

MANAGEMENT ISSUES RELATED TO JOHN A. STEWART PARK AND STEWART BRANCH CREEK

SUMMARY

At the 2002 annual meeting of the Parkhill Improvement Association, Bonnie Maiers, 112 Crestmere, was asked to form a working group to examine the issue of storm water drainage into Stewart Branch Creek. Initial discussions about the creek quickly linked to concerns about other park issues. This report is a set of broad management recommendations, assembled over the past year, based on many hours of discussion and park tours with resource management professionals. The report does not assume that there is any kind of consensus among the park owners regarding a need or desire for a more formal approach to managing the park. Hopefully, at the very least, this report will stimulate increased interest and involvement in the future of the park. A special thank you is extended to the following individuals for their time, patience and willingness to share their expertise and ideas with us:

Frank Gordon, Urban Resource Conservationist, USDA – Natural Resources Conservation Service
Brian Canady, Fisheries Management Biologist, Missouri Department of Conservation
Gene Basteed, City Arborist, City of Columbia, Missouri
Tom Wellman, Civil Engineer, Public Works Department, City of Columbia, Missouri
Mike Hood, Director, Parks and Recreation Department, City of Columbia
Jim Davis, Rural Sociology Department, University of Missouri
Dean Anderson, Watershed Partnership, University of Missouri
Lesa Beamer, President, Columbia Chapter, WildOnes
Ann Wakeman, Columbia Chapter, WildOnes

There was a surprising amount of agreement among the consultants on the condition of the park and things the Association should consider if a decision is made to do more planned park management:

1. **STREAM CHANNEL** – Stable right now. Protect with proactive mitigation with city.
2. **STREAM BANKS** – Relatively stable. No immediate attention required. Watch closely.
3. **RIPARIAN CORRIDOR** – Good urban example. Widen in selected areas with natives.
4. **OPEN GRASSY AREAS** – Fair to poor. Reconsider where and how we mow. Go native.
5. **WETLAND** - Very nice and unique. Expand, thin trees and go native.

If the park owners decide to adopt more formalized management guidelines; select best management practices appropriate for the guidelines; and implement those practices over an extended period of time, they will have achieved a consensus on what they want the park to look like and how they want it to function within the neighborhood, the watershed and the city. For example, general opinion would have to support the idea of dramatically changing the looks and ecological character of the park if tracts of open area were to be converted to wild flowers and prairie. General opinion supporting concerns about stream bank stability would be needed to support the development of management guidelines dealing with the mitigation of storm water impacts on the stream and park. Mitigation avenues run in many different directions including, but not limited to, detention fees, legal easements and changes in city policies. On the other hand, the

general opinion of owners may be that the park is fine just the way it is and there is no need to develop any kind of guidelines, plans or recommendations; simply maintain the status quo.

INTRODUCTION

During the winter months of 2001/ 2002, the City of Columbia installed a new storm water drainage system to handle increased storm water runoff from the new Columbia Public Library and address inadequate storm water collection at the corners of Crestmere Avenue and East Parkway Drive and Parkhill Avenue and East Parkway Drive. Prior to the construction, concerns about additional storm water being directed into Stewart Branch Creek were raised by Terry Barney, 202 East Parkway Drive, at the public hearing for approval of the project held by the Columbia City Council on March 19, 2001. During the construction, Bonnie Maiers, 112 Crestmere Avenue, organized a meeting with city engineers, library staff and neighbors to discuss water problems on properties adjoining the library and thought to be related to the storm water drain construction.

These concerns were raised again at the Parkhill Improvement Association's annual meeting in April, 2002. Bonnie Maiers was asked to form a working group to look at the overall issue of storm water drainage as it relates to Stewart Park and the segment of Stewart Branch Creek flowing through the park. The working group joined the Missouri Department of Conservation's Stream Team program to facilitate access to professional sources of expertise in urban hydrology and storm water management, riparian corridors, soil erosion, forest and grassland management, park management and native vegetation. Additionally, the program provides much easier access to an entire network of local and state watershed and storm water groups dealing with similar issues.

The primary goal of the working group has been the development of a set of broad guidelines for management of Stewart Park, including the segment of Stewart Branch Creek flowing through the park. Toward this end, the group spent 12 months examining the park with experts from the City of Columbia, the Missouri Department of Conservation, the University of Missouri and the Natural Resources Conservation Service; gathering inputs and recommendations for use in developing a set of management guidelines.

