



ECOLOGICALLY-BASED CITY PARK MASTER PLAN

AUTHORED BY:
KELSEY BLAHO
CAYLA COTHRON
MAY 12, 2016

project summary

Project Summary Table of Contents

Existing Conditions

Stormwater Management

Circulation

Wildlife Habitat and Vegetation

Areas of Ecological Importance

Analysis

Large-scale Context

Circulation/Connectivity

Waterways

Formal Gardens

Vegetative Area

Golf Course

project summary

City Park is a 320 acre park centrally located in the city and serving eight adjacent neighborhoods and the metropolitan area. It is considered a regional park as 85% of all Denver residents live within a five-mile radius. The Denver Zoo, Museum of Nature and Science, and the City Park Golf Course are located in the park. Recreation is a significant use in the park with multiple athletic fields and tennis courts, picnic areas, playgrounds, and paddleboat rentals. The park also has historical significance as seen through its monuments and structures, views to downtown Denver and the Rocky Mountains, formal gardens, lakes, and an expansive tree canopy.

Popular summer events such as Jazz in the Park, races, cultural festivals, and other annual activities are hosted in City Park. While the park has evolved to be one of the most popular destinations in the city since its opening in 1882, it still serves ecological functions through its important role in stormwater management, wildlife habitat and vegetation, and circulation. However, significant degradation of this ecological function has occurred to create complex challenges today – including impaired water quality, a lack of connectivity within the park for all modes of transportation resulting in confusing navigation, and low diversity in vegetation due to grass monoculture and the lack of native species.

This plan presents recommendations to maximize the ecological function of City Park in Denver within its context as a large, urban park. With City Park's location and size, it has the potential to become a model for urban park sustainability for the Denver metro area and beyond. Background research focuses on determining criteria toward achieving this sustainability model concept.

These criteria are used to evaluate existing plans for the park and identify gaps in these plans. Literature is then used to provide supplemental information that directs future analysis and provides a foundation for recommendations in our Ecologically Based Plan. Utilizing the Sustainable Urban Site Design Manual as guidance, we decided to use the criteria of stormwater management, wildlife habitat and vegetation, and circulation to direct the ecological and sustainable future of City Park (to read further about this process, see Appendix A). We applied these same three criteria to an existing conditions analysis to evaluate the current state of the park.

existing conditions

stormwater management

The lakes, fed from recycled City Ditch water, suffer from elevated pH, decreased dissolved oxygen concentrations, and high levels of ammonia from the rookeries on Duck Lake and Ferril Lake. Pollution in runoff from surrounding areas also contributes to impaired water quality. Shorelines of Little Lake and the eastern half of Ferril Lake are barren and present an opportunity for improvement aiding in provision of habitat and water filtration. Duck Lake's previously constructed wetland is also drastically degraded and requires restoration.

circulation

Road and path surface materials have been changed over time, road closures have occurred, and gates have been implemented at entrances. The Denver Zoo and the Museum of Nature and Science have also become entities whose interests potentially compete with those of the park rather than being mutually beneficial.

project summary

These changes have disconnected paths between amenities and made navigation confusing, as well as detracted from the use and character of paths for pedestrian/bicycle circulation. The Regional Bicycle Route is difficult to find with unclear connections and conflicts with vehicles at highly active areas, while pedestrian paths have insufficient wayfinding and surface material degradation and inconsistency. Visual and physical connections are deficient within the park, and pedestrian access between the Zoo and the Museum is missing. Connectivity is lacking within the park, among entities such as the park itself, the Museum, and the Zoo, as well as connection to City Park from adjacent neighborhoods.

wildlife habitat and vegetation

Wildlife habitat and vegetation within the park is provided by the water bodies, tree canopy, and historic gardens and vegetation. Today, a Black Capped Night Heron rookery is present on the islands in Duck and Ferril Lake, as well as the fourth largest Doubled-Breasted Cormorant Rookery in Colorado on Duck Lake's island. A majority of City Park's open water lacks development of wetland or riparian habitat, making the area attractive to Canada Geese but not to most other waterfowl. The wetland constructed along Duck Lake's shoreline requires restoration as the function is not being realized to its fullest extent. City Park has also suffered from duck weed blooms in Duck Lake and bouts of avian botulism annually at times depending on conditions.

Tree-lined paths, roads, and edges are part of the original design of City Park but over the past few decades, original plantings have disappeared and either been left without replacement or been replaced with incompatible species.

Garden plantings such as the Botanical Garden (including the lilac plantings, some of which are missing and have no access from the adjacent pedestrian path), perennial, and native collections are also historically and ecologically significant to the function of City Park. Native plantings have been utilized in gardens to attract native butterfly species as well but there is no evidence of its success.

