatened or endangered species given the highest rank. Due to the presence of rocks like limestone and dolomite that can dissolve from ground water and create sinkholes over time, the Highlands Council chose to separately look at carbonate rock topography within its jurisdiction. As a way of addressing carbonate rocks, the Highlands Council committed to tracking (with LIDAR) and managing development activities within carbonate rock areas to protect public safety.

The Highlands Council also, perhaps most importantly, looked at the water resources under its jurisdiction. This included the protection of ground water recharge, water quality – both surface and ground water, wellhead protection, water supply utilities, and wastewater. The analysis and management of the water resources was unique to the Highlands Council, with focus placed on protection of ground water and reducing nitrate pollution. As farming land uses is also a significant presence in the Highlands, the master plan's inventory of agricultural uses also serves as an important guide for future planning of the region. This similarly holds true for the plan's inventory of the region's historic resources and transportation resources. Following this inventory, the plan continues by looking at considerations of landowner equity (i.e. the region's transfer of development rights program) and sustainable economic development. The consideration of sustainable economic development included analysis of the region's recreation and tourism, including emerging areas of tourism like agri-tourism and heritage tourism. The Highlands Council additionally committed to tracking eight economic indicators, including population, employment, households, income, property taxes, equalized property values, land transactions, and building permits in order to determine impacts on local municipalities. The second half of the Highlands Master Plan is dedicated to outlining the goals and objectives, based upon the inventory of resources, and the specific programs created to carry these goals out. All of these goals and objectives were organized around the same resources identified for the plan's inventory. The final chapter of the plan outlines the actual implementation process for the entirety of the Highlands Master Plan, including required conformance among local municipalities. These sections, in particular provided several applicable examples that can be integrated into any potential master plan for the Delaware and Raritan Canal.

APPLICABILITY TO THE D&R CANAL

While the Highlands Master Plan pursues many initiatives that are unique solely to the region of the New Jersey Highlands, there are several initiatives and considerations that can be applied to the Delaware and Raritan Canal.

Participation

The Highlands Master Plan has an extensive local participation program to recruit the involvement of the local municipalities in the planning process. As the D&R Canal always spans multiple municipalities, these efforts can serve as a model. Specifically, the Highlands plan's "local participation" component calls for the creation of community-led advisory boards and panels to assist in planning and programming activities. Overall, the Highlands Council has instituted three participation initiatives - the Partnership, the Technical Advisory Committees (TACs), and the Network, all of which can be used as applicable examples for the D&R Canal Commission. The partnership "is a consortium of government representatives of the 88 municipalities and seven counties of the Highlands Region. It was formed to provide a forum for disseminating information on the RMP and implementation process". It is a good way of not only seeking input from municipalities themselves, but disseminating information to the public. This partnership includes data-sharing agreements that help to provide data like parcel specific information for the fulfillment of the council's responsibilities.

The Highlands' TACs consist of technical experts and practitioners that help to serve as resources to the overburdened staff of the Highlands Council. There have been 18 such committees created based around specific resource topics, including "water resources; land use planning; ecosystem management; land preservation; green construction; sustainable agriculture and forestry; eco-tourism; recreation; housing; community investment; regional development; brownfields; redevelopment; transportation; cultural, historic, and scenic resources; utility capacity; and transfer of development rights". These committees act as "voluntary consultants" and can help fill any staffing issues or resources gaps for an agency. These consultations can take the forms of meetings or multi-day workshop (or charrettes) where the TACs provide aid to the agency staff.

The Highlands "Network" refers to the Highlands Council's efforts to ensure that their Master Plan is as up to date as possible. This network includes the holding of programs to inform and educate residents on the process of the master plan. Overall, "The Network" initiative strives to "open the door to stakeholders, including the general public, to share information about progress on the RMP, gain local insight and comments on significant issues, address individual questions of concern, host special stakeholder events, conduct public information sessions, and provide web access". While not a specific initiative of "The Network", the Highlands Council objective of creating "Highlands RMP Monitoring Review Report" every six years that provides updates to the progress in accomplishing the master plan's goals supports "The Network". All three of these participation strategies make a good faith effort in collecting and using community knowledge and input for the constant improvement of the Highlands' Master Plan.

Technology

The Highlands Council's Master Plan is also worthy of serving as a role model for future plan drafts, due to its integration of technology in accomplishing its work. Most notably, the Highlands Council references the potential of LIDAR to help in its inventorying and improvement of the region's resources. In its Master Plan, the Highlands Council aimed to use LIDAR in the creation of topographic maps for tracking carbonate rocks as well as determining slopes, in creating a refined Hydrologic Unit Map, and accurate elevation modeling. LIDAR similarly has potential in revealing new context and knowledge of a

history of a place. As one of the busiest navigation canals in the United States in its prime, the Delaware and Raritan Canal is a prime example of the efficient uses of LIDAR to reveal hidden or lost history of a place. Overall, the integration of technology into a master plan can help to provide feasible means of implementing and fulfilling any of the objectives and responsibilities of an environmentally and historically significant region and entity.

Tourism

The Highlands Master Plan places a significant focus on the promotion of tourism to the region, specifically heritage and eco-tourism. As the D&R Canal is not only a popular historic site, but recreational destination this incorporation of tourism into the Highlands' master plan can provide some guidance on potential new additions and considerations to any new updates to the commission's master plan. In terms of heritage tourism, the Highlands Master Plan states that "Heritage tourism is a fast growing segment of the tourism market that is oriented toward a cultural heritage experience. It involves visiting historic and cultural places and artifacts and engaging in activities associated with the people and places of the past. The overall purpose is to gain an appreciation for the stories and the people that had a part in forming history. Heritage tourism uses resources that already exist and in this way is a sustainable activity". This inclusion of tourism into its Master Plan followed a technical report produced by the Highlands Council studying the historic and tourism resources in the region. This prioritization of tourism serves as a form of sustainable economic development, an innovative focus of the Highlands Master Plan and, as the Highlands Council recognizes, can also be supported by partnerships. One of the Highlands Council's objectives is to gain "support for existing eco-, agri- and heritage tourism program by partnering with appropriate agencies, municipalities, counties, and non-profit entities. The Cooperative Marketing Grant Program, a collaboration between the New Jersey Department of State, Division of Travel & Tourism and the New Jersey travel industry, is an example of an existing tourism grant program..."