STEWART BRANCH CREEK

Stewart Branch Creek is a small, intermittent tributary of Flat Branch Creek. The stream has been channelized (straightened) and covered (buried drainage pipe) in numerous places upstream from the culvert on West Parkway Drive and down stream from the culvert at the intersection of South Garth Avenue and Stewart Road. The portion of the stream running through Stewart Park is open and has not been channelized. It exhibits a meandering pattern that is typical for a natural, unaltered stream channel. Stewart Branch Creek has been an integral part of Columbia's storm water drainage system since the early 1900's, if not earlier. The upper end of the stream channel originally began between Hardin Street and Anderson Street just south of Broadhead Street, but only difficult-to-detect traces of this upper portion of the stream still exist. The original channel was probably several miles or more in length. The stream ends at the confluence with Flat Branch Creek just below Stewart Road.

STEWART BRANCH WATERSHED

Stewart Branch Creek drains an area of approximately 300 acres - the Stewart Branch watershed. Approximately 280 acres of the watershed drains through Stewart Park to the culvert at the corner of South Garth Avenue and Stewart Road. An additional 20 acres drain into the creek below this intersection before entering Flat Branch Creek. Stewart Branch watershed is one of several small, highly urbanized subwatersheds that combine to form the 2,300 acre Flat Branch watershed. In turn, Flat Branch is a subwatershed of the much larger 48,700 acre Hinkson Creek watershed. The Hinkson Creek drainage is a part of the Perche Creek system that outlets at the Missouri River. Stewart Park is the largest undeveloped tract in the Stewart Branch watershed. As such, it is a major city greenway and critical floodway for larger storm events. It is not unusual for storm water to back into the park and be detained until it can pass through the culvert under South Garth Avenue.

CONSTRUCTION

LIBRARY - In the latter half of 2001, an agreement between the City of Columbia, the Columbia Public Library and the Stewart Park Trustees resulted in the addition of two storm water outlets on the stream between the footbridge and the culvert at the north end of West Parkway. The upper outlet drains a significant portion of the library site directly into Stewart Branch Creek by way of a new underground pipe that joins a new junction box and street drain at the corner of Crestmere and East Parkway. The second outlet drains storm water directly from two new street drains at the intersection of Parkhill and East Parkway and a raised drain in the park located just east of the outlet on the stream channel.

ALDEAH STREET - In late 2002, the City of Columbia began a large storm drainage improvement project in the area of Aldeah Street, Walnut Street, Bicknell Street and Ash Street. The project involves some reshaping and clearing along Stewart Branch Creek, and new street drains, culverts and sidewalks. These upgrades will tie into the existing underground system that enters Stewart Park through the culvert at the north end of West Parkway.

EDGEWOOD/MAUPIN – The City of Columbia is planning to upgrade sewer lines and storm drainage, possibly starting construction in 2005. The project is roughly defined by Broadway on the north, Greenwood on the west, Maupin on the south and Edgewood on the east. These upgrades will tie into the existing open channel and underground pipe system that enters Stewart Park through the culvert at the south end of West Parkway. Additional routing could take part of the storm water load through a new underground pipe from the intersection of Edgewood and Maupin to a new outlet on Stewart Branch Creek, located north of the bridge and due east of the intersection of Maupin and West Parkway.

THE ISSUES

Concerns begin with recently completed, ongoing and future storm water drainage projects that will bring more water, more quickly into the park; contributing to faster flow rates in the channel and increasing the probabilities for more frequent flooding and increased rates of stream bank erosion. Initial discussions concerning how to maintain the stream banks quickly broadened to include the entire park. Maintaining stream channel stability requires dealing with the entire riparian corridor, which in turn, impacts the entire park area. These interrelated facets expand the list of issues far beyond storm water volume to include: water quality, vegetation, maintenance and esthetics.

PARK FUNCTIONS

Any set of management guidelines has to take into consideration the fact that the stream and the park each currently serve multiple functions and will probably continue to do so. Our segment of Stewart Branch Creek is a natural, intermittent drainage way, an urban storm water conveyance, a wildlife habitat corridor and recreational area. In addition to its traditional neighborhood park functions (esthetics, recreation, etc.) the park is a critical city greenway and floodway.

CITY STORM WATER MANAGEMENT

Another factor complicating park management, especially when dealing with stream channel and stream bank stability, is current and future city storm water management policy. Based on our many hours of discussion with city staff, the bottom line regarding channel/stream bank stability and current city policy appears to be that all channel and stream bank maintenance is the responsibility of the park owners because it is private property. We say “appears” because we cannot find this position in a written policy statement that is directly supported by current city ordinances or civil engineering standards and practices set forth by the city. We are in the unfortunate position of having very little, if any, protection built into current city policies regarding upstream events that impact the stream and park yet we are responsible for mitigating the known or unintended downstream consequences. This is especially frustrating given the city’s reliance on the stream for conveying storm water collected from acreage not owned or controlled by the park owners and city use of the park as a storm water detention basin and floodway.

