

Baldwin Park Stream Restoration

The Town of Chapel Hill, in partnership with the Town of Carrboro and the NCSU Stream Restoration Program, received federal and state funding to pay for restoration design, construction, materials, and native plants to treat urban stormwater, reduce streambank erosion, and reforest areas of the project area.



What was the problem?

- Direct stormwater input to the two streams enclosing Baldwin Park (on the Carrboro-Chapel Hill border) caused severe streambank erosion. Stormwater flowed off of very dense urban areas directly into the streams, increasing temperatures and carrying pollutants.
- Large amounts of fine sediment were deposited on the streambed below the project area. This smothered aquatic habitats, provided areas for fecal coliform bacteria to proliferate, and made the water cloudy. This sediment also contributed large amounts of nitrogen and phosphorus to the system, which impacted our ability to meet the Jordan nutrient management rules.

- The stream in the project area lacked protective forest cover. Ecological stream communities in North Carolina are adapted to forest conditions, with only small amounts of direct sunlight and most food sources being derived from fallen leaves rather than algae. The aquatic community was stressed by higher temperatures and changes in the food chain. The lack of shade and native vegetation reduced the amount of natural nitrogen and phosphorus processing that should have taken place.

What was the cause?

- Sediment that covered the streambed and smothered aquatic habitats came from runoff through storm drains and from erosion of the streambanks. Streambank erosion is caused by unmanaged stormwater entering the streams with high speeds and energy. Because so much of the upstream area is covered with rooftops and pavement, more water runs off than when the area was forested. Storm drains directly emptied into the stream, which increased water temperatures and carried pollutants and sediments into the stream with stormwater runoff.
- Invasive plant species outcompeted the forest and prevented regrowth of native trees. Mowing right up to the stream bank also prevented establishment of bank-strengthening forest vegetation.

What solutions were used?

- A rain garden was installed into which stormwater from the street is directed. A rock apron dissipates energy from gushes of water at the end of the storm drain, and stormwater slowly infiltrates the rain garden, recharging the groundwater. Pollutants are filtered out and temperatures are reduced in the process. Water percolates through the ground and eventually reaches the stream, where it is cleaner and cooler than when stormwater flowed directly into the stream. