

**IMBA International Mountain Bicycling
Association**

**Wissahickon Park Trail Sustainability Assessment
October 2004**

1. Summary

The Fairmount Park Commission was authorized to purchase the Wissahickon Park property in 1864 for the twin goals of protecting the natural aesthetics of the Wissahickon Valley and aquatic resources of the Wissahickon Creek. Reports and documentation over the last 20 years have highlighted the continued environmental degradation of the Wissahickon and erosion occurring on the trails. Erosion has been listed as a priority in planning documents from the 1983 Fairmount Park master plan through to the Recreation Trails of the Wissahickon Valley report produced in early 2004. There have been continuous repairs and reconstruction of the trail system over the last century.

It is time to examine the physical causes of trail erosion rather than just responding to the symptoms. A plan must be developed not just to repair the current trail, but to ensure a sustainable trail system for future generations. A sustainable trail system will reduce maintenance costs, reduce user conflict, and prevent further erosion and resource damage. More importantly it will enhance the public's enjoyment of the park and its natural beauty. It is only fitting that the trails that provide the public access to enjoy this resource conform to the original goals for this remarkable piece of land.

The process to achieve this goal of sustainable trails will require analyzing the goals and insights of the many stakeholders. Once this information is collected and examined, along with the wealth of data about the Wissahickon's natural resources, a plan can be developed to transform the current trail system into a successful sustainable trail system that will highlight the park well into the future.

2. Study Area

2.1 The Wissahickon Valley and its trails

The Wissahickon Valley is almost 2,000 acres of mostly wooded stream valley inside the city of Philadelphia. The park follows the Wissahickon Creek from the northern boundary of the city for over seven miles until the Wissahickon empties into the Schuylkill River. The stream canyon and valleys of its many tributaries provide a valuable natural refuge for wildlife and humans from the city that has developed around it. The trails that provide access to the valley also tell the history of its human occupation and use.

The first trails were used by game and Native Americans. As European settlers explored and settled in the area, these trails developed into the mill roads that now form the backbone of the Wissahickon trail system. During the early 19th century over 50 mills lined the banks of the creek. During this time the toll road that would later become known as Forbidden Drive and many of the stream side access roads were developed. The mills and roadhouses were torn down and only Valley Green and a few other structures remain from this time. The purpose of the valley turned to recreation and it became known as a place of wild beauty.

As Philadelphia developed, its impacts were felt in the park with numerous sewer lines and aqueducts constructed during the late 19th century. Many of these linear corridors have become part of the trail system along with routes developed strictly for recreation. The yellow trail from the Schuylkill to the Henry Ave. bridge is documented in the 1878 Annual Reports. By the 1920s large sections of the current Orange and White trails are described in trail guidebooks. Descriptions and postcards of the park from this time would seem familiar to current users. Wissahickon Drive is packed with visitors, the pictures of the upper trails look similar to now, and photos of the stream bank show exposed roots and soil erosion.

By the 1920's the increased popularity of the park had driven the community to ban automobiles from Wissahickon Drive and it became known as Forbidden Drive. During this time of public activism on behalf of the park the Friends of the Wissahickon came into being in 1924. The Works Progress Administration reconstructed and added to the trail system during the 1930's. Since that time various other trails have been developed or added to the system as new property has been acquired and city streets have been closed to vehicles and converted into trails. This patchwork trail system development demonstrates many different styles of trail design and various construction methods that have been employed over the years. From the stone pitching and older stone work of the 19th century, through the WPA stone work and trailside culverts, to the more modern rubble fill and gravel surfacing, a timeline of trail techniques is visible.

2.2 Geology and Soils

2.2.1 Geology

The park and creek cut through Precambrian and lower Paleozoic strata consisting of mixed of schist and quartzite. These banded layers of exposed rock have helped create the steep walled valleys that give the Wissahickon a sense wildness in the midst of a major city. The rock outcroppings create an important part of the aesthetic of the park and are valuable for the education of hobbyists and geology students from nearby universities.

2.2.2 Soils

The Wissahickon valley soils are predominantly from the Manor series and are stony loams without much clay. Lower in the valley near the stream the soils are *Manor and Chester extremely stony loams(McE)*, above this level the soils are *Manor extremely stony loam(MbD)*, and higher on the slopes appears *Manor loam(MaC)*, and some patches of other soils with more clay. All of the Manor soils are listed as having a severe erosion hazard. Understand that this erosion factor is based on agricultural use and bare hillsides. It does not mean that there can't be sustainable trails on these soils, but it provides an indicator that these soils likely lack a high amount of cohesion. Given the high level of use on the Upper trails and the non-cohesive soils that provide their foundation, it is recommended that the maximum trail grade sighted on native soils not exceed 15% and be less than 10% whenever possible. There are some occurrences in the park of other soil types that have slightly higher clay content and these local variations may allow slightly steeper grades to be sustainable.

2.3 Vegetation

2.3.1 Forest description

1,755 acres of the Wissahickon's nearly 2,000 acres is considered natural land and almost all of this is forest with a small amount (6%) being meadow or shrubland. Oaks, beeches, hemlocks, and tulip poplars are evident along with a broad mix of trees typical to an eastern hardwood forest. Despite the industrial history of the valley large sections of the forest were never cleared and are relatively well preserved. However the pressure of urban pollution, invasive species, unmanaged herbivores, and nonnative plantings has changed the character of the forest. Hemlock was much more common and a defining characteristic of the park during last century and early this century. The loss of the American Chestnut during the 20th century impacted all the eastern hardwood forests. More recently a huge upswing in the deer population devastated the understory and eliminated two decades worth of sapling survival for many species. The recent reduction in the deer herd has had an immediate beneficial effect on sapling and shrub survival. Andorra's history as a nursery has left a legacy of western cedars and Asian maples amongst other non native trees.

