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FREDERICKSBURG WATERSHED PROPERTY MANAGEMENT PLAN

APRIL 2010

Prepared by
Friends of the Rappahannock

for

The City of Fredericksburg

Funded by the Chesapeake Bay Gateways Network and Keith Campbell Foundation

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1. INTRODUCTION

The City of Fredericksburg owns an ecologically significant corridor of forested riparian lands along 32 miles of the Rappahannock and Rapidan Rivers and more than 30 additional miles of property along many of their tributary streams. In 2006, the City placed 4,232 acres of this land into a conservation easement, referred to herein as the *Fredericksburg Watershed Property* or the Property (Map 1). The Property's conservation easement provides a high level of protection from development, vegetation removal, and other major alterations. Still, there are numerous land management issues that will have a significant bearing on how the conservation easement is administered. These additional issues include access management, trails management, and consideration of new recreational uses. Consequently, the City committed itself to creating a management plan outlining guidance and policies to balance management of the exceptional natural resources of the Property with continued public recreational use.

1.1. Vision and Goals

The City of Fredericksburg regards the Watershed Property as an exceptional natural resource that plays a significant role in the region's quality of life. The City's riparian property was acquired to protect the City's water supply. As noted in its City Watershed Property Management Policy of 1991: "The protection of those water resources is essential to the health, safety, and welfare of its citizens.... It performs a vital water quality function by restricting non-point source pollution, retarding erosion and sedimentation, and protecting the riverine ecosystem."

As subsequently noted in the City's Rappahannock River Watershed Plan (1994), protecting the natural ecosystem has tangible benefits for water quality, while also providing an exceptional resource for recreation. Natural resource protection, however, requires a careful oversight and administration to avoid any adverse impacts.

In the 2006 easement document, the City outlined its goals for managing the Fredericksburg Watershed Property through the concept of conservation values. The following goals identified as the City's conservation values provided the guiding philosophy for the development of the management plan.

Goal 1: Protect the natural environment and habitats of the Property, including the viewscape to and from the Rappahannock and Rapidan Rivers.

Goal 2: Protect the water quality of the Rivers, to provide adequate water supplies.

Goal 3: Protect the historic and archeological resources located on the Property.

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Goal 4: Prevent residential and commercial development of the Property.

Goal 5: Allow reasonable use and enjoyment of the Property and the Rivers by the City and the general public in a manner consistent with the other easement goals (the conservation values).

This management plan is intended to:

- Provide clear management guidance to support the City's vision and goals.
- Provide analysis for sound policies and regulation.
- Identify and prioritize management needs.

1.2. Planning Process Overview

In 2009, the City of Fredericksburg appointed a committee to oversee the development of a management plan. The committee was comprised of representatives from the Virginia Outdoors Foundation, The Nature Conservancy, the Virginia Department of Game & Inland Fisheries, Friends of the Rappahannock, and representatives from the City staff (Planning and Public Works). To facilitate the planning process, the Friends of the Rappahannock received the City Council's approval to apply for funding (which it received) from the Chesapeake Bay Gateways Network and the Keith Campbell Foundation.

On March 4, 2009, the Committee conducted an initial public meeting to solicit input on issues that citizens thought should be addressed in a plan. Over 50 citizens attended and provided comments. Additional comments were received online and via mail, through April 15. The Committee subsequently met with representatives of various stakeholder groups. The received comments consistently noted the following values and benefits of the Property:

- Wildlife habitat corridor
- Remote natural experience (nature sounds, solitude, little or no signs of human encroachment, float-in campsites)
- Scenic vistas
- Water quality protection
- Recreational access to Property and the Rappahannock and Rapidan Rivers
- Access for hunting, fishing, and wildlife viewing

The Committee used the received comments as it developed a draft document. From May 2009 through February 2010, the Committee gathered other relevant data and information about the Property and crafted policies to balance recreational use with natural resource protection. A draft plan was released for another round of public comment and a second public meeting held on February 17, 2010. This meeting also opened a public comment period that lasted until March 3.

Approximately 70 individuals attended this second public meeting and many others submitted comments on the plan via web submission, by telephone, and in writing. Most of the comments came from recreational users of the Property and their main concerns included the following:

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- Equestrians – need equestrian trails/if multi-use trails are developed, include horses
- Trappers – if hunting is allowed, why not trapping (Trapping currently prohibited by City)
- Gold prospectors – City cannot restrict their activity in public waters
- Hunters – safety zone proposal seeks to address a problem that does not exist (canoeing and hunting occur in different seasons – conflict is perceived, not real)
- Mountain bikers – recognize impacts of biking/want to work with City to develop good trails that will not erode
- Public access – Some thought more access needed/others thought existing access is sufficient
- General – all recognized City held a wonderful resource – all want to share the resource and many want to help protect it

The Committee incorporated most of the additional comments into the final draft. Where potential problems exist from users, the plan outlines a process to evaluate a proposed use against resource protection.

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2. DESCRIPTION OF PROPERTY

2.1. Overview and History

The City of Fredericksburg owns approximately 4,800 acres of riparian lands along the Rappahannock and Rapidan Rivers. These holdings extend upriver from the City itself, into five upriver counties through Spotsylvania, Stafford, Orange, Culpeper and Fauquier Counties. The bulk of these lands is located to the west of Interstate-95, reaching toward Kelly's Ford (Route 620) on the Rappahannock and Germanna Ford (Route 3) on the Rapidan. The integrity of these resources is high and the prospect for long term preservation is outstanding. A portion of this acreage accommodates public drinking water impoundments on tributary streams, related raw water intakes, and water treatment facilities. Most of these City lands also remain in their natural state, to protect this critical source of drinking water as much as possible. As an added benefit, the natural integrity of this corridor provides exceptional recreational opportunities.

The City purchased its riparian property from the Virginia Electric Power Company (VEPCO). In the early twentieth century, the utility company had once planned a series of hydroelectric dams along the river and acquired much of the acreage that would have been flooded by these projects. The City bought the property in 1969, in anticipation of a single flood control dam, planned by the U.S. Army Corps of Engineers. The land was to be part of the City's share of the overall project cost.

During the 1960s, public appreciation grew for the rivers as natural areas and recreational opportunities. With so much riparian property in public ownership, opposition to the new flood control dam gained momentum. The cost-benefit analysis for the new flood control dam included a factor for recreational value, but the planned reservoir would be within a short distance of the existing reservoir at the North Anna River. This proximity made questionable any justification for compromising the natural free-flowing character of the Rappahannock. The U.S. Congress closed any further studies for a dam in 1974 and cancelled the project entirely in 1989.

A new dam would not be built, but there was still the old concrete Embrey Dam across the River, which had been constructed in 1909/1910 as a hydroelectric facility. VEPCO had sold the dam to the City when it quit generating hydroelectric power and the reservoir behind this structure still fed raw water to the municipal water treatment plant. The City and Spotsylvania County, however, began to develop a cooperative water agreement that would include shared facilities. In 1999, a regional water treatment plant came online at the Mott's Run Reservoir. This new facility did not need the reservoir behind the old dam and the Embrey Dam immediately went from being an asset to a liability.

In anticipation of the Embrey Dam's obsolescence, state and local governments had urged the Federal government to consider its removal. The Corps conducted the necessary reconnaissance study and by 1998, had determined that breaching the dam would provide enough environmental benefit to justify Federal participation. Planning for the dam's removal continued and in 2004 it was breached with explosives. Once the reservoir drew down, the remaining concrete structure and an 1850's stone and timber dam, newly exposed behind it, were removed mechanically.

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Once the Embrey Dam and the 1850s crib dam were removed, the Rappahannock River became a free-flowing river from the Blue Ridge Mountains to the Chesapeake Bay. The impact on anadromous fish populations has been dramatically positive and canoeing opportunities have increased as well. These ecological and recreational benefits are important and entirely compatible with the regional significance of the river as a source of drinking water. Protecting this riparian corridor protects the quality of the water that is processed for consumption.

2.2. Demographic Trends

Over the past few decades, the land adjoining the Fredericksburg Watershed Property has experienced increased growth and development pressure. Several subdivisions now abut the protected property and boundary line infringement has become a growing concern. In 2009, a detailed boundary survey was completed of the 4,232 acres of City's upriver holdings that were placed in a Conservation Easement. This survey is part of the easement administration process.

Most of the City-owned property is located in Stafford, Spotsylvania, and Culpeper Counties. The annual population growth for these three jurisdictions averaged four percent (4%) for the period 2000-2008. The U.S. Census Bureau's 2008 estimate of the population in these three counties is 287,970 persons.

Approximately, 70,000 residents obtain their drinking water from the Rappahannock River. The related water intakes are located upstream of Fredericksburg and the three major water intakes (Motts Run, Hunting Run, and Rocky Pen Run) are located within the river corridor dominated by the City's Watershed Property.

2.3. Current Policies

The strong public and private support for removing barriers to a free-flowing river was a surprise to outside agencies, but not to the Fredericksburg region. Following the acquisition of the riparian lands, the City was able to manage them with limited staffing. As the area grew, however, encroachments and conflicts became evident. In response, the City developed a Watershed Property Management Policy. This new policy, adopted in 1991, defined allowed recreational uses that would be consistent with maintaining the river's water quality. The City document also made clear that it sought regional cooperation, not to relinquish its property rights, but to help ensure that the integrity of its holdings would not be compromised. The benefit to the upriver jurisdictions was access to a superb recreational resource.

Following up on its river property management policy, the City initiated a larger regional discussion. Participants included staff and elected officials from five upriver jurisdictions (Spotsylvania, Stafford, Culpeper, Orange, and Fauquier Counties), other riparian property owners, State and Federal resource agencies, non-profit groups, and interested citizens. This regional effort identified areas of common concern and outlined them in a Rappahannock River Watershed Plan (1994). This plan was not adopted by anyone other than the City, but the regional discussions continued, focusing on water quality, open space, recreation, and other

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items of mutual interest. This working group met for several years, until effectively superseded by the Rappahannock River Basin Commission.

Over the years, river advocates asked the City of Fredericksburg to consider placing its riparian property under some sort of conservation easement. This concept did not gain sufficient support, though, until 2005, when several organizations were able to begin to discuss reasonable compensation as well as an acceptable agreement. In 2006, with the promise of an endowment for a watershed property manager, the City placed 4,232 acres of its riparian lands under a permanent easement held by the Virginia Outdoors Foundation, the Virginia Board of Game and Inland Fisheries, and the Nature Conservancy. The easement goals, also called *conservation values*, are as follows:

- protect the natural environment
- protect water quality
- protect historic and archaeological resources
- prevent residential and commercial development on protected lands
- Allow reasonable uses (consistent with these easement goals)

2.3.1. Access to the Rivers from the Watershed Property

The linear nature of the riparian corridor is both its strongest characteristic, yet also a significant weakness. The extensive natural area provides an outstanding recreational setting for river float trips of varying lengths and duration. A party can put in at a public boat ramp or at any number of private access points and travel for miles and hours without encountering visual intrusions. The unobstructed corridor, however, is also viewed as unnecessarily remote, especially when it is so close to existing roads. On several occasions, additional public access points have been suggested, but often with the intent to provide a new experience, rather than with due consideration of protecting the integrity of existing experiences. The easement allows up to five new access points, but does not require them. The easement also makes clear that new facilities must not exceed on aggregate total of 42 acres.

The City has consistently been cautious about establishing river access points where some camping areas currently exist. The City Council denied permission to the Virginia Department of Game and Inland Fisheries, for example, when it asked to develop public access points at the Confluence and at Snake Castle. These sites were determined to be too remote for proper administration. These additional access points also held a strong potential to create problems and degrade the resource rather than improve recreational opportunities.

The easement documents identify the following sites as existing access points or primitive camping areas. It should be noted that some of the primitive camping areas are used as private access points by river outfitters.

Public river access points:

- Elys Ford
- Motts Run

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Primitive camping areas noted in easement:

- Blankenbaker
- Hole in the Wall
- Confluence (Bumble Camp)
- Prettyman's Camp
- Snake Castle Rock
- Deep Run

Additional public access points need to be considered within the context of the easement's conservation values, which means that existing features and characteristics of the riparian corridor should be protected, including the existing (and highly coveted) recreational experiences.

2.3.2. Permitted Facilities and Activities

Water resources are used both off-stream (consumption) as well as in-stream (recreation). Balancing the two becomes necessary when both types of uses are deemed important. This potential conflict was very much part of the discussion when water withdrawal limits were established by the U.S. Army Corps of Engineers for water withdrawal permits related to local jurisdictional water treatment facilities. The conservation easement acknowledges and supports several off-stream uses, as follows:

- New public drinking water supply facilities, within authorized parameters.
- Maintenance, repair, and alteration of existing buildings, structures, equipment, and facilities.
- Farming, within authorized parameters.

While the conservation easement recognizes the needs for off-stream uses, it also protects recreational in-stream uses. A 100-foot buffer was also established by the conservation easement to protect the river resource. Permitted encroachments include non-motorized boat landings (as permitted by restrictions in the conservation easement), hiking trails, primitive camping areas, wetlands and stream restoration activity, and temporary structures needed for the repair of existing bridges. Balancing off-stream and in-stream uses has been a key component of protecting the river resource, while also providing outstanding recreational opportunities.

2.3.3. Conservation Easement Restrictions

The conservation easement of 2006 places several restrictions on the use of the Watershed Property. The following activities are prohibited:

- Trash and dumping
- Grading, blasting, and unauthorized land disturbing activities
- Disturbing historic and archaeological resources, except as authorized by the City
- New roads or other transportation infrastructure, except as authorized.
- Signs are closely regulated

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- Communications towers
- New utility easements, except as authorized
- New access easements, except as authorized
- Removal of trees, except as authorized.

2.3.4. Existing Management Restrictions

In addition to the limitations specified in the conservation easement, the following activities have been expressly prohibited on the property through the Fredericksburg City Code:

- Setting or maintaining a fire(except campfires)
- Dumping, burying, burning trash
- Polluting water bodies or wetlands
- Discharging a firearm (except for licensed hunting)
- Trapping
- Motorized vehicles
- Land disturbances that cause soil erosion
- Cutting, clearing, damaging, destroying trees or natural vegetation
- Failure to dispose of human waste properly (12 inches below ground & 100 feet from water bodies)
- Disturbing, defacing, injuring, or moving any structure, building, facility, or artifact

2.4. Ownership

2.4.1. No Right of Public Access

Although the easement will benefit the public, the City of Fredericksburg exercises the same rights as any property owner and retains the right to control access to its riparian property. This provision is a critical component for protecting specific areas of the riparian lands from overuse as well as to preserve specific sites and features of the Watershed Property.

2.4.2. Access Controlled by Owner

Recreational access has impacts on natural resources and imposes administrative responsibilities. The City has generally allowed recreational uses on its Watershed Property, but has also authorized the City Manager to limit specific activities, as necessary, to ensure the Property continues to provide its water quality function of restricting non-point source pollution, retarding erosion and sedimentation, and protecting the River's ecosystem.

Through a carefully considered policy on access, the City intends to manage its riparian lands as a sustainable recreational resource. Unrestricted access would invariably cause significant degradation of both the resource and the experience of those who would use the resource for recreational purposes. As a consequence, access will be managed by balancing recreational use and natural resource protection.