The city is sensitive to the situation but is in the rather awkward position of not having a comprehensive storm water management plan that deals holistically with stream and watershed health. A comprehensive planning framework would anticipate situations like the one we face and have downstream mitigation requirements built into the management processes. Over the past several decades, the city has spent a lot of time and money on controlling the volume of storm water runoff through the more traditional engineering venues. There are numerous city ordinances dealing with storm water management requirements. The city has developed and follows a storm drainage design manual that sets out standard design methods and policy. There is a city storm water master plan, developed with Storm Water Utility funds, based on computerized flow routing through the watersheds within the city. For several years, the city has sponsored a number of programs oriented towards water quality issues, including the familiar household hazardous waste program. More recently, the city has begun to address storm water volume and quality issues through more public venues, including the Community Storm Water Project and the joint county/city Storm Water Task Force.

In addition to current mandatory regulations and voluntary initiatives, future city storm water management will also be shaped by new federal and state regulations that require a more holistic approach in developing policies and best management practices. Recently, the city was required to file a National Pollutant Discharge Elimination System (NPDES) Phase II permit required for compliance with the Federal Clean Water Act and Missouri Department of Natural Resources regulations. Section XI of the permit deals with post-construction storm water management in new development areas and redeveloped sites that will impact storm water management throughout Columbia’s watersheds. The permit identified sediment/suspended solids as the highest priority target pollutant impacting Columbia storm water quality and stream bank erosion

as the primary source of the sediment pollution, both major concerns that relate to Stewart Branch Creek.

And finally, any city action is dependent upon adequate funding. Storm water management is just one more very expensive city responsibility and it is even very hard to get dedicated funds into actually building and maintaining best management practices. The city Storm Water Utility is a good example. In 1993, Columbia voters approved a storm water utility tax. The tax currently generates approximately 1.2 million dollars in annual income but only 32 percent (\$370,000) is spent on project construction.

MANAGEMENT ISSUES AND RECOMMENDATIONS

STEWART BRANCH CREEK CHANNEL AND STREAM BANKS

The primary threat to channel and stream bank stability will come from additional storm water brought into the park from redevelopment, land use conversion and storm water drainage improvements around and above the park. These types of changes will cause more water to enter the park, reaching higher levels more quickly and flowing faster. Dealing with these types of future changes will require interdiction by association officers and park trustees and their insistence on the utilization of on-site best management practices (BMPs) to mitigate the increases in storm water that changes above the park are generating.

The park segment of Stewart Branch Creek has adjusted well to its functions as an urban stream. The gradient (steepness) of the channel is stable, aided by the bedrock outcroppings below the bridge, several sewer line crossings and a well established riparian corridor. There is some minor bank erosion occurring at and above the bridge. This is a natural consequence of the meandering process, itself a good indicator of overall stream stability.

RECOMMENDED GUIDELINES

The goal should be to keep as much water in the channel as long as possible during high flow periods. This is best accomplished by keeping the channel free and clear of logs and other woody debris. Any type of channel clog forces water around the blockage, accelerating stream bank erosion. Check for and clear obstructions on an annual basis. . Do not use the channel as a disposal site for yard waste (leaves, grass clippings, brush) and unwanted brick, rock and concrete material.

All areas of active stream bank erosion should be monitored closely. The erosion taking place now reflects the natural adjustment of a meandering stream and do not require immediate attention. However, as more water is drained to the park by upstream changes, these areas are the most vulnerable to increased erosion. Investigate best management practices that would be agreeable to a majority of residents and be prepared to intervene if erosion rates accelerate.

Pursue every opportunity to convince city officials to build mitigating BMPs into all future storm water infrastructure projects above Stewart Park to maintain channel and stream bank stability. Be aware of all projects in the watershed that could possibly impact the park and be prepared to engage in the public planning process. Evaluate your own property and determine what you can do to minimize storm water runoff off of your lot.

Investigate possible legal agreements with the city that would set forth terms for use of the stream and park by the city and protect the residents' long term ownership rights and control of the appearance and use of the stream and park. There is legal precedent for such agreements using long term easements and other devices.

STEWART BRANCH CREEK RIPARIAN CORRIDOR

A riparian corridor is the natural vegetation adjacent to a stream channel. Riparian corridors play a number of important roles in maintaining and promoting a healthy stream. They act as a buffer between the stream and adjacent land uses; trapping flood debris, slowing and filtering sediments and other pollutants before they reach the stream, reducing stream bank erosion, maintaining channel stability, improving wildlife habitat and increasing esthetic value. The minimum riparian corridor should be approximately 100 feet wide on each side of the stream and composed of uneven aged trees and shrubs. Canopy should be open enough to allow a healthy under story ground cover to provide maximum protection against normal sheet erosion and high flow stream conditions.

The riparian corridor through Stewart Park is an excellent example of what an urban stream buffer should look like. The entire length of the stream has a good mix of native and introduced tree species. There are areas where mowing to the stream bank has overly narrowed the corridor. There are also areas where shrub honeysuckle has taken over.

RECOMMENDED GUIDELINES

The primary goal should be to maintain as wide a corridor as possible, implementing a workable compromise between the hands off "jungle look" and the overly manicured "park look". With this goal in mind, the following practices are recommended:

1. Re-establish woody and shrubby vegetation in narrowed areas with native species, paying careful attention to sun/shade tolerances. For example, in very shady areas consider lots of flowering dogwoods, mixing colors and planting in staggered patterns. Serviceberry (Autumn Brilliance) makes a good under-story planting. Redbuds will thrive in full sun areas close in along the banks and larger trees like pecans at the outer edges of the corridor. Good bank stabilizers like fragrant sumac and native hibiscus should be planted in those areas getting a mix of sun and shade. There are lots of species choices for each shade/sun combination, with cost, esthetics and riparian suitability being the primary considerations.
2. In replanted areas, carefully mow or trim grass/weeds three or four times through the growing season to maintain visual appeal. Keep this cover considerably higher than adjacent turf to maintain buffer functions – 6 to 12 inches.
3. Remove large thickets of honeysuckle and replant with native trees and shrubs.
4. The forested portion of the corridor between the stream and Stewart Road is in good condition. Keep this area thinned. Maintain an open canopy to promote an adequate vegetative ground cover.
5. Do not allow leaf/soil dumping or brush piles in the corridor. These activities destroy the more valuable living vegetative ground cover and add to channel clogging.
6. Pursue the development of a long term forestry management plan prepared by a professional forester and seek funding for implementing the plan.

OPEN SPACE GUIDELINES

Large areas of the park are currently devoted to open, grassy areas with scattered trees. These areas require frequent mowing during the growing season; generating the largest annual park maintenance cost. Turf quality is fair to poor. Historically, management has been restricted to mowing with no use of herbicides, pesticides or fertilizers due to the cost and environmental impact of more intensive turf care practices. Attempts to better control mowing heights have been sporadic and controversial.

RECOMMENDED GUIDELINES

1. Set mower deck higher for open areas within the riparian corridor to maintain a minimum buffer value.
2. No mowing within tree drip lines. Mulch these areas to keep mowers out and control weeds.
3. Set mower deck higher in shaded areas where grass has been replaced by other types of ground covers.
4. Give serious consideration to converting large tracts to beautiful, low-maintenance prairie. Warm season native grasses and wild flowers offer a number of long term advantages:
 - 1) Annual maintenance would be reduced to one mowing or prescribed burn.
 - 2) Reduced rainfall runoff.
 - 3) Improved esthetics.
 - 4) Expanded and improved wildlife habitat.
 - 5) Improved ecological balance.

Short term disadvantages:

- 1) It takes two to three years for most seedlings to flower and three years for prairie plants to overcome initial weeds. Tract must be mowed as needed to keep first year growth to eight inches and second year growth to 12 inches.
- 2) Proposed areas would require at least one herbicide application in late summer to kill existing cool season grasses prior to a winter seeding.
- 3) Conversion costs are estimated at approximately \$800.00 per acre.

WETLAND GUIDELINES

The wetland at the top (north end) of the park is a unique and very beneficial feature of the riparian corridor. The wetland is undergoing a very natural transition to more trees and far fewer herbaceous plants, like cattails. PHIA members must decide if they want this to continue, with selective thinning of less desirable species or open the area back up to more herbaceous species. Another issue is the size of the area. The wetness conditions at this end of the park are such that it will support an expansion of the site.

RECOMMENDED GUIDELINES

Expand the wetland to take in the adjacent area capable of supporting wetland vegetation. Thin out silver maples and old willow remnants. Plant more river birch on perimeter of expanded site. Consider conversion to a native prairie type wetland. This would involve thinning tree saplings, killing the cool season grasses in the fall and seeding natives like River Oats in open areas between trees.

CLOSING

John A. Stewart Park and Stewart Branch Creek are invaluable resources for the neighborhood, watershed and City of Columbia. Both are in good condition. There are no major problems that need immediate attention. We need to keep the stream channel open, carefully watch for signs of accelerating erosion of stream banks and expand the width of the riparian corridor wherever possible. Most importantly, we need to have an open and ongoing discussion about what we want the park to look like; how we want it to function; and how we want to conserve it. Your comments on this report and any thoughts you have on the stream and park can be addressed to any of the current PHIA officers or:

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