



J u b i l e e P a r k

A Conceptual Master Plan prepared for
Ivanhoe Civic League • August 2005

Prepared by:



College of Architecture and Urban Studies
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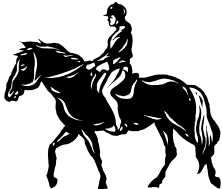
Project Team

Design Team: Sherry Roser, Graduate student, Landscape Architecture
Lew Holloway, Graduate student, Landscape Architecture

Project Advisor: Kim Watson, Landscape Architecture Project Coordinator



(L to R) Project team members Lew Holloway and Sherry Roser on the initial site visit



Acknowledgments

The CDAC team would like to extend their appreciation and recognition to the following groups of people for their work on and help with the project:

The Ivanhoe Civic League

Community Residents of Ivanhoe, VA

Tom Klatka, Southwest Virginia Regional Archeologist, Virginia Department of Historic Resources

Wendy Jacobson, Landscape Architecture Professor at Virginia Tech



Maxine Waller (R) and members of the community meet with CDAC representatives to discuss design options for the park.



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Introduction

Project Description

Ivanhoe is a small, rural community located in Southwest Virginia near Cripple Creek, which enters the New River in the Blue Ridge Mountains. One of the most notable community organizations within Ivanhoe is the Ivanhoe Civic League (ICL). The ICL was organized in 1986 when the people in the community came together to protest the proposed sale of the Industrial Park on New River. In the beginning the ICL's main purpose was to recruit an industry for Ivanhoe. Now several years later they strive to educate themselves so they can better nurture and develop the community utilizing their own resources - Ivanhoe citizens.¹

After using a Wythe County property as park space for nearly a decade and a half, the ICL was recently deeded the land. The ICL now plans to develop a formal master plan for the space, known to the community as Jubilee Park.

Jubilee Park is a 14.9 acre tract of land, bounded on one side by New River and flanked on another side by the New River Trail. The park currently has a covered shelter (known as Jubilee Shelter), an open dance area, a few horseshoe pits, a beach volleyball court, a concession stand, the foundation for a restroom facility, and a dilapidated horse show area that was formerly rented by a private organization.

The following is a list of activities that the ICL desires to cultivate and accommodate through the development of Jubilee Park. These activities were addressed in the creation of the master plan:

- Equestrian activities (horseshoe grounds, horse bed and breakfast)
- Youth health and fitness (walking trail and track; other fitness elements)
- Family-oriented activities (playground, picnic tables, additional horseshoe pits and volleyball)
- Community gatherings (enlarged dance area at Jubilee Shelter)
- Respite and reflection (meditation garden; riverwalk)
- Camping (tent camping; shower/bath facilities; possible camper hookups)

After the initial meeting with the ICL, the following additional programmatic items were added to the list of things to be considered in the development of the master plan for the site:

- Area for "camping in the rough" - tent camping
- Hook ups for other types of camping
- Meditation garden with the Jubilee Scripture carved into a stone
- More horseshoe pits
- Enlarge dance area

¹ Information taken from <http://wythe.pcsos.com/t-ivan.htm>



Looking from the existing band stand out toward the existing softball field



(L to R) Restroom foundation, concession building (white), and bandstand on western 1/2 of site



Wooded edge of property between site and New River Trail



New River Trail and trail right-of-way located adjacent to the site



- Move horse show area; enlarge and upgrade to show standards
- Playground near the shelter
- Walking trail/track - will combine with a grant proposal from Nike (young people related to losing weight)
- Keep the area near Jubilee Shelter as a community area with picnic tables for family gatherings and weekend picnics

The Design Center prepared a conceptual campus master plan for Jubilee Park that designated spaces for the aforementioned activities. The Design Center worked with the Ivanhoe Civic League and members of the Ivanhoe community to ensure the master plan meets the needs of the park users.

Products for the project included a conceptual master plan for the park, supporting sketches, a short supporting report, and a CD with digital files of final drawings and the final report.



Site Information

Jubilee Park is located adjacent to the small community of Ivanhoe, just off State Road 94 (Ivanhoe Road). The park is located at the edge of Wythe and Carroll Counties. There are about 600 people in the surrounding areas that could potentially benefit from this park, though its primary user group is envisioned to be the Ivanhoe Community and others drawn in by events hosted there.

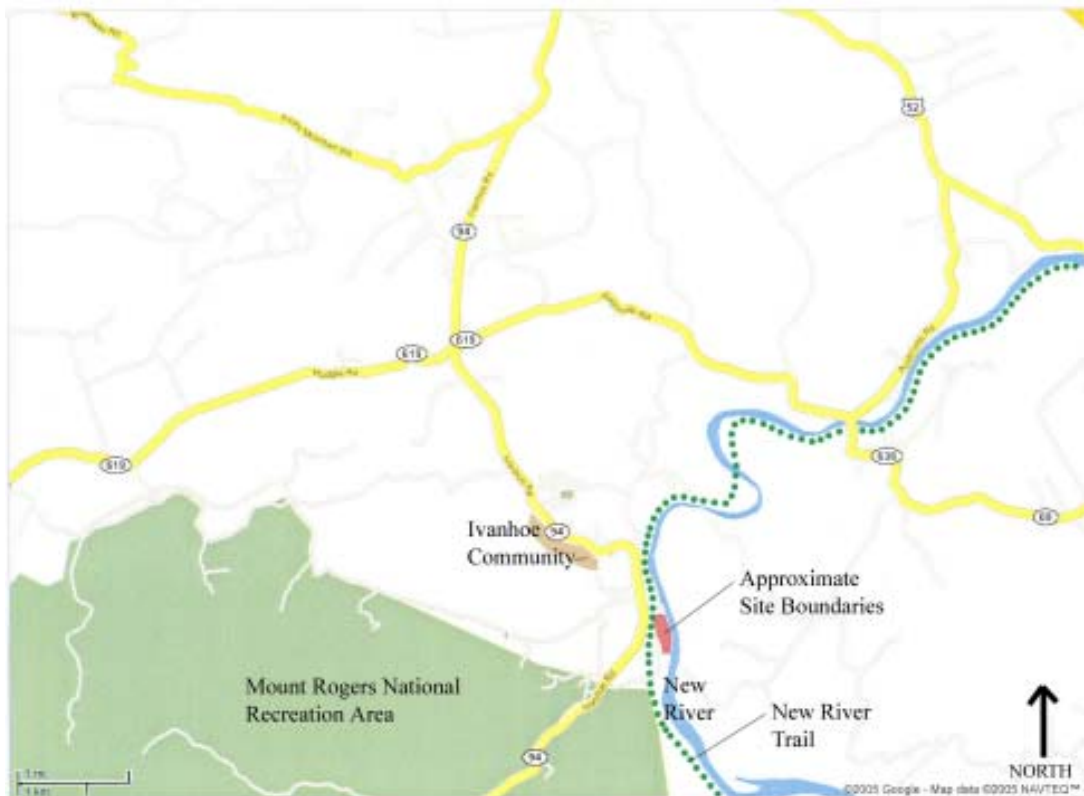
The park is bordered on one side by the New River and most of the site sits in a flood plain. According to local residents, the water frequently rises up to the riparian area bordering the riverbank, but has risen up to the stage in the park only once in their lifetime. Access to the park is from State Road 94 down a connecting road that travels under the New River Valley Trail. The 15 acre tract of land starts at the fence post marked Game and Inland Fisheries, owners of the adjacent property. The New River Trail edges the park opposite the New River. The back edge of the park ends at a fence adjacent to private property.



Position of Ivanhoe as related to surrounding major highways and towns



Location of Wythe & Carroll Counties



Location of Ivanhoe as related to surrounding roads



Summary of Design Process

The project began with a meeting and luncheon at the Civic League where Maxine Waller, President of the Ivanhoe Civic League (ICL) and primary contact for the project, introduced the CDAC team to other members of the ICL. ICL members expressed their ideas for the design of the park to the CDAC team, explaining both how the park was currently used and how they envisioned using the park in the future. After this initial meeting, the CDAC team proceeded to the site and began conducting an inventory and analysis of current site conditions. Part of this analysis included on site spot verification of topography since only a 20 foot contour USGS map could be obtained. This process gave the CDAC team a chance to formulate ideas based on current location and existing elements, taking into account the placement of the property in the floodplain.

With the existing conditions and site analysis information at hand, the CDAC team returned to Ivanhoe for a community meeting to brainstorm ideas for desired uses for the site. The participants broke into groups to discuss their ideas with the CDAC team members. These ideas were recorded on flip charts and in turn presented to the entire group at the end of the meeting. The CDAC team came away with a good idea of what it was that the residents wanted and expected out of the park.

From the ideas from this meeting, the CDAC team developed two preliminary design concepts for Jubilee Park. These designs were shown to the community at another meeting. Changes were made based on the comments received. The CDAC team left with the task of refining the plan into one final conceptual master plan.

The CDAC team consulted with Professor Wendy Jacobson, a Landscape Architecture Professor at Virginia Tech and avid horsewoman, regarding the design for the horse arena, the stables, and vehicular circulation for vehicles towing horse trailers. Some changes were made to the plan based on Professor Jacobson's input. The CDAC team also researched horse and RV camping to gather information on the manner in which sites should be laid out, their size, and other elements that needed consideration.

After completing this research and doing case studies of other parks and campgrounds, analyzing their design and success, the CDAC team prepared the final conceptual master plan for Jubilee Park. This master plan was presented to the ICL in August 2005. The final master plan was dry mounted and laminated in time for display at the community's annual Jubilee Festival, held at the park. This final report was prepared to document the design process and aid the ICL in the implementation of the master plan.



Looking toward existing horse stables and arena



Looking toward New River Trail from incoming road



Team member Lew Holloway standing on the banks of the New River



Previous site entrance road; closed by county and no longer used



Site Inventory and Analysis

Existing Conditions

The CDAC design team made multiple trips to the site to understand its features and determine its strengths and potential design constraints. The site is nestled snugly between the New River to the east and the New River Trail to the west. Views to the New River are afforded at several spots along the riverbank during the spring and summer, and at many more places during the fall and winter, as the leaves begin to fall from the trees. A beautiful rock bluff can be seen when looking across the river. There are also open views along the southern edge of the site, across the open space owned by the Industrial Development Authority of Carroll County to a semi-wooded site owned by the Virginia Department of Game and Inland Fisheries.

There are several existing structures on the park property, including a covered stage and an adjacent dance floor area, a concessions stand; older stables in need of repair, the foundation for a restroom, fencing, light poles, and a dugout for the existing softball field. Also currently found on site are a sand volleyball court, some evergreen plantings near the stage, and a row of dogwood trees along the fence line. A few oak trees are also scattered around the stage area.

The current high use areas include the stage/dance floor, concession stands, and the softball field. The entire park is highly used during the community's annual Jubilee Festival that occurs in the late summer.

Analysis

Two potential constraints that were identified during the inventory/analysis process were the site's proximity to the New River and how that related to floodplain construction limitations and the possibility of the presence of archeological artifacts on site. The CDAC team contacted both Carroll and Wythe Counties to determine limitations of building a park within the floodplain. There were slight variations per county, but the general guiding element was the location of the 100-year flood plain. No major built structures should be sited within this floodplain. The location of the 100-year floodplain as it relates to the project site can be seen on the 11x17 site analysis handout on the page 11.

The CDAC team also made contact with Tom Klatka, Southwest Virginia Regional Archaeologist for the Virginia Department of Historic Resources regarding a study that suggested the site once served as an Indian camp for a significant period of time. Mr. Klatka reported back to the CDAC team that the Department of Historic Resources has records of two archaeological sites in the vicinity of the proposed park. However, he was not sure if either of the recorded sites falls within the boundaries of the



Looking through existing trees and brush toward the New River



Existing stage and dance floor



Looking from boundary bank across the New River



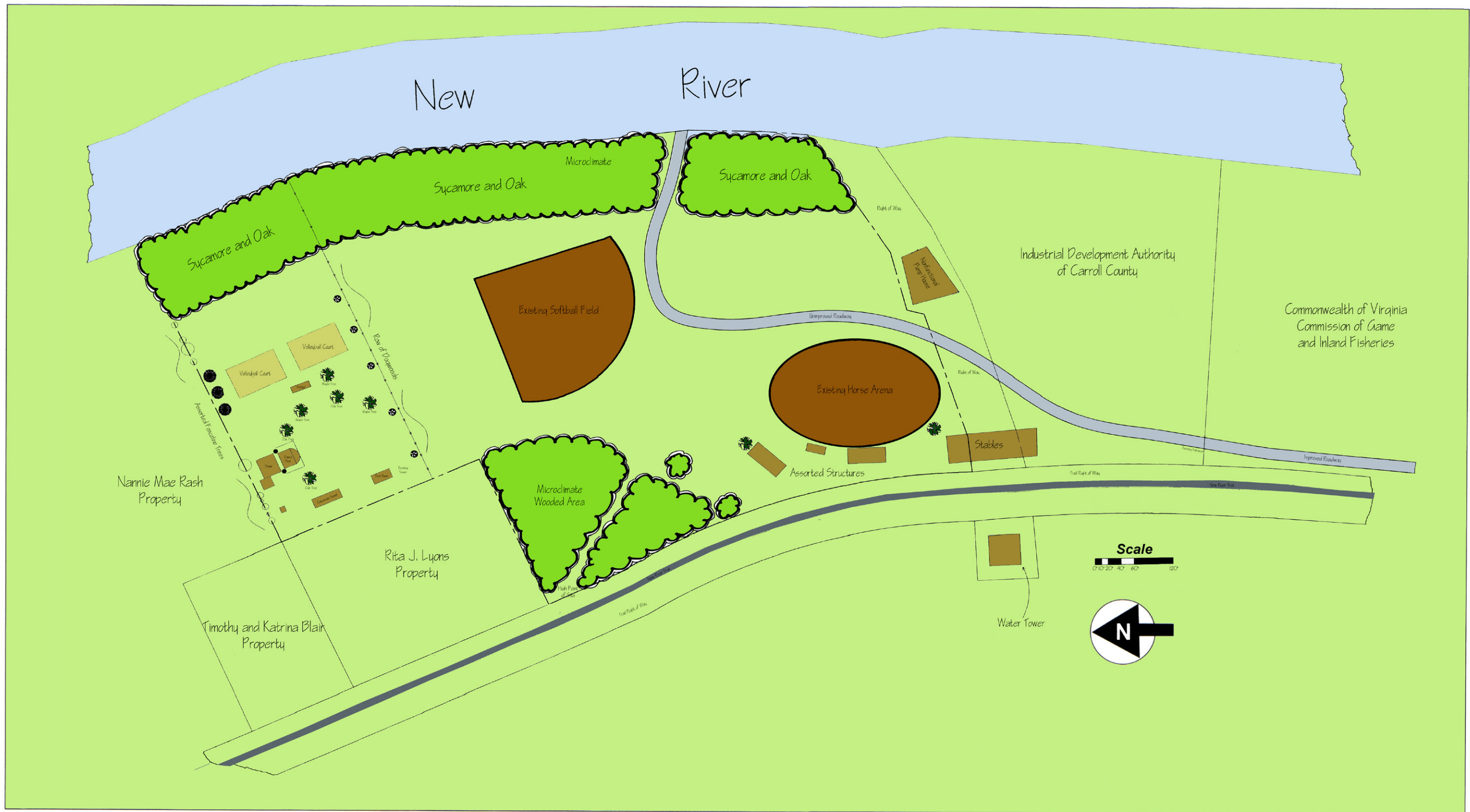
Looking toward site from river side; new road on left, old road on right



park. Since no further details could be found, the design team proceeded with the design process. A copy of the correspondence with Mr. Klatka can be found in Appendix C.