3. RESOURCE PROTECTION

3.1. Natural Resources

The Watershed Property is rich in natural resources and represents an exceptionally intact corridor of forested riparian habitat as well as upland habitat protecting approximately 65 miles of rivers and tributaries. This area is dominated by deciduous oak-hickory hardwood forests, providing habitat for a variety of fauna and flora of ecological and conservation significance. Additionally, the Property's forests filter runoff from the surrounding landscape before it enters the rivers and streams, thereby significantly protecting water quality of the Rappahannock River which is the drinking water supply for multiple jurisdictions.

The Property lies within the gently rolling physiographic province of the Piedmont, but due to its riparian association, it is characterized by relatively rugged terrain with steep river and stream valleys. Its southern terminus reaches the transition zone, or the Fall Line, which is the boundary between the resistant, metamorphic rocks of the Piedmont and the softer, sedimentary rocks of the Coastal Plain.

Planning team members compiled existing field and GIS spatial data and consulted state, federal and non-profit partners to provide foundational knowledge on the natural resources of the Property.

3.1.1. Forest Conditions

In 2006, The Nature Conservancy conducted an inventory of the Property to document human impacts (e.g., camps, clearings, trash) and ecological features (e.g., dominant vegetation, invasive species, geologic features). This information was compiled into a baseline documentation report (Appendix 3). According to this report and field observations, the majority of this Property is dominated by mature sawtimber-sized deciduous oak-hickory forests with sycamore (*Platanus occidentalis*), oaks (*Quercus spp.*), tulip poplar (*Liriodendron tulipifera*), river birch (*Betula nigra*), beech (*Fagus grandifolia*), green ash (*Fraxinus pennsylvanica*), boxelder maple (*Acer negundo*), paw-paw (*Asimina triloba*), spicebush (*Lindera benzoin*), ironwood (*Carpinus caroliniana*), and mountain laurel (*Kalmia latifolia*) commonly observed. Additionally, near Ely's Ford, there are high rock bluffs with a stand of eastern hemlocks (*Tsuga canadensis*).

3.1.2. Ecological Integrity

Most of the forests of this Property are classified as providing *outstanding to very high ecological integrity*, according to a GIS analysis conducted by Virginia Division of Natural Heritage (VDNH) (Map 2). VDNH defines ecological integrity for an area as the relative contribution of ecological services it provides. Larger, more biologically diverse areas are assumed to provide greater ecological value, as are areas that are part of a larger complex of natural lands or contribute to water quality enhancement. Additionally, this ecological integrity analysis only includes areas that represent: (1) cores of unfragmented natural habitats, such as forests and wetlands, having at least 100 acres of interior habitat (interior habitat begins 100 meters inward from a forest-developed land edge); (2) natural habitat fragments of 10 to 99

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acres; and (3) landscape corridors such as forested riparian corridors (Bulluck et al. 2007). Map 2 illustrates how the Property's ecological integrity, along with the surrounding forests, is primarily ranked as outstanding to very high, demonstrating the importance of these lands to the Central Basin of the Rappahannock River watershed. Notably, the Property and adjacent lands also stand out from an even larger scale perspective. Across the entire Rappahannock River watershed, from the Blue Ridge Mountains to the Chesapeake Bay, these lands are one of the few areas with outstanding/very high ecological integrity, joining the ranks of large governmental landholdings such as Shenandoah National Park, Fort A.P. Hill and C.F. Phelps Wildlife Management Area (Map 3). Clearly, the Property (and the surrounding lands) contributes significantly to our region's biological diversity and ecological integrity.

The value of this Property as an ecological corridor is significant. The Property buffers 32 miles of riverfront along the Rappahannock and Rapidan rivers and an additional 33+ miles of stream corridors. Rivers and streams form natural connections between habitat blocks. When buffered with forests, these riverine connections, or corridors, provide a myriad of ecological functions such as conserving regional biological diversity and serving as carbon sinks. The function of forested riparian corridors is dictated by their role as both a transition zone between the aquatic and terrestrial environments as well as a corridor through the landscape that optimally connects larger blocks of habitat. Intact riparian corridors provide biodiversity protection by serving as dispersal routes between natural landscapes for migratory mammals, birds, fish, and butterflies, providing habitat for many common and unique plants and animals, and even facilitating pollination and seed dispersal (Tewksbury et al. 2002). Forested riparian corridors also mitigate flood impacts, control erosion and sedimentation rates, and filter out many pollutants before they reach waterways, thus protecting clean water.

Because the Property is dominated by forests and forms a unique riparian corridor, it is classified as *green infrastructure*. Green infrastructure is a connected network of protected natural lands and waters that supports native species, maintains ecological processes, sustains air and water resources, conserves working landscapes for human uses (such as agriculture and forestry), serves recreational open space needs, and contributes to the health and quality of life for our communities and citizens (VDNH 2002). The significance of the green infrastructure concept is emphasized by the Property's linkages to additional blocks of natural habitat areas in private and public ownership. Upriver of the confluence, along the Rappahannock River, the Property nearly reaches the state-owned C.F. Phelps Wildlife Management Area (4,589 acres). Regionally, it is near other major land holdings such as the federally-owned Fredericksburg-Spotsylvania National Military Park, Fort A.P. Hill, and Shenandoah National Park. Outside of the Property and these state and federal conservation areas, much of the remaining landscape is fragmented, or likely to become fragmented, by residential, agricultural and suburban/urban land uses (Map 4). The Property and the state/federal protected lands, which form our green infrastructure network, will become increasingly important to supporting critical ecological services and recreational opportunities as private lands become developed and fragmented.

3.1.3. Water Resources and Wetlands

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The importance of the Property to the health of the regional waterbodies is further demonstrated by the state's watershed integrity model developed by the Virginia Division of Natural Heritage, the Virginia Department of Forestry and Virginia Commonwealth University (Ciminelli and Scrivani 2007). This model, commonly depicted as a map ranking the relative value of land as it contributes to watershed or water quality integrity, shows important terrestrial features that should be conserved for water quality based on the best available scientific data. For the Property, the state model ranks a significant portion of these protected forests, and adjacent privately-owned forests, as providing high watershed integrity (Map 5). In particular, much of the Property's forests, from Mott's Run Landing to the Confluence and above Ely's Ford on the Rapidan, are highlighted as contributing significantly to water quality integrity.

Numerous studies have observed the relationship between increasing impervious (hardened) surface and deteriorating water quality, and positive relationships between water quality and large forested areas, particularly forested riparian buffers. Areas immediately adjacent to water bodies contribute to water quality health by serving as groundwater recharge and filtration areas, regulating temperature, and contributing to the maintenance of important aquatic and riparian habitat. Fortunately for our region, some of the most critical forests for maintaining high water quality are already protected within the Property boundaries. There are additional adjacent lands that also clearly provide this important ecological service, suggesting that our region would greatly benefit by extending conservation practices to these notable privately-owned forests.

Additionally, there are numerous connected and isolated wetlands located on the Property, ranging from <1 to 50+ acres in size (Map 6). The National Wetland Inventory, provided by the U.S. Fish and Wildlife Service, defines these wetlands as Freshwater Forested/Shrub Wetland (PFO1A). These are palustrine wetlands forested by woody broad-leaved deciduous vegetation and experience temporary flooding conditions. The deepwater habitat of the rivers technically is also classified as the wetland type Riverine (R2UBH).

As stated earlier, 65 miles of rivers and streams and numerous wetlands are embedded within the Property, and they benefit greatly from the filtering function of its extensive forests. The Property's riparian forests filter sediment, nutrients, bacteria and toxins from surface water runoff originating from the developed and agricultural lands across the landscape, thus playing a large role in reducing the amount of pollutants affecting this region's waterways. Healthy, clean waters for drinking, swimming, fishing, and aquatic life depend on these forests. This pollution-reduction role is arguably the most important ecological service that the Property supplies for this region.

3.1.4. Geologic Features

The Rappahannock River watershed lies within three physiographic regions known as the Blue Ridge Province, the Piedmont Plateau, and the Coastal Plain. The streams in the Blue Ridge Mountains are precipitous and from its source near Chester Gap, the Rappahannock Rivers initially flows over ancient and hard rocks before cutting into the sedimentary rocks and sandstone of the Piedmont Plateau.

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The Piedmont is characterized by rolling terrain traversed by small valleys. Between Chester Gap and Kelly's Ford, the Rappahannock River is narrow and slightly entrenched. Between Kelly's Ford and the confluence with the Rapidan River, the terrain becomes increasingly rugged. Farmlands give way to steep, heavily wooded hillsides. The River courses over a bed of sand, gravel, and boulders. Rapids and islands become more frequent. The riverscape is dominated by rock outcroppings and steep valley walls that level off into the broad upland surface.

From the Confluence, the Rappahannock is similar to its middle reaches, but much larger as a result of the added flow of the Rapidan River. In this middle section, the River runs through a heavily wooded valley, its long deep pools occasionally interrupted by erosion resistant rock ledges that traverse the riverbed and cause riffles.

In the Fall Line transition zone, the Property includes a spectacularly scenic fall-zone river gorge with numerous channel-shelf boulder and gravel bars supporting exemplary dense colonies of American water-willow (*Justicia americana*), an aquatic herbaceous plant. This river gorge notably includes rock bluffs and scenic falls.

3.1.5. Biological Diversity

In terms of biological diversity, the Property abounds with native flora and fauna and supports healthy waters for aquatic life in the Rappahannock and Rapidan Rivers and their tributaries. Available state and federal data highlight the existence of rare species and an exemplary natural community and notable breeding bird, freshwater mussel, and fish assemblages.

Bald eagles, a state threatened species, use this Property extensively year-round due to its proximity to aquatic habitat for their preferred prey, fish (for scientific names of birds listed in this section, see Appendix 4). Although the eagle was removed from a federal protected status under the Endangered Species Act, it continues to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Due to the presence of bald eagles, the southern terminus of the Property near Interstate-95, this area has been designated as a conservation site by the Virginia Division of Natural Heritage.

Additionally, in the vicinity of England Run, above the I-95 bridge, there exists a Natural Heritage resource (i.e., rare species or exemplary natural communities) termed the Rocky Bar and Shore natural community (DNH 2010). This community is found within the Virginia mountains and Piedmont, primarily along major rivers such as the Rappahannock, and are characterized by seasonally flooded to intermittently exposed woodland, shrub, and herbaceous vegetation of bouldery and cobbly depositional bars. Vegetation varies from woodlands to herbaceous, with the dominant herb at this site on the Rappahannock being American water-willow (*Justicia americana*). This native aquatic herbaceous plant has a striking white to purple flower during the summer and forms large mats partially submerged along the Rappahannock's shorelines and shallow waters, helping to reduce erosion and providing habitat for fish and invertebrates. Scrub river birch (*Betula nigra*) and American sycamore (*Platanus occidentalis*)

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are also commonly found on the outcrop bar at this location. At this particular site, the community is influenced by a high-energy alluvial environment of periodic flood-scouring.

Riparian bird surveys were conducted along segments of the watershed Property during the 2008 breeding season by the Virginia Department of Game & Inland Fisheries (DGIF) and the Virginia Society of Ornithology (Harding 2009). The surveys included two segments along the Rapidan River, one along the Rappahannock, and one segment encompassing portions of both rivers (Map 7). Collectively, these surveys covered 21 miles of riparian habitat and all but 0.8 miles are located along the Property. A total of 76 points along these routes were surveyed, resulting in the detection of 738 individual birds of 60 species located in the riparian habitats (Appendix 4). An additional 118 individuals, representing 10 additional species, were documented as fly-overs. These additional 10 species, which include the state threatened bald eagle, may not necessarily be breeding in the immediate area surveyed but likely use the area (for example, for foraging habitat). Based on the survey results, the Property supports a community of birds that are closely associated with the narrow corridors of forested riparian habitats, which provide important foraging, cover, and breeding resources for survival and reproduction.

The Property also supports common forest generalist species with a more widespread distribution in Virginia. The former riparian-associated species include the Acadian flycatcher, northern parula, yellow warbler, yellow-throated warbler, and Louisiana waterthrush; as well as great blue heron, green heron, osprey, waterfowl (Canada goose, mallard, wood duck) and belted kingfisher. The surveys particularly highlight the importance of the Property to neotropical migrant birds. These comprise over half of the documented species, and include the red-eyed vireo, wood thrush, scarlet tanager, ovenbird, black-and-white warbler, and worm-eating warbler. The forested habitats of the Property clearly support several species that are dependent on riparian habitat, several that are forest generalists, and a smaller number of species (36.7%) that exploit small openings in the forest or are associated with forest edges (Harding 2009; VDGIF 2009).

In 2006, DGIF developed the Virginia Wildlife Action Plan to identify Species of Greatest Conservation Need (VDGIF 2005). These species are threatened because of their relatively small populations in the state, or, despite larger populations, have experienced declines in Virginia and other parts of their range in the past 30 years. Nearly a third of the species documented during the riparian bird surveys on the Property are identified as Species of Greatest Conservation Need in Virginia (VDGIF 2009). Of these species on the Property, two-thirds are forest birds.

In addition, DGIF (VDGIF 2009) reports that numerous imperiled and/or listed freshwater mussels are present in the Rappahannock and Rapidan rivers. The Rapidan River, upstream of the Property, has been designated a Threatened and Endangered Species Water due to the presence of the state threatened green floater. The Rappahannock River, through the Property, also has this designation due to the presence of the federal endangered dwarf wedgemussel and the state threatened green floater. The dwarf wedgemussel has not been found in recent surveys, thus it is undetermined if it still occurs in the Rappahannock watershed (B. Watson-VDGIF, pers. comm.). Furthermore, a number of freshwater mussel species identified as Species of

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Greatest Conservation Need in Virginia, such as the yellow lance, triangle floater and creeper mussel, have been documented from the Rapidan and Rappahannock rivers. The mussel assemblages in these waters represent about 25 percent of the mussel species found within the Atlantic slope watersheds of Virginia.

In addition to supporting imperiled mussels, both the Rappahannock and Rapidan rivers are designated as Anadromous Fish Use Areas due to the presence of anadromous and/or semi-anadromous fish, such as the American shad, hickory shad, blueback herring, alewife, and striped bass. A catadromous fish, the American eel, also is present in these rivers. With the removal of Embrey Dam in 2004 and renewed access to 106 miles of historic spawning and rearing habitat, many of these fish are expected to increase in numbers in this riverine system. Depletion sampling in these rivers (at Ely's Ford, below Kelly's Ford, above I-95 and adjacent to Lauck's Island) in July 2001 by DGIF resulted in a fish assemblage dominated by redbreast sunfish, smallmouth bass, rock bass, northern hogsucker American eel, channel catfish, shorthead redhorse, yellow bullhead, gizzard shad and bluegill (Odenkirk 2008). See Appendix 5 for the full list of fish species, and their scientific names, found during this sampling period.

Based on the importance of this region for Virginia's fish and wildlife species, DGIF has recommended that emphasis be placed on the maintenance, enhancement and expansion of the forested riparian buffer to benefit the forest bird community, riparian bird community, and sensitive waters known to support imperiled freshwater mussels and anadromous fish. DGIF further recommends that a forested riparian buffer of at least 100 meters be maintained on each side of the rivers. Any management practices, new access site development, and/or required habitat modifications should be performed in a manner that minimizes their impact to this forested buffer and are compatible with forest bird habitat management, water quality maintenance, and the management of sensitive aquatic resources. To avoid forest fragmentation, DGIF recommends that management practices resulting in the opening of forest habitat be: (1) clustered, rather than dispersed along the length of the Property, and (2) placed outside of the riparian buffer to maintain the integrity of the buffer and to minimize habitat loss and degradation of riparian habitat and water quality.

3.1.6. Threats to the Natural Resources

Destructive Recreational Use

Certain recreational activities have negatively affected the natural resources of the Property and threaten the ecological integrity of these lands. Most notably, unauthorized motorized vehicles, such as all-terrain vehicles (ATVs), motorbikes and 4-wheel drive vehicles have had severe impact on these lands. These vehicles destroy habitat, create multiple avenues of bare soil that erode away with each rain event, and create conditions for the introduction of invasive species.

There are numerous camping areas along the Rapidan and Rappahannock Rivers that have been overused/abused. Three intensively-used and road-accessible campsites are located at the Confluence (Goerge H. Brumble campsite), Blankenbaker, and Hole in the Wall. Another road-accessible campsite is located at Snake Castle. In addition, some campers have used motorized vehicles to reach these campsites damaging vegetation and causing erosion of both the trails and the campsites. Some of these sites have become semi-permanent camps, evidenced by tarps,

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grills, horseshoe pits, garbage cans, raking of the ground, movement of stone slabs to form chairs and tables, and construction of primitive canoe landings. Many of these campsites are littered with trash. Intensively-used camps often have bare soil well into a 100-foot buffer along the river.

Boundary Intrusions and Unauthorized Land Disturbances

Adjacent and nearby landowners periodically have intruded into the Property when harvesting trees on their own lands, clearing trees to create a view of the river from their house or clearing vegetation to create their own boat launch on the river. Additionally, portions of the Property have sometimes been misappropriated for farming. These boundary intrusions have originated both from misunderstandings or incorrect interpretations of the location of the Property's boundary as well as from a handful of people knowingly conducting unauthorized land disturbance activities on the Property..

Fragmentation of the Forested Riparian Corridor

Fragmentation of a natural landscape typically occurs when natural habitats such as forests are harvested for timber or cleared for development into agricultural or suburban/urban land uses. Forest clearing for these uses will not occur in the Property due to its protected status. The continuity of this corridor, however, must still be considered when decisions are made on where to place future public access sites such as boat launches.

Conversion of Surrounding Landscape to Developed Land Uses

Much of the Property's surrounding landscape is privately-owned and thus highly vulnerable to future development (Map 4). The Commonwealth of Virginia will see more land developed in the next 40 years than has occurred in the past 400 years (Virginia Conservation Network 2003). This region of Virginia is no exception. As human population increases, the unprotected forests surrounding the Property have a high probability of being developed to suburban and urban land uses. Thus, the Property will increasingly become isolated from other tracts of natural lands, which will impact wildlife and plant populations by reducing interior forested habitat for wildlife and inhibiting animal movement, insect pollination and seed dispersal across the region. Along the edges of the Property, where it is juxtaposed with developed lands, these disturbed lands will introduce more opportunities for invasive species into the Property, which will degrade the Property's ecological integrity. Additionally, construction on adjacent lands to the Property can lead to an influx of sediment pollution onto the Property and the adjoining waterways (Ricker et al. 2008). This problem is exacerbated when the erosion and sediment controls on the construction site are either lacking, poorly installed, or insufficient to capture the eroding soils from the disturbed lands.

Invasive Species

Invasive species are any plant, animal, insect, or other organism that is not native to an area, and

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whose introduction causes economic or environmental harm. All of the above threats provide opportunities for invasive species to be introduced or expand their distributions into the Property. The greatest threat to biodiversity is habitat destruction, followed by invasion by exotic species. The economic cost of researching, eradicating and controlling invasive species in Virginia is \$1 billion annually, to protect natural areas, address health concerns, and to support agricultural, forestal, and fishery industries (Pimental et al. 2000). Because invasive species are able to spread unchecked, these non-native organisms can cause significant population declines, and even extirpation, of native plants and animals. Currently, several invasive plants can be found on the Property particularly along disturbed areas such as trails, utility rights-of-ways and boundaries with adjacent developed lands. These plants include garlic mustard (*Alliaria petiolata*), tree-of-heaven (*Ailanthus altissima*), multiflora rose (*Rosa multiflora*), Japanese honeysuckle (*Lonicera japonica*), and Japanese stiltgrass (*Microstegium vimineum*). Additionally, bamboo has been found and hydrilla has exploded in its distribution along the riverine habitats buffered by this Property. A full survey is needed to assess the impact of invasive plants occurring on the Property.

Impaired Water Quality

The Rappahannock River watershed encompasses 2,715 square miles, or 6.8 percent of the Commonwealth of Virginia. The river and its tributaries, including the waterways buffered by the Property, are degraded by polluted runoff, most of which originates outside of the Property. The Virginia Department of Environmental Quality (DEQ) has designated sections of the watershed as impaired (waters fail to meet state-determined water quality standards due to high levels of at least one pollutant). As measured in 2008, 267 river/stream miles were identified as impaired for aquatic life, 28 miles for fish consumption, and 370 miles for recreational uses. These numbers are not comprehensive because DEQ has not assessed all sections of the river. The primary cause of waters impaired for recreational use is excessive bacteria levels (*E. coli*, *Enterococcus*, and fecal coliform) from sewage discharge, land application of wastes, livestock manure, and pet/wildlife waste.

The impacts of sediment and nutrient pollution occur throughout the Rappahannock River watershed and include the following:

- Likely extirpation of the endangered dwarf wedge mussel (*Alasmidonta heterodon*)
- Decline of underwater grasses, which serve as fishery and shellfish nurseries
- Severe declines of productive oyster (*Crassostrea virginica*) grounds in the Chesapeake Bay
- Declining populations of blue crab (*Callinectes sapidus*)
- Dead zones – water oxygen levels too low to support aquatic life

The primary source of nutrient pollution is nitrogen and phosphorus, transferred in the runoff from urban/suburban and agricultural lands, overflow from septic systems, and discharges from wastewater treatment plants. Excessive nutrients cause harmful algal blooms in the lower Rappahannock, blocking sunlight needed by underwater grasses and consuming oxygen (as the algae die) needed by fish and shellfish to survive.

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Sediments are soil particles in waterways, which have eroded off of lands and streambanks that are bare of vegetation or otherwise disturbed. Sediments reach waterways from construction sites and from agricultural areas where there is heavy tillage, cattle stream access, and insufficient forested riparian buffers. The Rappahannock River contributes the highest annual sediment yield (329 tons per square mile) to the Bay. These sediments smother underwater grasses and aquatic organisms.

The riparian forests of the Property filter out a portion of these pollutants before the surface runoff reaches the rivers and streams.

Wildfires

Wildfires can have a devastating impact of the critical riparian forests on the Property.

3.1.7. Natural Resource Protection

Continue to Balance Recreational Use with Natural Resource Protection

Water-based recreation is exceptionally popular nationwide, but controlling access is the key to environmental protection. Because the Rappahannock River is its raw water supply, the City of Fredericksburg has been very explicit in its public policy related to water quality. The City's Watershed Property Management Policy (1991), its Rappahannock River Watershed Plan (1994), and the 2006 Conservation Easement have all stated that protection of the natural resource is a higher priority than all other uses, including recreation. Although multiple recreational uses will be allowed to continue, decisions on additional types of recreational uses and the location of necessary infrastructure will continue to be based on their impact on natural resources.

Protect Integrity and Connectivity of Riparian Corridor

Although the entire Property is protected, the City will continue to manage these lands to maintain the ecological integrity and the connectivity of the riparian corridor. The conservation easement requires a minimum of a 100-foot forested buffer where encroachments are to be minimized. The standard ecological recommendation for resource protection, however, is a 300-foot wide buffer. A forested riparian buffer of at least 300 feet wide on each side of the river (as feasible) is considered critical to protect from future human-caused disturbances. Any management practices, new access development, and/or required habitat modifications should be performed in a manner that minimizes their impact to the 300-foot wide forested buffer and which will help ensure compatibility with forest bird habitat management, water quality maintenance, and the management of sensitive aquatic resources.

To avoid forest fragmentation of the Property, necessary management practices resulting in the opening of forest habitat should be: (1) clustered, rather than dispersed along the length of the Property, (2) placed outside of the 100-foot riparian buffer required by the conservation easement, which will help to minimize habitat loss and degradation of riparian habitat and water quality, and (3), where feasible, minimize impacts within a 300-foot wide riparian buffer.

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Minimize Land Disturbing Activities

The City will prohibit or limit activities that disturb the natural resources of this Property or results in negative impacts to the water quality of the Rivers and their tributaries. The City and the conservation easement already prohibit the use of off-road vehicles on the Property due to the destructive nature of this activity. This management plan supports the prior decisions by the City and the conservation easement partners in barring off-road vehicles. The proper construction of trails, to minimize erosion, while accommodating heavy trail use, will be paramount when trails are considered and evaluated.

Ensure Integrity of Boundaries

In 2009, a boundary survey was conducted to clearly identify the 4,232 acres placed under the Conservation Easement. The Property's boundaries should be monitored and any conflicts or intrusions should be appropriately, but aggressively resolved.

3.1.8. Recommended Actions for Natural Resource Management

- Ensure Property boundaries are clearly marked
- Establish physical barriers to vehicular access where possible
- Conduct a natural resource inventory
- Conduct an invasive species inventory
- Identify potential land acquisitions to fill gaps along the forested riparian corridor
- Identify and prioritize habitat restoration projects (e.g., riparian buffer reforestation, eroding streambanks, and priority areas to remove invasive species)
- Work with the Virginia Department of Forestry to implement best management practices for prevention of wildfires

3.2. Historic Resources

The Rappahannock River valley has been marked by human activity for thousands of years. This riparian corridor includes a wide range of resources that reflect on many eras. The landscape is dotted with aboriginal settlement sites, early industries, canals and locks, the scars of gold mining, the remnants of water powered mills, military entrenchments from the Civil War, battlefields, road traces, and river crossings. These resources show the evolution of the Rappahannock valley, from backwater wilderness to an industrial corridor and wartime barrier, to a reasonably remote recreational area.

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The first inhabitants were Native Americans and archaeological investigations of their camps and villages have revealed that tribal groups occupied the Rappahannock basin as early as 7000 B.C. These occupants, known as Mannahoaks, encountered Captain John Smith in 1608, but were gone by the time settlers pushed into the Virginia Piedmont in the 1670s. John Smith identified four major settlements on his 1624 map of exploration. Although he obtained the information from interrogating a captured Mannahoak warrior, through an Algonquian interpreter, field investigations in 1934 confirmed the location these Native American sites. The minimal European/Mannahoak contact holds great promise for their archaeological significance.

The Mannahoaks were the last aboriginal culture in the Rappahannock valley. The next phase of occupation was the European influx that began in the late seventeenth and early eighteenth centuries. This period was dominated by Governor Alexander Spotswood's iron industry, which had enormous implications for the founding of Fredericksburg and its prominence in national affairs through the American Revolution. The furnace that Spotswood built in the wilderness had used up enormous tracts of woods, leaving the countryside denuded of trees. It ceased operations by 1792.

Following independence from Britain, the new government did not authorize Fredericksburg to remain a port-of-entry for overseas trade. Spotswood's iron industry was gone, but the river valley remained characterized by farming, milling, and gold extraction. The Rappahannock valley was the site of numerous gold mining enterprises and construction of a navigational canal began in 1811, to link them with the transshipment point of Fredericksburg. The California gold strikes, however, drew mining activity west, where extraction was less difficult than pulverizing the local quartz deposits. Agriculture alone could not sustain the canal enterprise and railroads also had a profound impact on the Rappahannock valley. East/west railways through Alexandria and Richmond cut into upriver markets.

While east-west railroads took away economic opportunities, a north/south railway provided a logistics infrastructure that drew the Civil War armies to Fredericksburg. During the period 1862-1864, four major battles were fought in the vicinity, leaving behind a blackened countryside and a wrecked economy.

River related industries came back after the Civil War, though, and some gold mining recurred. River powered industries were superseded by electrified industries and new north/south transportation routes also refocused human activity away from the river valley. These developments included the Richmond, Fredericksburg, and Potomac Railroad (completed between Richmond and Washington by 1872), State Route 1, and eventually Interstate-95. During the twentieth century, and into the twenty-first century, the Rappahannock valley never saw the level of use that had occurred during its peak period of activity the century before.

3.2.1. Historic Resource Inventories

The Virginia Department of Historic Resources (VDHR) has a standard inventory process to examine and evaluate historic resources within the broad patterns of Virginia's history. A careful analysis, through the context of cultural region, historic period, and theme, places resources within their large setting. This standardized approach for collecting and evaluating

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information also allows VDHR to better understand the data available so as to understand any gaps in their historic record. The overall intent is to provide a sound basis for preservation decision making. The VDHR database has many individual site reports on file, which is searchable on-line. The reports vary in quality, however, as they are submitted by all types of professionals as well as interested citizens.

The City of Fredericksburg, in partnership with the National Park Service, did its own reconnaissance survey of resources on its upriver riparian properties in 1996-1997. The final report, entitled *Historic Resources along the Rapidan and Rappahannock Rivers* does not follow the standard chronological VDHR format, but categorizes resources thematically (although there is also a loose chronological order as well). This approach resonated with the public and the document has been reprinted three times following the original 1997 printing. The broad themes contained in this publication include Native American sites, early industrial sites, canals and dams, gold mining, water powered industries, and the Civil War.

3.2.2. Threats to the Historic Resources

Threats to historic resources come from both natural causes as well as human activity. Under natural causes, erosion can significantly impact a site, but on the Property, it has typically already run its course. Erosion occurs relatively quickly after a site is abandoned. As vegetation returns, though, the level of erosion usually stabilizes. By then, building foundations and/or military earthworks are at least partially filled in. Their relief is also softened and obscured, at least above ground. Once stabilized under forest cover, the threat of erosion is usually minimal, as long as human activity does not cause the process to resume.

Flooding of resources is another natural impact, but has mixed results. On the one hand, flood waters can cut into a resource and carry it away. This destruction is known to have occurred at Native American sites within the river floodplain. On the other hand, floodwaters can also bury resources in alluvial deposits, which encapsulate and protect them.

Threats from human activity are both deliberate as well as inadvertent. Deliberate destruction includes removal of artifacts without following proper procedures or unauthorized activity on sensitive sites, such as driving vehicles along earthworks or through canals. Inadvertent destruction can result from overuse of the Property.

Unauthorized Artifact Removal

The many historic sites on the City's riparian land have the potential to yield information important to historic research. Underground evidence related to the resource is contained in buried artifacts as well as in the soil strata above the undisturbed soil that relates to erosion sequences.

Unexploded Ordnance

Many areas along the Rappahannock and Rapidan Rivers were once battlefields or were

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subjected to artillery bombardment. Unexploded ordnance from this period can still function. In the event such a hazard is encountered, the site should be evacuated without disturbing the unexploded ordnance and proper authority notified.

3.2.3. Historic Resources Protection

The City of Fredericksburg has traditionally sought to preserve its historic and archaeological resources, recognizing that those who live in special places have been entrusted with a responsibility for their protection and preservation. Fortunately, the City's policy of maintaining a forest cover over its riparian property, which enhances water quality, is also the most effective means to preserve historic and archaeological resources in those same areas. Forest cover is the most effective in preventing erosion. Tree roots stabilize the soils as do the layers of leaf litter built up over the years.

The Rappahannock valley was an active industrial area when water-powered mills were in operation and when the armies came during the Civil War. Since then, the once managed landscape has reverted back to woodlands. As trees reestablished themselves, the leaf litter layer built up on the forest floor, which is a defining characteristic of an intact forest ecosystem. Since the City does not log its property, shade tolerant trees have occupied the overstory canopy.

Leave Resources Undisturbed

The historic resources on City-owned lands include significant Native American settlements, early industrial sites, as well as battlegrounds. Their study is encouraged, as long as they are not disturbed in any way. Any archaeological evaluations and any related digging must be authorized by the City of Fredericksburg.

Recommended actions are:

- Monitor proposed and existing development on lands adjacent to City-owned property, to avoid adverse impacts to historic resources in the easement areas.
- Identify and track the condition of key resources that are near or adjacent to private land uses, to ensure these sites are not degraded as a consequence of off-site activity.

Allow Self-Discovery

One of the attractions of the City's riparian property is the opportunity to explore its many historic features, long fallen into disuse and being reclaimed by nature. The City seeks to protect these resources, so future generations can continue to experience the thrill of discovery. In this context, interpretive signs are to be strictly limited to trailheads and parking areas.

Recommended actions are:

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- Maintain an inventory of historic resources and update, as appropriate, to ensure it remains an accurate database for planning and policy development.
- Avoid the installation of signs on specific sites, but provide educational materials to the public so they can fully appreciate their protected heritage as well as understand their responsibility to care for them by leaving historic resources undisturbed.
- Ensure viewsheds and historic vistas retain their integrity and scenic value by carefully evaluating any proposed intrusions for visual impact.

Limit Restoration

The historic resources in the Rappahannock valley are being reclaimed by nature. In some instances, the natural vegetation serves to protect and preserve resources, but can also cause their loss. The root system of a naturally wooded area, for instance, can stabilize Civil War earthworks. A tree growing out of earthworks, however, can also cause considerable damage when it ages and eventually falls. In this context, it may be advisable to cut out some trees, while maintaining others.

Follow the principle of *economy of intervention*, to minimize any work that is accomplished within the City's riparian holdings. Clearing woodlands, for example, may be deemed necessary to maintain some areas, but may also initiate erosion and other negative impacts.

Recognize that many of the historic resources within the easement lands are ruins. They have deteriorated in a natural environment and will continue to deteriorate. Resources in obscure locations can be expected to be compromised by tree roots and eventually collapse.

If restoration or stabilization must be considered as a matter of safety – for instance, when the resource is in heavily travelled areas readily accessible to the public – then the necessary work must be accomplished according to established preservation standards, as authorized by the City of Fredericksburg.

3.3. Scenic Values

The Fredericksburg Watershed Property is highly valued as a recreational resource because it provides a river corridor that is largely undisturbed by signs of human intrusion. Despite its location within some of the fastest growing localities in the region, the Property's river buffer insulates the recreational user and provides scenic seclusion.

This effect of seclusion and privacy is maintained because City property at a minimum typically runs from ridgetop to ridgetop, encompassing the entire viewshed from the vantage point of a canoeist, camper, or hunter. Where outparcels to City ownership exist, structures and cleared vegetation are common.

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Three public water withdrawal stations constitute the most significant visual intrusions into the scenic corridor. These facilities are Motts Run, Hunting Run, and Rocky Pen Run.

3.3.1. Threats to Scenic Integrity

Tree Cutting / Vegetation Removal

Numerous private residential parcels directly abut the Property. Adjoining landowners have frequently trespassed on the Property cutting down trees and removing vegetation to create a view of the river or to improve their access to the river. In other areas, chainsaws have been used to remove trees and vegetation for ATV trails and riverfront clearings. The City has successfully pursued civil action against violators in the past, requiring financial restitution and/or restoration of removed vegetation, but aggressive enforcement is still needed to curtail this activity.

Adjacent Developments

The construction of houses, commercial/industrial buildings, or other man-made infrastructure on adjacent lands has impacted the viewshed experienced by recreational users. When feasible, the City and a non-profit group have worked with developers to ensure that the development would not impact the viewshed. Celebrate Virginia, for example, has a proposed eco-tourism component and worked with the Friends of the Rappahannock to protect the viewsheds from the River as this large scale project is constructed.

Noise Intruding on Solitude

Some noise is a natural part of the human experience, but increasing recreational use has resulted in incidents of excessive noise. Of particular concern is noise such as loud music and late night parties in camping areas. These types of activities are inconsistent with the City's goal of protection of the experience of solitude on the river.

3.3.3. Protecting Scenic Integrity

Avoid or Minimize Adverse Scenic Impacts

When future recreational infrastructure is developed on the Property, the City should ensure that scenic impacts are part of the evaluation process. The City will continue to work with developers on adjacent lands where proposed development may impact the scenic integrity of the Property or the rivers it buffers.

Protect Integrity of the Property Boundary

The City will continue to monitor the Property boundary for trespassing intrusions, such as tree removal, and take appropriate action, as needed.

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4. RECREATIONAL ACTIVITIES

The Watershed Property and the rivers that these lands protect provide many recreational opportunities to the public. Citizens commonly use these lands and the rivers for hiking, hunting, wildlife viewing, paddling, fishing, camping, historical explorations, meditation, mountain biking, trail running, family outings, and nature appreciation. Below is an overview of trends for these common activities.

4.1. Trends in Recreational Uses

Canoe Liveries

Three canoe liveries are present on the Rappahannock River. Interviews with these liveries indicate that paddling rentals continue to be popular from April through September mainly, tubing rentals have increased primarily on the stretch below I-95, and overnight camping rentals vary based on water level.

Fishing

The Rappahannock River is known regionally, and even nationally, as a quality destination for smallmouth bass angling. Nearly the entire river and its major tributary, the Rapidan, provide stellar habitat for smallmouth bass and its relatives: the redbreast sunfish and rock bass. Since the removal of Embrey Dam in 2004, the resident population of channel catfish has begun expanding greatly, and target species for fish passage including river herring (blueback herring and alewives), hickory shad, American shad and even striped bass have been found as far upstream as Kelly's and Ely's Fords. These migrants are generally encountered during spring, and yellow and white perch also may be found along the lower reaches of the river along the Watershed Property. Fallfish, chain pickerel, and common carp provide additional angling opportunities and diversification, and even largemouth bass are present at lower densities in the river's slower sections.

Hunting

Hunting has always occurred on the Property and has continued during City ownership. Several local hunt clubs own significant tracts of land that adjoin the Property. Species known and likely to be hunted on the Property include: white-tailed deer; black bears; gray and fox squirrels; wild turkeys; waterfowl; and furbearers such as raccoons, gray and red foxes, and coyotes. Though the extent of hunting on the Property is largely unknown, an increase in the use of, and demand for, lands and waters open to the public in the Central and Northern Piedmont regions of the Commonwealth is apparent. The VDGIF has observed an increase in hunter use of the neighboring C. F. Phelps Wildlife Management Area over the last decade. Given the close proximity of the Property to major Urban Centers and the growing public awareness of the Property, interest in and use of the Property by hunters is likely going to increase.

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Additionally, the Watershed Property is essentially a continuous forested riparian corridor of habitat, ranging from river bank and flood plain forests to upland forests, and is classified as providing high ecological integrity. Moreover, the characteristics and use of the surrounding land varies tremendously, from urban/suburban development to uses such as agriculture, livestock, and intense management of wood products. These habitat types are interspersed and the habitat afforded by the Watershed Property constitutes preferred habitat for several important game species like white-tailed deer and black bears and can facilitate an overabundance of these species, particularly deer. Deer and bear populations have been increasing throughout much of Virginia over the last 30 years, particularly in the urban/suburban/rural interface resulting in more human/deer/bear conflicts. Scientific research has also demonstrated that high deer populations negatively impact ecological integrity of forest communities through over-browsing. Ecological damage will occur from deer over-browsing without some level of population control.

Trapping

The Watershed Property includes a wide array of suitable and preferred habitat for many furbearing species. Aquatic species include beaver, river otter, and muskrat. Terrestrial species include mink, weasel, skunk, opossum, raccoon, gray and red fox, bobcats, and coyote. Over the past 15 years, DGIF has observed a significant increase in human-wildlife conflicts in urban and suburban areas. Currently, the incidence of diseases carried by some furbearers is increasing. For instance, much of the eastern US is experiencing a rabies epidemic due to the raccoon, which is a primary vector of the disease.

Trapping is a recognized as an effective wildlife management tool, to keep furbearer populations at healthy and acceptable levels, and to minimize the spread of mammalian diseases such as rabies. Since the boom in fur prices of the 1970s and 80s, there has been a downward trend in trapping and trapper numbers, a result of a growing intolerance for using fur for clothing and other products. This trend has resulted in rising furbearer populations and a rise in human-wildlife conflicts.

Similar to hunting, trapping has always occurred along the rivers, although the City prohibited trapping on its riparian property in 1991. To repeat, legal trapping still takes place on the rivers. Although the extent of trapping on the rivers and on the Property, prior to its prohibition, is unknown, it is apparent from public comments that there exists a great interest to trap the Property and the tributaries of the Rappahannock and Rapidan Rivers.

Camping

There are no developed campsite facilities on the Property. Camping is primitive and can occur anywhere on the Property, although campers must follow a Leave No Trace ethic. There are several popular camping areas along the Rivers, accessed primarily by water, so the level of camping activity is driven largely by water levels. Adequate water levels typically occur during

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the six-week window from early May through mid-June. During weekends in May and June, camping in the vicinity of the Confluence is in high demand.

Trail Use

An extensive network of trails exists throughout the property, though these trails were established by various users rather than carefully planned and designed to minimize environmental impacts. Many of them were created by ATVs which has become and will continue to be a prohibited activity. Currently, some trails have become popular destinations for hikers, runners and mountain bikers. The City is currently working with Friends of the Rappahannock to inventory trails, to determine which ones are appropriate for public use and which ones should be closed.

Mountain Biking

Mountain biking can cause trail erosion leading to excessive sedimentation input into nearby waterways. This recreational activity needs to be properly managed, and any authorized trails constructed and maintained to standards directed by the City.

Mountain biking currently occurs on a specified trail system close to Fredericksburg that is mostly on private property, but also extends onto City lands that are not under easement. The City currently is working with mountain biking partners to explore the feasibility of establishing a longer biking route that will not degrade the natural setting. Mountain biking is not being considered for any other trails crossing the Property.

Horseback Riding

Certain sections of the Property have been used in the past by horseback riders, but horses have the potential to contribute significantly to pollution problems facing the rivers and streams. The Rappahannock River is sensitive to nutrient loading and extensive efforts have been made to reduce the impact of animal waste to this waterway.

The City, with assistance from the conservation easement partners, will assess all existing trails on the Property.

Gold Prospecting

An area called the Southern Appalachian gold district extends along the southeast front of the Appalachian Mountains. When molten rock intruded out of a north-south fault extending from what is now Maryland to Alabama, it spread to the east and eventually cooled in a narrow strip that is called the gold-pyrite belt. The various minerals eventually cooled, their relative location dictated by their densities. In the 1830s and 40s, Virginia was the third largest gold producing state until the California strikes of 1848 (Virginia Department of Mines, Minerals and Energy).

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Extraction of gold in Virginia has not been commercially worthwhile, but recreational prospectors can be found on the Rivers searching for placer deposits.

The U.S. Army Corps of Engineers has determined that a recreational suction dredge using an intake nozzle of 4 inches or less has a minimal effect on the aquatic environment and is generally not regulated. Further, the Virginia Marine Resources Commission exempts this activity from any permit requirements within non-tidal waterways up to the ordinary high water mark, which is admittedly sometimes difficult to determine, but is generally indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of vegetation, presence of litter and debris, or other appropriate means that consider the characteristics of the area. The cumulative effects of prospecting is not addressed, although recreational gold prospecting is not to affect the rights of riparian property owners (the City), is not to adversely impact certain in-stream uses, and is not to adversely impact historic resources.

Recreational gold prospecting is not permitted on the Property, including along tributary streams. Prospectors provided comments during the public participation process reminding the City that their activity was not regulated.

4.2. Existing Recreational Infrastructure

The following infrastructure is in place on the Property. Some of it, such as trails, will be evaluated to determine if they should be improved or closed. Other features, such as public boat ramps, will remain intact and possibly improved. Controlled access will be brought under formal license agreements and monitored more closely, to restore areas of damage. Maps 8 and 9 show the recreational infrastructure that currently exists on the Property.

Trails

Pedestrian access is permitted across the entire Property, unless otherwise posted. Most of the Property adjoins private property, though, so anyone gaining access to the City's Property will need permission from the owners of the adjoining property as well. Existing trails have not been planned and constructed to minimize environmental impacts, so an inventory of trails is needed and each one evaluated for continued use, improvement, or closure.

Public Access

There are two public boat ramps on the Property. These access points are at Ely's Ford and at Mott's Run. In addition, the upper reaches of the Property along the Rappahannock River can be accessed from a public boat ramp at Kelly's Ford.

Controlled Access

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There are two primary access points used by canoe liveries. These occur at two locations below the Confluence, called Blankenbaker's and Hole-in-the-Wall.

Camping Areas

The City has not established formal camping areas. Primitive camping is allowed at any suitable location, as long as campers follow some basic rules described herein. The Confluence of the Rappahannock and Rapidan Rivers, however, is a heavily used camping area and the City will establish a no-hunting safety zone there.

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5. MANAGING RECREATIONAL USES

5.1. Management Planning

The conservation values identified in the Property's conservation easement includes the following goals:

1. Protect the natural environment and habitats of the Property, including the viewscape to and from the Rappahannock and Rapidan Rivers.
2. Protect the water quality of the Rivers and provide for adequate public water supplies.
3. Protect the historic and archeological resources located on the Property.
4. Prevent residential and commercial development of the Property.
5. Allow reasonable use and enjoyment of the Property and the Rivers by the City and the general public in a manner consistent with the other easement goals (the conservation values).

The Conservation Easement places the preservation of the stated conservation values above permitted activities, which is consistent with all of the City's previous management planning. This management plan provides the practical guidelines to ensure that the conservation values remain adequately protected. The measures outlined in this section are based on the concept of *Management Through Infrastructure*.

5.1.1. Management through Infrastructure

Management through Infrastructure is an approach to conservation planning that carefully manages the placement of infrastructure (public access, trails, and campsites) as means to manage impacts on the land and water. Because recreational users generally follow the infrastructure that is provided, protection of sensitive natural resources can often be accomplished by limiting infrastructure in areas that are more susceptible to damage. This process does not regulate the number of users, but rather focuses on the condition of the resource. The parameters used to assess impacts are called *Limits of Acceptable Change*.

5.1.2. Limits of Acceptable Change

For certain key aspects of the Property, it is useful to define limits at which the benefits it provides begin to become compromised. For example, establishing a boat ramp and formal camping facilities in the vicinity of the Confluence may lead to increased ecological impacts and reduced recreational enjoyment due to overcrowding.

The concept of *Limits of Acceptable Change* recognizes that resources are finite, not inexhaustible. Instead, Limits of Acceptable Change acknowledges that there are impacts from various users and that these impacts need to be reconciled with the allowed uses. The capacity of the resource is determined through a systematic evaluation that results in established limits of acceptable change.

Determining the limits of acceptable change requires a focus on the Property's physical condition rather than on user limits. The condition of the different resources become the

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benchmarks for measuring how much change from human activity will be allowed to occur. The necessary steps to this approach are as follows:

1. Inventory existing conditions to obtain appropriate data.
2. Identify issues and concerns as a basis for developing management objectives.
3. Develop objectives for resource protection and recreational use.
4. Select the biophysical and social indicators of change that will be measured over time.
5. Formulate standards to establish measurable reference points.
6. Monitor conditions.
7. Compare conditions to established standards.
8. Take remedial action if established standards are exceeded.

Clearly, this process requires an interdisciplinary working group, which is provided by the range of expertise available on City staff and from its easement partners. In addition, groups that actually use the resource for recreation should be included to ensure the various user groups can help to identify what conditions are acceptable to them, as these properties are managed and protected.

5.1.3. Recreational Use Corridors

Existing recreational infrastructure has already established three distinct corridors that help to define intensities of recreational use. The best policy for protecting the Property is to use these existing corridors and plan additional recreational infrastructure accordingly.

The factors that define each of these Recreational Use Corridors are various aspects of the following:

- Proximity to City of Fredericksburg (higher recreational intensity closer to the City)
- Continuity of forest cover
- Ecological integrity
- Scenic quality
- Recreational use suitability

The Recreational Use Corridors are shown in the table below and depicted in Map 10.

Corridor	Location	Example River-related Activities	Access Available	
Corridor 1: Most Intensive Recreational Use	Mott's Run to I-95 and below	Large groups on short float trips, including tubing	Public boat launch and extensive trail network with multiple access points	
Corridor 2: Moderate Recreational Use	Blankerbaker's/Hole-in-the-Wall to Mott's Landing	Full day canoe trips	Controlled access for put-in; public boat launch at Mott's Run for take-out	

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Corridor 3: Low Recreational Use	Rappahannock River: Deep Run to Blankenbaker's/Hole-in-the-Wall; Rapidan River: Ely's Ford to Blankenbaker/Hole-in-the-Wall	Overnight trips	Controlled or private launches on Rappahannock River; public boat launch at Ely's Ford
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5.2 Recreational Management

Public ownership and a conservation easement provide a good basis for resource protection. A clear process guided by the Easement’s stated conservation values provides the framework for good public decisions, to effectively balance resource protection and recreational uses.

5.2.1. *Protecting the Resource*

Camping

Primitive camping is allowed across the Property. There are numerous areas along the Rivers where camping is popular, many originating from paddlers accessing these areas from the water, but also by campers accessing the Property overland. The locations of these heavily used areas are depicted on the Rappahannock River Water Trail Map, which can be obtained through Friends of the Rappahannock. The City has no plans to construct formal campsites.

When choosing where to camp on the Property, campers should locate tents and other camping equipment in locations that minimize visual and ecological impacts. The following items should be considered when selecting a camping location:

- Connectivity of Riparian Buffer – As outlined above, live and standing dead vegetation should not be removed for a camping area. Removal of vegetation fragments the riparian buffer corridor and promotes soil erosion.
- River access - Avoid locations with steep banks that will be eroded by foot traffic. Choose an area where there is shallow grade access at the riverbank and where canoes can be secured without removing vegetation.
- Sight lines - Minimize the visual impact of a campsite by locating it at least 10 feet inland from the top of the river bank and behind a buffer of trees and vegetation.
- Camping surface – Choose an area that is level and well drained.

The current number and density of camping areas on the Property does not appear to adversely impact the recreational experience or scenic integrity. Of greater concern are the impacts on

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water quality due to improper disposal of wastes. At present, the City has no plans to develop formal campsites. A study of water quality impacts and alternative disposal methods should be undertaken as soon as possible, to provide basic information for policy decisions.

Leave No Trace

Recreational users exert an inevitable impact on natural resources. As large numbers of people are drawn to the Rappahannock River, it becomes increasingly important to minimize their impact, so all may continue to enjoy what the river offers. *Leave No Trace* is a conservation ethic that is widely recognized as a standard for recreational use of sensitive habitats and landscapes. The City introduced this concept in its Rappahannock River Watershed Plan (1994), under the heading of Low Impact Recreation. *Outdoor Ethics for the Rappahannock River* was developed by the Leave No Trace organization and the Friends of the Rappahannock, to adapt the general Leave No Trace guidelines specifically to the Rappahannock corridor that is upriver of the City of Fredericksburg. These Rappahannock guidelines are published on a waterproof plastic card which is designed to be attached to a backpack or canoe and can be obtained at no-cost at Friends of the Rappahannock, Virginia Outdoors Center, and Clore Brothers. The guidelines are listed in Appendix 6.

Fires

Campfires can pose a wildfire risk. For most of the Property, the ratio of wildland/urban interface is high because of the Property's narrow in width between the Rappahannock or Rapidan River and developed lands. Potential wildfires originating from campfires on the Property could spread quickly to neighboring residential homes. In 2009, a small campfire started a wildfire near Ely's Ford, but was contained before it could spread to nearby homes.

Open-air campfires are permitted, with due consideration of the following safety rules:

- Open-air campfires must be attended at all times and kept in a protective ring
- Open-air campfires must be located under treeless areas
- Only downed wood should be used for campfires. Do not disturb live or standing dead vegetation.
- Trash should not be burned in campfires.
- Before their trip, campers should consult the Department of Forestry website as well as the local jurisdiction's Fire Marshall for fire restrictions.

Human Waste

Campsites are heavily impacted by river users during the peak season of May through July. The Fredericksburg City Code requires that waste be buried 12 inches deep and at least 100 feet from the river, but field evidence indicates that holes are frequently not dug and, when dug, are rarely deep enough. Campers should carry a small shovel to dig the hole deep enough to be within the soil's biodegradable layer. The bacteria and various insects in the soil will dispose of the biotic

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waste within a few weeks. Food or solids should not be buried as animals will dig this material up and leave it scattered across the landscape.

Human waste should be handled in either of two ways:

- Waste, including tissues, can be packed out (e.g., collected in portable toilet, double bagged, and properly disposed of at the end of the trip), or
- Waste can be buried in a hole at least 12 inches deep, and at least 100 feet from the water.
Note: Any tissues (e.g., toilet paper, Kleenex, and baby wipes) need to be biodegradable if they will be buried in the hole.

Noise

Protection of the recreational experience on the Watershed Property includes ensuring noise levels do not disturb other users. The experience of solitude has been recognized as a highly desired component of the experience afforded by the Property. Noise from campsites should not impact the recreational experience of others.

Erosion Control

Soil erosion is one of the main problems for these Rivers, causing excessive sediments to run into the water. Some users have cleared camping areas by removing trees and other vegetation.

Popular areas have grown in size as campers continue to remove woody vegetation for campfires or to create temporary shelters. Additionally, campers have caused soil erosion along the riverbanks when accessing the Property from the Rivers by climbing up a bank. To minimize soil erosion, campers should do the following:

- Avoid removing or clearing existing vegetation
- Use special care when climbing out of rivercraft, by stepping on stones or sturdy roots in the riverbank instead of bare soil.

Trapping

Since 1991, trapping has not been an authorized activity on the Watershed Property pursuant to City Code Section 66-142. Trapping is a management tool, though, and could be considered as an authorized activity in the future, either throughout the Property or in specific zones. Legal trapping of the Property will require all necessary licenses and all applicable State trapping laws, regulations, local ordinances, and rules specific to the Property will need to be followed.

Hunting

The development of this policy included extensive input from the hunting public and from

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the Virginia Department of Game and Fisheries (VDGIF). Hunting is permitted across most of the Property and requires no permits beyond applicable State and Federal hunting licenses and stamps. All applicable State and Federal hunting laws, regulations, local ordinances, and rules specific to the Property must be adhered to at all times. Additional rules specific to the Watershed Property will be posted at all public access sites, the City of Fredericksburg website (www.fredericksburg.gov), and are available by calling the City of Fredericksburg, Department of Public Works (540-372-1023).

The Property-specific rules for hunting on the Property currently are:

- No trapping.
- No permanent tree stands.
- No hunting or discharge of firearms within any posted safety zones.
- Hunters must comply with all other laws or regulations relevant to the Property adopted into City Code or any additional posted rules.

The language in this management plan shall not supersede Federal, State, or local laws or regulation as they relate to hunting. Current hunting regulations can be obtained from VDGIF's website (www.dgif.virginia.gov/hunting) or referring to the most recent version of the Hunting & Trapping in Virginia digest or migratory waterfowl and webless migratory bird seasons and bag limits, also available online.

Pets

Dogs should be on-leash at all times on the Property except when using dogs to find and retrieve game during open hunting seasons. Other pets are not permitted. Owners shall dispose of pet waste in a similar manner as human waste:

- Waste should be buried in a hole at least 12 inches deep, and at least 100 feet from the water; or
- Waste should be collected in a bag or other container and packed out. If campers are returning by canoe, the waste must be stored in a waterproof container (eg. drybag) and tied securely to the canoe. The waste should be properly disposed of in a trash receptacle, or in a toilet serviced by a septic system or municipal sewer when returned to land.

Signs

One of the goals of the conservation easement is to protect the "viewscape to and from the Rappahannock and Rapidan Rivers." Indiscriminate use of signage has the potential to impact the natural viewscape along the river corridor. The river corridor currently exists in a state where few, if any, signs of human encroachment are visible on significant segments. This rare experience is worthy of special measures to ensure its protection. Therefore, the following guidelines relate to the use of signage on the Property:

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- No signage should be visible from the vantage point of a canoe on the River.
- Signs shall be limited to safety information, regulations, and interpretive materials at publicly-maintained access points and selected camping areas.

Trash Receptacles

Trash receptacles are not appropriate along the City's riparian lands, due to the high likelihood of their loss during flood events. Recreational users are expected to follow the Leave No Trace ethic and pack out what they packed in. All trash should be disposed of properly, off the Property. Trash receptacles may be considered at managed, public access points, but only if adequate staffing is ensured for maintenance of the receptacles.

5.3. Infrastructure Management

5.3.1 Trails

Trails allow the public to access many natural and recreational features and hiking on existing trails is a popular use of the Property. Pedestrian access is permitted across the entire Property, unless otherwise posted. Trails are a key aspect of the "Management by Infrastructure" approach, which seeks to manage impacts by controlling the extent of infrastructure. Construction of new trails on the Property should be undertaken only after thorough assessment of the potential unintended impacts of human access to an area.

Currently, no established trail exists that allows passage along the entire length of the Property. Certain natural features, as well as parcels that are not owned by the City, have divided the trails into segments. While a through-trail has been suggested on several occasions as a way to increase recreational accessibility of the Property, the nature of the terrain is not conducive to this effort. Development of a through-trail along the entire length of the Property is neither feasible nor recommended.

The following factors should be considered when evaluating proposals for any new trails:

Protection of Float-In Only Camping Areas

Does the proposed trail provide land access to a camping area that was otherwise only accessible by canoe? Float-In Only camping areas are a special feature of the Property, providing seclusion from land-based intrusions such as ATVs or walk-in party-goers. Every effort should be made to protect the secluded nature of these camping areas.

Discourage Off-Road Vehicle Access to Trails

Off-road vehicles, particularly ATVs, gain access to the Property from public rights-of-way. Blocking this type of access is extremely difficult since ATV operators typically will create a new trail around any trail impediments such as boulders or gates. This activity can be managed by limiting the creation of *new* trailheads.

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Erosion Control

Trails should be constructed along the elevation contours to minimize erosion. Suitable water diversion mechanisms should be employed to ensure that trails do not become conduits for water flow and further erosion. Appendix 7 includes recommended design specifications for new trails to limit erosion potential.

Scenic Impacts

Trails should be set back from the top of the riverbank by at least 15 feet, so as not to be visible from the river. To facilitate access to scenic vistas, trails should use occasional spurs to river overlooks in lieu of a trail along the top of the riverbank. The overlooks should maintain a vegetated understory of woody plants and grasses along the top of the riverbank to reduce erosion and visibility of the overlook from the river.

Trails Planning

Mapping of the trail network on the Property is currently incomplete. The City and partners are inventorying the vast network of trails that have been created by various recreational uses. Given the extensive network of high impact ATV trails (often on steep terrain) that is apparent through the current limited mapping and visual surveys, these ATV-made trails on the Property are frequently in conflict with the criteria defined above. Therefore, trail impacts on the Property are currently beyond acceptable levels. No additional trails should be constructed until current trails are fully inventoried, assessed for their impacts, and either improved to the point where they no longer cause adverse impacts or closed.

The following actions should be considered in the management of trails on the Property:

- A complete GPS inventory should be conducted of all trails on the Property.
- Trails on steep terrain, trails with erosion problems and trails that impact historical features should be considered for relocation, closure and/or restoration.
- Numerous trails on the property exist primarily due to illegal ATV use. These trails should be evaluated to determine if they have recreational value or should be closed due to impacts that cannot be mitigated.

5.3.2. Public Access

Effective management of the Property requires proper administration of public access. The City currently allows pedestrian access to the entire Property for permitted activities, unless otherwise posted. Several public access points are also available for recreational users to enjoy these lands and to access the Rappahannock and Rapidan Rivers. Some river reaches require an overnight canoe trip, while others are suitable for half-day or whole-day trips. For some of the public, the existence of river reaches that require overnight trips is desirable and adds to the remote wilderness experience. Others desire additional access in order to make other reaches suitable for day trips.

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The existing public access points protect the recreational experiences described under Recreational Corridors and help to protect the conservation values contained in the Conservation Easement. The City of Fredericksburg does not intend to administer a large network of public access points; but will continue to strategically use public access points that provide access while protecting river experiences.

Public access points are the primary recreational infrastructure features on the Property. Their location and management directly impact various sections of the Rappahannock and Rapidan Rivers. Consequently, careful planning is required to make certain that adequate access is available to the public, providing options for trips of both short and long duration, while ensuring that they do not impact critical environmental, historical, scenic and recreational aspects of the corridor identified for preservation.

The challenge for access planning is striking the correct balance between access and maintaining the ecological integrity and conservation values of the river corridors. For environmental protection, there are several key factors of relevance:

- preserving the ecological integrity of the Property
- protecting the connectivity of the riparian corridor for wildlife
- protecting water quality
- maintaining a natural viewscape from the river
- maintaining the wild and scenic experience of long river stretches without encountering human encroachments
- maintaining the seclusion of float-in only campsites

In terms of public access, there are also these considerations:

- maintaining adequate accessibility for recreation uses
- locating access points strategically, to allow float trips of both short and long duration

There are both public boat ramps as well as controlled access points on the Property. This rivercraft access is distinct from overland pedestrian access, which the City currently permits across the entire Property, unless otherwise prohibited.

Opinions differ, however, as to the adequacy of the current extent of boat launches on the City's Watershed Property. Some recreational users note the inconvenience of not being able to quickly reach certain reaches of the river. Others point out that one of the features that make the City's Watershed Property so special is the relative inaccessibility of some areas, which lends a wild and scenic aspect to the recreational experience. This relative remote experience is not typically available on rivers so close to major population centers and this quality has been protected by the City since adoption of its Rappahannock River Watershed Plan, in 1994.

As an example, the Fredericksburg City Council declined a proposal by the Virginia Department of Game and Inland Fisheries, in the late 1990s, for the establishment of new publicly

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administered access points at Snake Castle and the Confluence. In turning down this infrastructure, the City Council cited the remote nature of the sites for administration and their likely intrusion on the section of river prized for its wild and scenic recreational experience.

The conservation easement sets a generous limit on future access facilities, potentially allowing up to five new access points plus the improvement of several existing primitive access points to full public access. Implementation of this level of access would severely stress the resource, though, and impose a considerable challenge for maintaining the conservation values of the Property.

River Access

The City has considered the number and distribution of public boat launches within the Property to be adequate to meet the demands of recreational users, while still protecting the conservation values and the recreational experience of the river corridor. There are also points of controlled access that present a number of benefits. For instance, any controlled boat launch on the Property must receive the permission of the City and be subject to a formal licensing process. All agreements for controlled access address several requirements:

- Consistency with the conservation easement
- Protection of the scenic viewshed from the river
- A locked control structure at the Property boundary
- Defined limitations on permitted users
- Minimum buffer from waterbodies
- Limits on removal of vegetation
- Protection of the habitat and water quality

Still, the popularity of the controlled boat launches at Blankenbaker's and Hole-in-the-Wall suggest that an additional public boat ramp in that general vicinity would be useful, especially if these controlled access points must be closed if passage through the adjoining private property is no longer available. A new public facility in this area would allow continued overnight trips through the Confluence as well as provide longer day trips to Mott's Run and areas downstream.

There exists a site for a boat launch at the Hunting Run water control facility, owned and managed by Spotsylvania County. This site is on the Rapidan River, 1.2 miles upstream of the Confluence, and is already compromised by the water intake facility. In addition, infrastructure for vehicular access, parking, and river access is in place. Very minimal disturbance of the riverbank would be necessary to construct a boat launch.

A public boat launch at Hunting Run would be consistent with the conservation easement, will protect the remote recreational use corridor on the Rappahannock River, will meet the demand for additional public access along this stretch of the river, and is strategically located so as not to duplicate any other existing access. Given the potential benefits as well as the desirable aspects of this site, VDGIF recently proposed to Spotsylvania County that a boat launch be developed on the County's property at Hunting Run. The County agreed to the proposal and has indicated it

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will enter into a cooperative agreement with VDGIF to develop the site. The U.S. Army Corps of Engineers has already been consulted and has also inspected the site. The VDGIF will design and construct a low-impact canoe slide on the site, as well as provide signage and enforcement.

An additional site for a public access to the Rappahannock River may be considered, if one is desired in Stafford County at the Rocky Pen water intake facility. This site is also consistent with the above referenced river access criteria. Like Hunting Run, the Rocky Pen Run area has infrastructure in place so that very little disturbance would be required to develop a boat launch.

There is also the potential for additional public access points to the Rivers to be developed on lands outside the Watershed Property. For instance, the VDGIF is considered developing a low-impact boat launch on the southern portion of the C.F. Phelps Wildlife Management Area near the upper reaches of the Watershed Property. This site would be roughly six miles below the Kelly's Ford boat launch and would break up the long river trips from Kelly's Ford to Mott's Run.

While a new public access at Hunting Run would serve many needs, canoe outfitters may require access downstream of the Confluence, to be able to provide float trips at times of low water when the Confluence is not easily travelled. As a consequence, the City should consider establishing a controlled access below the Confluence in the event the controlled access is lost at Blankenbaker's and/or Hole in the Wall.

Land Access

Though overland access (walk-in) to the Property can occur at any point along its boundary, the number of places that are publicly accessible is limited to Prettyman's Camp (off River Road in Spotsylvania County), Richard Ferry Road (Culpeper), Route 17/Deep Run (Stafford/Fauquier Counties), and Hunting Run/Spotswood Road (Spotsylvania County).

The end of Richards Ferry Road, in Culpeper County, is a very popular, but undeveloped and uncontrolled public access point to the Watershed Property near the Confluence. This site has been abused for many years with unauthorized vehicle intrusions. A new parking area, just inside the Watershed Property, for public walk-in access to the Confluence area, could be considered as a way to establish better control and enforcement of activities near the Confluence. Such a parking area would need to be consistent with the easement goals, but could significantly improve and protect this large and popular section of the Property, by placing the parking/access within the jurisdiction of VDGIF and the City's watershed property manager. If established, the new parking area would be approximately 1,000 feet from the Rappahannock River and nearly a mile from the popular camping area at the Confluence.

5.4. Maintaining Watershed Property Integrity

5.4.1. Motorized Vehicles

Consistent with the Fredericksburg City Code and the conservation easement, motorized vehicles will continue to be prohibited on the Property. The popularity of All Terrain Vehicles (ATVs)

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has grown steadily in recent years, while the locations where they can be legally operated has decreased. The result has been increasing ATV pressure on unmonitored lands, causing destruction of vegetation and soil erosion. Research by Ricker et al. (2008) in two sub-watersheds of the Rappahannock River indicates that ATV disturbances play a major role in sediment input because ATV trails become conduits of suspended sediments even during minor rainfalls.

5.4.2. Unauthorized Artifact Collecting

The Property contains a wide range of historic resources, including Native American sites, mill foundations, canals and canal locks, gold mines, Civil War earthworks, and more. Collection of artifacts will continue to be prohibited, unless authorized in specific instances by the City of Fredericksburg.

5.4.3. Boundary Intrusions

Removal of trees and other vegetation by adjoining landowners or anyone else is a significant illicit activity on the Property. In many locations, the City land extends only to the top of the ridge, where private homes abut the Property and removal of trees on the Property provides landowners with a view of the river. In other areas, adjoining landowners have cleared land at the riverfront and set up semi-permanent camps, with picnic tables, grills and makeshift structures.

Cutting, clearing, damaging, and destroying trees and other vegetation will continue to be prohibited, unless authorized in specific instances.

5.4.4. Recreational Use Impact

The City will continue to assess user activities for consistency with the conservation values of the Watershed Property and amend policies, as necessary, to ensure an appropriate balance is maintained between resource protection and allowed recreational uses.

5.4.5. Special Uses

For recreational uses or other activities currently prohibited in this plan, interest groups may submit a proposal to the City for their activity. The proposal will need to demonstrate how the activity will avoid or minimize impacts to the conservation values of the Property and to authorized public recreational uses. All licensing agreement proposals will need to be evaluated by the City and the conservation easement partners.

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6. ADMINISTRATION

The Fredericksburg Watershed Property is administered by its Department of the Public Works. The Watershed Property Manager is tasked with coordinating resource protection, public outreach, enforcement of regulations, and recreational management of the Property. Additional City departments support the administration, enforcement, maintenance and management of this Property, in particular the Police Department, Planning and Community Development, and Parks, Recreation and Public Facilities.

The Virginia Department of Game and Inland Fisheries, Virginia Outdoors Foundation and The Nature Conservancy are easement holders and also provide management support.

For law enforcement issues, the Watershed Property Manager, the Fredericksburg Police, VDGIF conservation offices, and county law enforcement officers are authorized to enforce the law and regulations on the Property, consistent with their jurisdictional authority. State and local law enforcement agencies, for example, cannot enforce City ordinances on the Property, but are limited to enforcing their respective state and/or local laws.

Under the Virginia Code, the City of Fredericksburg is not liable for injuries or damages incurred by an individual engaged in recreational activities on the Property. Landowners who provide recreational opportunities to the public are exempt from liability for injury or damages, provided the following conditions are met:

1. The landowner (including the City of Fredericksburg) has not charged a fee.
2. There has been no willful or malicious failure to guard or warn against a dangerous condition on the Property.

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7. OBJECTIVES AND ACTION ITEMS

The following objectives will help to balance public recreational uses with natural resource protection. Action items are the means to reach these objectives.

Objective 1: Preserve the conservation values of the Property, which protect the River's water quality.

- Action: Conduct inventories of natural resources and invasive species.
- Action: Identify potential land acquisitions to fill gaps along the forested riparian corridor.
- Action: Identify and prioritize habitat restoration projects (e.g., riparian buffer reforestation, eroding streambanks, and priority areas to remove invasive species).
- Action: Promote Leave No Trace ethics.
- Action: Participate in public interpretive trips on the Property, to educate citizens and officials about the conservation, historical and recreational significance of the Property.
- Action: Work with state partners to evaluate the environmental impacts of recreational activities on water quality.

Objective 2: Manage recreational activities to preserve the natural experience and solitude on the rivers and the Property.

- Action: Monitor and manage recreational trails and public access points.
- Action: Educate river users about the allowable public uses and regulations on the Property.
- Action: Develop a controlled access license agreement for river access points on the Property. This agreement will need to include specific rules on where the controlled access can be placed, how it is to be designed (to minimize environmental impacts), and what activities will be allowed.

Objective 3: Provide opportunities for hunting, fishing and wildlife viewing.

- Action: Continue working with the Virginia Department of Game & Inland Fisheries to manage and monitor hunting.
- Action: Post authorized safety zone(s).
- Action: Promote Leave No Trace ethics.

Objective 4: Partner with appropriate agencies, research institutions, and/or non-profit organizations to assess activities on the Property's natural resources, ecological functions, and water quality of rivers/streams.

- Action: Collaborate with VDGIF and researchers to conduct a recreational user survey to evaluate various recreational activities taking place on the Property (potential research partners: Virginia Tech or George Mason University).

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- Action: Collaborate with VDGIF and researchers to evaluate ecological impacts of recreational activities on water quality and aquatic populations.
- Action: Continue to use the Watershed Property Easement Partners Committee, to review future recreational use, infrastructure proposals, and potential disturbance activities on adjacent lands, to fully assess environmental impacts to natural resources, historic sites, and scenic areas and viewsheds.

Objective 5: Monitor the Property for prohibited uses, educate violators, and take enforcement actions, as needed.

- Action: Educate recreational users about prohibited activities.
- Action: Mark and maintain boundaries of Property and conduct periodic inspections to identify trespassing.
- Action: Take action against boundary intrusions.
- Action: Work with adjacent landowners and neighborhoods to educate them about authorized uses of the Property and assess whether existing infrastructure needs to be removed (and habitat restored) or whether City should develop an agreement with the neighbor(s) to authorize continued access.

Objective 6: Educate recreational users on the proper disposal of human waste.

- Action: Erect unobtrusive educational signs at public access points.
- Action: Provide educational information in brochures, at kiosks on public access points, with livery outfitters, and at the Friends of the Rappahannock's River Orientation Center.
- Action: Work with livery outfitters to create a program to lend small shovels to overnight canoeists to be able to dig proper holes for human waste disposal.

Objective 7: Manage camping areas and trails to minimize environmental impacts.

- Action: Conduct a survey of environmental impacts of current camping areas (soil and riverbank erosion, vegetation destruction, accumulation of trash) and develop a plan to minimize adverse impacts.
- Action: Post camping rules on kiosks and in brochures.
- Action: Map all trails and collect data on their condition.
- Action: Consider improvement, relocation, or closure of trails that are causing erosion problems or that impact historic resources.
- Action: Evaluate trails created by unauthorized activity, such as motorized vehicles, to determine recreational value or whether they should be closed.

Objective 8: Protect historic resources and scenic viewsheds.

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- Action: Monitor proposed and existing development on adjacent lands, to avoid adverse impacts to historic resources on the Property.
- Action: Identify and track the condition of key resources that are near or adjacent to private land uses, to ensure these sites are not degraded as a consequence of such activity.
- Action: Maintain an inventory of historic resources and update, as appropriate, to ensure it remains an accurate database for planning and policy development.
- Action: Avoid the installation of signs on specific sites, but provide educational materials to the public so they can fully appreciate their protected heritage as well as understand their responsibility to care for them by leaving historic resources undisturbed.
- Action: Ensure viewsheds and historic vistas retain their integrity and scenic value by carefully evaluating any proposed intrusions for visual impact.

Objective 9: Administer public access points on the Property.

- Action: Install regulation and interpretive signs at public access points at Mott's Landing, Ely's Ford, and Prettyman's Camp.
- Action: Retain the Watershed Property Easement Committee to review any proposed infrastructure for consistency with this management plan, the conservation easement, and any applicable City codes.

Objective 10: Identify the resources and funding needed to implement these objectives and actions.

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8. REFERENCES

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9. MAPS

Maps are attached.

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Appendix 1. Compilation of public comments during the first public meeting in March 2009.

Public Meeting – 03/04/2009 – Comments from Break-out groups Fredericksburg Watershed Property Management Plan

Note: Comments from about 50 participants in six break-out groups

General Comments on Public Values and Balancing Natural Resource Protection with Recreational Use

- Wonderful property – true treasure that these forests along river have been protected for so long – important natural resources protected such as wildlife habitat
- Above all - Preserve the land and preserve the remote experience
- Preservation - Wildlife buffer
- Praised the easement as a wildlife corridor and the importance of keeping it intact and adding more land to it - work with land conservancy groups and private citizens to increase the size of the property.
- What natural resource studies have been done on this land? How will this information be used in the plan to develop natural resource goals/objectives?
 - This public meeting seems very focused on the public recreational use – top focus should be natural resource protection – then what recreational use is acceptable
- Population in the region is expected to increase – public use will increase with population - afraid we will love the Property and its resources to death
 - But we do not want to prohibit all public use because people need to experience the Property and the river to become engaged in protecting these lands and waters in the future
 - Minimal use of property until a few years ago - The easement has brought more attention, especially out-of-towners
- Like the easement lands for their solitude and quiet - not many people knew about it or were willing to work hard to get there. It made the experience better because “you have to work to get to the quiet parts of the river.”
- Liked that they couldn’t see any houses
- Important to protect the natural vistas
- Primary intent of the management plan as “maintaining what we’ve got” - preserve recreation, but balance it with protection.
- Committee should define all uses, see which use has the greatest number of people and then prioritize on the number of users (one person thought hunters more prevalent - others were sure that bikers and hikers are more prevalent)
- Keep things simple (with management)
 - Keep laws, regulations, guidelines, etc. simple and easy to understand. Don’t make it difficult for users to remain in compliance while recreating on the property. This may lead to frustrating experiences and challenges for enforcement. Kiosks, in limited and appropriate locations can be helpful.
 - Don’t create maintenance and upkeep problems. Limit or eliminate signage, trash barrels (pack out what you pack in), benches, and other man-made items. The exception would be for the higher use zone, closer to the City Limits, but still keep eye towards minimal maintenance requirements.
- Need to periodically evaluate and revise the management plan – every 5 years?
 - Include public input each time – can recreational user input change direction of plan (e.g., policies about public use)?