2.3.2 Invasive species

There are numerous invasive species spreading through the park and challenging native plants for nutrients and light. Evident on forest edges and deep under the canopy, a variety of aggressive non-native plants have taken root. Japanese stilt grass, non-native honey suckle, mile-a-minute vine, privet, garlic mustard and Japanese knot weed are just a few of the plants that will provide management challenges over the coming years if the Wissahickon is to retain the appearance of a classic eastern deciduous forest.

2.4 Wildlife

2.4.1 Mammals

The Whissahickon supports populations of whitetail deer, raccoon, fox, squirrel, chipmunks, and other small mammals. As is typical with managed forests in urban areas where hunting and large predators are not compatible with other uses there needs to be an active large mammal management program.

2.4.2 Birds

The forest and meadows of the Wissahickon provide forage and habitat for 167 separate bird species. While 66 species breed in the park or surrounding areas, many of the birds seen in the park are short term visitors during some stage of migration. While the entire park provides habitat for some species, there are several areas recognized by birders as superior for observation. Carpenters Woods, the meadows at Andorra, Cathedral Road Meadow, and large patches of unbroken forest are areas considered especially important to the avian population.

2.5 Access and transportation

Surrounded by neighborhoods, the Wissahickon is a porous park that has numerous entry points and is part of the larger Philadelphia transportation infrastructure. The Wissahickon's many access points create management challenges in dispersing information to visitors and in developing accurate data about frequency and patterns of use.

2.5.1 Transportation

Three paved roads bisect the park. Bell's Mill Road is a narrow twisty road without shoulders that connects the Andorra neighborhood to Chestnut Hill. It is the only east-west connecting road for over three miles when traveling north-south. The Walnut Lane bridge is a landmark in the park and allows the Walnut Lane traffic to pass above the park. Lincoln Drive is a busy four-lane road that serves as a feeder to I-76 and creates a less than park-like ambience on the trails adjacent to it.

The park also provides a corridor for alternative transportation. Numerous commuters use the park both on foot and by bike.

2.5.2 Access

Trail access points are where park visitors start their trail experience in the park. There are over 60 access points to the trail system from the surrounding neighborhoods and 12 designated trailheads with parking. Those 12 parking lots provide nearly 400 parking spaces with another several hundred parking spaces available on city streets within a block of an access point. There are also two stables that provide equestrian-only parking and act as access points. There are also 6 Septa train stations within 5 blocks of a trail access point.

2.6 Recreational use of trails

There is a huge variety in the types of recreational use and the experience goals of visitors to the Wissahickon. Trail visitors run, walk, hike, ride bikes, walk dogs, ride horses, watch birds, fish, socialize, rock climb, swim, and enjoy nature. Some visitors have a goal of solitude and tranquility, others look to socialize in the forest, and others are looking to exercise in a natural setting. The challenge of the trails and the physical effort required to navigate them is of primary importance to some visitors, while others never breathe hard and focus on quietly experiencing what the forest has to offer. This diverse range of uses and experience goals creates the potential for user conflict, or goal interference. While the majority of the park trails are managed for shared use, some are restricted to certain uses and there are also areas in the park reserved for a single type of use. The stables and challenge course are examples of single use zones as are developed managed areas like ballfields. Motorized use is prohibited on the park trails, except for a short section of Forbidden Drive.

2.7 Stormwater

The Wissahickon parkland surrounds the creek and its tributaries with a green buffer, however this forested area does not extend to the top of the ridges and only covers the bottoms of the watersheds. The tops of the watersheds, especially to the East are developed and a mix of impervious surfaces adjacent to the park in the form of parking lots, streets, and buildings sets the stage for increased storm water flows into the park. Storm water runoff is the leading cause of erosion in the park. Each large rain event leaves evidence of erosion on hillsides, creek banks, and trails.

3. Existing Trail System and evaluation

3.1 Existing Trail System

The Wissahickon trail system is composed of approximately 55 miles of trail. Forbidden drive is a rail-trail style gravel surfaced trail 5.3 miles long, running the length of the valley. There are 1.4 miles of gravel-surfaced roads that closed to vehicles which are used as trails and provide maintenance and emergency service access. There are also 1.9 miles of paved trail in the south end of the park. The remaining 45 miles of trail are commonly referred to as the Upper trails and are a combination of natural surface, gravel, cobblestone and deteriorated pavement. It is these 45 miles of upper trail that are the primary concern of this report.

3.2 Trail type by designated use

The Wissahickon has three different types of trail use designation:

1. Hiking only;
2. Hiking and equestrian;
3. Hiking, equestrian, and cycling.

3.2. Synopsis of evaluation process

During the weeks from August 21st through September 13th the entire Upper trail system was evaluated on foot. All sections open to bike were ridden in both directions to check for poor sightlines and areas with high potential for user conflict.

The goal of the Trail Sustainability Evaluation was to determine the scope of work required to create a sustainable trail network.

3.2.1 Variables considered in determining sustainability

The following factors were examined in the field to determine the potential sustainability of the Upper Trails:

- Soil type – all soils were considered highly non-cohesive.
- Level of use- All trails were considered potentially high use (over 500 user passes per week.)
- Grade of trail- Trail grades of 15% and over will create problematic sustainability issues. Sections of the park trails are over 30%.