The 11x17 pullout on the following page graphically documents the intensity of current uses, identifies 100 year floodplain, highlights key views, shows site's relationship to the New River as well as the New River Trail, documents general areas of slope (only topographic information available was USGS quad maps), and identifies adjacent landowners and land uses.





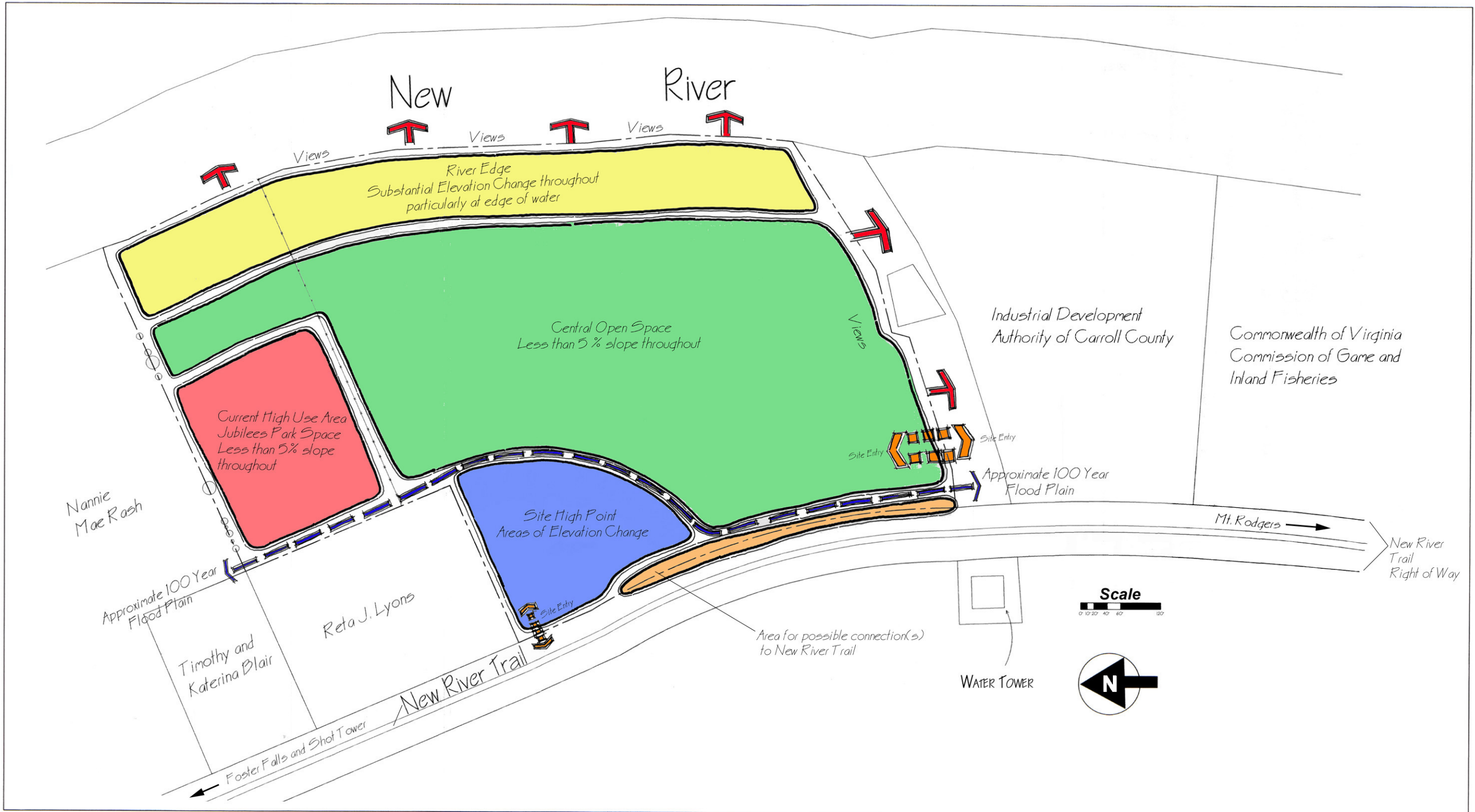
Jubilee Park

IVANHOE, VA

Existing Conditions

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Jubilee Park

IVANHOE, VA

Site Analysis

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Preliminary Designs

Participatory Workshop

On January 13, 2005, the CDAC design team visited the community and met with members of the Ivanhoe Civic League (ICL) to brainstorm ideas for the site. From this meeting it was learned that the community is very interested in rodeos and the ICL wants a regulation size rodeo arena. They also want 20-40 double horse stalls for housing visiting participants' horses.

Other items of interest for the park were two regulation-size volleyball courts. There are currently two on the site but they need to be upgraded. Workshop participants also expressed an interest in having two regulation size horseshoe pits. Workshop attendees discussed the possibility of siting ten RV camping areas with hook-ups for water and electricity. County water is currently easily accessible to hook into but they will need to site and install at least one other in-ground septic system. The workshop participants also expressed an interest in tent camping close to the river. They plan to maintain the existing boundary line by Jubilee Stage. It was noted in times past, the Department of Game and Inland Fisheries (DG&IF) had approached the ICL, asking that they add canoe docks to the river's edge. The ICL is open to the idea but would need funding support to augment costs of construction and installation. Maxine Waller mentioned the addition of a skate park for the neighborhood children.

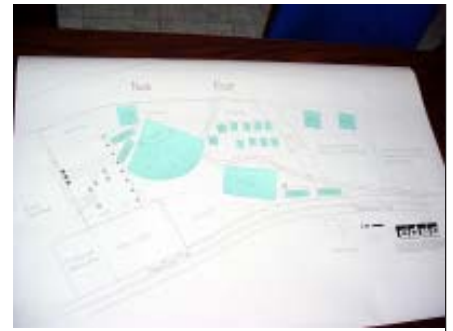
The ICL and other workshop participants desire to develop Jubilee Park in stages. Three stages of development were laid out for the CDAC design team:

Stage 1 - refine softball field; clear out scrubby vegetation down to the river

Stage 2 - develop horseshoe pits and tent camping

Stage 3 - develop horse arena

There was also mention of the possibility of creating a new recreation center off of State Road 94 and moving the ICL building out to that location.



Map presented at initial meeting



Team member Lew Holloway (R) discusses options with residents



Neighborhood children give input into plan to include a skate park



Members of the community meet to discuss options for the park



Preliminary Conceptual Design Alternatives

The initial preliminary design work for this project was performed after meeting with members of the Ivanhoe Civic League. This initial meeting, using cut-outs of some of the sizes of requested elements for the park, allowed the member's to get a real sense of the size of the park and what would and would not fit. With feedback from this discussion in mind, the CDAC design team returned to Blacksburg to begin two potential design options. Two preliminary conceptual design alternatives were crafted and then presented to the Ivanhoe Community for review and comment.

As a whole, both preliminary conceptual design alternatives seek to provide for the numerous uses that were discussed in the initial meeting. Clear differences in the two alternatives could be seen when presented to the larger community. These differences helped the Ivanhoe residents to focus in on what they most desired for the site and gave them a variety of choices.



Meeting attendees look at sketches of preliminary design amenities



Maxine Waller (standing) discusses a poster depicting skateboard park amenities



Community residents listen to presentation of preliminary designs



Design Team member Lew Holloway (L) discusses options with community members



Preliminary Conceptual Plan A

Preliminary Conceptual Plan A focuses on placing the multitude of uses outlined by the community onto the site in a functional manner. This proved somewhat difficult considering the number of uses outlined by the community and their size constraints. Nonetheless, the site did provide some substantial opportunities. The topography of the site was considered first and foremost: clearly the river and its floodplain play a dominant role in the makeup of the site. There are however, three distinct regions on the site; the area closest to the river, a middle ground which makes up the one hundred year flood plain, and finally a smaller knoll farthest from the river which provides the only area truly out of the flood plain. To protect the only new structures proposed for the site, the horse stables were located on this knoll. This decision formed the backbone for the design along with the existing Jubilee Park facilities.

The horse ring and softball field were then fitted into the remaining space on the master plan. This allowed for an adjustment to be made to the entrance road and associated parking. A concern brought to bear here was how to allow easy access for larger trailers that require greater turning radii and road widths. Dead-end parking was avoided, thus the inclusion of the circle at the far end of the entrance drive. This design was also intended to provide handicapped access to the new children's playground, volleyball and horseshoe courts, skate park, and the Jubilee stage. The skate park, horseshoe pits, and new children's play area were arranged to give each the space they needed without making it difficult for the associated parents to congregate and still easily keep their children in sight.

The final area of design interest was the riverside itself. Here the construction and building opportunities were limited because of the imminent threat of flooding, thus low impact use was perceived as the most appropriate solution. This included primitive camping, which could be made available to both boaters on the New River and those travelers using the New River Trail. Another element designed for this area was the meditation garden. Although detail design for the garden would obviously have to take into consideration the possibility of flooding, the proximity to the river was important for the success of this element, not only for the views of the river and the opposite bank, which has some wonderful rock formations, but for the soothing sound that the running water creates. It seemed practical to also include a boat ramp in this area. The river is a source of recreation for the community and for visitors, and with the parking already being provided by the other needs of the park, this use fit in nicely.



View of existing softball field and riparian buffer



View of existing horse barn and arena



View from entrance toward stage and dance floor



Wooded area next to the New River where possible camp sites could be located





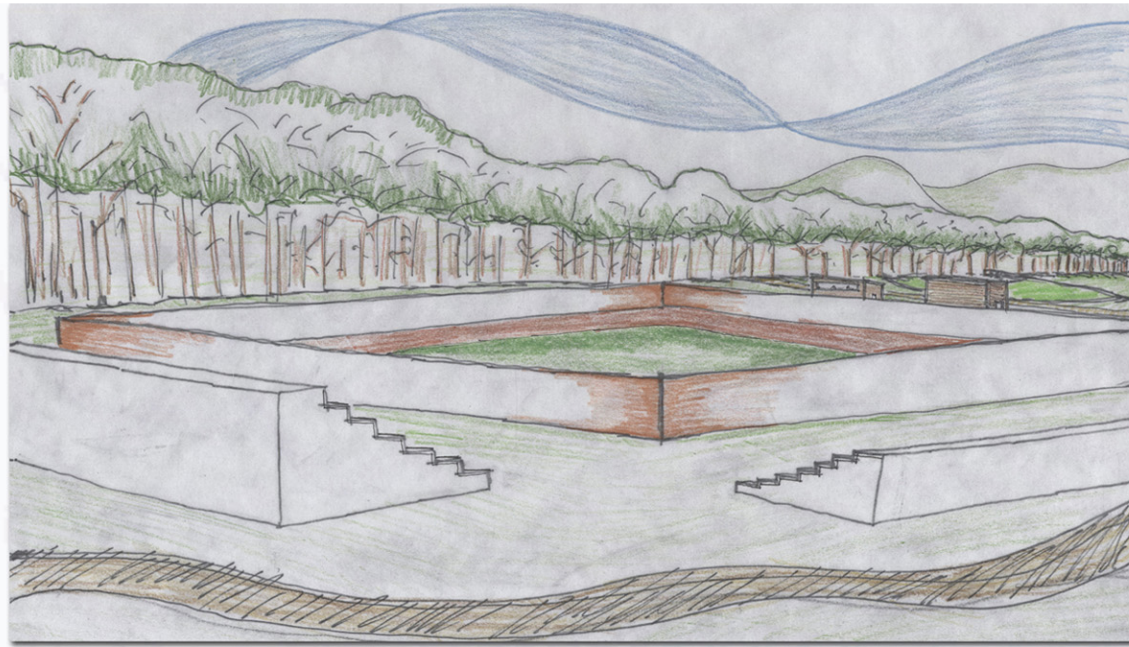
Jubilee Park

IVANHOE, VA

Preliminary Plan A

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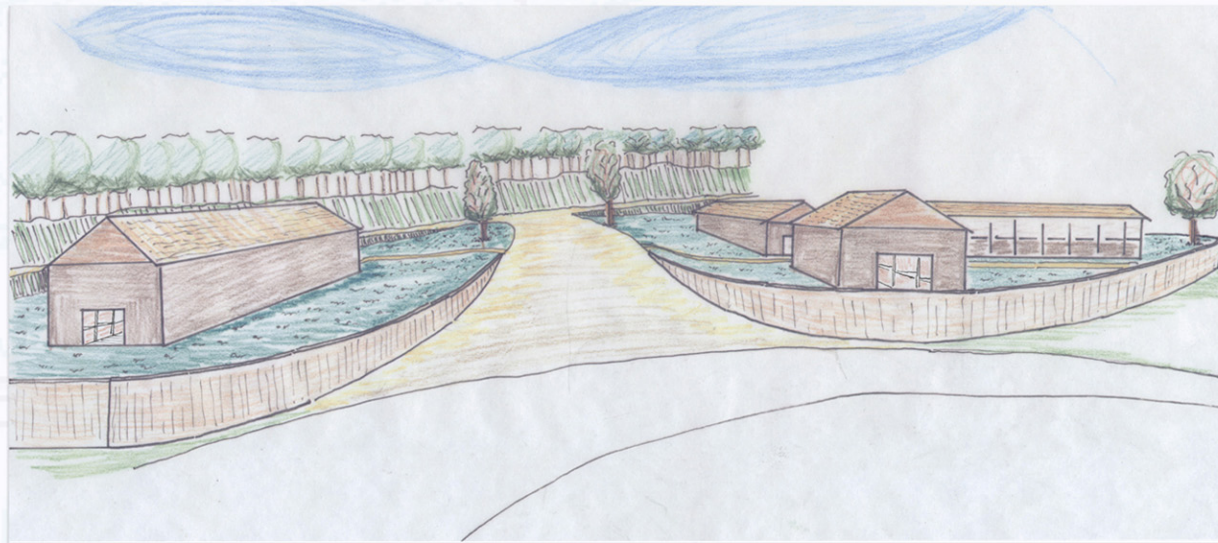




