RAN Fact Sheet

Redesigning the American Neighborhood

A Multifunctional Wetland Park to Treat Stormwater Runoff from Suburban Vermont Neighborhoods

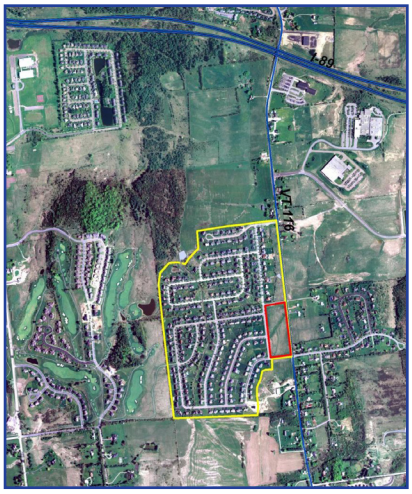
A team of four University of Vermont students, mentored by Professor John Todd, used ecological problem solving to create a design for a wetland park to help treat stormwater runoff from two adjacent suburban developments in South Burlington, Vermont.

Changing landscape

About 12,500 years ago, glaciers retreated northward from the Champlain Valley of Vermont. Melt water formed a lake that later became known as "Lake Vermont." During the time Lake Vermont covered the sites of the two present day South Burlington housing developments, fine sediments settled to the lake bottom and formed the rich clay present today. The ice sheet left behind a valley compressed to a lower elevation than it is today, and sea water flowed in from the north replacing Lake Vermont with the smaller "Champlain Sea." Eventually the Sea became closed off from the Atlantic Ocean, and freshwater once more filled the basin, creating a much reduced, present day Lake Champlain.

Human land use

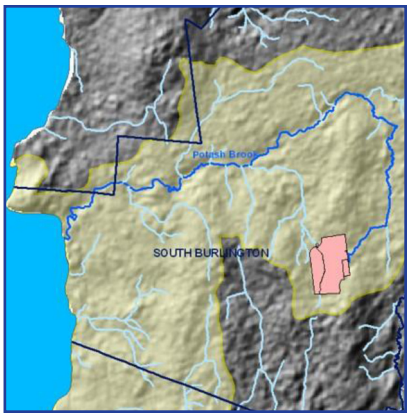
Forests grew in the deep, rich clay soils that remained from Lake Vermont and the Champlain Sea. The natural community is referred to as a "clay-plain forest." Although the soils were wet and poorly drained, European settlers recognized their agricultural fertility and converted much of the forest to farmland. Today many of the pastures and farm fields remain but are interspersed with housing developments and a golf course. Adding to the poorly drained soils are impervious roads, sidewalks, driveways, and rooftops which make Oak Ridge and Butler Farms neighborhoods ideal locations for ecological problem-solving to treat stormwater runoff.



South Burlington, Vermont housing developments, Oak Ridge and Butler Farms, outlined in yellow. Site of potential wetland park is outlined in red.

Potash Brook watershed

The two neighborhoods are part of the Potash Brook watershed which drains into Lake Champlain, mostly via Potash Brook. The Brook is listed in Vermont as an impaired waterway because of sediment loading and pollution from stormwater runoff. The developments send water to Potash Brook from the eastern side of the neighborhoods and through the neighborhoods to the north.



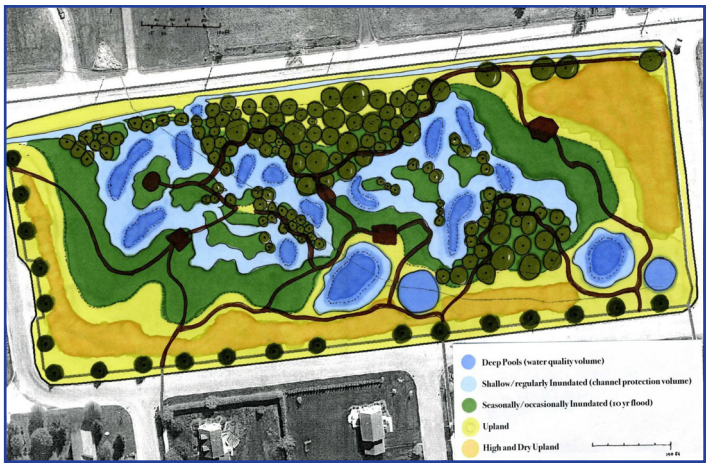
The South Burlington, Vermont housing developments (pink) are part of the Potash Brook Watershed (tan). Potash Brook (dark blue) flows from the developments to Lake Champlain.

Ecological problem solving

The South Burlington Stormwater Utility plans to handle runoff from the developments by revitalizing a stream running through them, building a retaining pond to the north, and installing micropools to hold water coming from a sub-watersheds on the eastern side. And finally, an eight-acre field on the eastern side of the neighborhoods will receive water from two sub-watersheds in the southern part of the developments. The field has been nicknamed "mud field" by the residents and lives up to its name for at least part of the year. It is also the "front door" to the neighborhoods and an ideal location for a wetland park that incorporates recreation, education, art, and other community centered amenities.

An eight-acre field to the east of the neighborhoods receives water from the southern part of the developments and has been nicknamed "mud field" by the residents.

Multifunctional Wetland Park to Treat Stormwater Runoff



Design for a "front door" wetland natural area park in the eight-acre field adjacent to the housing developments.

Wetland design process

The students brainstormed ways that plants, animals, and humans could come together around the centerpiece of water in aesthetic and functional ways. They envisioned a forebay and pond to remove many of the sediments in the runoff as well as slowly feed water into the wetland. The students designed zones of perpetually wet, regularly inundated, seasonally or occasionally inundated, and upland vegetation to help stabilize soil, remove pollutants, remove excess water through transpiration, and shield the park from traffic noise.

Great Blue Heron, a common wetland species in the Champlain Valley of Vermont. Credit: Allan Strong

They planned long, open vistas for bird watching and a sense of open space. Shrubs and alder groves could be planted for bank stabilization and to discourage colonization by large numbers of geese. Recommendations for enhancing the wildlife potential of the wetland park included: large rocks for amphibian habitat; large downed trees for wildlife habitat; purple martin "apartment complexes" to help keep insects at bay; maintaining variable forest, shrub land, grassland, and water habitats to entice a diversity of wildlife; and educating residents about impacts of dumping chemical cleaners or using toxic chemicals on lawns. By design, the wetland should maintain a steady flow of water and not encourage mosquito breeding. Introducing a fish species or using bacteria rings that destroy mosquito eggs or larvae would also manage populations.

Cost sharing and community engagement

There is room in the design for creative additions to enhance community recreation, gathering, and education. This could take the form of boardwalks, outdoor learning spaces, an observation tower, sculptures, or fountains. The wetland park could provide areas for all seasons and has potential to become an attractive natural area with water features and native vegetation that add to the amenities considered when assessing the value of the homes.

Community engagement is a key component of the wetland design.

The financial aspects of the project have been negotiated by the South Burlington Stormwater Utility. But the students considered several ways to bolster the budget and add in recreation and aesthetic components through cost sharing and community engagement. Their ideas included: sharing costs with an upcoming development to the south; a tree planting day with community volunteers; engaging university courses in education and trail building projects; hiring a Vermont Youth Conservation Corps crew to plant vegetation and build trails or outdoor learning areas; share costs of developing educational potential with local schools; selling unwanted excavated soil; bartering or selling stormwater credits and carbon credits; and planting vegetation that fits with the local ecology, then allowing the wetland natural area to take over and grow itself, reducing maintenance and long-term costs.

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