- Storm water runoff from sources outside the park property- As these point sources of storm water are likely beyond the control of the FPC or FOW they were considered permanent watercourses, like the natural streams.
- Condition of trail- the condition of the trail and recent rain events left much evidence of water erosion and past reconstruction efforts. However, maintenance during the last decade and a lack of maintenance logs may have created, in some areas, a false picture of sustainability.
- Ratio of trail grade to sideslope- a contour trail needs to have a trail grade of under half of the sideslope grade to avoid capturing water flow water. Whenever possible it is best to have the trail grade be a third or less of the sideslope grade.

3.2.2 Variables considered irrelevant to determining potential sustainability.

The following factors were not considered in determining the potential sustainability of the Upper Trails:

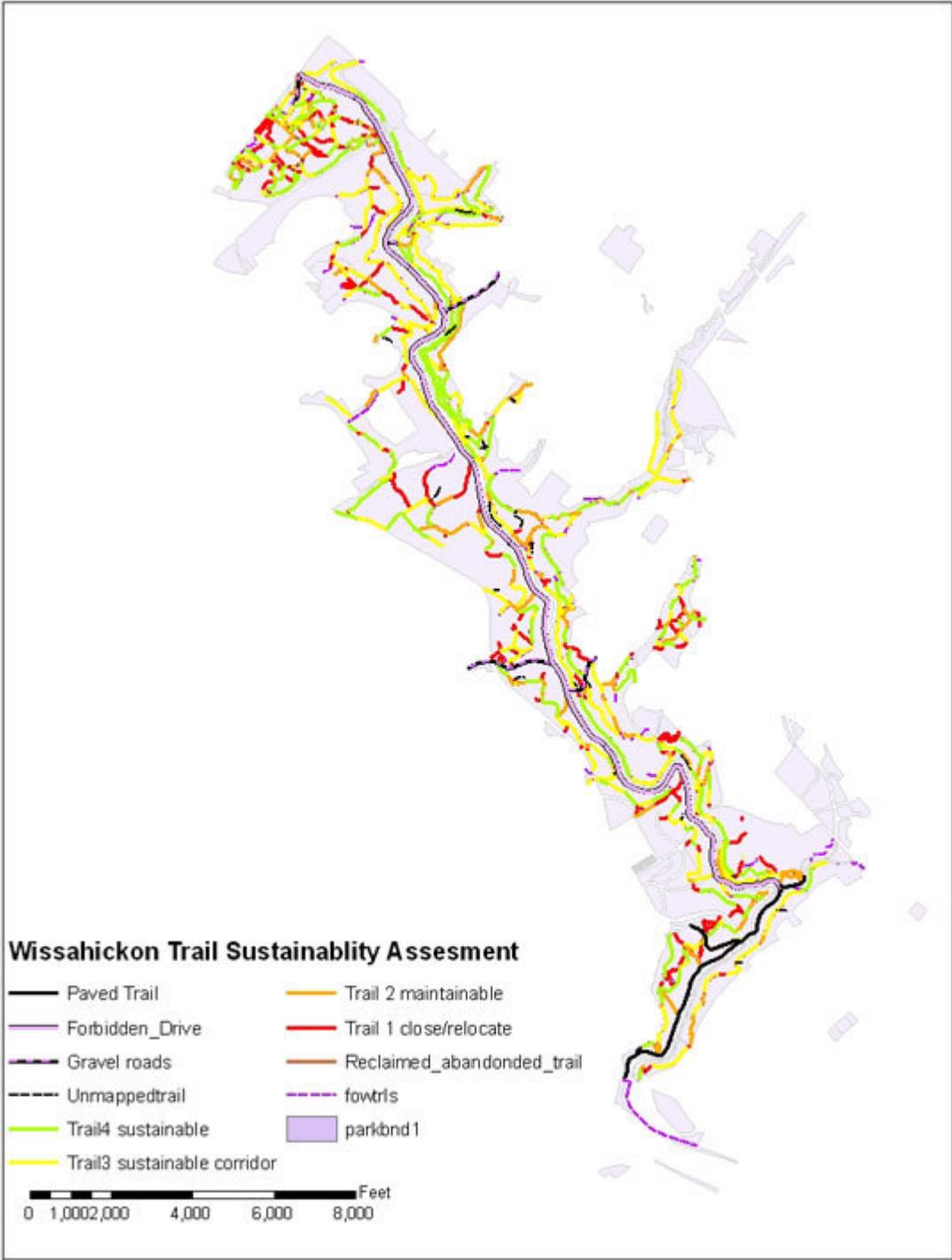
- Type of use- walkers and cyclists have different styles of impact on trails, however the level of tread disruption has been shown to be very similar when comparing large numbers of user passes. The professional trail community has agreed that equestrians and other powered uses have a higher per-pass impact than human powered users. However, the level of equestrian use in the Wissahickon is light compared to the other uses. Given the high levels of similar use (hike and bike) it didn't seem like the type of use on the trails is an influential factor in the trails sustainability. However, the type of use will be a critical factor to consider during redesign and reconstruction.
- Width of trail – this can be altered during reconstruction and was not considered a permanent asset.