Key Takeaways

- Understaffing issues can be mitigated through local participation and technical advisory committees using "volunteer expert consultants"
- Tracking of the goals of a master plan should be done every few years in the form of a Monitoring Review Report
- Currently state of the art technology (i.e. LIDAR) should be integrated in some form into the implementation of master plan objectives to ensure the most accurate information is collected.
- Prioritize sustainable economic development by promoting new, emerging forms of tourism like heritage tourism and eco-tourism

VII. Bronx River Greenway Plan

BACKGROUND

The Bronx River has a complicated history of uses and has been greatly impacted by the construction of parkways and the highway system. This construction left much of the river abandoned and inaccessible for a long time, as it polluted and fragmented its waters and the surrounding Bronx community. Reclamation efforts continually stemmed from residents and grassroots organizations, beginning in 1974 with the creation of the Bronx River Restoration Project and again in 1997 with the formation of the Bronx River Working Group. Multiple federal, state, and local government agencies and businesses have aided these efforts over the years and together, these organizations have conducted clean-ups, secured grants for community projects, and completed many restoration projects. In 1999, the Bronx River Action Plan was drafted, officially creating the Bronx River Greenway and in 2001, efforts to formalize the existing working group lead to the formation of the Bronx River Alliance.

The Bronx River Alliance is a private-public partnership whose mission is “to serve as a coordinated voice for the river and work in harmonious partnership to protect, improve and restore the Bronx River corridor and greenway so that they can be healthy ecological, recreational, educational and economic resources for the communities through which the river flows” (1.2-1.3). The Executive Director of the Alliance is also the Parks’ Bronx River Administrator and each member of the Alliance belongs to one or more of the organization’s teams (Ecology, Education, and Greenway), which are responsible for different aspects of the Alliance's mission. The Ecology Team creates principles for guiding restoration work and provides a forum for discussion, evaluation and prioritization of environmental studies and restoration work. The Education Team acts as community liaisons working with local schools and organizations to utilize the river as a learning tool. They train volunteers and conduct workshops, fairs, and other activities. The Greenway Team is responsible for identifying and prioritizing greenway projects and serves as a standing community, technical advisory committee, and forum for discussing the design and implementation of the greenway. There is also an Outreach Program which sponsors events and activities and works to develop a broad-based constituency for the river. The park itself is maintained and owned by the NYC Parks department, while the Alliance is run as a non-profit. They receive in-kind support from NYC Parks and since 1999, the Alliance and its partners have secured \$120 million in public funding commitments. These funds are chiefly allocated to NYC Parks and NY State Department of Transportation (NYSDOT) and then budgeted to individual projects.

In 2006, the Bronx River Alliance and their partner organizations created The Bronx River Greenway Plan to establish a collective vision for the continuing efforts to reclaim and improve the Bronx River Greenway. The plan includes guidelines for sustainable and consistent design of the linear park’s 23-mile bike/ped path, information on maintenance and operations, as well as suggestions for programming to help enhance the park and encourage revitalization of the communities along its borders. Existing highway infrastructure and other elements of the built environment have cut off access to the waterfront for many communities and created dangerous intersections and pathways. vegetated landscapes to provide adequate safety for users. Yet, efforts to create safer

access must also allow for the ecological restoration of the river and its surrounding environment. These are some of the major challenges the Alliance and its partners face in maintaining and improving the greenway. They must also balance differences in public agency standards, protocols, and cultures, as well as the visions of the community, while dealing with limited staffing. The community itself also faces major housing challenges. The area's recent resurgence has led to rapidly increasing housing prices and population growth, as well as conflicting interests on the types of developments best suited for the area and its context. This has contributed to declining housing standards, overcrowding, and displacement for many Bronx residents.

PLAN ELEMENTS

While there is little clear discussion of the planning process for the Bronx River Greenway Plan, there is a variety of information on sustainability relating to both the environment and the continuation of the greenway's development. Chapter 3 of the plan is dedicated to providing principles for guiding the ecological performance of the Bronx River and its greenway. Each section of the chapter addresses a different management concern (Landscape, Stormwater Management, Hardscape, Streetscape, and Sustainable Maintenance) and identifies some of the major challenges facing the development of the greenway as an ecological and recreational resource. It outlines specific ways in which human impact on the natural environment of the greenway can be mitigated through preservation efforts and more sustainable design practices. The plan emphasizes the need to continually evaluate and adjust these efforts as new experiences and knowledge inform them. Each section of this chapter includes a short list of goals, such as increasing ecological connectivity and habitat diversity, reducing surface runoff, erosion, and encroachment, maximizing the energy performances and longevity of products, and planning for maintenance as an integral aspect of the greenway's development. Many of the principles outlined hint at or explicitly mention the need for supplementary plans to be developed. For example, the Hardscape section includes a footnote about a complementary wayfinding plan.

These sustainability goals, both environmental and organizational, are expanded upon in the next chapter of the plan which addresses maintenance and operations. Sections are included on staffing, safety, and funding. The private-public partnership between the Alliance and the various Parks departments creates a shared responsibility in terms of park maintenance. While routine tasks (such as path maintenance, snow removal, lawn mowing) are performed by parks' staff, the Bronx River Conservation Crew is responsible for the waterways and restoration aspects of the greenway. Safety discussions bring include considerations for the use of Crime Prevention through Environmental Design as well as security cameras. This is particularly important regarding issues with policing and equitable use of the park. The following section of the chapter, called Carrying the Vision Forward, emphasizes the importance of cooperation between the various organizations responsible for the park and its development. This section also brings up the importance of the park for local Bronx residents, as the greenway not only improves access to local nature and recreation but can also increase access to living-wage jobs and professional development.