Horse Arena



Meditation Garden



Horse Stalls and New River Trail Entrance

Jubilee Park

IVANHOE, VA

Park Activity Sketches

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Preliminary Conceptual Plan B

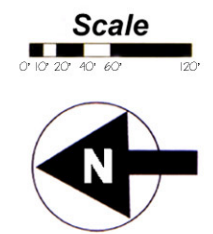
The concept behind Preliminary Conceptual Plan B is to create a park that incorporates all of the amenities designated in the original Jubilee Park Conceptual Master Plan narrative while giving special attention to the horse arena area and making the park accessible to large horse carrying vehicles. The park will accommodate 20 such vehicles with a road pattern that makes it easy to enter and exit parking spaces. There is also a parking lot for those who wish to take advantage of the softball field, the skate park, the playground, the campgrounds, and the stage and dance floor when activities for this facility are planned. This parking lot will hold 66 cars.

There are eight single camping sites and one group site that are nestled among the trees next to the river. Since the site lies in the flood plain, camping sites will be designated by wooden borders with small gravel infill to tolerate flooding. There are four horseshoe pits bordering the two volleyball playing fields and a large playground with a prefabricated play structure seated in mulch and surrounded by a wooden border. The two volleyball courts will remain in their current locations, with minor upgrades suggested, and a skatepark will run perpendicular to these featuring a variety of skate challenges. The softball field will be repositioned to face north for sun considerations and will have bleachers on both sides.

The horse ring is 142' x 154' and is surrounded by prefabricated fencing. It also has bleacher seating. The horse stalls back up against the treeline next to the New River Trail and will accommodate 40 horses with a ten foot walkway between stalls. Parking for RVs and horse trailers is on an angle and allows for pulling in and pulling out without backing. There are two bathroom facilities and a refreshment stand, plus benches all over the park for visitors to use.

The entrance road to the park follows the current path, with a few minor adjustments and ends at the river with room for parking for those planning to launch boats at the new boat dock. To link the park to the trail, there are steps constructed especially deep for horses so park visitors may ride their horses on the trail if they choose or trail riders may stop and visit at Jubilee Park.





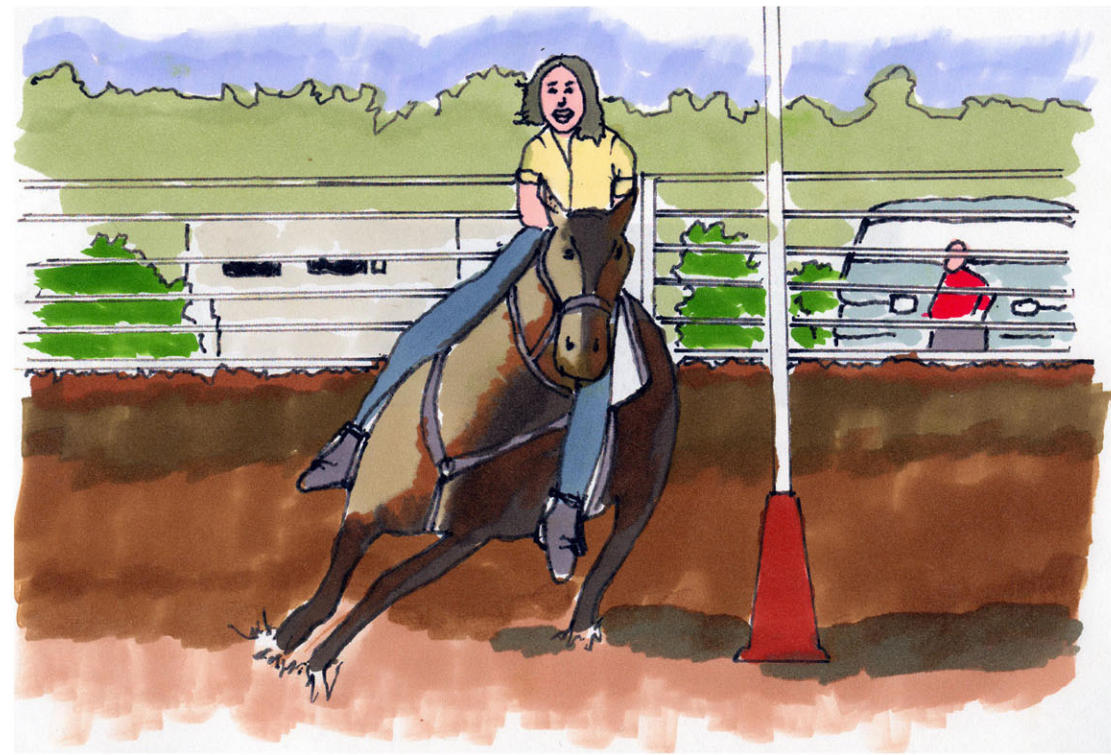
Jubilee Park

IVANHOE, VA

Preliminary Plan B

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Jubilee Park

IVANHOE, VA

Park Activity Sketches

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Final Design

Final Conceptual Master Plan Description

The Final Conceptual Master Plan was the result of a series of dialogues between the ICL and CDAC staff. Through the course of the project, the equestrian component of the park rose to the top as a priority for both the ICL and Ivanhoe community residents. Because of floodplain issues as well as spatial constraints of the site, the CDAC team chose to refine the list of programmatic items to be included in the master plan. The RV camp sites were removed from the final master plan. The CDAC team feels this item could be added should the ICL ever acquire the adjacent property owned by the Industrial Authority of Carroll County.

In the Final Conceptual Master Plan, park visitors will enter the park through an improved roadway, sited in the same location as the existing gravel drive. Park visitors will be greeted by an entry sign and plantings at the edge of the property. The CDAC team also recommends the addition of park signage along Route 94 to improve wayfinding for first-time park visitors.

After entering the park, visitors will have two parking options, depending on their recreational objective. For those interested in visiting the horse area, accessing the New River, or walking along the edge of the riverbank on a trail, a parking lot is situated on the southern side of the site. For visitors with horse trailers, a separate entrance, forking off the main entry road, is provided for pull-through drop-off of horses. Pull-through parking is also sited on the southern edge of the site, for visitors pulling trailers.

For park visitors interested in softball, volleyball, horse-shoes, or in utilizing the playground, skatepark, or bandstand, a separate parking area is provided on the northern half of the site. This lot also provides visitors with access to the riverbank trail. This trail loops around the Jubilee Park site, affording park visitors safe pedestrian circulation and exercise opportunities. Access to the New River Trail, which borders Jubilee Park, is also provided. Some additional trees are proposed on the southern edge of the site near the old pump house. The ICL could consider creating a small arboretum by planting a variety of appropriate tree species along the trail.

The horse stables and arena were placed near the back of the site, siting them on the site's high point. Fifty double loaded horse stalls are proposed. These stables would serve the park during equestrian events. They could also be utilized for horse-back riders on the New River Trail who desire to camp overnight



Community members make notes during final presentation



Design Team member Sherry Roser (L) discusses final design



Residents look at final designs for the park and the memorial garden



Design Team member Sherry Roser (R) shows final conceptual design



at the park. Both the horse arena and softball field are regulation size fields, making Jubilee Park an excellent venue for tournaments and horse shows. Bleachers, an additional concession stand, box office, and restrooms are also proposed in conjunction with the horse arena

Several improvements are proposed along the northern edge of the site as well. The existing dance floor is expanded to afford more room for dancing and other events. A picnic shelter is proposed adjacent to the playground and volleyball courts. This covered shelter would serve as an excellent place for Sunday picnickers, family get-togethers, children's birthday parties, and daily park visitors who desire a covered respite.

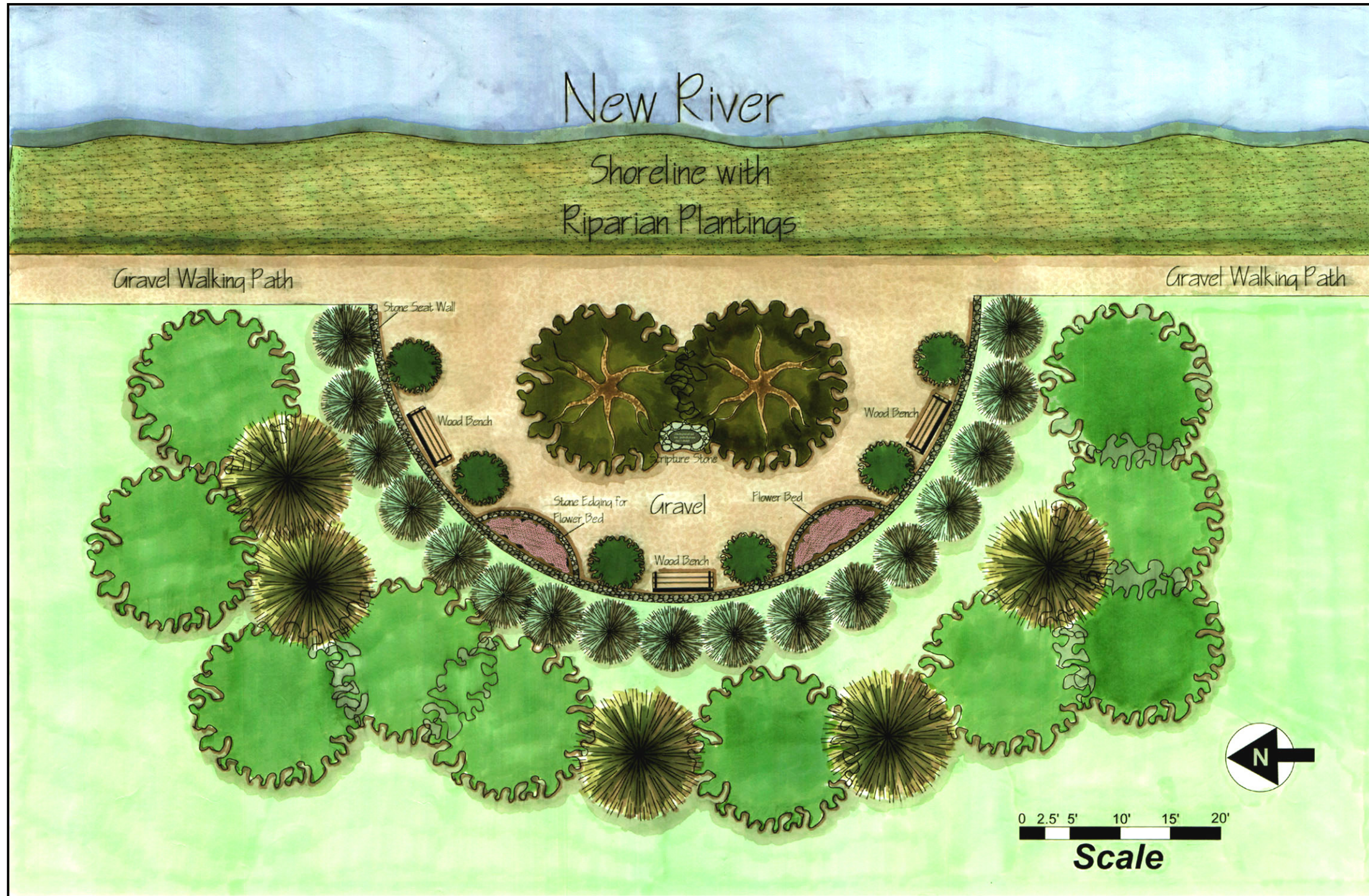
Additional respite and reflection opportunities are provided on the site as well. Fourteen tent camping pads are nestled within the wooded area along the New River. These camping pads could be utilized by community residents, New River Trail users taking an overnight trip, girl scout and boy scout groups, or any other organization the ICL identifies.

The horse stables and arena were placed near the back of the site, siting them on the site's high point. Fifty double loaded horse stalls are proposed. These stables would serve the park during equestrian events. They could also be utilized for horse-back-riders on the New River Trail who desire to camp overnight at the park. Both the horse arena and softball field are regulation size fields, making Jubilee Park an excellent venue for tournaments and horse shows.

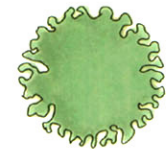

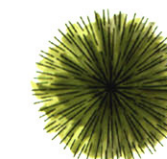
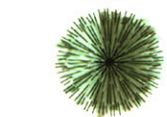
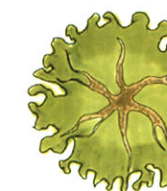
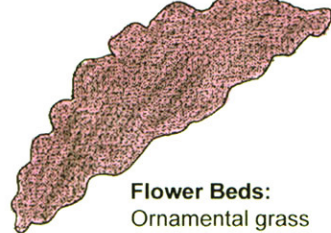
The final component of the Conceptual Master Plan for Jubilee Park is the meditation garden, located along the riverbank, and designed in honor of M.H. Waller, whose vision and efforts contributed much to the initiation of this project.

11x17 graphic illustrations of both the Final Conceptual Master Plan and a site scale design for the meditation garden can be found on the following pages.





KEY

-  Existing Trees
-  Virginia Sweetspire (*Itea virginica*)
-  River Birch (*Betula nigra*)
-  Winterberry (*Ilex verticillata*)
-  Sycamore (*Platanus occidentalis*)
-  **Flower Beds:**
Ornamental grass
Hostas
Ferns
Spiderworts (*Tradescantia*)
Coreopsis (*Coreopsis verticillata*)
Daylillies (*Hemerocallis*)
Bellflowers (*Campanula*)
Purple Liatris (*Liatris spicata*)
Goat's Beard (*Aruncus*)
Hardy hibiscus (*Hibiscus syriacus*)
Aaron's Beard (*Ligularia*)
Obedience Plant (*Physostegia*)

Jubilee Park

IVANHOE, VA

Meditation Garden

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Conclusion

The community of Ivanhoe is very blessed to have such energetic and dedicated residents committed to the preservation and enhancement of their community and its members. The Ivanhoe Civic League (ICL) is an embodiment of these qualities and the CDAC design team hopes that Jubilee Park will be one of the best settings for its display. The conceptual master plan for Jubilee Park provides guidance for short-term improvement efforts as well as a long-term vision for a community asset and gathering space.



Appendices

Appendix A: Suggested Plant List for Wet Places

Suggested Flowers

Suggested Shrubs

Suggested Trees

Appendix B: Riparian Buffers

Riparian Banks and Buffers

Planting Riparian Banks and Buffers

Riparian Buffer Plant Matrix

Photographic Examples of Plants for Riparian Buffers

Appendix C: Correspondence with the Department of Historic Resources

Appendix D: Skate Park Photoboard (11x17)



Appendix A: Suggested Plant List for Wet Places

Flowers:

***Astilbe* (False Spirea)**

The fern like foliage and the showy plume flowers of False Spirea make them a favorite summer flowering perennial. The flower plumes which appear in June and into July come in a variety of colors ranging from pink, white, red and purple. The most common varieties grow to a height of about a foot and a half. Plants prefer moist soil except during exceptionally wet winter months and tolerate full to part shade.



Astilbe
<http://www.thegardenhelper.com/astilbe.html>

***Astrantia major* (Masterwort)**

Perennials with true exotic grace thanks to their palm-shaped foliage and decorative blooms. They like moist or boggy soil and full sun and can grow to a height of 30". They also offer an extremely long flowering period from mid-summer into autumn.



Astrantia Major 'Snowstar'
<http://plants.thompson-morgan.com/uk/en/product/7104/1?RA=tiscali>

***Boltonia asteroides* (Snowbank)**

A summer blooming plant that loves moisture. Resembles a dainty aster with billows of flowers. Can be found in varieties of white, pink, and violet shades. Grow in full sun. A native American plant that can reach 3-5 feet tall.



Boltonia asteroides
<http://ncnatural.com/wildflwr/cohosh.html>



Astrantia Major 'Roma'
<http://plants.thompson-morgan.com/uk/en/product/7063/1?RA=tiscali>



***Cimicifuga racemosa* (Bugbane or Black Cohosh)**

North American native plant with 5 to 6 foot tall flower. White flower spikes are a distinctive mid-summer accent to any shady or part shade space. Growth can be rampant so spring division is suggested.



Cimicifuga racemosa
<http://www.naturehills.com/new/product/perennialsdetails.aspx?prodid=1383>

***Coreopsis verticillata* (Threadleaf Coreopsis)**

Grows very well in wetter gardens. Likes having wet feet. Flower for a long period of time (almost all summer) and are hardy.



Coreopsis verticillata
Copyright @ 1997 Alice B. Russell.
<http://www.ces.ncsu.edu/depts/hort/consumer/factsheets/perennials/images/coreove2.htm>

***Filipendula purpurea* 'Elegans' (Pink Meadowsweet)**

A bold, striking plant. Showy, large white flower heads with red antlers. Attractive, large 6-pointed, maple-like leaves with similar, smaller leaves on the flower stems. Fades to light pink as blooms age. Average height 24", part sun/shade.



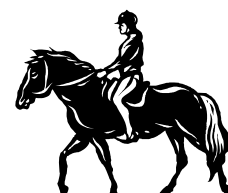
Filipendula purpurea 'Elegans'
<http://www.bethchatto.co.uk/plant%20portraits%20of/filipendula%20purpurea%20elegans'.html>

***Hemerocallis* (Daylily)**

Blooms in midsummer and is very hardy. Will grow almost anywhere. 'Stella d'Oro' is a good everblooming variety. There are many different varieties to choose from.



Hemerocallis
(Jarvis 2003)
<http://www.ofts.com/bill/daylily.html>



Hosta (Hosta)

Thrives in the damp, shady garden. Hostas are easy to grow, shade tolerant, herbaceous perennials. Hostas are grown mainly for their beautiful foliage. Hosta leaves come in a wide range of shapes, colors, sizes, and textures.

Lobelia fulgens 'Queen Victoria' (Queen Victoria Cardinal Flower)

A hybrid of Mexican Cardinal flower, with the same easy care disposition. HUMMINGBIRDS love its bright, rich scarlet flowers. Will only take sun if soil is very moist or wet in summer (but well-drained or dry in winter). Average moisture in shade. Vigorous grower. Height 24-36", sun, part shade, shade.

Miscanthus sinensis 'Morning Light' (Japanese Silver Grass)

Clump forming ornamental grass with reed-like stems and leaves that are narrow and arch to the ground. The flower heads are puffy plumes that form in late summer to fall. Most species are moderately frost hardy. *Miscanthus sinensis* 'Morning Light' has leaves that have a narrow band of clear white on the leaf margins, causing them to appear silver from a distance. The foliage grows 4 to 5 feet tall, with flowers 5 to 6 feet tall. The flowers emerge a reddish-bronze color and dry to a fluffy cream.

Monarda didyma (Bee Balm)

A beautiful, perennial, bright red flower that grows in dense clusters, flowering from July to late August. It is a member of the mint family and grows 3 to 4 feet tall. This herbaceous plant is best in full sun but tolerates light shade and prefers moist soil.



Monarda didyma
<http://www.thegardenhelper.com/screensaver/DDG/epix.html>



Hosta
<http://www.pal-metto.com/hosta/hostapics3.html>



Lobelia fulgens 'Queen Victoria'
http://www.geocities.com/RainForest/Vines/7025/lobelia_fulgens.html



Miscanthus sinensis 'Morning Light'
Magnolia Gardens Nursery © 1999-2005
http://www.magnoliagardensnursery.com/productdescrip/Miscanthus_Morning.html



***Osmunda cinnamonmea* (Cinnamon Fern)**

Prefers swamps, streambanks, and shores and can grow to a height of 2-5'. This native fern does well in part to full shade. Separate spore-bearing, stiff, fertile fronds appear in early spring, quickly turning brown. This gives the plant the appearance of having cinnamon sticks poking up through the center, thus the name.

***Osmunda regalis* (Royal Fern)**

This perennial fern prefers wet soil along river banks and can grow to 2-5' tall. It is unusual in that it forms new fertile fronds in autumn, and not in spring or summer as is common in most ferns. Best in light shade.

***Physostegia virginiana* (Obedient Plant)**

Fine blooming garden plant that will thrive in damp spots. These plants are rampant spreaders with showy pink and violet flower spikes. Herbaceous perennial with a height of 3 to 4 feet.

***Tradescantia* (SpiderWort)**

This plant is a winner in a damp garden. It blooms almost all summer. Available in several colors - from whites through shades of purple and light pink. Approximately 30" tall for sun or light shade.



Osmunda cinnamonmea
© Janet Novac
<http://www.ct-botanical-society.org/ferns/osmundacinn.html>



Osmunda regalis
© Janet Nova
<http://www.ct-botanical-society.org/ferns/osmundarega.html>



Tradescantia
© Paul Rebmann
<http://2bnthewild.com/plants/H299.htm>



Physostegia virginiana
<http://www.mobot.org/gardeninghelp/images/low/G620-0901020.jpg>



Shrubs

***Amelanchier arborea* (Serviceberry)**

Downy serviceberry is a native deciduous, early-flowering, large shrub or small tree which typically grows 15-25' tall in cultivation but can reach 40' in the wild. Features 5-petaled, showy, slightly fragrant, white flowers in drooping clusters which appear before the leaves emerge in early spring. Flowers give way to small, round green berries which turn red and finally mature to a dark purplish-black in early summer. Can take partial shade or full sun and is attractive to birds and other wildlife.



Amelanchier arborea
<http://www.hort.uconn.edu/plants/a/amearb/amearb1.html>

***Aronia arbutifolia* (Red Chokeberry)**

Deciduous, slow-growing shrub that reaches a height of about 40-60'. Tolerates a variety of soil types and prefers sun to partial shade. Bears bright red fruit that persists into winter.



Aronia arbutifolia
http://www.ces.ncsu.edu/depts/hort/consumer/factsheets/trees-new/aronia_arbutifolia.html

***Clethra alnifolia* (Sweet Pepperbush)**

Native deciduous shrub that grows 3-8' in height. Called the sweet pepperbush for its sweet spicy fragrance that perfumes the garden during its flowering time with creamy white spikes July to September. Can take full sun or part shade.



Clethra alnifolia
<http://greenwoodnursery.com/page.cfm/31706>

***Ilex glabra* (Inkberry Holly)**

Native evergreen shrub with small rounded foliage, grows 6-8' tall. Its berries are a deep purple-black and less significant than other holly varieties and does not require a pollinator. It is one of the few evergreen shrubs that can thrive in a wet site. Full sun or part shade.



Ilex glabra
© Mike Baker
http://www.mikebaker.com/plants/ilex_glabra.html



***Ilex verticillata* (Winterberry Holly)**

A native attention grabber in December for humans and song-birds. Likes partial shade to full sun and grows 3-15' tall but many cultivars are available that vary in height. Need male and female plants to produce berries. Buy one male and surround it with females that will produce the berries. Once the leaves fall off you're left with a beautiful display of red berries that will last til mid-winter.



Ilex verticillata
http://www.pottedliners.com/article_9.htm

***Itea virginica* (Virginia Sweetspire)**

A rare medium-sized shrub of streambanks and other moist habitats. Fairly common as an ornamental. This deciduous shrub grows to a height of 3-5' and prefers full sun to partial shade. Prefers moist, humus rich soils, but tolerates a wide range of soil conditions. Features fragrant, tiny white flowers borne in cylindrical, drooping racemes (3-6" long) which cover the shrub with bloom in early summer.



Itea virginica
<http://www.duke.edu/~cwcook/trees/itvi.html>

***Salix discolor* (Pussy Willow)**

This large shrub prefers swamps, fens, stream banks, floodplains, marsh borders, ditches and other wet habitat. A small willow native to eastern North America it has grayish leaves and silky catkins that come before the leaves. The large, fuzzy, silvery catkins open in late winter or very early spring. Can grow to a height of 15-18'.



Salix discolor
<http://www.mnpower.com/treebook/fact101.html>

***Sambucus callicarpa* (Red Elderberry)**

Shrub to small tree, 3-15' tall, with a strong, characteristic odor. White to creamy flowers in rounded or pyramidal cluster and bright red berrylike drupes. Can be found in streambanks, swampy thickets, moist clearings and shaded forests.



Sambucus callicarpa
© W.L. Wagner. Courtesy of Smithsonian Institution,
Dept. of Systematic Biology, Botany.
http://plants.usda.gov/cgi_bin/topics.cgi?earl=plant_profile.cgi&symbol=SARA2



***Sambucus canadensis* 'Aurea' (American Elderberry)**

Grow in average, medium wet to wet, well-drained soil in full sun to part shade. Best golden foliage color in full sun. Tolerates wide range of soils, but prefers moist, humus soils. This deciduous shrub typically grows 5-12' tall. Effective in shrub borders. Prefers full sun to partial shade.



Sambucus canadensis 'Aurea'
<http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=F460>

***Viburnum lantanoides* (*Viburnum alnifolium*) (hobblebush)**

This straggly shrub has beautiful bronze-red or purple autumn coloration and is used by wildlife for food and cover. It also features fragrant, flat-topped clusters of small, white flowers, the outer flowers larger than the inner ones. Grows 3-5' in height.



Viburnum lantanoides
© David Ransaw
http://www.enature.com/flashcard/show_flash_card.asp?recordNumber=TS0234



Trees

***Betula nigra* (River Birch)**

River birch can grow 50 to 90 feet tall but is often seen 40 to 50 feet. Features strongly peeling bark in shades of cream, cinnamon brown and red brown; yellow fall color. Full sun or partial shade.

***Carpinus caroliniana* (American Hornbeam)**

Crisp, green summer foliage; smooth gray bark and branches with a sinewy or muscled appearance; red-orange fall color. Can grow 50-60' tall. Full sun to shade; best in moist soils.

***Fraxinus pennsylvanica* (Green Ash)**

Common fast growing woodland tree well known for its adaptability. This native tree can grow to 60' tall when found in the open. Tolerant to potential stress, full sun or partial shade.



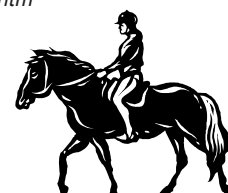
Betula nigra
<http://www.cnr.vt.edu/dendro/dendrology/syllabus/factsheet.cfm?ID=13>



Carpinus caroliniana
http://www.urbanext.uiuc.edu/treeselector/index_tree.cfm?id=25



Fraxinus pennsylvanica
<http://www.ohiodnr.com/forestry/Education/ohiotrees/ashgreen.htm>



***Platanus occidentalis* (American Sycamore)**

This fast growing, deciduous tree can reach the height 80 feet and 60 feet wide under urban conditions, but much larger in the wild. Very adaptable to a wide variety of soils including moist soils. Will tolerate sun or partial shade. Each has thin bark that flakes which gives the trunks a mottled appearance with irregular brown, gray, white and green patches.



Platanus occidentalis
http://www.ces.ncsu.edu/depts/hort/consumer/factsheets/trees-new/platanus_occidentalis.html

***Quercus palustris* (Pin Oak)**

This deciduous, native, large shade tree can grow to be 80-100' tall and has a medium to rapid growth rate. Tolerates moist to wet soil and full sun. Has glossy green leaves with showy scarlet color in the fall. Likes full sun and leaves may persist into winter.



Quercus palustris
© Scott Biggs
<http://www.hcs.ohio-state.edu/images/cd0669/jpeg/cd0669-97.jpeg>

***Populus deltoides* (Eastern Cottonwood)**

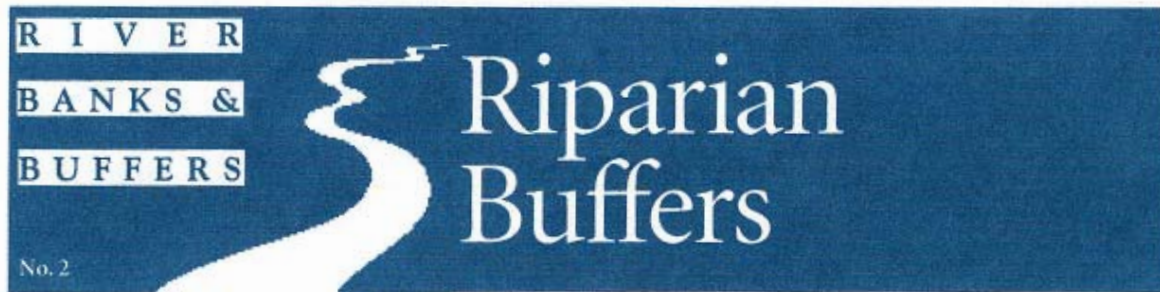
Native, deciduous, wide-spreading tree with a fast growth rate, from 80-100' tall. Prefers wet soils and full sun, but can tolerate drought.



Populus deltoides
© Gary Falless
http://www.uwgb.edu/biodiversity/herbarium/trees/popdel_aspect01_web400gf.jpg



Appendix B: Riparian Buffers



Riparian vegetated buffers are crucial to the protection of our water resources in Vermont and New Hampshire. These strips of grass, shrubs, and/or trees along the banks of rivers and streams filter polluted runoff and provide a transition zone between water and human activity. Buffers are also complex ecosystems that provide habitat and improve the stream communities they shelter.

Natural riparian buffers have been lost in many places over the years. Restoring them will be an important step forward for water quality, riverbank stability, wildlife, and aesthetics in the Connecticut River Valley. Landowners, town road agents, local governments, farmers, and conservation organizations can all help restore and protect the riparian buffers that in turn restore and protect the quality of our streams.

HOW BUFFERS GO TO WORK

Sediment Filter

Riparian buffers help catch and *filter* out sediment and debris from surface runoff. Depending upon the width and complexity of the buffer, 50–100% of the sediments and the nutrients attached to them can settle out and be absorbed as buffer plants slow sediment-laden runoff waters. Wider, forested buffers are even more effective than narrow, grassy buffers.

**For water
quality**

Pollution Filter, Transformer, and Sink

The riparian buffer traps pollutants that could otherwise wash into surface and groundwater. Phosphorus and nitrogen from fertilizer and animal waste can become pollutants if more is applied to the land than plants can use. Because excess phosphorus bonds to soil particles, 80–85% can be captured when sediment is *filtered* out of surface water runoff by passing through the buffer. Chemical and biological activity in the soil, particularly of streamside forests, can capture and *transform* nitrogen and other pollutants into less harmful forms. These forests also act as a *sink* when nutrients and excess water are taken up by root systems and stored in the biomass of trees.

Stream Flow Regulator

By slowing the velocity of runoff, the riparian buffer allows water to infiltrate the soil and recharge the groundwater supply. Groundwater will reach a stream or river at a much slower rate, and over a longer period of time, than if it had entered the river as surface runoff. This helps control flooding and maintain stream flow during the driest time of the year.

Bank Stabilizer

Riparian buffer vegetation helps to stabilize streambanks and reduce erosion. Roots hold bank soil together, and stems protect banks by deflecting the cutting action of waves, ice, boat wakes, and storm runoff.

**For bank
stability**

Bed Stabilizer

Riparian buffers can also reduce the amount of streambed scour by absorbing surface water runoff and slowing water velocity. When plant cover is removed, more surface water reaches the stream, causing the water to crest higher during storms or snowmelt. Stronger flow can scour streambeds, and can disturb aquatic life.



Wildlife Habitat

The distinctive habitat offered by riparian buffers is home to a multitude of plant and animal species, including those rarely found outside this narrow band of buffer influenced by the river. Continuous stretches of riparian buffer also serve as wildlife travel corridors.

**For fish and
wildlife**

Aquatic Habitat

Forested riparian buffers benefit aquatic habitat by improving the quality of nearby waters through shading, filtering, and moderating stream flow. Shade in summer maintains cooler, more even temperatures, especially on small streams. Cooler water holds more oxygen and reduces stress on fish and other aquatic creatures. A few degrees difference in temperature can have a major effect on their survival. Woody debris feeds the aquatic food web. It also can create stepped pools, providing cover for fish and their food supply while reducing erosion by slowing flow.

Recreation and Aesthetics

Forested buffers are especially valuable in providing a green screen along waterways, blocking views of nearby development, and allowing privacy for riverfront landowners. Buffers can also provide such recreational opportunities as hiking trails and camping.

And more

THE BETTER BUFFER

For every buffer there is a reason. Whether it is pollution filtration, erosion control, wildlife habitat, or visual screening, the size and vegetation of the buffer should match the land use and topography of the site.

Buffer Width

A wider buffer is generally more effective than a narrow one. While it is nearly impossible to set a width that applies to all streambanks and that will do all of the jobs a buffer can do, it is simple to say that the wider a buffer is, the better it will perform, and a narrow buffer is better than no buffer at all. The capacity of a buffer to capture pollutants partly depends upon how far surface runoff must travel across it before reaching the stream. The continuity of a buffer is as important as its width, especially for wildlife.

Topography

A buffer is more important for water quality in areas that collect runoff and deliver it to streams, and less critical on land that tips away from the water. Steeper slopes call for a wider riparian buffer below them to allow more opportunity for the buffer to capture pollutants from faster moving runoff. This is also true at the downstream end of the flood chute, or the path a river takes across a meander at high water.

Hydrology and Soil

The ability of the soil to remove pollutants and nutrients from surface and ground water also depends upon the type of soil, its depth, and relation to the water table. On a wetter soil, a wider buffer is needed to get the same effect.

Vegetation

The purpose(s) of the buffer will influence the kind of vegetation to plant or encourage. In urban and residential areas, trees and shrubs do a better job at capturing pollutants from parking lots and lawn runoff and providing visual screening and wildlife habitat.

Between cropland and waterways, a buffer of shrubs and grasses can provide many of the benefits of a forested buffer without shading crops, and trees can be used on the north side of fields. Trees should not be planted where ice floes typically collect at high water.

Trees have several advantages over other plants in improving water quality and offering habitat. Trees are not easily smothered by sediment and have greater root mass to resist erosion. Above ground, they provide better cover for birds and other wildlife using waterways as migratory routes. Trees can especially benefit aquatic habitat on smaller streams. Native vegetation is preferable to non-native plants.



Figure 1. A riparian buffer on the Connecticut River or major tributary.



Land in active residential or agricultural use
Fertilizer and pesticides are carefully managed.

Buffer Edge
Surface runoff can filter into soil. Haying or controlled grazing can occur.

Riparian Buffer
Plants and leaf litter capture and store sediment, nutrients, and other pollutants. Selective forest management keeps riparian vegetation vigorous. Nearer the stream, the buffer should remain undisturbed.

Riverbank
Dense shrubs and low plants hold soil, filter runoff, and protect the bank from scour by waves and ice.

On farmland, a buffer of shrubs and grasses can do much of the work of a forested buffer without shading crops. Exclude livestock, heavy equipment, and mowing here.

On smaller tributaries, mature trees growing to the water's edge can improve aquatic habitat by shading and by creating pools when they fall into the stream.

Management

Where a buffer has been lost or reduced, plantings of rapidly growing grasses and shrubs can hold the soil and nutrients before trees are established. In a forested buffer, a no-cut zone should be maintained where trees should be removed on larger rivers only when they threaten to fall and dislodge bank soil. Stumps should be left intact. Beyond this area, an actively growing forest composed of a variety of species, especially hardwoods which will sprout from their stumps, is most effective in storing nutrients, and can be encouraged by careful selective management. Thick growth and accumulated plant litter in the buffer work to trap sediments and nutrients. The buffer should not be mowed or compacted by animals or large equipment. Fencing will be necessary to keep livestock out of the buffer and off the streambank.

WHAT YOU CAN DO FOR WATER QUALITY

- ◆ **Protect or increase** existing riparian vegetated buffers.
- ◆ **Enhance** grass and herbaceous buffers by planting shrubs and trees.
- ◆ **Re-establish** riparian buffers where they have been lost.
- ◆ **Include planting and protection** of buffers in all streambank restoration projects.
- ◆ **Keep livestock out** of riparian buffers and off stream banks.



WHERE TO GO FOR HELP

There are several sources of information and plant materials for landowners and communities who want to establish buffers. Cost-share programs for riparian buffers have greatly expanded in recent years, and include the Environmental Quality Incentives Program (EQIP), the Wildlife Habitat Incentives Program (WHIP), and non-point pollution control grants through state water quality agencies. Contact your county office of the USDA Natural Resources Conservation Service for more information on EQIP. The Connecticut River Coalition of Conservation Districts coordinates the WHIP program in the Valley, and can be reached through NRCS. The Cooperative Extension Service and state water quality agencies also provide plant lists and sources.

USDA Natural Resources Conservation Service
NH county offices:
Coos County: 788-4651
Grafton County: 747-2001
Sullivan County: 863-4297
Cheshire County: 352-3602

USDA Cooperative Extension Service
NH statewide: 862-1067
NH county offices:
Coos County: 788-4961
Grafton County: 787-6944
Sullivan County: 863-9200
Cheshire County: 352-4550

VT county offices:
Essex/Caledonia Counties: 748-3885
Orange/Windsor Counties: 295-1504
Windham County: 254-5323

VT county offices:
Essex/Caledonia Counties: 676-3900
Orange/Windsor Counties: 296-7630
Windham County: 257-7967

NH Dept. of Environmental Services, Surface Water Quality Bureau: 603-271-3503
VT Agency of Natural Resources, Water Quality office: 802-241-3770

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Prepared by the Connecticut River Joint Commissions with support from the Rivers and Trails Conservation Assistance Program of the National Park Service through the Connecticut River Valley Partnership Program, April 1996. Revised and reprinted with support from the New Hampshire Department of Environmental Services, November 1998.

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Planting Riparian Buffers

You want a riparian buffer. How do you turn a bare riverbank into a buffer that works for clean water, stable banks, fish habitat, birds, and wildlife? You have two choices: let nature do the work, or give it a hand to speed things up.

NATURAL REVEGETATION

Simply ignore your riverbank by creating a no-mow zone, and see what happens. Birds, squirrels, wind, water, and wandering roots from nearby plants will find their way to your streambank, delivering your future forest in the form of seeds, nuts, berries, and runners. Over time you can add plants you want and remove non-native or unhealthy ones. This is the easiest and cheapest way to encourage a buffer, and you won't need a permit, but you'll have to wait awhile and if your bank is poorly vegetated, it may erode in the meantime.



ACTIVE REVEGETATION

If you want quicker results or wish to encourage certain plants, establish cuttings or nursery grown stock. See the companion sheet No. 10 in this series for sources of advice and financial assistance for installing a riparian buffer.

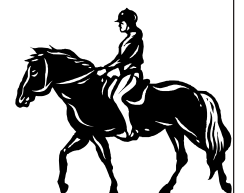
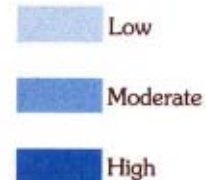


DEVELOP A PLANTING PLAN

- ☛ Determine a schedule that gets the plants in the ground when they are ready to grow. Plant trees and shrubs when they are dormant, in early spring before bud break and after the ground thaws or in autumn after leaf fall.
- ☛ Identify the work zone in the field. Consider property boundaries, permit restrictions, utilities, special natural/cultural features, and sensitive habitat.
- ☛ Draw out a design to help you decide how many plants are needed. Be sure there are enough to be effective. Plan on spacing shrubs 3-5' apart, small trees (25' at maturity) 15' apart, large trees 25' apart, and ground covers 1-3' apart. This spacing will result in a dense buffer at maturity, assuming that all plants survive. Wider spacing could still provide water quality protection but would allow more view.
- ☛ Consider soils—are they well drained or saturated? Some plants are used to wet feet.
- ☛ Confirm sources of materials and check their quality.
- ☛ Obtain any necessary permits.

Effectiveness of Different Vegetation Types for Specific Buffer Benefits

BENEFITS	grass	shrubs	trees
stabilize streambank	Low	Moderate	High
filter sediment and the nutrients, pesticides, & pathogens bound to it	Moderate	High	High
filter nutrients, pesticides, and microbes from surface water	Moderate	High	High
protect groundwater and drinking water supplies	Moderate	High	High
improve aquatic habitat	Moderate	High	High
improve wildlife habitat for field animals	Moderate	High	High
improve wildlife habitat for forest animals	Moderate	High	High
provide economically valued products	Moderate	High	High
provide visual interest	Moderate	High	High
protect against flooding	Moderate	High	High



Select the Plants

Natural selection has already chosen the best plants for the Connecticut River watershed. Visit a streambank near you to see what has proven well suited to this environment. The more natural the buffer vegetation, the more natural it will look and the better it will do its job. Natives may also require less care than non-native plants. Besides, native plants and native birds, butterflies, and wildlife are well matched. The enclosed plant list describes trees, shrubs, groundcovers, and vines native to the Upper Connecticut River Valley of New Hampshire and Vermont, their soil and light preference, rooting traits, bank stabilizing properties, and ornamental and wildlife value. Your county district conservationist or extension agent may have further recommendations.

Try for a mix of different kinds of plants to provide more diverse habitat and a prolonged and varied leaf fall to meet the energy and pupation needs of aquatic insects. It will also help avoid trouble with pests that attack specific plants. Be sure to include deciduous plants, since their leaf litter is important for trapping nitrogen.

Favor plants that have multiple values such as erosion control, those suited for timber, biomass, nuts, fruit, browse, and nesting. Don't forget aesthetics — consider seasonal foliage color, flowers, fruits, and branching habit. Native perennials provide blooms and attract butterflies. Berry-bearing shrubs attract birds.

Plant dominant species or those which are unlikely to colonize the site readily, such as oaks, rather than planting all the possible appropriate species. The height of streamside vegetation should equal or exceed the stream width to provide adequate shade to keep the water cool.

Understand Natural Succession

Plant communities naturally change over time, and while you may set the stage, nature will take care of putting on the show. Pioneer species adapted to bare soils and lots of light are gradually replaced by longer-lived species that can grow and reproduce under more shaded and protected conditions. If you plant early successional species to stabilize an eroding streambank, expect that longer-lived plants will eventually take over. Where conifers tend to follow riparian hardwoods, generally north of Route 2 in the northern Connecticut River Valley, plant conifers among blocks of pioneer species to speed the transition.

Sources of Plant Material

The no-cost approach is to move young plants to your buffer from elsewhere on your own property. You can dig or take cuttings of *common* woody plants in the wild using sharp, clean equipment. If you would like to take cuttings or transplant from someone else's property, be sure to ask the landowner's permission.

Willows, which are excellent for stabilizing shorelines, grow readily from cuttings of stems even as thick as your arm. Keep them moist and replant deeply the same day. Do not try to transplant wildflowers from the wild—it is rarely successful and is illegal without the landowner's permission.

For more reliable—but more expensive—plant material, buy nursery-grown bare rooted, potted, or burlap-wrapped plants from a responsible supplier. Bring your plant list with you—your nursery may have it but not know it's native. Ask about the source of any plant material before purchasing it. Collection of uncommon wild plants from wild populations could threaten their survival. The Agency of Natural Resources offers a booklet on sources of native plant materials in Vermont.

PREPARING THE SITE FOR PLANTING

If you have an unstable bank, deal with this first. Consult *The Challenge of Erosion in the Connecticut River Watershed*, published by the Connecticut River Joint Commissions. Your county Conservation District office has an inventory of erosion sites on the Connecticut River mainstem, and plenty of good advice.

Before planting, control invasives and competing vegetation. Mechanical control of undesirable plants is preferred in riparian buffers because chemicals can quickly enter the water system. Cover bare soil where trees and shrubs are to be planted with less-competitive cool season grasses to hold the soil and discourage weeds until woody plants become established. Otherwise, use properly installed sediment and erosion control such as silt fencing and straw bales. Check its effectiveness after every rain storm.

Avoid these invasives:

TREES

Black locust *Robinia pseudoacacia*
Glossy buckthorn *Rhamnus frangula*
Norway maple *Acer platanoides*
Tree of heaven *Ailanthus altissima*
White cottonwood *Populus alba*

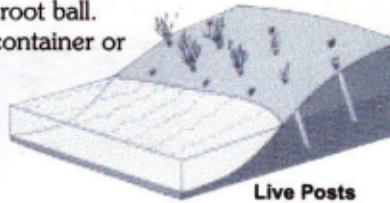
SHRUBS

Common buckthorn *Rhamnus cathartica*
Common barberry *Berberis vulgaris*
Japanese barberry *Berberis thunbergii*
Multiflora rose *Rosa multiflora*
Autumn olive *Eleagnus umbellata*
Russian olive *Eleagnus angustifolia*
Privet hedge *Ligustrum vulgare*
Blunt-leaved privet *Ligustrum obtusifolium*
Burning bush *Euonymus alatus*
Tatarian honeysuckle *Lonicera tatarica*
Bell's honeysuckle *Lonicera X bella*
Bush honeysuckle *Lonicera xylosteum*
Japanese honeysuckle *Lonicera japonica*
Fly honeysuckle *Lonicera morrowii*
Amur honeysuckle *Lonicera maackii* or L. "Rem Red"



PLANTING THE RIPARIAN BUFFER

- ✗ Avoid use of heavy equipment near the stream edge. Where the ground is wet or soft, use light tracking equipment with low pressure tires or rubber tracks.
- ✗ Arrange plantings to create a gradual edge rather than an abrupt one, for a more natural appearance and for blowdown protection.
- ✗ For woody cuttings or live posts, drive them deeply into the soil, allowing a foot or so to remain exposed.
- ✗ For rooted plants, prune any large damaged roots before planting. Set plant in a hole 2-3 times as wide but only as deep as the root ball. Plant at the same depth it was growing in the container or before transplanting. Fill in the hole gently but firmly with the original soil, watering to settle the soil.
- ✗ Plant understory species later, which usually do not tolerate full sun.
- ✗ Water regularly once a week through the first growing season. Take care not to start gullies or erosion.
- ✗ Use only lime or wood ash to fertilize in the buffer zone.
- ✗ Mulching limits surface erosion, suppresses weeds, and retains soil moisture. Use organic mulches such as leaf humus, wood chips, pine mulch, or other shredded bark. Avoid redwood or cedar, since they are toxic to some seedlings and their chemistry interferes with buffer function. Stockpile fresh wood chips for at least 6 months before using, to avoid introducing disease and other troubles. Straw is commonly used but can introduce undesirable seeds.
- ✗ Fencing is useful to control grazers, equipment, onlookers, and vandals. To deter small mammals from girdling saplings, surround individual plants with simple chicken wire or use below-ground collars. Deer require robust fencing only until well-chosen plants are established. Use temporary fences on flood plains; permanent fences can be used elsewhere.



Avoid these invasives:

VINES

Black swallowwort
Vincetoxicum nigrum
& *V. rossicum*

Kiwi vine
Actinidia arguta

Oriental or Asiatic
bittersweet

Celastrus orbiculatus

Porcelain berry

Ampelopsis
brevipedunculata

Silver fleece vine
Polygonum aubertii

HERBACEOUS PERENNIALS

Bishop's weed or
goutweed

Aegopodium
podagraria

Celandine
Chelidonium majus

Flowering rush
Butomus umbellatus

Garlic mustard
Alliaria petiolata

Giant reed
Phragmites australis

Japanese bamboo
or knotweed

Polygonum cuspidatum

Purple loosestrife
Lythrum salicaria

Yellow iris
Iris pseudoacacia

REFERENCE:

Connecticut River
Watershed/Long Island
Sound Invasive Plant
Control Initiative
Strategic Plan, 1999.

For more information
on invasive plants,
contact the Silvio O.
Conte National Fish
& Wildlife Refuge
20 Avenue A,
rners Falls MA 01376
3/863-3070
ww.fws.gov/r5soc

MAINTENANCE

Inspect plantings and erosion control after rainstorms and regularly every 2 weeks for the first 2 months; then once/month for 6 months, then every 6 months for 2 years. Look for stressed or failed plants, invasives, weed competition, deer or beaver browsing, ineffective erosion control, debris accumulation, and encroachments. For urban plantings, alert neighboring residents on what to look for and whom to call if they see problems such as sediment-laden runoff. Prevention is easier than trying to control active erosion.

Anticipate the need to replant if the buffer is subjected to prolonged high water, drought, or ice damage before plants are fully established.

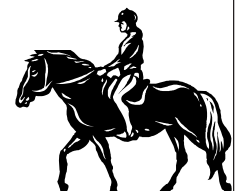
Leave vegetation undisturbed along the riverbank except for individual trees presenting unusual hazards such as blocking culverts. On a larger river, remove a large leaning tree only if it threatens to pull its root ball and part of the riverbank into the water. On a smaller stream, leave such trees undisturbed to provide fish cover, unless they threaten to cause flooding. Where debris dams must be removed, try to retain useful stable portions, and deposit removed material far enough away so that it will not be refloated by high water.

Manage a wooded buffer as an uneven-aged stand to make sure it provides continuous cover now and in the future. Leave leaf litter and undergrowth undisturbed in the stream-side zone, and as much as possible in the middle zone. Mow grass in the outer zone, and remove clippings to remove the nutrients captured by the plants. Avoid using fertilizers (other than lime or wood ash) or pesticides near the stream.

USEFUL RESOURCES

Sources of Native Plant Materials in Vermont, VT Agency of Natural Resources of Water Quality, 1999.

Native Vegetation for Lakeshores, Streamsides, and Wetland Buffers, \ Natural Resources, Division of Water Quality, 1994.



BUFFER PLANTS FOR SPECIAL PURPOSES

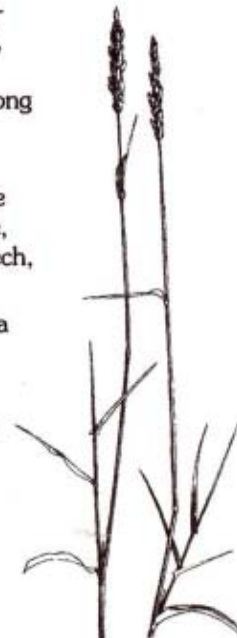
Economically Valuable Crops from the Forested Riparian Buffer

- ✦ **aromatics:** essential oils from plant leaves, seeds, bark, roots. Cedar oil is especially profitable; balsam pillows are a time-honored product of the northern forest. The smoke from woods such as alder, apple, maple, hickory, and cherry is used as a flavor enhancer, especially in grill cooking.
- ✦ **nuts:** black walnuts, butternuts.
- ✦ **mushrooms:** shiitake mushrooms, grown on culled oak logs, are now the second most important mushroom on the market.
- ✦ **decoratives:** many kinds of cones, from tiny alder to the pine, are used in floral, wreath, and potpourri products, or dipped in wax and sold as firestarters. Club mosses such as ground pine or ground cedar are used for wreaths and enclosed planters. Birch bark is in demand for rustic home furnishings.
- ✦ **weaving and dyeing materials:** black ash splints for baskets, grape vines for wreaths, and bark from alder, birch, hickory, poplar, and willow for dyeing wool.
- ✦ **specialty woods:** burls and crotches of walnut, cherry, maple, birch, and cedar are used for decorations and carvings. Cedar veneer is also in demand.
- ✦ **pharmaceuticals:** the root of ginseng, a forest wildflower, is highly sought as a medicinal plant. \$70 million of ginseng root is exported annually, principally to Asia.



Plants for Problem Visitors

- 🦌 **deer:** non-native plants may attract deer. Use native plants known to be less palatable to them. Plants of low value to deer include alder, spruce, hemlock, tamarack, beech, hornbeam, and viburnum. Dogwoods, willows, ash, and yellow birch will endure heavy browsing, and sprout again. Mixing shade tolerant canopy trees among faster growing trees will reduce deer browsing on future dominant species.
- 🦫 **beaver:** dam building, bank burrowing, tree cutting, and flooding are common challenges for landowners who share their land with beavers. Beaver forage on the bark and twigs of trees such as apple, alder, ash, aspen, birch, cherry, maple, pine, poplar and willow. Less palatable are spruce, white cedar, hemlock, tamarack, beech, red maple, and paper birch. Use chicken wire around stems to discourage them.
- 🦢 **Canada geese:** plant a dense barrier of shrubs to discourage geese from using a lawn—they like a sight line to the stream. Low shrubs are sufficient and will not block the view for human residents.
- 👤 **Trespassing humans:** living barriers such as blackberry or raspberry can work better than “no trespassing” signs.



Reed canary grass
Phalaris arundinacea

Plant only where essential for soil stability.

Fact sheets in the series *Riparian Buffers for the Connecticut River Watershed*

- No. 1 Introduction to Riparian Buffers
- No. 2 Backyard Buffers
- No. 3 Forestland Buffers
- No. 4 Buffers for Habitat
- No. 5 Buffers for Agricultural Land
- No. 6 Urban Buffers
- No. 7 Guidance for Communities
- No. 8 Planting Riparian Buffers (& plant list)
- No. 9 Field Assessment
- No. 10 Sources of Assistance

See also the companion series for land owners:

The Challenge of Erosion in the Connecticut River Valley, Connecticut River Joint Commissions, 1998.

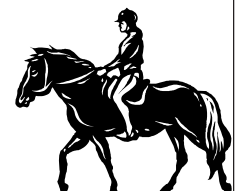
Part of the *Living with the River* series. May be reprinted without permission.

Riparian Buffers for the Connecticut River Watershed was prepared by the Connecticut River Joint Commissions of NH & VT with support from the Silvio O. Conte National Fish & Wildlife Refuge Challenge Cost Share Program, PG&E National Energy Group, NH Dept. of Environmental Services, and EPA. Technical assistance was provided by UNH Cooperative Extension Service, USDA Natural Resources Conservation Service, VT Dept. of Environmental Conservation, Connecticut River Conservation District Coalition, Upper Valley Land Trust, Environmental Protection Agency, Appalachian Mountain Club, NH Dept. of Environmental Services, US Fish & Wildlife Service, PG&E National Energy Group, CRJC river commissioners and local river subcommittee members. September 2000



PO Box 1182 • Charlestown NH 03603 • 603-826-4800 • WWW.CRJC.ORG

While these fact sheets were written specifically for the Connecticut River Watershed, the information contained herein still applies to the general creation of a riparian buffer and can be used in Virginia as well.





NATIVE TREES for Riparian Buffers in the Upper Connecticut River Valley of New Hampshire and Vermont

NAME	DECID/ EVERGR	MATURE HEIGHT	GROWTH RATE	ROOTING	LIGHT PREFERENCE			SOIL PREFERENCE			WILDLIFE HABITAT & FOOD VALUE	ORNAMENTAL VALUE	BANK STABILIZING VALUE	HARDNESS ZONE
					full/ part shade	full sun	dry	moist	flood tolerant					
Silver maple <i>Acer saccharinum</i>	d	60'	moderate	shallow	x	x		x		x	silvery foliage	very good, esp. for flood chute	4	
Box elder <i>Acer negundo</i>	d	40-70'	very fast	deep lateral		x		x		x		very good, esp. for flood chute	3	
Pagoda dogwood <i>Cornus alternifolia</i>	d	15'	fast	shallow	x	x		x			elegant branching habit; white flowers	very good	3	
Black willow <i>Salix nigra</i>	d	50'	very fast	very shallow		x		x		x	new foliage is attractively colored	excellent, esp. for flood chute	3	
Red maple <i>Acer rubrum</i>	d	40-75'	moderate to fast	very shallow		x		x		x	early red flowers; bright fall color	very good	3	
Striped maple <i>Acer pensylvanicum</i>	d	20-35'	moderate	shallow	x			x			white striped bark attractive all seasons		3	
Sugar maple <i>Acer saccharum</i>	d	60-100'	slow	shallow	x	x		x			excellent fall color, attractive shape		3	
American beech <i>Fagus grandifolia</i>	d	70-90'	slow	shallow	x	x		x			smooth gray bark in winter, copper fall color		3	
Black cherry <i>Prunus serotina</i>	d	40-60'	moderate	deep taproot	x						flowers, attractive reddish brown bark; however, prone to tent caterpillar		3	
Wild plum <i>Prunus nigra</i>	d	25'	moderate	shallow	x	x		x			early white flowers, attractive black bark; handsome fall foliage		3	
American mountain ash <i>Sorbus americana</i>	d	25'	fast	shallow	x	x		x			attractive shape, good for small lawns; brilliant orange red fall foliage, showy white flowers, clusters of bright red or orange berries		3	
Shadbush, serviceberry <i>Amelanchier laevis</i>	d	15-25'	slow	shallow	x	x		x			masses of early white flowers, berries, bright fall color; effective screening		4	
Black walnut <i>Juglans nigra</i>	d	50-75'	moderate	very deep	x			x			edible nuts, attractive shape		4	
Northern red oak <i>Quercus rubra</i>	d	60-80'	moderate	deep lateral	x	x		x			attractive shape, fine fall color		3	
Yellow birch <i>Betula alleghaniensis</i>	d	60-90'	slow	shallow/ moderate	x			x			shining golden bark		3	

NAME	DECID/ EVERGR	MATURE HEIGHT	GROWTH RATE	ROOTING	LIGHT PREFERENCE				SOIL PREFERENCE			WILDLIFE HABITAT & FOOD VALUE	ORNAMENTAL VALUE	BANK STABILIZING VALUE	HARDINESS ZONE
					full/ part shade	full sun	dry	moist	flood tolerant						
Paper birch <i>Betula papyrifera</i>	d	50-75'	fast	shallow		x	x	x			moderate - seeds eaten by grouse, siskins; buds by small mammals	attractive white bark (avoid planting in public areas to avoid problem of bark stripping)		3	
Grey birch <i>Betula populifolia</i>	d	20-35'	fast	shallow		x	x	x			moderate - seeds, buds	gray bark		3	
Black birch <i>Betula lenta</i>	d	50-75'	moderate	shallow	x		x	x			moderate - catkins, seeds	reddish brown bark		4	
Hophornbeam <i>Ostrya virginiana</i>	d	25-50'	slow	shallow	x	x	x	x			moderate - seeds	yellow fall color, red bark		4	
American hornbeam <i>Carpinus caroliniana</i>	d	20-30'	slow	moderate	x	x	x	x	x		moderate - seeds eaten by birds, squirrels	gray bark, fall color		3	
White ash <i>Fraxinus americana</i>	d	70-100'	moderate	shallow	x	x		x	x		moderate	purple fall color		3	
Green ash <i>Fraxinus pennsylvanica</i>	d	60-80'	fast	shallow	x	x		x	x		low	purple fall color	very good	3	
Black ash <i>Fraxinus nigra</i>	d	60-80'	moderate	shallow	x			x	x		moderate	wood used for splint baskets	excellent	3	
Basswood <i>Tilia americana</i>	d	70-80'	moderate	deep	x	x		x			moderate	attractive foliage and shape		3	
Balsam poplar <i>Populus balsamea</i>	d	60-80'	fast	shallow		x	x	x			low	can be brittle and drop branches	very good	3	
Eastern cottonwood <i>Populus deltoides</i>	d	80-100'	fast	shallow		x	x	x	x		low - grouse browse catkins	can be brittle and drop branches		3	
Quaking aspen <i>Populus tremuloides</i>	d	40-60'	fast	shallow		x	x	x			moderate - beaver, porcupine, deer; favorite food of beaver and snowshoe hare; buds important to grouse	can be brittle and drop branches; fluttering gray-green leaves		3	
White pine <i>Pinus strobus</i>	e	70-100'	moderate	shallow		x	x	x			high - food & cover for birds & mammals, inc. crossbills and cardinals	feathery foliage; good year-round screen		3	
Red pine <i>Pinus resinosa</i>	e	50-80'	moderate	shallow		x	x	x			moderate	orange-red bark; good year-round screen		4	
White spruce <i>Picea glauca</i>	e	40-70'	moderate	shallow	x	x	x	x			moderate - seeds	foliage; windbreak, screen		3	
Balsam fir <i>Abies balsamea</i>	e	50-75'	fast	shallow		x		x	x		high - seeds, bird roosting, nesting	fragrant, glossy foliage; attractive habit, Xmas trees		3	
Hemlock <i>Tsuga canadensis</i>	e	40-70'	moderate	shallow lateral	x		x	x			moderate - winter deer cover; seeds eaten by small mammals, chickadees, siskins, crossbills, grouse; nesting cover for warblers	attractive foliage, habit; screen		3	
Northern white cedar <i>Thuja occidentalis</i>	e	25-50'	slow/mod	shallow		x		x	x		moderate - winter cover	attractive foliage; screen		3	
Tamarack <i>Larix laricina</i>	d	40-80'	variable	moderate		x		x	x		high	pale new foliage; yellow fall color		3	

from Riparian Buffers for the Connecticut River Watershed, Connecticut River Joint Commissions, 2000



NATIVE GROUND COVERS, Vines, and Herbaceous Perennials for Riparian Buffers in the Upper Connecticut River Valley of New Hampshire and Vermont

NAME	DECID/EVERGR	HT	LIGHT PREFERENCE			SOIL PREFERENCE			WILDLIFE HABITAT & FOOD VALUE	ORNAMENTAL VALUE
			full/part shade	full sun	dry	moist	flood tolerant			
Riverbank grape <i>Vitis riparia</i>	d	25'	x	x		x	x	very high – fruits a favorite of turkeys, grouse, wood duck, pileated woodpeckers, & mammals inc. bear	vines useful for making wreaths	
Virginia creeper, woodbine <i>Parthenocissus quinquefolia</i>	d	25'	x	x	x	x		moderate – provides cover; pileated woodpecker, crested flycatcher, vireo	foliage – good cover for walls and rockpiles when leafed out	
Partridge berry <i>Mitchella repens</i>	e	2'	x		x	x		high – berries eaten by grouse & mammals	dark green, glossy foliage; paired white flowers in June; bright red berries in late summer, fall	
Bearberry <i>Arctostaphylos uva-ursi</i>	e	1'		x	x			high – fruits	handsome foliage; good ground cover	
Wintergreen <i>Gaultheria procumbens</i>	e	4"	x			x		high – fruits	flowers, fruits, glossy aromatic foliage	
Blue flag iris <i>Iris versicolor</i>	d	1-3'		x		x	x	low	showy purple-blue flowers in late spring	
Milkweed <i>Asclepias tuberosa</i>	d	2		x		x		very high – one of most important butterfly plants; monarchs rely exclusively on it; hummingbirds & many other insects use flower nectar	fragrant pink-purple flowers; distinctive seed pods useful for decorations	
Blue-eyed grasses <i>Sisyrinchium</i> spp.	d	1'		x	x	x		low	stiff, grass-like plants with blue-violet flowers	
Ginseng <i>Panax quinquefolius</i>	d	8-16"	x			x		low	woodland wildflower of pharmaceutical interest. Wild populations are suffering from over-collecting, but cultivated plants could be harvested from a forested riparian buffer.	
Bunchberry <i>Cornus canadensis</i>	e	6"	x			x		high – fruits eaten by birds and mammals	showy white spring flowers and red summer berries, purplish fall color; excellent ground cover	
Foamflower <i>Tiarella cordifolia</i>	d	1'	x			x		low	small star-like flowers in a loose spike	
Twirlflower <i>Limnaea borealis</i>	e	6"	x			x		low	trailing plant; white and pink paired flowers	
Marsh marigold <i>Caltha palustris</i>	d	1-2'		x		x		low	early yellow flowers	
Whorled loosestrife <i>Lysimachia quadrifolia</i>	d	4'	x	x	x	x		low	yellow flowers with red markings; attractive foliage; not related to invasive purple loosestrife	
Cardinal flower <i>Lobelia cardinalis</i>	d	2-4'		x		x		moderate – hummingbirds attracted to flowers	brilliant red flowers	
Blue false indigo <i>Baptisia australis</i>	d	3-4'	x	x	x	x		low	large dark blue or violet flowers	
Joe pye weed <i>Eupatorium purpureum</i>	d	5-6'		x		x		high – butterflies are attracted to flowers	large flat-topped cluster of fuzzy purple flowers	
Boneset <i>Eupatorium perfoliatum</i>	d	4-6'		x	x	x		high – attracts butterflies & other insects	white flowers	

NAME	DECID/ EVERGR	HT	LIGHT PREFERENCE		SOIL PREFERENCE			WILDLIFE HABITAT & FOOD VALUE	ORNAMENTAL VALUE
			full/part shade	full sun	dry	moist	flood tolerant		
Wild lupine <i>Lupinus perennis</i>	d	1-3'		x	x	x	low	purple-blue flower spikes in June; attractive foliage	
Harebell <i>Campanula rotundifolia</i>	d	1'	x		x		low	delicate wildflower with blue-lavender bell-shaped flowers	
Jewelweed <i>Impatiens capensis</i>	d	1-3'	x	x	x	x	high – favored by hummingbirds, butterflies	orange flowers in summer; seed capsules burst when touched; juice of plant said to help defend against exposure to poison ivy	
Daisy <i>Chrysanthemum leucanthemum</i>	d	1-4'		x	x		moderate – seeds favored by finches; common nectar source for butterflies	familiar white ray flower with yellow center	
Goldenrod <i>Solidago</i> spp.	d	1-5'		x	x	x	moderate – seeds eaten by finches; nectar by butterflies	many species of wildflowers in midsummer to early fall; all except silverrod are yellow	
New England aster <i>Aster novae-angliae</i>	d	5'		x	x	x	high – seeds used by songbirds; attracts butterflies	late summer/fall purple flowers with yellow centers	
Christmas fern <i>Polystichum acrostichoides</i>	e	1'	x			x	low	evergreen ground cover; glossy foliage	
Hay-scented fern <i>Dennstaedtia punctilobula</i>	d	2'	x	x	x	x	low	fragrant light-green foliage; spreads well, forms pure stands; tolerates full sun	
Bracken fern <i>Pteridium aquilinum</i>	d	2-3'	x	x	x		low	sturdy foliage; tolerates full sun	
Cinnamon fern <i>Osmunda cinnamomea</i>	d	3-4'	x			x	low	vase-shaped clusters; handsome foliage; cinnamon colored fertile fronds	
Royal fern <i>Osmunda regalis</i>	d	6'	x	x		x	low	handsome foliage; new crostiers edible as "fiddle heads"	
Interrupted fern <i>Osmunda claytoniana</i>	d	3-4'	x			x	low	vase-shaped clusters	
Sensitive fern <i>Onoclea sensibilis</i>	d	2'	x			x	low	fertile fronds used in dried arrangements	
Cattail <i>Typha latifolia</i>	d	6'		x		x	high – seed heads valuable food for birds	strap-shaped leaves; brown seed head is distinctive and often used in horticultural arrangements	
Reed grass <i>Calamagrostis canadensis</i>	d	5'		x		x	moderate	attractive grass forms clumps, stabilizes soils well	
Pennsylvania sedge <i>Carex pensylvanica</i>	d	2'		x	x		low	forms low turf on sunny dry soils	
Tussock sedge <i>Carex stricta</i>	d	4'		x		x	moderate – food for sparrows, grouse, snipe, others	forms clumps or tussocks	
Rattlesnake manna grass <i>Glyceria canadensis</i>	d	3'		x		x	moderate	grass with delicate and distinctive inflorescence; plant in clusters where no competition by others is likely	
Rice cutgrass <i>Leersia oryzoides</i>	d	5'		x		x	high – food for waterfowl; cover for fish, reptiles, amphibians	attractive seed head	
Tufted hair grass <i>Deschampsia caespitosa</i>	d	4'				x	moderate	attractive seed head	
Reed canary grass <i>Phalaris arundinacea</i>	d	2-6'		x	x	x	moderate – provides cover but European form is very aggressive, especially in wetlands, and can overtake plants with better wildlife value	excellent for bank stabilization, plant only where needed for soil stability, such as on the entrance to flood chutes	

from Riparian Buffers for the Connecticut River Watershed, Connecticut River Joint Commissions, 2000



NATIVE SHRUBS for Riparian Buffers in the Upper Connecticut River Valley of New Hampshire and Vermont

NAME	DECID/ EVERGR	MATURE HEIGHT	GROWTH RATE	LIGHT PREFERENCE			SOIL PREFERENCE			WILDLIFE HABITAT & FOOD VALUE	ORNAMENTAL VALUE	BANK STABILIZING VALUE	HARDINESS ZONE
				full/ part shade	full sun	dry	moist	flood tolerant					
Silky dogwood <i>Cornus amomum</i>	d	6-10'	fast	x	x	x	x	x	high - fruits eaten by birds & mammals; cover	purple twigs	excellent	4	
Grey dogwood <i>Cornus racemosa</i>	d	10'	moderate	x	x	x	x	x	very high - fruit eaten by grouse and pheasant	small whitish flower cluster, white fruits	very good	4	
Red osier dogwood <i>Cornus sericea</i> , ssp. <i>stolonifera</i>	d	4-8'	fast	x	x		x	x	high - whitish fruit eaten by birds	bright red stems attractive in winter; white flowers	very good	3	
Willows <i>Salix</i> spp.	d	4-10'	fast	x	x		x	x	high - provides good cover	foliage	excellent	3	
Pussy willow <i>Salix discolor</i>	d	20'	fast		x		x	x	moderate - nesting, buds eaten; male flowers attract butterflies	early buds are used in horticultural arrangements	excellent	3	
Buttonbush <i>Cephalanthus occidentalis</i>	d	6-12'	moderate	x	x		x	x	moderate - high; nectar used by hummingbirds; waterfowl eat seed	white pom-pom like flower clusters; glossy foliage	excellent	4	
Highbush blueberry <i>Vaccinium corymbosum</i>	d	6-12'	slow	x	x	x	x	x	high - fruits eaten by birds & mammals; favorite of scarlet tanagers, bluebirds, grouse	flowers, fruits, bright fall color, attractive habit		3	
Lowbush blueberry <i>Vaccinium angustifolium</i>	d	1-2'	slow	x	x	x	x	x	high - fruits eaten by birds and mammals	flowers, fruits, scarlet fall color, good ground cover		3	
Black chokeberry <i>Aronia melanocarpa</i>	d	10'	moderate	x	x	x	x	x	very high - fruits	purple fruits, purple fall color		4	
Pin cherry, bird cherry <i>Prunus pennsylvanica</i>	d	30'	fast		x				high - fruits used by birds	shining dark red bark, white flower clusters, red fruits		3	
Chokecherry <i>Prunus virginiana</i>	d	15-25'	moderate	x	x	x	x	x	moderate - fruits, cover	flowers, fruits, good fall color		3	
American cranberry bush <i>Viburnum trilobum</i>	d	10'	slow to moderate	x	x	x	x	x	high - fruits persist into winter	white flower clusters, scarlet fruits, good fall color		3	
Wild raisin, withered <i>Viburnum cassinoides</i>	d	6-10'	moderate	x			x	x	high - fruit eaten by grouse, songbirds; rabbits & deer browse twigs	white flowers, edible blue-black fruits, good fall color		4	
Nannyberry <i>Viburnum lentago</i>	d	10-20'	moderate	x	x	x	x	x	high - fruits remain into winter	fruits, good fall color		3	
Northern arrowwood <i>Viburnum racognatum</i>	d	10-15'	moderate	x	x		x	x	moderate - fruits eaten by birds; nesting	flowers, blue fruits, good fall color		3	
Maple-leaf viburnum <i>Viburnum acerifolium</i>	d	3-6'	moderate	x	x		x	x	moderate - fruits eaten by birds	fruits, attractive foliage, good fall color		3	
Hoopbush <i>Viburnum alnifolium</i>	d	10'	moderate	x			x	x	moderate - fruits eaten by birds	very showy white flower clusters in halo arrangement; purple fall color; open habit		4	
Winterberry holly <i>Ilex verticillata</i>	d	6-10'	slow	x	x		x	x	high - fruits eaten by flickers, thrushes, cedar waxwings, also birds in winter	attractive bright red berries persist into winter, make excellent Xmas decorations		3	
Inkberry holly <i>Ilex glabra</i>	e	6-8'	slow	x	x		x	x	high - fruits eaten by songbirds, turkey, grouse	leathery evergreen foliage; black fruits		4	

NAME	DECIDUOUS/EVERGREEN	MATURE HEIGHT	GROWTH RATE	LIGHT PREFERENCE			SOIL PREFERENCE			WILDLIFE HABITAT & FOOD VALUE	ORNAMENTAL VALUE	BANK STABILIZING VALUE	HARDINESS ZONE
				full/ part shade	full sun	dry	moist	flood tolerant					
Sheep laurel <i>Kalmia angustifolia</i>	semi-e	4'	slow	x	x	x	x	x	(poisonous to livestock)	very showy pink-red flowers		3	
Elderberry <i>Sambucus canadensis</i>	d	12'	moderate	x	x		x	x	very high - berries an important summer food for songbirds inc. bluebirds, rose-breasted grosbeaks, pileated woodpeckers, thrushes	showy white flower clusters; blue berries; jelly and wine can be made from berries	very good	3	
Sweet pepperbush <i>Clethra alnifolia</i>	d	8'	moderate	x	x		x	x	high - fruits	white flowers		4	
Hazelnut <i>Corylus americana</i>	d	10'	moderate	x	x		x	x	high - nuts eaten by mammals, grouse, pheasant	edible nuts		3	
Beaked hazelnut <i>Corylus cornuta</i>	d	6-10'	moderate	x	x		x	x	high - beaked nuts used by both mammals & birds	good for hedgies; edible nuts		5	
Spotted alder <i>Alnus rugosa</i>	d	15-25'	fast		x		x	x	moderate - buds & twigs browsed by muskrat, rabbits, moose, deer, beaver, grouse	tiny cones make Xmas decorations	very good	3	
Spicebush <i>Lindera benzoin</i>	d	12'	moderate		x		x	x	high - many mammals and birds eat fruits, buds, & twigs; attracts swallowtail butterflies	spicy scented flowers and leaves; shiny red fruits		5	
Witch hazel <i>Hamamelis virginiana</i>	d	20-30'	slow	x	x		x		moderate	yellow flowers in autumn after leaves fall		4	
Rhodora azalea <i>Rhododendron canadense</i>	d	3-4'	slow		x		x	x	low	very showy rose purple flowers before leaves		3	
Swamp azalea <i>Rhododendron viscosum</i>	d	5'	moderate	x	x		x	x	low	glossy leaves, very showy white - pink flowers	/	5	
Early azalea <i>Rhododendron roseum</i>	d	10'	slow	x		x	x		low	very showy white or pink flowers		4	
Blackberry <i>Rubus allegheniensis</i>	d	6'	fast		x	x	x	x	very high - fruits eaten by over 40 species of birds inc. woodcock, turkey, grouse; also by many mammals	makes good barrier		3	
Raspberry <i>Rubus idaeus</i>	d	6'	fast	x	x	x	x	x	same as above - fruits eaten by many mammals & birds	makes good barrier		3	
Meadowsweet <i>Spiraea latifolia</i>	d	5'	moderate		x		x		low	white or pale pink flowers	very good	2	
Steeplebush <i>Spiraea tomentosa</i>	d	4'	moderate	x	x		x	x	low	spires of pink flowers		3	
Staghorn sumac <i>Rhus typhina</i>	d	20'	fast	x	x	x			very high - fruits late winter survival food for mammals and migrating songbirds; twigs eaten by moose, deer, N E cottontail rabbit	colorful fruit clusters, brilliant fall color; velvet covered branches	good	3	
Smooth sumac <i>Rhus glabra</i>	d	9-15'	fast		x		x		high - fruits	red fruit clusters, orange-red fall color		3	
Sweet gale <i>Myrica gale</i>	d	2-4'	slow		x		x	x	moderate - grouse eat buds and leaves; deer browse	aromatic foliage		3	
Sweetfern <i>Comptonia perigrina</i>	d	2-4'	slow-moderate	x	x	x			moderate - grouse, deer feed on foliage	gray green aromatic fern-like leaves		3	
Pasture juniper <i>Juniperus communis</i>	e	1-4'	slow		x	x			moderate - food for grouse, pheasant, deer, moose, small mammals, & birds	foliage; good ground cover		3	

from Riparian Buffers for the Connecticut River Watershed, Connecticut River Joint Commissions, 2000

Photographic Examples of Plants for Riparian Buffers

Blue Flag



Button Bush



Chokeberry



Common Elderberry



Great Lobelia



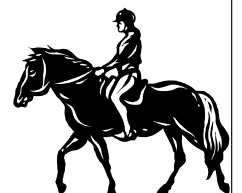
Meadowsweet



Monkeyflower



Pickerleweed



Red Chokeberry



Yellow Iris



Winterberry



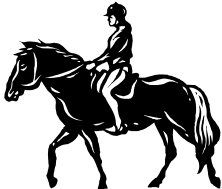
Turtlehead



Steeplebush



Image taken from <http://www.fxbrowne.com/html/riparian%20buffers.htm>



Appendix C: Correspondence with the Department of Historic Resources

March 2, 2005

Kim,

Based on your description of the location for the proposed park and the map you forwarded, I can only report that the Department of Historic Resources has records of two archaeological sites in the vicinity of the proposed park. However, I am not sure if either of the recorded sites falls within the boundaries of the park. Attached is a jpeg of part of the Austinville quadrangle map illustrating the locations of the two recorded sites. (The sites are polygons filled with cross hachure marks.)

The northern site in Wythe County is designated 44WY0005, while the southern site in Carroll County is designated 44CA0032. The site in Wythe County was identified in the early 1960s by Gilly Holland and it was briefly mentioned in his report, "An Archaeological Survey of Southwest Virginia," published in 1963 by the Smithsonian Institution. The site in Carroll County was recorded in 1974 after two Carroll County residents reported the site to the Department of Historic Resources. Neither site has been investigated in detail by professional archaeologists. Based on the information at hand, we can say that each site is a prehistoric Native American village that dates to the Late Woodland Period (A.D. 1000-1600). While both sites have been partially disturbed by modern land use and development, it is likely that each possesses a degree of significance.

It is also possible, and probable, that other archaeological sites exist in the area depicted on the attached jpeg. If additional sites exist in this area then they have not yet been recorded with the Department of Historic Resources.

Let me know if you require any additional information,

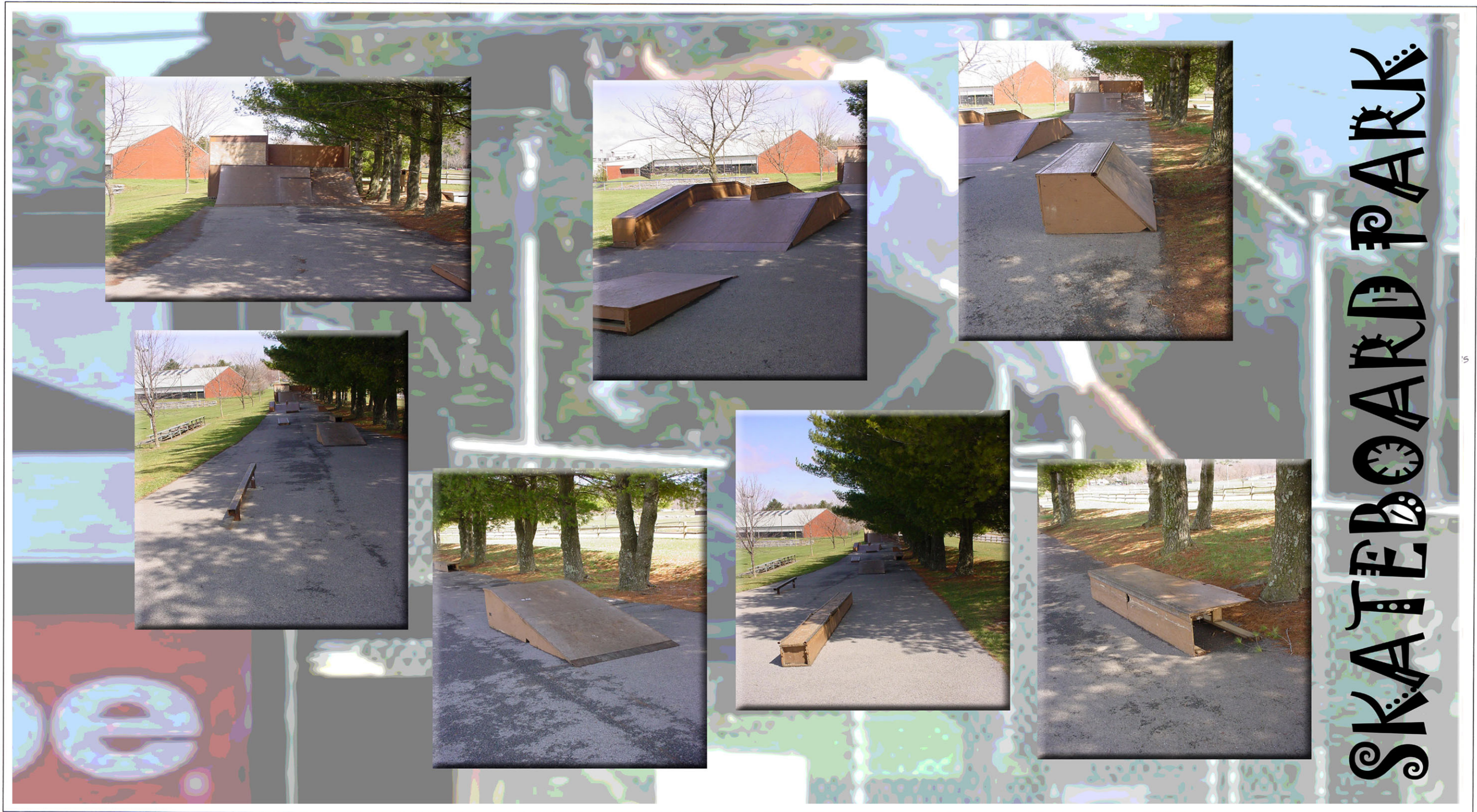
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Austinville USGS Quadrangle map illustrating location of the two recorded sites





SKATEBOARD PARK

Jubilee Park

IVANHOE, VA

Skateboard Park Poster

This drawing is conceptual and was prepared to show approximate location and arrangement of site features. It is subject to change and is not intended to replace the use of construction documents. The client should consult appropriate professionals before any construction or site work is undertaken. The Community Design Assistance Center is not responsible for the inappropriate use of this drawing.