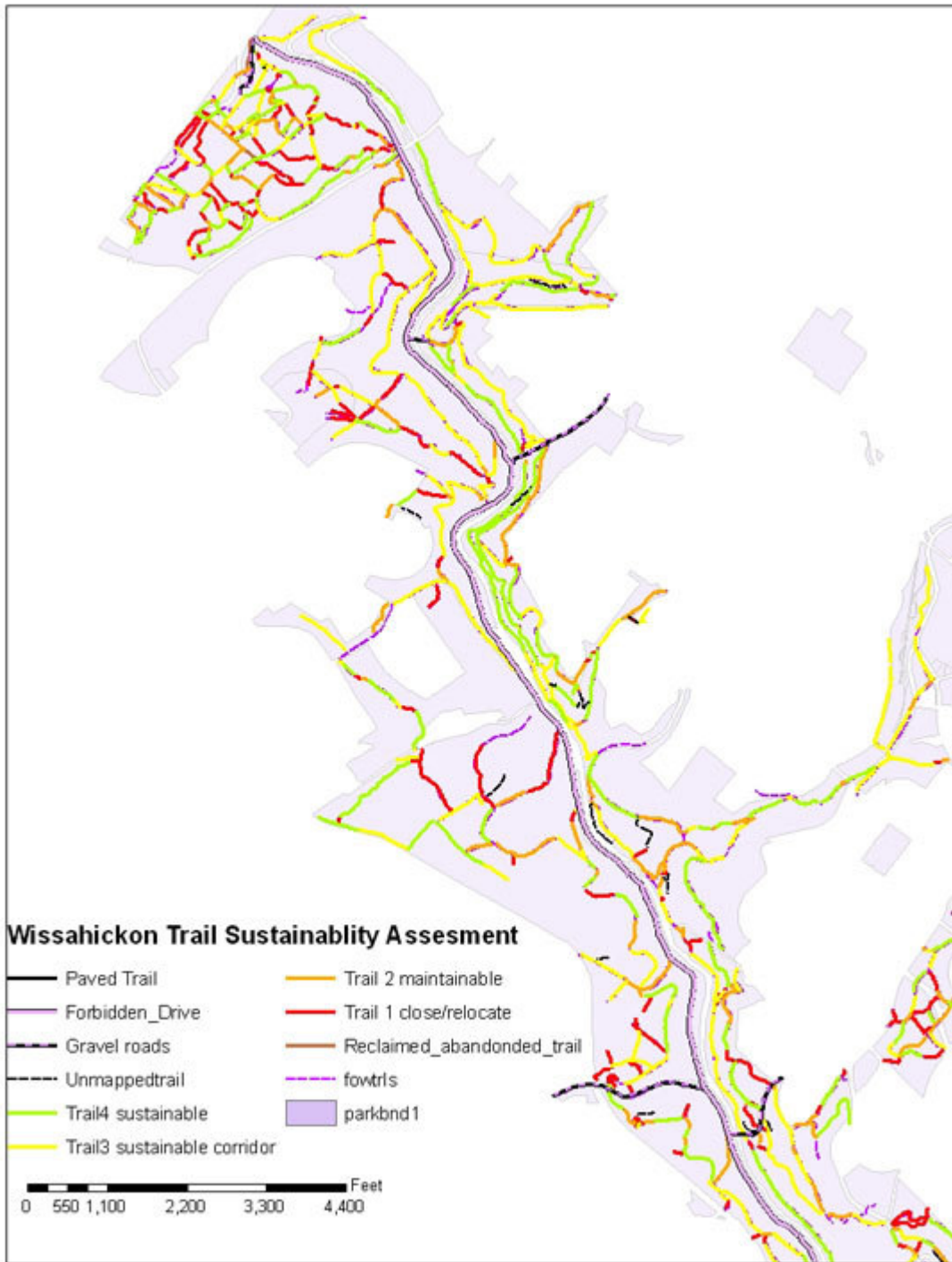
3.2.3 Potential sustainability rating system

Employing the assessment factors listed above, a number a different gradations of trail sustainability emerged. The attached map displays the locations of these differing levels of sustainability and the general assessment of each type of trail is as follows:

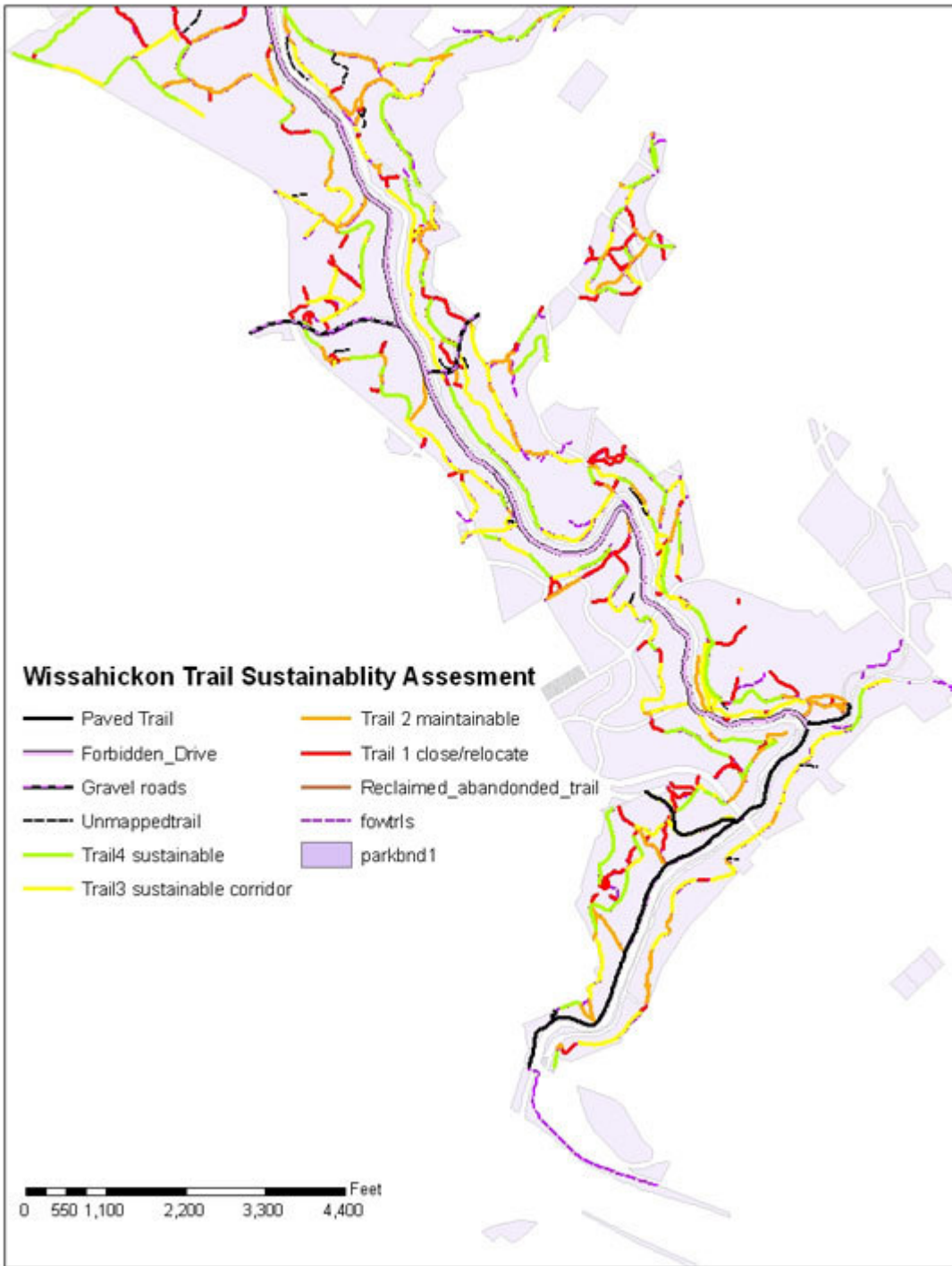
- Green – Trail has a sustainable design and requires only normal maintenance. Many green sections of trail are long overdue for regular maintenance and require hundreds of full size rolling grade dips, knicks, and corridor clearing.
- Yellow – Trail has a mostly sustainable design. These trails may require slight relocation to achieve sustainable design and likely require major reconstruction work within the existing corridor to be made sustainable with regular maintenance.

- Orange- Trail does not have truly sustainable design. Quite likely, relocation would be cheaper and more long lasting than reconstruction, however lack of relocation options due to property constraints or historical structures may preclude this option. Trail can be made maintainable with aggressive reconstruction and stone work. Maintainable means that this section will require more frequent monitoring and maintenance of drains and be more likely to fail during catastrophic rain events, it does not mean sustainable. Understand that the reconstruction work required in some of these sections to withstand six plus inches of rain may be five to ten times the cost of relocation in terms of labor and materials.
- Red – Trail has a fall line design that guarantees long term failure without continuous maintenance and reconstruction. Closure is the best option. These trails will have to be relocated if access is still required or desired. Some of these segments may be considered Orange if there is no relocation option and the segment cannot be closed. Again realize that, at best, the end product will be a maintainable section of trail, not a sustainable section, and more frequent maintenance will be required.





Wissahickon Trails- North End



Wissahickon Trails- South End

3.3 Stakeholder meetings

The goal of stakeholder meetings is to receive input from park visitors, neighbors, volunteers, and managers. The stakeholders are critical to the long term success of the trail system and park. Often the stakeholders can provide information and insight into the workings of the park and trails that is unavailable elsewhere. It is important that their opinions and concerns be understood early in the planning process.

3.3.1 Stakeholder meetings 8/04- 9/04

A number of meetings with stakeholder groups have taken place at this date. These meetings include:

- Wissahickon Environmental Center: Trish Fries
- 92nd District police: Captain Descher, Officer Viteo, and Officer Bikel
- Friends of the Wissahickon trail task force
- Wissahickon Restoration Volunteers: Sarah Low
- Representatives of Wissahickon birding community: Shirley Gracie and Stephen Lawrence
- Fairmount Park Commission: Deborah Wolf-Goldstein
- Fairmount Park Commission office of planning and development: Theresa Stuhlman

Meetings with other groups that, at this date, have not taken place but should be scheduled include:

- Wynacot Audobon Society
- Morris Arboretum
- Wissahickon geological community: Sarah West
- Delaware Valley Mountain Bike Patrol
- Jersey Action Riders
- Appalachian Mountain Club – Delaware Valley Chapter
- The Philadelphia Trails Club
- Representative from Monastery Stables
- Representative from Courtesy Stables
- Schuylkill Environmental Center
- Representative from NLREEP
- Friend of the Wissahickon Wildlife committee
- Fairmount Park Commission 3rd district maintenance staff
- Fairmount Park Commission Rangers
- Philadelphia Water Department's Office of Watersheds
- Philadelphia Fire Department
- The Wissahickon Wanderers running club
- The Suburban Dog Training Club

- Fairmount Park Commission Volunteer Coordinator: David Bower
- Munro Ecological Services

3.4 Documents referenced

The history and environmental resources of the Wissahickon valley are well documented by a variety of sources. The following documents provided the majority of information about the park.