This chapter also discusses a few options for securing funding for plan implementation. A few strategies discussed include potential establishing a Bronx River Greenway district or

a dedicated maintenance endowment as an aspect of capital budget planning. The plan also mentions potentially receiving funding from river pollution settlements negotiated by the New York State Attorney General or other regulatory agencies. The Alliance emphasizes the need to prioritize advocacy for adequate public funding for maintenance and to use its status as a public-private agency to help secure additional funding.

APPLICABILITY TO D&R PLAN

The main point of comparison between the Bronx River Greenway Plan and the D&R Canal Master Plan are the chapters which break down each section of the park. This is a significant portion of both plans that includes specific information regarding the current conditions of the park and the needed improvements. However, the Bronx River Greenway Plan provides a bit more information for each section by outlining travel routes, relevant history (specific to that section), future plans, connections to other greenways and on-street routes, and a list of component projects. This plan also provides more detailed maps and relevant photos to illustrate the discussed uses of the park, visions for future development, and concerning conditions more clearly. The inclusion of Design Standards in the plan's appendices also helps to provide for more specification and consistency. These details could be especially useful for the updated D&R Canal plan, considering the canal serves a variety of potentially conflicting uses.

A major difference between the two plans is the discussion of partner organizations. While the '89 D&R plan does briefly discuss the importance of NJWSA and DEP, there is little discussion of the multiple other friend groups that help care for and protect the canal. The Bronx River Alliance itself is an organization built out of partnerships, which helps provide access to a variety of additional resources for funding, volunteers, planning, maintenance and so on. Considering the amount of friend organizations already existing for the D&R Canal, it would likely be very beneficial for the Commission to collaborate with these organizations more often.

Key Takeaways

- Include more specific and detailed maps and imagery in the breakdown of the park sections to help orient the reader and illustrate needed improvements
- Work in collaboration with DEP (and DOT?) to provide more specific design guidelines
- Consider increasing/improving partnerships between the commission and its friend groups and utilizing these partnerships to provide services for the continual development and improvement of the park
- Include more discussion of the park users, how they can benefit from the park and how it impacts the lives of the communities it runs through – this can be leveraged to help gain more financial resources and general support

VIII. Greenpoint-Williamsburg Waterfront Open Space Master Plan

BACKGROUND

Type of organization and mission

The Greenpoint-Williamsburg Waterfront Open Space Master Plan is the product of the collaboration of several organizations engaged in the development and maintenance of parks and open spaces in New York City. In particular, this plan was developed by the New York City Department of Parks and Recreation along with the Office of the Mayor, the Department of City Planning, and the New York City Economic Development Corporation. The idea was for these organizations to work together to develop this plan in order to make the best of the recreational and open space opportunities that the Greenpoint-Williamsburg Land Use and Waterfront Access Plan creates.

What are they planning? (Canal, waterfront, municipality, etc.)

The master plan envisages the evolution of the previously underutilized and industrial waterfront into an active extension of the communities of Greenpoint and Williamsburg in Brooklyn, New York. This vision is in accordance with the City's goals of reinvigorating growing neighborhoods and improving residents' quality of life, and former Mayor Bloomberg's agenda of expanding access to the waterfront, building more parks, and greening the City.

Striking a balance between the city's and the community's vision for the area, the master plan prioritizes the creation of active and passive recreational spaces, and restoring the fragile habitat of the area. In order to achieve this, the master plan proposes the creation of a variety of public spaces - parks, esplanades, sports fields, playgrounds, public amenities, gathering spaces, and natural areas. Among these, the extension and maintenance of existing parks, future parks to be built by City agencies and private developers, a pedestrian esplanade connecting all the open spaces will encompass the bulk of the development that the plan proposes.

Focus area (Water quality, recreation, etc.)

The master plan focuses on the creation of open spaces and recreational activities, ensuring improved access to the waterfront, and the preservation of the character, heritage, and culture of the Greenpoint and Williamsburg communities. To achieve this vision, the plan outlines six goals that are as follows:

- **Goal 1:** Create a publicly accessible waterfront
- **Goal 2:** Create a balance between active and passive recreation opportunities to serve the diverse recreational needs of the community
- **Goal 3:** Identify appropriate opportunities for direct interaction with the river, such as boating
- **Goal 4:** Promote a healthy east river environment through sustainable design practices, habitat enhancement, and public education
- **Goal 5:** Develop design guidelines to unify the waterfront as a whole, while encouraging the creation of unique, memorable spaces on an individual basis
- **Goal 6:** Reflect the rich character, heritage, and culture of the community in both publicly and privately developed open spaces

Major challenges

Through the implementation of the goals laid out in the master plan, the intent of the New York City Department of Parks and Recreation is to ameliorate the challenges of the lack of parks and recreational spaces in the area and the issue of missing public access to the shoreline. Specifically, changing economic patterns, technological advancements, and changes in land use patterns have adversely impacted the Greenpoint and Williamsburg communities and contributed to the increasing vacancy and underutilization of waterfront industrial resources in the area. The master plan aims to rejuvenate the economy and the public use and perception of the area by improving public use and access to the waterfront.

Issues of authority (Regional, state park, etc.)

Relationship to surrounding jurisdictions/other plans

As mentioned above, the Greenpoint-Williamsburg Waterfront Open Space Master Plan sets forth goals and objectives that align with the wider goals and vision of other environmental and economic players in the area. The collaboration between agencies such as the New York Department of Parks and Recreation, Department of City Planning, New York City Economic Development Corporation, and the Office of the Mayor ensure that the plan caters to a diverse set of interests and priorities that each of these organizations brings to the table.

COMMUNITY CHARACTER

Geography and land use

Back in the 17th century, before the establishment of the two communities of Greenpoint and Williamsburg there, the area was relatively untouched and predominantly salt marsh, meadow, and forest landscapes. The East River, Newtown Creek, and Bushwick Creek supported the existence of fresh and salt-water ecosystems.

In stark contrast, currently, the water's edge consists of urban and industrial landscapes - both active and deteriorating. However, in some areas, less intensive use and limited access to the waterfront have contributed to the creation of naturalized plant communities at the water's edge. For instance, groves of *Ailanthus* sp., *Morus* sp., and other invasive native and non-native ground covers and shrubs exist along the narrow band surrounding the Bushwick inlet.

Moreover, the East River's currents act as a strong erosive force on the shoreline. In response to this threat of erosion and potential flooding, owners of waterfront land parcels resort to several techniques to reinforce the shoreline. For example, The Existing Water's Edge Condition plan classifies the shoreline into 6 categories of edge types in 4 states of repair to provide a better understanding of the extent of attention required by different stretches of the shoreline.

In 2005, the comprehensive rezoning of the two communities focused on the renewal of vacant and underutilized parts of the waterfront and the revitalization of the adjoining neighborhoods. In addition to planning for open spaces and recreational areas, the plan creates opportunities for the creation of much-needed market-rate and affordable housing units in the area, encourages local commercial development, and promotes light industrial activity in appropriate areas.

PLAN ELEMENTS

Public engagement process

The Greenpoint and Williamsburg communities have been highly active in several waterfront-based planning processes to date, and the Open Space Master Plan was no different. Through effective community engagement and participation, local residents and community groups have created multiple community planning and design documents that have heavily informed and influenced the Master Plan. For instance, local and citywide park advocates, along with the Municipal Art Society and Matthews Nielsen Landscape Architects, created the Vision Plan for Brooklyn's Green Crescent in March 2006 that acted as the concept plan for the East River waterfront from the Williamsburg Bridge to Newtown Creek. Another document, the Greenpoint-Williamsburg Open Space Plan, created by the Greenpoint Waterfront Association for Parks and Planning, Trust for Public Land, Phillips Preiss Shapiro Associates, Fos and Fowle Architects, and Roesch Landscape Architects was useful in the Master Plan process as well.

In addition to the community-based plans above, residents have also participated in city-led planning initiatives for the waterfront, including the creation of the Greenpoint 197-A and Williamsburg 197-A plans in January 2002 and the Greenpoint-Williamsburg Zoning Amendment and Waterfront Access Plan in 2005.

Environmental (climate change)

Environmental sustainability has been a key consideration in the Master Plan development process. Both the publicly and privately developed parts of the Waterfront Planning Area will need to incorporate technologies and practices aimed to increase the longevity and vibrance of the area and reduce the environmental impact of development along the waterfront. Some of these practices include:

- **Adaptive reuse of existing structures and materials** - In order to reduce waste generation while also preserving historical and existing characteristics of the neighborhood, salvaged materials and structures should be considered for evaluation and reuse on-site.
- **Use of "green" material and construction materials** - The Master Plan recommends the use of durable, easily maintainable, and eco-friendly materials in the design and construction of elements like site furnishings and paving. Moreover, local production and fabrication of materials and elements are prioritized in the Plan.
- **Incorporation of alternative energy sources** - Alternative and renewable energy sources, such as solar power, should be used throughout the Waterfront Planning Area and in public open and recreational areas.

Implementation

Zoning changes in the area permit the design of a public waterfront walkway (proposed esplanade) and adjacent public open spaces through the collaboration of public agencies and private developers. As per the goals and overall vision outlined by the Plan, the City's public parks agencies will be responsible for planning, designing, and creating over 30 acres of planned public parks and 1 mile of the waterfront walkway.

On the other hand, private developers will be responsible for the design and creation of four designated Supplemental Open Space areas, adjoining waterfront parcels, and 2 miles of the walkway. In addition, these developers will also be responsible for the development of potential pier (re)construction projects along the waterfront. If they

choose to, developers have the option of transferring the Supplemental Open Space areas to the Parks Department once they are constructed.

Innovations

One of the Master Plan's biggest strengths is its reliance on direct community input to shape its goals and vision. In order to fulfill the community's desire to incorporate possible kayak launches in the area, the Master Plan proposed the integration of its recreational goals with the need to preserve the historical and cultural heritage of the area.

Until 1988, the Greenpoint-Williamsburg waterfront area contained piers along the shoreline. However, many of these structures have deteriorated over time, almost to the point of disrepair. The New York State Department of Environmental Conservation only recognizes one of these piers, the Green Street Pier, as a viable existing structure. The Master Plan promotes the restoration of the Pier, (re)construction of additional piers, and many possible kayak launches through the area. The piers are an important determinant in the siting and planning of many proposed developments.

APPLICABILITY TO D&R PLAN

Similarities and differences

Although the scale of the D&R Canal Commission review area is much larger than the Greenpoint-Williamsburg area, the nature of both master plans as waterfront development plans helps draw parallels between both plans. In terms of geography, both areas face problems of invasive species on their shorelines. As with the Greenpoint-Williamsburg plan, the D&R Canal can also create an Existing Water's Edge Condition map to systematically address the different needs of different parts of the canal and its adjoining areas.

The Master Plan proposes the adaptive reuse of historical and cultural structures of importance on its site. The Canal Commission, too, can analyze the feasibility of adaptive reuse as a means of historic preservation on its site. As with the Canal Commission, the Greenpoint-Williamsburg Master Plan also faced the challenge of consolidating the needs of different municipalities, albeit on a smaller scale. However, the participation of community members in the planning process helped shape the planning process and ensure outcomes that were attuned to the community's needs. Public outreach and participation, especially during the planning phase can help the Canal Commission address grassroots issues in the various municipalities that make up its review zones.

Strengths or weaknesses of the plan

Among the biggest strengths of the Open Space Master Plan is the planning process that it adopts. Specifically, the prioritization of community input and participation in the process has created a Master Plan that is uniquely suited to respond to the context and specific needs of the Greenpoint-Williamsburg area. Instead of replicating other waterfronts in the city, the Plan is specific to the two communities in the neighborhood and represents and upholds the past and present characteristics of the area.

In an effort to reflect the community's history and culture in the new development in the area, the Plan respects the community's desire for furnishings that reflect the unique sense of place and local history. Moreover, the New York City Department of Parks and Recreation (NYCDPR) requires the application of additional criteria to the furnishings selection process, including sustainability, durability, and maintenance concerns, and the opportunity to create local jobs and industries.

Key takeaways or lessons learned

Among the key takeaways from the Greenpoint-Williamsburg Master Plan is that public outreach and participation in the planning process can go a long way in ensuring that the Master Plan proposes elements that are in tune with the needs of the community. Moreover, the use of innovative technologies to mitigate issues of erosion, invasive species, and incorporating green materials can be a model for the Canal Commission to borrow from in their planning process. Finally, to reduce waste generation on-site while preserving historical characteristics of neighborhoods, salvaged materials and structures can be used in a way that minimizes waste while reducing the Commission's expenses.

IX. Bordentown Master Plan- Open Space Element

BACKGROUND

Type of organization and mission

The City of Bordentown Planning Board and the Burlington County Department of Economic Development and Regional Planning have teamed up to develop the Open Space Preservation Plan Element with the goal to plan for Open Space Preservation in Bordentown.

Relationship to surrounding jurisdictions/other plans

Bordentown is situated in the northern part of Burlington County at the meeting of Crosswicks Creek and the Delaware River. Crosswicks Creek is the county and municipal boundary that separates Hamilton Township in Mercer County from Bordentown City. Bordentown Township borders the City of Bordentown to the north, east, south and southwest.

No funding information indicated.

Demographics

According to the 2000 U.S. Census, cited in the 2005 Bordentown Master Plan, Bordentown City has a population of 3,969. The net density of Bordentown City is about 9.1 persons per developed acre. The net density can also be viewed as the number of dwelling units per developed acre: 1,757 dwelling units/437 developed acres or 4 dwelling units per developed acre.

Geography and land use

Bordentown City contains about one square mile of landmass. The City has developed over the past 300 years, with most development being compact. Development is concentrated in the central part of the City by Routes 130 and 206, which make up the eastern municipal boundary. About 58% (324 acres) of the landmass is developed. The rest of the land is either open space, parks, water bodies, or vacant. The vast amounts of open space in Bordentown present many opportunities for open space preservation through linking existing open space and parks and providing public access to these areas. Additionally, since streams surround the municipality, it creates a unique environmental surrounding for Bordentown City, which presents copious waterfront opportunities.

PLAN ELEMENTS

Successes

Due to the condensed development, there are large amounts of open space to preserve, 91.74 acres to be exact. The City of Bordentown also has numerous streams that can contribute to waterfront preservation.

APPLICABILITY TO D&R PLAN

New Ideas

The Bordentown Open Space element has four main ideas that would be helpful to encompass in the Delaware & Raritan (D&R) Canal updated Master Plan. First, the Bordentown Open Space element intends to make tourists aware of and promote open space. Specifically for the D&R Canal Master Plan, promoting the trail is key as many nearby residents and tourists alike are unaware of the trail. Promoting the trail could be done through programs and social media advertisements. Second, the Bordentown Open Space element mentions opportunities to expand pedestrian walkways. Expanding

walkways could be carried out in dense areas such as New Brunswick and Trenton to make the trails more accessible to pedestrians. Third, the Open Space element mentions creating overlay zones. Overlay zones, in the case of Bordentown's Open Space plan, are designed to restrict development on environmentally sensitive lands. Creating overlay zones for the D&R Canal could ensure that the canal's numerous goals are maintained, like preserving water quality and recreation. Fourth, the Bordentown Open Space element plans to educate residents about the importance of protecting and preserving open space. Educating the public about the importance of the D&R canal could greatly benefit the community.

Strengths or weaknesses of the plan

The main strength of the Bordentown Open Space plan is that it is concise. The plan is only about thirteen pages, yet still entails what the City must do to preserve open space. The plan's conciseness also serves as a weakness, because there is a lack of information about public engagement. Public engagement could be greatly beneficial to the City of Bordentown's open space preservation. Additionally, the plan does not mention funding sources at all.

Key takeaways or lessons learned

The plan's conciseness serves to emphasize the importance of open space for Bordentown City. Master plans typically are lengthy and cover a lot of material. In the case of the D&R canal, having a separate master plan that highlights the importance of an aspect like open space preservation could be very helpful to showcase the significance of a certain goal.

X. Reclaiming the High Line- Meatpacking District and West Chelsea, Manhattan, NYC

BACKGROUND

Type of organization and mission

What are they planning?

The High Line is a continuous, 1.45-mile-long greenway that spans from Gansevoort Street in the Meatpacking District, north through the West Chelsea neighborhood to 34th Street. The park was designed on top of a former elevated railroad line that operated until 1980. The viaduct was abandoned then slated for demolition in the 1990s. The Friends of the High Line, a non-profit organization founded in 1999, advocated for the development of this project and are now financially responsible for the programming, maintenance, and operations of the park.

Focus area

The focus of this project began as an opportunity for adaptive reuse and historic preservation of an abandoned rail line. As the project has grown and changed overtime, the focus expanded to include recreation, active transportation, economic development, and sustainability.

Major challenges

The major challenges this project faced include the vulnerabilities of the elevated structure, including wind and the width and depth. This project also faced the issues of private property ownership below the structure; capital improvements to add stairs, elevators, and other access points; as well as repairing and maintaining the structure to make it safe for public occupation.

The neighborhood also presents unique challenges as it is dense and well developed. In particular, the zoning of the neighborhood presented a challenge and ultimately, a new zone had to be created for this project. Much of the rest of the neighborhood is zoned as a historic district. The neighborhood also experiences flooding due to its proximity to the Hudson River.

Issues of authority (Regional, state park, etc.)

The organizations that own and operate the High Line have a unique partnership. The public park is owned by the New York City Department of Parks & Recreation but operated by the non-profit organization Friends of the High Line. Per the public-private agreement signed in 2009, the city became the owner and party tasked with the infrastructure investments required for park operations. Ultimately, the park would become a part of the city parks system. Due to budget constraints for the parks department, Friends of the High Line agreed to provide approximately 90% of the annual operating budget and be responsible for day-to-day operations. Friends of the High Line also committed to contribute funding to construction costs.

Community Character

West Chelsea is a mixed-use neighborhood along the Hudson River in Manhattan. The neighborhood is home to prominent cultural destinations, a growing office district, and a vibrant residential community. There are many amenities in the neighborhood, including retail stores, restaurants, and art galleries.

The built environment consists of former manufacturing buildings converted into other uses, low rise gallery buildings, row houses, and other mixed-use buildings. Particularly relevant to the High Line are the zoning districts. Much of the neighborhood is zoned in the Special West Chelsea District, which was created between 2004 and 2006 to support the development of the High Line. There are also historic districts located on either side of the park.

PLAN ELEMENTS

Planning process

This project began in 1999 when Joshua David and Robert Hammond, engaged and connected community members, founded Friends of the High Line. Between 2001 and 2002, The Design Trust for Public Space created a fellowship for architect Casey Jones, resulting in the “Reclaiming the High Line” plan with the support from Friends of the High Line. This plan analyzed four potential outcomes for the viaduct:

demolition/redevelopment, transit reuse, commercial reuse, and open space reuse. After the completion of the plan, David and Hammond engaged consultants to provide an economic impact analysis which showed that revenue and taxes generated by the project would exceed the cost to preserve the viaduct.

In 2003, Friends of the High Line hosted an open “ideas competition,” receiving 720 ideas from over 36 countries for ways the park might be used. Ultimately, the design team was selected in 2004 by Friends of the High Line and the City of New York. Also integral to the development of this project, the special zoning district, called The West Chelsea Special District, was proposed and approved between 2004 and 2006. In November 2005, the High Line structure was donated to the city by CSX Transportation, Inc. and construction began in April 2006.

Public engagement process

The conception of the High Line project was the result of neighborhood advocacy around the potential of the viaduct and the desire to prevent its demolition. As a part of developing the Reclaiming the High Line plan, four advisory meetings were held that incorporated both professionals in the fields of planning, architecture, open-space design and advocacy, transportation, among other related fields and community members. Friends of the High Line as well as Chelsea Property Owners, another neighborhood organization, abstained from participation in this engagement. Additionally, workshops and presentations were conducted throughout the design process, although more specific details were unavailable. Private donors were engaged due to the need to raise funds for the operations and maintenance of the park. Friends of the High Line agreed to be responsible for public engagement around the High Line project.

Sustainability

This project showed much potential as an economic development strategy in a post-9/11 New York City. The taxes and revenue generated by the project were a clear benefit from the city’s perspective and through the agreement made between the city and Friends of the High Line, they would not be responsible for funding the operations and maintenance. The public-private partnership model ensured that the burdens would not fall on the city. The design of the High Line considered environmental sustainability at the heart of the project. Friends of the High Line call it “inherently green” because it is reusing a structure as well as creating green space. Two key features of the High Line demonstrate the

attention to sustainability in the design process: the landscaping consists of primarily native, resilient, and low-maintenance species including native pollinators and green roof systems and technologies capture 80% of the water for irrigation purposes. Additionally, there are bee hotels, and no pesticides or chemical fertilizers are used during maintenance.

Implementation

The High Line was constructed and opened in several stages.

- Stage 1 included the part of the viaduct spanning from Gansevoort Street to 20th Street and opened in June 2009
- Stage 2 extended the park to 30th Street in 2011
- Stage 3 developed the High Line at the Rail Yards and opened in 2014
- Stage 4 added the “Spur” at 30th Street and 10th Avenue which opened in spring 2019

Funding for this development included money contributed from New York City, the federal government, the State, and funds privately raised by the Friends of the Highline. There are also emerging plans for the future of the High Line. In 2021, Governor Cuomo proposed a plan to build extensions connecting the High Line to other transportation and recreation assets in New York City. This development would occur in 2 phases, including the High Line East Connection connecting the High Line to Penn Station, and the High Line North Connection extending the park westward to Hudson River Park

APPLICABILITY TO D&R PLAN

Comparability

The High Line is an elevated railway that is no longer used to support commerce or transportation and the project did not have to consider the many challenges that come with protecting open space, water quality and service, and the jurisdiction of multiple regulatory agencies. This project connects a smaller geographic area than the D&R Canal and runs through fewer communities.

While the High Line is a unique public space, the project has many potential lessons for the D&R Canal. The elements of this project that are particularly relevant to the D&R Canal include the adaptive reuse of industrial structures for the public good, the use of a park as active transportation and a connector, and the economic development impact that this project has had on the surrounding community. According to the designers, the High Line has stimulated over \$5 billion in urban development and created 12,000 new jobs as a result of New York City’s investment of \$115 million USD.

Strengths or weaknesses of the plan

The public engagement process surrounding the project could have been more robust and transparent by including more community members than professionals. Additionally, the plan did not address the downsides of increased development pressures in the area and did not take equity into consideration.

The major strengths of this plan include the public-private partnership model which does not place the financial burden on the city for maintenance and the focus on environmental sustainability in the design, materials, and maintenance.

Key takeaways or lessons learned

There is a rich potential for public-private partnerships in the development and maintenance of park spaces. Additionally, an economic impact analysis could demonstrate the potential economic development value of the D&R Canal and be used as leverage to help the Canal Commission engage additional resources. Using a project like the High Line or D&R Canal as an economic development strategy might have unintended consequences such as development pressures or gentrification- these impacts should not be ignored during the planning process.

XI. Buffalo Bayou Master Plan

Background:

The Buffalo Bayou Park 2002 Master Plan was created by the Buffalo Bayou Partnership (BBP), a non-profit organization established in 1986. The BBP was created to care for the 10-mile stretch of bayou that flows through downtown Houston, Texas and empties into the Port of Houston Turning Basin. The park falls entirely under the City of Houston's jurisdiction, but BBP operates and maintains the park. At the time the plan was written, the area around Buffalo Bayou was mostly residential on the west side, and slowly turned industrial as one moves east and closer to the Port. The master plan was created by a consulting firm over the course of 18 months. Funding for creating the plan was not directly addressed, but presumably came from the \$30 million dollar catalyst foundation gift. While the BBP originally focused on environmental stewardship, the Master Plan focuses on the economic development of adjacent parts of Houston as well as conservation and wildlife preservation. At the time the plan was written, the Bayou was a neglected waterway that had little wildlife, poor water quality, and limited capacity for recreation. The ultimate goal was to transform the historically significant but neglected resource into a centerpiece of the region.

Plan Elements:

Public engagement and consultation was an important part of the planning process. The planning committee held three large public workshops that included neighborhood leaders, school administrators, and other local stakeholders. The planning committee also held numerous focus groups with community leaders.

The Plan outlines the BBP's vision in several key categories: Urban Development and Design, Environmental Quality and the Eco-region, Flood Management, Landscape, Bayou Access and Transportation, and Water-based Activities. Highlights from these sections include:

- Plans to restore the bayou to its natural state. At the time the plan was adopted, the bayou suffered from poor water quality, frequent flooding, and little wildlife.
- Supporting non-motorized watercraft and boat tours by contracting with a third party
- Creating "green fingers", or small green corridors that would integrate the park into the adjacent urban neighborhoods.
- The construction of new canals in order to divert flow from the canal.
- Widening the floodplain within the Bayou corridor in order to enrich wildlife habitats

Financing

The Financial section of the plan lists several ways that the BPP plans on getting the fund to build the park. Essentially, the plan argues that adjacent property will enhance adjacent property values, so the park should be funded by capturing a portion of the increased value. Potential approaches that were discussed included:

- General obligation bonds backed by anticipated revenue from increased sales taxes or property taxes, levied by local or regional government
- A real estate transfer tax that could be directed to a dedicated fund for parks and open space

- Federal grants directed towards transportation- and flood control-related projects, such as the Land and Water Conservation Fund, TEA-3, or U.S. Army Corps of Engineers. The plan also suggested that Houston could also worth through Congress or the Texas Department of Transportation to receive funds through appropriations.
- Tax-increment reinvestment zones (TIRZ) take the increased tax revenue from rising property values in a defined area and channels it back into public improvements that would directly benefit that district.
- Establish a special assessment district or management district, in which a majority of property owners agree to an extra real estate tax for a public improvement that will directly benefit them.

Implementation

The Implementation section of the Plan anticipates that the BBP will have to expand its functions and authority in order to effectively coordinate the actions of a variety of private and public stakeholders. Even though the Bayou is contained within one municipality, the BBP still has to coordinate with the Department of Planning, Public Works, Harris County Flood Control District, and other partner organizations. The BBP already has a considerable amount of freedom to advocate for the recommendations laid out in the Master Plan. However, without the power to implement and enforce development standards or assemble land holdings, it's likely that development will continue as usual. If partner organizations allow development as usual, the bayou will continue to decline in environmental quality, and equitable public access to the park will suffer.

The plan suggests that the BBP petitions the city for a continuous TIRZ adjacent to the Bayou in order to establish control over funding and land use development. If that doesn't work, then Houston could use it's power of subdivision approvals, site plan review, or street platting to require developers to adhere to the Master Plan.

The BBP itself would also be reorganized into three divisions: a Development Division that would acquire land and pursue redevelopment projects, a Conservation Division that focuses on park maintenance and improvements, and a Design Center that would focus on public outreach and provide technical assistance and design services to development projects in the TIRZ.

Applicability to D & R Plan

Similarities and Differences

Like the Delaware and Raritan Canal, Buffalo Bayou Park is a linear park centered around a water feature whose stewards must balance the needs of environmental conservation, urban development, flood management by collaborating with a variety of public and private stakeholders. The main differences are that the BBP only must work with one other municipality – Houston – and no other competing non-profit organizations. In the BBP, the control over adjacent development, and conservation efforts for the length of the bayou all fall under the jurisdiction of the same organization. The bayou isn't a source of drinking water, so there are no concerns over the water quality beyond its effect on local wildlife and recreation.

Strengths and Weaknesses

The plan's biggest strength is the thought that was put into how the park would be maintained and financed. Having a robust list of options for making the plan into a reality is crucial, especially for an organization that can't count on getting appropriations from the state's general fund. The plan could be improved by providing constituents a way to stay involved and continue to direct the development of the park. The workshops and focus groups were a good start, but the BBP could use a way to keep in touch with the changing needs and desires of residents.

XII. New York State Canal Recreationway Plan (1995)

BACKGROUND

Type of organization and mission

What are they planning? (Canal, waterfront, municipality, etc.)

The New York State (NYS) Canal Recreationway Plan was prepared for the New York State (NYS) Canal Recreationway Commission for submission to the New York State (NYS) Thruway Authority and the New York State (NYS) Canal Corporation and completed in 1995.

The Canal System is comprised of the Erie, Champlain, Oswego, and Cayuga-Seneca Canals and their associated natural waterways; the central channels of Oneida, Onondaga, Cross, Seneca, and Cayuga Lakes; short canal sections at Ithaca and Watkins Glen; reservoirs; feeder canals; canal terminals on Lake Champlain; and canals and rivers not accessible by boat from the Canal. This plan includes recommendations for the 524 navigable miles of the Canal System in Upstate New York.

Specifically, the plan defined the Recreationway as *“a linear park to be developed for boating and other recreational use, taking advantage of the canal’s historic heritage, conserving its beauty and natural character, and utilizing recreationway improvements to enhance the economic potential of the canal”* (5.1).

Focus area (Water quality, recreation, etc.)

This plan included three fundamental goals: preserve the best of the past (historic and environmental preservation), enhance recreational opportunities, and foster appropriate and sustainable economic development. In terms of recreation, the plan prioritized boating; the creation of an end-to-end trail for hiking, biking, and other recreational activities; and providing access to other parks, historic sites, restaurants, and other facilities from the recreationway. Additionally, the plan set out to conserve open space by establishing a protected greenway around the canal.

Major challenges

The major challenges identified in the plan include:

- Private property ownership along the canal
- Residential opposition to recreationway trails and preservation restrictions
- Inadequate and irregular public facilities
- High capital-improvement costs
- Conflicting uses, including recreation, water supply, commercial shipping, hydropower, wildlife management and conservation areas, and others
- High level of coordination between government agencies
- Complex hydrology, existing pollution, and potential for future pollution

Issues of authority (Regional, state park, etc.)