Tree canopy plays an important role in roosting and nesting as well as providing a food source for bird populations in the Denver region. Historically and ecologically, cottonwood, pine, spruce, and crabapple species that are present in the park are serving these purposes for migratory birds, songbirds, and other bird species – these trees account for around 31% of the tree inventory in City Park.

areas of ecological importance

From the existing conditions analysis, the following areas were identified as being significant to maximizing the ecological functioning of City Park. They will be used as a foundation for the analysis moving forward.

- **Waterways:** DeBoer Waterway, Lily Pond, Little Lake, Ferril Lake, and Duck Lake.
- **Formal Gardens:** Burns Garden, Sopris Garden, the Perennial Garden, Benedict Garden, the Botanic Gardens including the Lilac Collection, Prunus Collection, Box Canyon, and the Pinetum, as well as the Flowering Shrub Collection.
- **Vegetative Areas:** The DeBoer Natural Area, the Crabapple Collection, and the Cottonwood Grove.
- **Golf Course:** Detention plans, water features, and vegetation adjacent to the water.

project summary



analysis

The plan recommendations are outlined in six sections; each includes multiple recommendations for 24 in all. These sections are organized into the large-scale context of the park, circulation/connectivity within and to the park, and the Areas of Ecological Importance. They are then grouped by section, and generalized cost and time estimates per recommendation are given to create a framework to prioritize future implementation. The following are the recommendations for each section:

large-scale context

- For areas not utilized for recreation, replace turf with native prairie grasses, such as Buffalo grass, and wildflower meadows to help decrease the amount of pollutants entering waterways and improve water quality, irrigation and maintenance necessity, and provide habitat enhancement.
- Increase tree cover of flowering crabapple species and species in the pine, spruce, and cottonwood families to provide bird habitat in the park, aid in natural cooling, and decrease overall stormwater runoff.

circulation/connectivity

- Improve physical and visual connection between the park and the Denver Zoo by extending the braided path concept envisioned for the zoo into the park to create the Zoo Loop, re-opening the east and west entrances to the zoo, and improving the visibility offered through the fence around the zoo.
- Increase signage in the park to better facilitate easy navigation and potentially design signage in a way that evokes zoo signage to increase connectivity between the two entities while improving circulation, placemaking, and wayfinding.
- Create consistency of surface materials on park paths and trails to indicate use and help visitors easily navigate through the park.
- Increase connectivity and circulation in the park by better incorporating sometimes underutilized entities, such as the Graham Bible House, into the park for use potentially as a vendor location to maintain park visitation when there are not specific events being held.

project summary

waterways

- Restore the DeBoer Waterway and its use as a water feature.
- Replant the Lily Pond with water lilies from Berkeley Lake.
- Implement subsurface aerators in Duck and Ferril Lakes.
- Implement constructed wetlands using gravel filters on the slopes of Little and Ferril Lakes to improve water quality of both
- Implement end-of-pipe filtration to treat for nutrient and pathogen pollution in the pipe between Ferril and Duck Lake that empties into the latter.

formal gardens

- Include native flower and grass species into existing formal gardens to make the gardens more substantial and appropriate for native species' habitat, food, and shelter, as well as infiltration and drought tolerance.
- Retrofit existing formal garden beds to serve as rain gardens with either overflow or underdrain pipes to aid in stormwater quality and management.
- Implement milkweed plantings into the DeBoer Natural Area, south of the Lily Pond, and meadows not utilized for recreation to provide Monarch butterfly reproductive habitat.
- Implement a rain garden with native species that support butterfly populations in the area south of the Lily Pond.
- Incorporate flowers that attract adult butterflies into existing gardens to aid in the rebound of Monarch butterfly populations.
- Utilize improved butterfly habitat to educate park users about the status of Monarch butterfly populations and efforts undertaken in City Park to aid in their survival.

vegetative areas

- Utilize turf alternatives in the DeBoer Natural Area, the southwestern edge of the Big Meadow, and open areas not used for recreation to increase native grasses, vegetation, and plantings.
- Replace turf along shorelines with a vegetative fringe to decrease the Canada Goose population and attract native bird species to the area, as well as to improve water quality in the lakes.
- Preserve existing trees and replace trees that have died over time in the Cottonwood Grove and Crabapple Collection.

golf course

- Daylight channels that follow the storm pipe network, as well as the Hale Parkway to improve detention, mitigate flood events in the area, and create additional habitat for birds and other wildlife
- Relocate Bogey's Restaurant out of the future detention area and to higher ground.
- Implement vegetated swales in low lying areas and water channels to slow stormwater flow and increase stormwater quality.
- Increase native cottonwood plantings in riparian areas around waterways/detention areas.