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Public Use Intensity Zones

- Level of use (impacts) zones are basically already in effect, and should continue to be the case
 - Close to city limits = high use zone (potential for established bike trails, walking trails, etc.). Attempting to restrict access or usage in this area will most likely result in higher enforcement requirements and may lead to adverse impacts. Try to facilitate recreational opportunities in this area as much as possible without causing safety issues or adverse impacts on the environment.
 - Farthest away from city = low use and low impact zone. Little to no improvements (impacts) should be made in this area. Most remote experience areas.
- Zones will be hard to manage – need more Lee's to enforce zones – don't zones already effectively exist? Higher use near access points?
- Supportive of low public use zones to protect natural resources, but think it will be virtually impossible to manage
- Do not think zones are needed to manage different public uses – group does not perceive a true conflict between recreational user groups (but does concede there could be conflict between natural resource protection and recreational use)
- How would zone boundaries be demarcated? Signs? This could get obnoxious-looking
- Intensity Zones – possibly define by:
 - Hunting – by State regulations
 - Buffer hunting from campsites
 - Provide Canoe access
 - Provide areas for high intensity hunting
 - Provide areas for high intensity camping
 - Are there sensitive wildlife areas?
 - High use may occur on its own in certain areas – easy access locations
 - Enforce high use zone regulations
 - Hunting season – all should have
 - Lead shot concern Orange (include non-hunters)
 - Type of rifle/gun

Public Access

- Access points: more access – more people (some concerns)
- New accesses are not necessary.....but if there is any consideration in this area, it would only be for one access point to help break up the long trip from Eley's or Kelly's Fords to Motts Landing. Emphasis seemed to be on no new public accesses.
- Provide more access points for day trips to better manage public access (to limit where the public "creates" their own illegally)
 - How would more access affect outfitter capacity? Would this support more outfitter businesses and thus commercial use of river?
 - How does more access affect overall user experience?
 - Will plan designate where new access points could be located in the future? If not, plan should define guidelines on how City will assess proposals for future access points
 - Need a public access point between Kelly's Ford and Mott's Landing – two-day float – would like to also have the option of day floats along this stretch

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- Need access from Stafford and Fauquier
 - One possibly near confluence, must be well-planned, possibly give permits for access
- Restrict access points to the river - "Too many access points will trash it up"
 - "Perhaps one access point at the confluence since the service road is already there will allow one day trips to get more people out there to appreciate it, but not too many to destroy the experience" (There was concern about Celebrate VA North access and wanted to keep it closed.)
- Discussion about how many access points will each jurisdiction get
 - Very political
 - Is there a true public need or just a perceived need
- Consider access needs for emergencies vs. public access
- One group brought up erecting mile markers on the river
 - might increase access and increase non-experienced people (seen as a crutch)
 - possibly for emergency situations?

Hunting

- Is hunting a true conflict or a perceived conflict?
 - Minimize or avoid regulations for anything that is not a true issue – only concentrate on regulations that are absolutely necessary because regulations take away the ability of flexibility to respond to changes in the future
 - Is hunting a conflict NOW with other recreational users? If so, how?
 - Can't we co-exist?
 - Major hunting time is from Nov 1 until end of year – it is likely that other public uses are minimal at this time. *Any necessary regulation could allow hunting during particular hunting seasons that minimizes/avoids overlap with when the public more commonly uses the Property.*
- The management plan needs a plan for conflict resolution between public uses (e.g., if hunting does become a true conflict with other public uses, what process will the City use to resolve?)
- Hunting: should be allowed but consider safety requirements. We did not come up with specific safety requirements during the discussion, but folks did seem to agree that there is a concern about camping and hunting in same locations. Safety zones, time of year restrictions were a couple of ideas.
- Minimal conflict during hunting season with recreational users
 - Not many canoeists during winter
 - More conflict with hikers/bikers and hunters (Celebrate VA tract)
 - Bikers are putting themselves at risk by using property during hunting season
 - Hunters can only use property for 2 months out of year, rec. users have all year to enjoy property- does it need to be regulated, is it already regulated
 - All users need to share responsibilities
- Keep hunting but regulate it, like CF Phelps
- One group had diverse sentiments on hunting:
 - Management plan will be an "assault on hunting"
 - Others interested in restricting hunting areas, but still allowing it – while others wanted to restrict hunting all together. A biker felt he was "terrorized" by gunshots when he was riding his bike.
 - One hunter floats on the river and shoots toward the land - felt he could continue hunting even if Property restricted because he was on the water. With DGIF as one of the trustees, he was sure hunting would not be restricted.

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- Leaving deer parts on trails should be restricted.
- Hunting dogs should not be allowed to run the riparian lands.

Campsites

- “Designated” campsites – do not use this wording. “Designated” is an official category affected by health department codes, requiring waste facilities and potable water (comment from Jerry Simms, VDGIF)
 - Use “primitive” or “LNT” camping
- Will City start “advertising” the existing campsites? These are well-used, but not well-known – if known more widely, use will increase – is this desired?
- Campsites
 - Need to assess each site’s impact on environment/river
 - Some sites have access issues
 - Rating system
 - Number of people allowed per site
 - Rotate sites
- Kiosks – very important to educate about Leave No Trace, reg’s
 - In high use campsites
 - Well constructed
 - Rustic
- The need to control campsites was a consensus at one group - Back country camping was also a consensus
- One commenter liked the idea of allowing back country camping so one could camp anywhere on the property, but only allowing the fires at established sites.

Human Waste Management

- Existing City regulation is fine (bury waste) but people need to be educated to do this
 - place signs at campsites and at access points on how to dispose
 - Outfitters educate each group
 - Not sure how else to change human behavior – do not want facilities because this takes away from wilderness experience
 - Require a permit for campers (to be issued by outfitters?) – then provide information with permit about human waste
- All agreed about the human waste issue. One person said “just go in the river because all the animals do! It will break up before it gets to Fredericksburg.”

Trails

- Most wanted trails that could be hiked and if the trails could be marked on a map and in the environment. Kind of like national parks.
- Trail Development:
 - Bike: Single track vs. peagravel
 - Hiking
 - Horse
- Solicit groups to help maintain/cleanup trails - no leaf blowers though (odd comment!)
- Any new trails should be “natural” - no gravel or concrete.
- Lack of trails and lack of access is nice - too many people would ruin the environment and experience.

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- Concern about trails being too close to the river and on steep slopes causing damage. There should be a buffer and more ground cover put on the eroding slopes
 - More people on the land hurt the land and river - Push back access from the bank of the river

Mountain Biking

- FATMUG
 - Change opinion
 - Trail use interaction
 - Low impact use
 - Regional attraction
 - Trail building opportunities
- The want for gravel mountain bike trails came up
- Established mountain biking trails for high use area. Potential for stewardship/partnership agreement with biking group to maintain trails and monitor/protect property
- Establish rules for wet weather since most of the damage caused by mountain bikes occurs when it is wet.
 - Place gates at trail entrances - mountain bikers could take responsibility for closing the gate in wet weather to protect the trail
- Love to see a trail run from 95 to the confluence.

Trash & Alcohol

- Alcohol should be banned from property to reduce alcohol-related safety issues on Property and on the river
 - Will also help reduce trash
 - Glass bottles should be banned too
- Trash – who empties trash cans? Available trash cans encourages dumping of trash Solution – remove trash cans – Some people mentioned success with this
- Canoeing does have its impacts: littering being main one. All canoes should have trash bags (pack out what you pack in...leave no trace). More emphasis on this, the better. Outfitters may need to better I.D. their canoes (i.e. numbers) so that it would be easier for people to report violators (e.g. "I saw canoe ABC-1234 throw their cans and bottles in the river").

Public Education

- More education necessary so people know what is restricted.
 - Reporting procedures should be posted at access points. Who do they call when they see an issue?
- Reach out to the schools because the students don't know about the lands. "They need to get involved in protecting it or they will trash it in the future."
- Interpretative signs so that people would "know the treasure we have."
- Educate public about Leave No Trace ethics (including human/trash waste disposal), alcohol, safety issues
 - Signage at access points – include the City's existing regulations
 - Outfitters also educate their customers before each trip
- School Educational Outreach

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- Student involvement in property
- Activities (e.g. geo-caching)

ATVs

- ATVs should be restricted
- ATV usage- primarily younger people with limited access to the property
- ATV's: NO
- Everyone hated ATVs!!!

Horses

- Property should be allowed to be used by all interested parties except ATVs and horses.
- Horses: our group did not seem to agree with allowing horses on the property due to the impacts they cause (soil erosion, manure impacts, potential safety issues- spooked horses)
- Horses too damaging to trails and should be restricted.

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Appendix 2. Public comments submitted via web submission in April 2009 and in March 2010.

This lengthy appendix of comments can be viewed at www.river.friends.org - click on link to Fredericksburg Watershed Management Plan.

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Appendix 3. Baseline documentation report of existing infrastructure, human impacts and ecological features compiled in 2006 by The Nature Conservancy.

A 14-page summary report can be viewed at www.riverfriends.org - click on link to Fredericksburg Watershed Management Plan. Maps, pictures and appendices are not part of the summary report due to the volume of pages (261 pages). The full report with these additional materials can be accessed by contacting The Nature Conservancy in Virginia, Friends of the Rappahannock, or the City of Fredericksburg.

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Appendix 4. Breeding bird species detected during riparian habitat surveys in 2008 along sections of the Rapidan and Rappahannock Riverflowing through the Fredericksburg Watershed Property. Survey coordinated by the Virginia Department of Game and Inland Fisheries and the Virginia Society of Ornithology.

Common Name	Rapidan 1	Rapidan 2	Rapidan 3	Rappa-hannock 3
Number of Points Surveyed	20	19	20	16
Total Species Detected	55	43	38	23
Canada Goose	31	20	0	2
Wood Duck	1	0	2	1
Mallard	3	2	5	11
Great Blue Heron	1	5	5	6
Great Heron	0	1	0	0
Black Vulture	1	0	0	0
Turkey Vulture	0	1	1	1
Osprey	0	1	1	1
Bald Eagle	0	0	2	0
Red-Shouldered Hawk	3	0	0	0
Killdeer	0	0	1	0
Morning Dove	0	4	0	0
Yellow-billed Cuckoo	6	0	0	0
Chimmney Swift	0	0	3	0
Ruby-throated Hummingbird	7	0	0	0
Belted Kingfisher	1	2	1	0
Red-bellied Woodpecker	4	0	1	1
Downy Woodpecker	5	4	2	5
Northern Flicker	1	0	0	0
Pileated Woodpecker	3	3	1	0
Eastern Wood-Pewee	2	1	5	0
Acadian Flycatcher	6	10	12	4
Easten Phoebe	0	2	0	0
Great Crested Flycatcher	1	1	1	0
Eastern Kingbird	1	0	4	4
Purple Martin	1	0	0	0
Tree Swallow	3	0	7	0
Northern Rough-winged Swallow	1	0	0	0
Barn Swallow	1	8	0	0
Blue Jay	1	3	3	1
American Crow	17	0	0	5
Fish Crow	1	0	0	0
Carolina Chickadee	15	13	3	3
Tufted Titmouse	9	26	3	3
White-breasted Nuthatch	1	2	0	0
Carolina Wren	13	13	6	13

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Blue-gray Gnatcatcher	15	23	11	0
Eastern Bluebird	0	1	0	0
Wood Thrush	1	6	4	7
American Robin	1	0	0	2
Brown Thrasher	1	0	0	0
Cedar Waxwing	6	0	0	0
White-eyed Vireo	4	4	3	0
Red-eyed Vireo	21	15	26	10
Northern Parula	26	18	22	13
Yellow Warbler	2	3	6	0
Yellow-throated Warbler	2	1	0	0
Pine Warbler	0	2	0	0
Prairie Warbler	1	0	0	0
Black-and-white Warbler	2	0	0	0
Prothonotary Warbler	0	1	0	0
Worm-eating Warbler	1	0	2	0
Ovenbird	1	3	5	0
Louisiana Waterthrush	5	7	9	1
Kentucky Warbler	0	2	0	0
Common Yellowthroat	2	0	2	0
Hooded Warbler	0	2	0	0
Yellow-breasted Chat	4	2	0	0
Summer Tanager	0	1	2	0
Scarlet Tanager	0	2	1	0
Northern Cardinal	14	24	14	6
Indigo Bunting	17	7	9	0
Eastern Towhee	1	1	0	0
Field Sparrow	1	0	0	0
Song Sparrow	1	0	1	0
Common Grackle	1	0	0	0
Brown-headed Cowbird	6	9	1	1
Orchard Oriole	2	2	0	0
American Goldfinch	9	10	11	1

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Appendix 5. Fish species collected at four sites (at Ely's Ford, below Kelly's Ford, above I-95 and adjacent to Lauck's Island) during depletion electrofishing in July 2001 by Virginia Department of Game and Inland Fisheries (Odenkirk 2008) with percent contribution to total weight in parentheses (t=trace).

Sunfish Family Centrarchidae (48%)

Rock bass *Ambloplites rupestris* (9%)
Black crappie *Pomoxis nigromaculatus* (t)
Smallmouth bass *Micropterus dolomieu* (20%)
Largemouth bass *Micropterus salmoides* (t)
Green sunfish *Lepomis cyanellus* (t)
Redbreast sunfish *Lepomis auritus* (17%)
Bluegill *Lepomis macrochirus* (2%)
Pumpkinseed *Lepomis gibbosus* (t)
Redear sunfish *Lepomis microlophus* (t)

Perch family Petromyzontidae (t)

American brook lamprey *Lampetra appendix* (t)

Eel family Anguillidae (8%)

American eel *Anguilla rostrata* (8%)

Herring family Clupeidae (2%)

Gizzard shad *Dorosoma cepedianum* (2%)

Minnow family Cyprinidae (2%)

Common carp *Cyprinus carpio* (t)
Golden shiner *Notemigonus crysoleucas* (t)
Fallfish *Semotilus corporalis* (1%)
River chub *Nocomis micropogon* (1%)
Satinfin shiner *Cyprinella analostana* (t)
Common shiner *Notropis amoenus* (t)
Spottail shiner *Notropis hudsonius* (t)
Swallowtail shiner *Notropis procne* (t)

Sucker family Catostomidae (27%)

Northern hogsucker *Hypentelium nigricans* (12%)
Shorthead redhorse *Moxostoma macrolepidotum* (5%)
White sucker *Catostomus commersoni* (10%)

Catfish family Ictaluridae (10%)

Channel catfish *Ictalurus punctatus* (7%)
White catfish *Ameiurus catus* (t)
Yellow bullhead *Ameiurus natalis* (3%)
Brown bullhead *Ameiurus nebulosus* (t)
Margined madtom *Noturus insignis* (t)

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Bass Family Moronidae (1%)

White perch *Morone americana* (t)

Striped bass *Morone saxatilis* (t)

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Appendix 6. Rappahannock Leave No Trace Ethics, created cooperatively between Leave No Trace and Friends of the Rappahannock.

RAPPAHANNOCK RIVER LEAVE NO TRACE ETHICS

PLAN AHEAD & PREPARE

- Know Before You Go. Check the weather forecast and water levels before your trip. Stay updated on changing conditions at www.riverfriends.org. River levels greater than the indicated levels are unsafe:
 - **Fredericksburg gage: 3.2 ft**
 - **Remington gage: 5 ft**
 - **Culpeper gage: 4 ft**
- Take a weather radio and watch the weather during your trip. Upstream thunderstorms can cause the river to rise rapidly.
- Use a river map to plan the trip (www.riverfriends.org).
- If you are cold, wet hungry or dehydrated you will be preoccupied with your own discomfort and disregard impacts you might be making to the environment. An environmentally responsible outing starts with gathering all the information and equipment you need to keep yourself safe and comfortable.
- Avoid spreading invasive species by cleaning shoes and equipment before every trip to remove hitchhiking weeds, seeds and other plant materials.