- Wissahickon Trail Master Plan
- Wissahickon Creek Restoration Plan
- Wissahickon Valley Master Plan
- Fairmount Park Commission Regulations
- Recreational Trails of the Wissahickon Valley
- Along the Wissahickon Creek
- Recommended Projects in the Wissahickon Valley
- Gems of the Wissahickon
- Checklist of Birds in the Wissahickon
- Fairmount Park Survey
- Fairmount Park Master Plan
- Friends of the Wissahickon Membership Survey
- Trails GIS data

3.5 Documents required for further planning

Documents that will be required for the future planning of the trail system that have not yet been made available include:

- Natural Resources Inventory GIS data
- Storm water outflow and sewer line GIS data

4. Planning Issues and Opportunities

4.1 Continual resource impacts due to trail erosion

Trail erosion in the Wissahickon is a causing continual resource impact in the form of sedimentation and loss of soil. The erosion is a primarily a result of unsustainable trail design and maintenance. The combination of high levels of use and water runoff will continue to cause erosion on park trails unless addressed. Many of the most unsustainably aligned trails have undergone a cycle of deep erosion, reconstruction, and further erosion. This can be seen in the depth of non-native aggregate exposed in the trail beds during the recent rain events. Filling and regrading these trail beds only addresses a symptom and fails to get at the cause of the erosion. Simply put, if the trail creates a natural path for water to flow, it is likely to see erosion problems. There is the opportunity to eliminate the sections of trail that are unable to be considered sustainable and reconstruct those sections that can achieve sustainability. The end result would be a stable, sustainable trail system that can withstand catastrophic rain events with little or no erosion and retain the diversity and character that has drawn visitors to the Wissahickon for years.

4.2 Continual resource impacts due to off-trail use

The degradation of the trail tread surface and obstruction by deadfall has encouraged users to widen and in some cases blaze new trails around obstacles. This unmanaged expansion of the trails increases bare ground, impacts the trail side vegetation, and increases the potential for erosion during large rain events. By creating a sustainable, stable trail surface that provides visitors with the experience they are seeking, it is possible to reduce off trail travel and minimize impacts to trailside vegetation and wildlife.

4.3 User conflict

The high levels of use in the park and lack of sufficient green space and funding for separate use trail systems requires that much of the trail system be shared use. User conflict occurs for three primary reasons.

4.3.1 Crowded Trails

As many trail users are out on the trail to escape the hustle and bustle of city life and looking for a peaceful natural experience they are potentially hostile to with interaction with other users.

4.3.2 Startle Factor

While the Wissahickon operates under a Fairmount Park Regulation that limits speeds to 7 mph this doesn't seem to be widely adhered to by the public on the upper trails. Cyclists and trail runners are frequently moving at speeds of 8 to 13 mph. While trail

etiquette requires that faster users slow down to interact with other users, poor sightlines and degraded tread conditions can sometimes prevent this. The current trail system has long sections where waterflow has scoured all the soil away and left the trail surface a loose scree field that provides an unstable surface. There are also many blind turns and intersections that are likely to create user conflict. A well designed and maintained shared use trail has sufficient sightlines and uses the trail design and construction to ensure a low maximum speed. A sustainable trail also has a tread that remains stable and allows users to feel more secure in their mobility.

4.3.3 Perception of Resource Damage

The perception of damage to a valued resource by another type of user can generate hostility and resentment. Fingers are pointed in many directions when there are mud holes or erosion rills. All types users have impact on trails- often different impacts, but impacts still the same. Mud holes are a good example. Cyclists leave a linear trench that holds water and displaces soil to the sides. Horses will posthole the soft soil creating holes that hold water and displace soil. Hikers frequently skirt the edge of mud holes and widen the trail. Each user type has a different impact, but each type of impact encourages further resource damage. Different trail features and design will increase or decrease the potential impact by different user groups. When designing or maintaining shared use trails it is vital to be aware of the potential impacts and behavior of each group in order to create a sustainable trail that doesn't foster user conflict.

4.4 Navigation and signage

Effective signage aids navigation and is an important tool for educating users about risk, proper behavior, designated uses, natural resources.

4.4.1 Navigation

With over 200 intersections and 60 possible entrance points, the Wissahickon trail system creates a challenging wayfinding situation. In talks with stakeholders and examining web log descriptions of rides and hikes, there emerges a familiar theme of being lost in the Wissahickon. Many frequent users don't seem to venture beyond the trails they know for concern of becoming disoriented. A system of improved waymarking that is easy to understand and follow would help disperse visitor traffic around the park and enable visitors to plan routes and navigate them successfully.

4.4.2 Ability to communicate location

During the stakeholder meetings it became painfully clear that even individuals that are intimate with the park have a hard time communicating that location to someone else. An improved signage system would enable trail users to clearly identify their location and communicate this information to other users, park staff, and emergency responders.

4.4.3 Trailhead kiosks

Many land management agencies use trailhead kiosks to communicate expected risks, regulations, expected behavior, navigation information, how to communicate location to emergency responders and interpretive information on the historical and natural aspects of the park. Kiosks at the designated parking areas would enable this detailed information to be provided along with a map.

4.4.4 Designated use

The current system of shared and restricted use trails requires clear signage if trail users are expected to abide by the designated uses. The current signage makes an admirable attempt at this, however, the many unsigned intersection, inconsistent designation, difficult to see green blazes, and lack of consistency between the map and on the ground signage creates a situation where it is unreasonable to expect users to stay on the appropriate trails. Improved signage would provide users with clear use designations at each intersection so they can make the correct choices about which trail to use.