In 1992, legislation titled *Thruway 2000* transferred authority over the Canal System from the NYS Department of Transportation to the NYS Thruway Authority. This legislation authorized long-term leasing of lands that are part of the state Canal System. It established the NYS Canal Corporation as a subsidiary of the NYS Thruway Authority tasked with operating, preserving, and renewing the Canal System for recreation and economic development. Additionally, *Thruway 2000* also established the Canal Recreationway Commission, a 24-member body consisting of state/local officials and

private citizens and has a mandate to prepare and revise the Recreationway Plan and advise the Canal Corporation in carrying out its duties. According to the plan, *Thruway 2000* provides the legal and financial framework to “reinvent the canal based on today’s realities of tourism, recreation, historic preservation, and environmental conservation.”

Community Character

The Canal System in Upstate New York links five separate river drainage basins and runs through 4 major metro areas (Buffalo, Rochester, Syracuse, and Albany), 13 smaller cities, 57 villages and hamlets, and 136 towns. According to the plan, the canal era spurred the development of almost all the cities and villages that line the canals today. There are 25 counties contiguous to the Canal. At the time that this plan was prepared, they estimated that 73% of the state’s population lived within 2 miles of the canal system and connecting waterways.

The dominant land uses in the region included community, farming, woodland, wetlands, open space, and farms. Exhibit 4-8 in the plan provides more detailed descriptions of dominant land used and canal character for the 15 Thematic Canal Regions.

PLAN ELEMENTS

Planning process

The planning process was kicked off with two initial studies, the Canal System Inventory documenting historic, environmental, land-use and recreational features and a study of tourism and marketing potentials of the Canal System. The planning process occurred between 1993 and 1995, when the plan was adopted.

Public engagement process

The public engagement process surrounding this plan included public focus groups and other meetings that invited private citizens, businesspeople, and representatives of canal interest groups to give feedback. Due to the geography of the canal, engaging constituents across the state was highly important. The planning team formed seven Canal Planning Regions and held three meetings with each group. They also conducted targeted outreach to local political leadership and interested stakeholders in the various communities contiguous to the canal. Stakeholders were given a final opportunity for public comment at the completion of a draft plan.

Sustainability (Financial/Environmental)

While the plan did not use the language of sustainability, the plan addressed both the financial considerations for the recreationway development as well as the impact on the natural environment. The plan addressed financial sustainability as part of the economic development strategy of tourism and recreation. The Canal Corporation sought to improve the financial standing of the canal through increasing the amount of direct revenue through lease payments for use of canal-owned lands, tolls, and other user fees. Though it noted that the recreationway would be a significant upfront cost, the towns have potential to see public and private investments and increased tourism to the region. Additionally, it addressed conservation measures for the natural resources surrounding the canal through the development of 15 region-specific land use and conservation guidelines. Generally, these conservation measures included the creation of a greenway with natural vegetation, preventing development that encroaches on the canal, preserving agricultural uses, protecting wetlands and other ecosystems/habitats. The plan also

mentioned conservation of water resources, including pollution control, maintaining an appropriate water-level, and floodplain management along the canal.

Implementation

The total costs for the implementation of this plan are estimated at \$145.6 million (1995) with costs spread over three five-year long phases (15 years total), reflecting short-, medium- and long-term goals. In terms of funding for implementation, grants and low-interest loans, technical services from other organizations, volunteers, fund-raising efforts, funding partnerships, and additional state and federal support were all indicated as potential and necessary sources. The plan argues that the economic and tourism benefits of the investment in the canal would outweigh the costs associated with the project.

APPLICABILITY TO D&R PLAN

Comparability

While this plan is also analyzing a large canal system that serves a diverse set of communities, this plan provides a framework for unifying a patchwork of recreational facilities and trails. The D&R Canal is a mature state park that has end to end recreational facilities. Additionally, Upstate New York was not facing the same development pressures, population growth, and environmental challenges that the counties along the D&R Canal are facing today. This plan also permits different type of recreation- primarily boating- and does not have the duty to maintain a drinking water system to serve an entire region.

New ideas (technology)

The plan puts forth a chapter about interpreting and marketing the canal. The interpretation of the canal is intended to convey the benefits and significance of the canal system in 7 thematic areas: transportation, commerce and industry, the natural environment, cultural heritage, architecture, recreation, and military history. These interpretations are also described in the context of the 15 regions identified in the plan. The plan also pays attention to trends in tourism as the basis for their marketing plan and establishes strategies for marketing efforts.

One tool that is now available to users is an interactive map of facilities and features on the canal system. The interactive map can be found here:

<https://www.canals.ny.gov/maps/index.html>.

Strengths or weaknesses of the plan

One of the primary strengths of this plan was the approach to breaking the canal into different sections and different levels of analysis. For example, the Canal Study Area consisted of 3 components: the 36,000 acres of Canal-Owned Land (Primary), a Canal Corridor consisting of the towns, cities, and villages adjacent to the canal (Secondary), and the 25 counties that the canal runs through (Tertiary). These areas have different proximity to the canal, interests, impacts, and considerations. The plan also took a regional approach, tailoring recommendations to the community and its needs.

One perceived weakness of the plan was the community outreach process. While the scale of this plan is very large, covering numerous communities, having 3 meetings for a large region seems inadequate by today's planning standards.

Key takeaways or lessons learned

One of the key takeaways is the need to divide the canal into regions that have different investment needs, challenges, and community character. Additionally, this plan was intentional about using the canal as an economic development driver and supported this idea with a chapter dedicated to interpreting and marketing the canal. Dedicating resources toward a marketing campaign can help the D&R Canal support the communities it runs through.

While this plan is also older, the NYS Canal Recreationway Commission is currently undertaking a reexamination of the plan in support of future planning efforts. Following this engagement process and reaching out to the Canal Recreationway Commission could inform the process that the D&R Canal Commission.

Appendix B: References

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