TRAVEL & CAMP ON DURABLE SURFACES

- Camp on existing campsites. Consult the *Rappahannock Water Trail Map and Guide* for campsite locations.
- At campsites, focus activity where vegetation is absent.
- When hiking, walk single file down center of trail (even when muddy) to protect vegetation.
- Leave your campsite cleaner than when you arrived.

DISPOSE OF WASTE PROPERLY

- Pack it in, Pack it out!
- Use a portable camping toilet to pack out human waste, toilet paper, and tampons.
- For guidance on proper methods of disposing waste visit Leave No Trace at www.LNT.org
- Don't throw trash in river, on land, or leave at campsite.

LEAVE WHAT YOU FIND

- Appreciate historical structures like locks, dams, and mills, by leaving them undisturbed.
- Do not build structures or dig trenches in campsites.

MINIMIZE CAMPFIRE IMPACTS

- Use a camp stove for cooking and use existing fire rings for campfires.
- Collect firewood from driftwood debris piles only, not from the forest.
- Consider bringing your own firewood or charcoal.
- Burn all wood to ash. Extinguish fires completely with water.

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- Pack out any campfire litter. Never burn any trash.

RESPECT WILDLIFE

- Observe wildlife from a distance. Never follow or approach them.
- Never feed wildlife; store your food and trash securely in a strapped cooler
- Keep your pets on a leash or leave them at home. Pack out their waste!

BE CONSIDERATE OF OTHER VISITORS

- Respect other visitors and protect the quality of their experience.
- Do not discharge firearms except for lawful hunting.
- Leave larger campsites for larger groups.
- Let nature's sounds prevail.

Leave No Trace FISHING

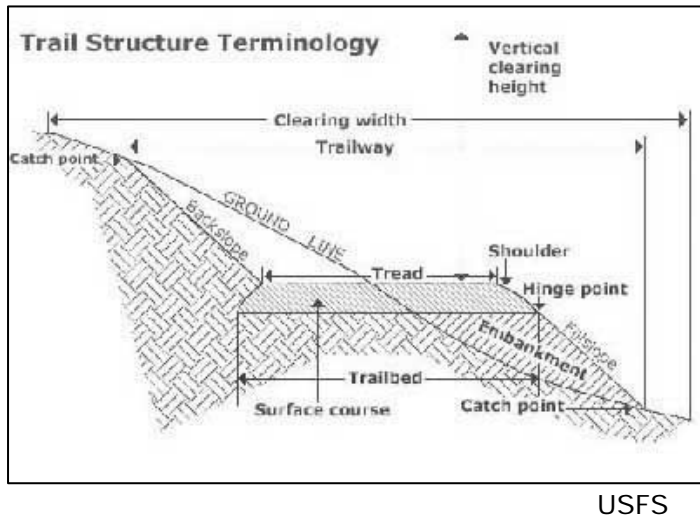
- Don't discard monofilament fishing line in the river or on the riverbank - it's a danger to humans and wildlife.
- Use commercially available alternatives to lead sinkers. Lead sinkers pose a serious threat to birds that ingest the lead when eating fish.
- Don't spread non-native plants and animals! Never release live bait such as minnows, leeches or worms into the river. Pack them out and dispose of them in the trash.

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Appendix 7. Recommended trail design specifications and techniques to minimize soil erosion potential on the Fredericksburg Watershed Property. Adapted from *The Rappahannock River Recreational Access Guide: Planning Environmentally Low-Impact Recreational Access on Riparian Lands* (Friends of the Rappahannock 2007).

Trail Design

Hiking trails are highly desirable recreational features along waterways. Seemingly simple, trails require some skill for appropriate trail design and construction. There are numerous excellent resources for trail standards, and we strongly recommend that readers consult the trail publications in the Resource Box at the end of this section. In this guide, it is not possible to include all of the technical details associated with trail design, construction and management. Hence below, we focus on basic trail guidelines from these publications, especially aspects critical to controlling surface water runoff.



Practice: Take time to plan the route of the trail, the trail width, and desired trail features to minimize impacts to sensitive areas and scenic vistas.

Trail Corridor Widths

The dimensions of the corridor are determined by the needs of the target user, trail difficulty level, or by guidelines designed by the landowner. *On Fredericksburg's Watershed Property (the river conservation easement lands), unpaved trails are allowed with a maximum treadway width of three feet and a maximum 2-foot wide additional shoulder on either side of the treadway (City Easement 2006).* For other areas, Table 2 includes recommended standards for trail construction.

Table 2: Hiking trail corridor clearing guidelines (VDCR and Virginia Trails Association 2000).

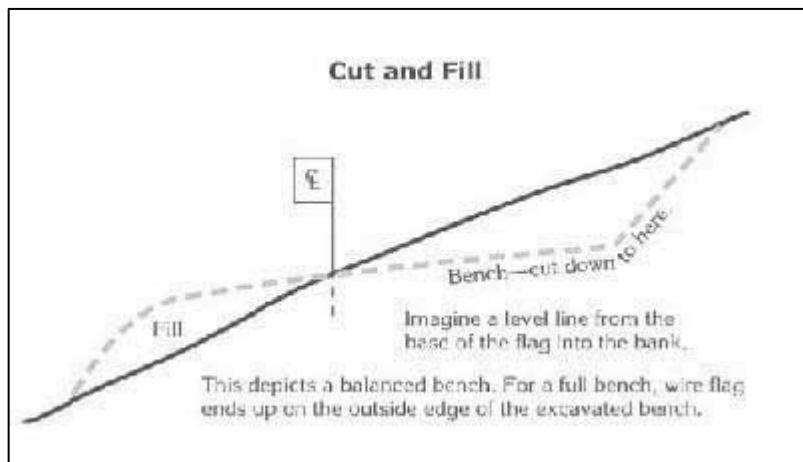
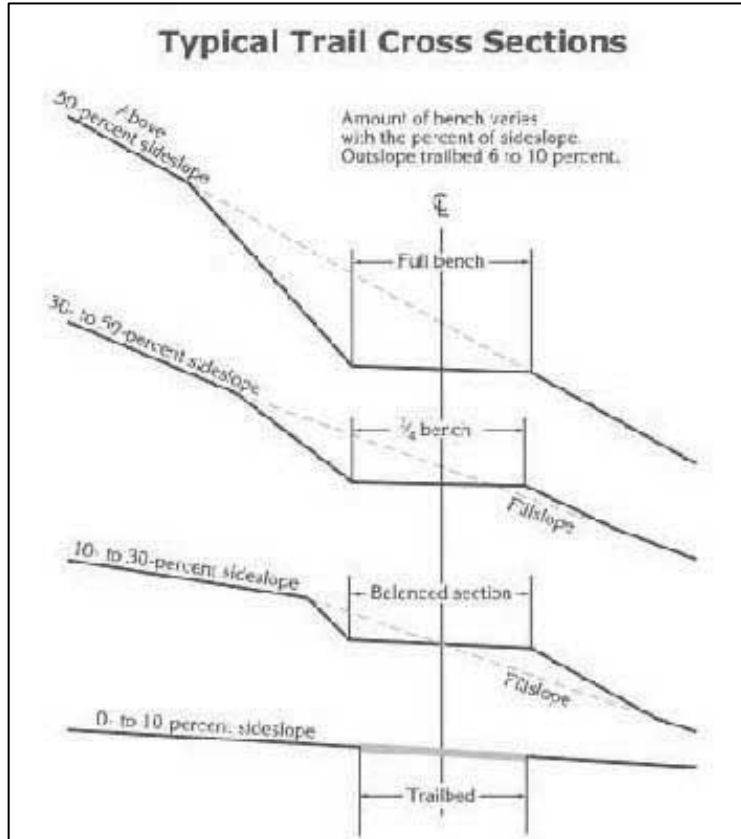
Component	Standard
Vertical Clearance	8 feet
Trail Width	2-5 feet
Horizontal Clearance (beyond trail width)	2 feet
Grade	Max 8-10%

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Trailbed

The existing trail surface should not be unnecessarily disturbed, especially on flat areas (less than 10%). On level ground, the trail base should be formed by building up a slight crown of at least 3 inches to provide proper surface water drainage. On hillside trails, the trailbed is excavated into the side of the hill to provide a slightly outsloped travel path on mineral soil. Hillside excavation should not be necessary on slopes less than 10%.

On steep slopes, *full-bench* construction is usually needed where the trail crew cuts into the bank to the level of the trail center line. As the slope of the hillside decreases, *partial-bench* and *balanced-bench* methods are used.

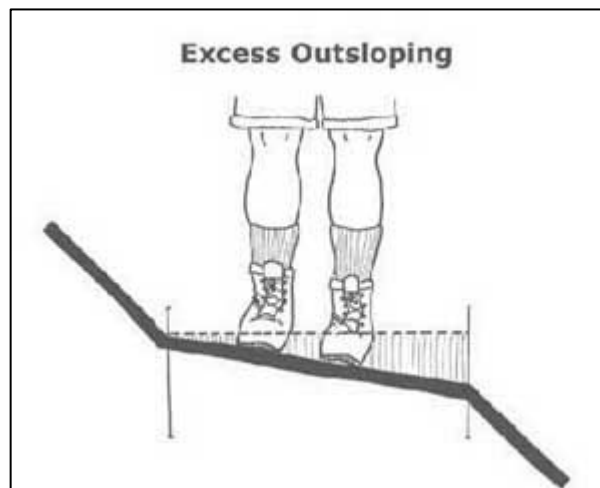


Cut and Fill method for sidehill trail building (USFS 2000).

These latter methods require the use of fill material on the outer edge (downslope) of the trailbed, termed the *cut and fill* method. Even though it requires more excavation, full-bench trailbeds are more often preferred by trail professionals because they are more durable and require less maintenance (fill materials on partial-bench trails may erode).

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The *outslope* of the trailbed should be constructed with a barely discernable downward grade on the outside or downhill side to facilitate water drainage. Outsloping lets water run naturally off the trail. The amount of outsloping is small, usually only a few percent. An easy method to check the outslope is to walk the trail. If your ankles want to roll downhill, there is too much outslope. A partially-filled water bottle makes a great level.



If your ankles start to roll, there is too much outslope (USFS 2000).

Surface Water Control on Trails

Diverting surface water off the trail should be a top priority. Running water erodes tread and may contribute sediment into nearby streams. *You can learn a lot about where problems may occur by sloshing over a wet trail in a downpour and watching what the water is doing and how your drains and structures are holding up.*

The best drainage structures are those designed during the original trail construction to be self-maintaining with minimal maintenance demands.

Outsloping, discussed above, is the first line of defense against erosion on a trail. Outsloping is most effective when used in combination with *grade dips*. Grade dips are permanent and usually maintenance-free. The basic idea is to use a reversal in grade (a relatively short rise on the trail then a return to the original trail descent slope) to force water off the trail. A *terrain grade dip* uses the existing terrain to plan for grade reversals and is a natural part of the landscape.



A similar concept to a terrain dip is the *rolling grade dip*, which consists of a short reversal of grade in the tread (figure to the left). The main difference from the terrain dip is that the rolling dip is constructed and not a natural part of the terrain. Water running down the trail cannot climb over the short rise and will run off the outsloped tread at the bottom of the dip.

The *waterbar* is the most common drainage structure after outsloping, but ***we recommend only using waterbars when grade dips cannot be used.*** You can build a grade dip quicker than a waterbar and it will work better. Most waterbars are ineffective at water control because they are not installed at the right angle or are too short. The waterbar needs to be anchored 12 inches into the cutslope and

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extend 12 inches into the fillslope. It also should be placed at a 45-60° angle along the trail, otherwise it will be too short and will clog with sediment, becoming ineffective.

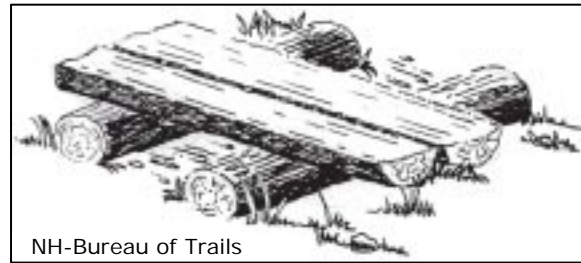
Trails in Wet Areas

The best choice for dealing with wet areas, such as wetlands, streams, seeps and springs, is to route the trail around these features. In lieu of this, following are a few strategies for wet areas that minimize environmental impact.



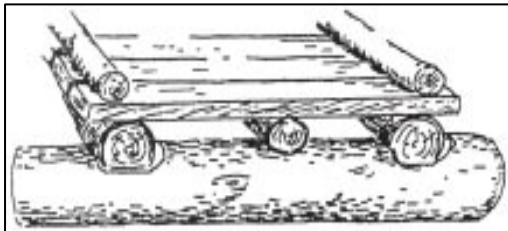
Stepping stones are large flat-topped rocks set into a stream that allows for dry passage. *Stepping stones* are the option of least environmental impact for stream crossings that accomplish the objective of providing dry passage. The ideal location for these stones is in shallow streams with light to moderate flows. They also are a standard solution for low wet and boggy areas, and work well when well placed.

Puncheons are wooden walkways, typically constructed of wood, to cross bogs, mud flats, marshy areas, or fragile, wet terrain. Puncheon consists of a deck or flooring made of lumber or native logs placed on stringers to elevate the trail across wet areas. The simplest type of puncheon is a topped-log puncheon.



Wooden *boardwalks* elevated above the wet surface also are a useful solution for wet area crossings through areas of fragile habitat and in areas susceptible to flooding. Boardwalks are fixed planked structures built on pilings often located in marshy areas.

Bridges are designed to cross open water, wetlands or ravines where more simple structures cannot be used, especially for areas susceptible to flooding. On hiking trails, well-anchored foot logs can be used as a "rustic" bridge to cross streams. *The construction of bridges should only be considered after other options in trail location and "wet area structures" have been examined.* In addition to the often taxing-work of transporting bridge materials to the trail site, bridge construction usually requires significant erosion control measures due to the proximity of wetlands or water.



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See the *Trail Construction and Maintenance Notebook* (USFS 2000) for more information on

more complex wet area crossing methods, such as using geosynthetic materials, culverts and French drains.

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Trail Resource Box

Internet Resources

- The Virginia Greenways and Trails Toolbox - www.dcr.virginia.gov/prr/docs/toolbox.pdf
- Best Management Practices for Erosion during Trail Maintenance and Construction, New Hampshire Bureau of Trails - www.nhtrails.org/Trailspages/BMPmanual2004.pdf
- Trail Construction and Maintenance Notebook, U.S. Forest Service and U.S. Department of Transportation, Federal Highway Administration
www.fhwa.dot.gov/environment/fspubs/00232839/index.htm

Publications

- Birchard, W., R. Proudman, and M. Dawson. 2000. Trail Design, Construction, and Maintenance. Appalachian Trail Conference.
- National Park Service. 1992. NPS Trails Management Notebook. U.S. Department of the Interior, NPS-Denver Service Center. NPS-2023