4.4.5 Trail difficulty and accessibility rating

The diverse nature of the trails and conditions in the Wissahickon Valley provides many potential experiences. However, the lack of signage indicating a trail's difficulty creates a problem for users trying to choose a route that provides the level of challenge they desire. This is an extremely important issue in regards to compliance with the Americans with Disabilities Act Accessibility Guidelines. The biggest barrier to access isn't impassable trail, it is a lack of knowledge of future trail conditions. By not providing trail condition information, mobility challenged users are prevented from exploring the potentially accessible trails. Mobility challenges cover a wide range, from a minor mobility impairment requiring a cane to major impairments requiring powered wheelchairs. By providing clear objective trail information, such as created by the Universal Trail Assessment Process (UTAP), mobility challenged users can determine which trails are accessible given their level of mobility.

4.5 Unenforced park regulations

There are several regulations issued by the FPC, some dating back years, which are currently not enforced. The lack of enforcement creates a public perception that all FPC regulations are either unenforced or subject to arbitrary enforcement. Enforcement should be a tool of last resort and the goal of any management body issuing regulations would be a development of societal ethics that creates self enforcement through peer pressure and understanding that the regulations create a better experience for all. There will be individuals who, through selfish acts or a sense of alienation, will violate these regulations and enforcement will be required. However if violation is practiced by a majority of the population, there is a problem either in the regulation itself, its implementation, or enforcement. The following three regulations have important impacts on the trail experience of users and appear to be currently unenforced.

- Bike trail permits
- Dogs on leash
- 7 mph speed limit

4.6 Trail emergency response plan

An important part of any risk management plan is planning for an emergency response situation. During the 92nd District stakeholder meeting it became evident that the current emergency response plan for the Wissahickon trails is insufficient. There were several stories of excessive response times. This appears to be a result of:

- Difficulty in public communicating emergency site to emergency responders;
- Inability to accurately determine emergency site results in inappropriate emergency response team being dispatched;
- Inability of emergency responders to locate emergency site; and,
- Inconsistent chain of communication between 911, emergency responders, FPC rangers, and 92nd district during emergencies.

An effective emergency response plan would improve coordination between agencies, allow the public to clearly indicate emergency location to 911, and would provide emergency responders with the information they need to choose the right vehicle and efficiently navigate to the emergency site.

4.7 Bridge locations or spans not sustainable

The rain events during the summer of 2004 resulted in the failure of a number of decades old bridges and bridge abutments. In many areas these abutments constricted the stream flow at that location. It is possible that the size of the storm water flow surges has increased in recent decades as improvements to the storm water system have been made and more impervious surface has been added to the watersheds. The current bridge abutment locations and bridge spans may need to be reexamined for long term viability.

5. Priorities

5.1 Sustainable trails

Develop and implement a plan based on current best management practices of sustainable shared use trail design and construction. The plan should indicate unsustainable trails and bridges to be closed, locations of potential reroutes, recommendations on reconstruction trails in sustainable corridors, and recommendations on sustainable construction techniques. The goal is long lasting sustainable trail system with a stable tread surface able to weather catastrophic rain events with minimal damage and requiring much reduced annual tread maintenance. The plan should take potential user conflict into account during design of relocations and reconstruction. This may require improving sightlines and reducing users' potential speeds as well as intersection redesign.

5.2 Signage and Navigation

Along with the sustainable trails plan a signage and waymarking plan will have to be implemented to address the needs of improved navigation, reduced emergency response time, compliance with ADAAG through use of UTAP, use designation at each intersection, and improved communication of regulations and expected behavior.

5.3 Trail standards and training

Considerable training of staff and volunteers on sustainable, shared use trail maintenance best management practices will be vital to the long term sustainability of the Wissahickon trail system. With this knowledge of sustainable trail standards, the park's management team can more effectively maintain and construct trail to meet the varied trail experiences and requirements of the users of the Upper Trails.

5.4 Collect data on trail user visits

There is currently no reliable data on the amount of trail user visits for the Upper trails. The current visitor numbers were extrapolated from a few parking lot surveys. It is important to improve on the trail users data before and during the planning process. It will also help to prioritize implementation of the sustainability plan.

5.4.1 Trail counters

Using a series of magnetic and infrared trail counters will enable data to be collected that will show the level of user passes on sections of trail. This data can then be used to compare levels of trail wear, prioritize trail maintenance, and evaluate the effectiveness

of maintenance and signage. 30 counters would allow for either 10 stations that differentiate between types of uses or 30 stations just gather number of user passes. The goal is not to count individual users, but rather count user's passes. That is the data required to correctly estimate trail use and wear.

5.4.2 Trail Surveys

Another approach to gathering user data is to use trail surveys distributed on trail and to stakeholder groups that ask about type of use, experience, and perception of the trails condition. These survey questions could also be incorporated into a larger park user survey.

5.5 Unenforced FPC regulations

The user permit, leash, and speed limit regulations should be examined as to their goals, implementation, and potential for enforcement.

5.6 Trail emergency response plan

The FPC and Friends of Wissahickon will have to work closely with the emergency management authorities to create a plan that effectively provides access to any portion of the park in an expedited manner in emergency situations. The needs associated with this access should be determined during the trail design process so that the potentially contradictory needs of vehicular access and recreation experiences can be optimized.

5.7 Examine bridge failures and determine appropriate action

The recent failure of many of the park's bridges during storm events necessitates more than just rebuilding similar bridges in the same location. If bridges failed due to inconsistent maintenance coupled with very large stream flows, then the possibility exists to rebuild the crossings with the previous dimensions at the previous locations. However, failure may have been caused by a changing stormwater regime that would necessitate much larger bridges in the previous locations or rerouting the trail on either side of the crossing to create a less expensive long term solution.

6. Implementation

6.1 Install trail counters

6.1.1 Traftx trail counters are recommended due to cost, ease of data collection, and software. More information can be found at Traftx.net

6.1.2 Timeline

6.1.2.1 Trail counters should be installed as soon as possible to allow for maximum data collection.

6.1.2.2 This should be able to be completed in 7 days

6.1.2 Cost is estimated at \$12,000 for the counters

This cost is based on the FOW already having purchased the Traftx starter kit at an earlier date.

6.2 Gather user data through trail surveys

6.2.1 Trail surveys will enable detailed information to be collected about trail users and their opinions on the trails.

6.2.2 A copy of the trail user survey is located in the appendix

6.2.3 Trail user surveys information will be collected through on trail interviews and by distributing the survey via stakeholder groups.

6.3 develop Wissahickon sustainable trails draft plan

6.3.1 Elements of plan

6.3.1.1 Trail sustainability plan

6.3.1.1.1 Trail standards and specifications

6.3.1.1.2 Trail redesign and recommendations in GIS form

6.3.1.1.3 Specific recommendations on trail closure, relocation, and reconstruction.

6.3.1.1.4 Stock diagrams of recommended trail structures and construction techniques

6.3.1.1.5 Recommendations on development of wheelchair accessible trails and trailheads.

6.3.1.1.6 Recommendations on bridge relocation and reconstruction.

6.3.1.2 Trails navigation and signage plan

6.3.1.2.1 Recommendations on waymarkings

6.3.1.2.2 Recommendations on Kiosk location and content

6.3.1.2.3 Recommendations on trail intersection signage that provide for ease of navigation, determination of designated use, and location determination

6.3.1.2.4 Recommendations on interpretive signage to communicate value of historical and natural resources to visitors.

6.3.1.3 Trails education and enforcement plan

6.3.1.3.1 Training guidelines for staff and volunteers on sustainable shared use trail maintenance

6.3.1.3.2 recommendations on successful implementation and enforcement of park regulations

6.4 Public scoping of plan

6.5 Finalize Trails Sustainability Plan

6.6 Reconstruction demonstration project to designed to showcase a variety of sustainable, shared use techniques.

6.7 Train volunteer crew leaders, FPC staff, and contractors in best practices for maintenance and management of shared use sustainable trail.

7. Timeline

- 7.1 Winter 2004 start field work for trail sustainability plan (20 days)
- 7.2 Spring/Summer 2005
 - 7.2.1 Install trail counters(7 days) start data collection
 - 7.2.2 Demonstration reconstruction project (5 days)
 - 7.2.3 Sustainable trail maintenance training(12 days)
- 7.3 Winter 2005/2006- Complete field work for trail sustainability plan (84 days)
- 7.4 Spring 2006- Complete draft trails sustainability plan (25 days)
- 7.5 Summer 2006
 - 7.5.1 Public scoping of draft plan and comment period(60 days)
 - 7.5.1 Revise plan and publish(7 days)
- 7.6 Fall 2006
 - 7.6.1 Write grants and develop funding for implementation of trail plan
 - 7.6.2 Start implementing sustainability plan with available resources
- 7.7 Winter 2006 - 2010
 - 7.7.1- Complete reconstruction and achieve goal of sustainable shared use trail plan. Use of contractors and an aggressive implementation schedule could shrink this time down to 2 years.

8. Conclusion

There is much agreement that the trails in the Wissahickon Valley are in poor shape. The recent rain events of the summer have only illustrated how susceptible many of the trails are to erosion. However, it would be good to look at those sections of trail that suffered no erosion during these same storms. Those sections of trail hold the key to the potential of the Wissahickon trail system. They are proof that heavily used shared use trails can be sustainable, even in the poor soils of the Wissahickon during catastrophic rain events. By applying the same design principals found in those sustainable sections to the currently eroding section of trail answers may be found.

The other part of the trail equation is the users themselves and their interaction with the park. By applying shared use design principals to the current trail, much of the potential for user conflict can be removed along with the potential for erosion. Improving signage so that users are informed and make educated choices about their actions will result in a visitor population that has less impact on the natural resources, values the park even more than currently, and is better able to help the park management achieve it's goals.

Realize this will not be an easy task. There are a multitude of variables and some of the stakeholder goals are in direct conflict. The process of public input, plan development, and then public review takes an agonizingly long time. However, it is critical to achieve buy-in from the public in order to make the Wissahickon a model urban sustainable trail system. The public is the single greatest resource the caretakers, both government and citizen, have to help preserve and protect the Wissahickon Valley. While the fixing the trails is only one part of the overall preservation goals of the Wissahickon it is one of the most visible to the public and is intertwined with many of the other restoration and management goals. Success at this goal will increase public support and perception of the park and enable other possibly more important, yet less visible restoration goals to be achieved.

The most optimistic element of this process is the diverse coalition of public and private entities that are working together towards the goals of sustainable trails. Continued cooperation between these partners as the process unfolds will ensure a sustainable trail system in the future of the Wissahickon Valley.

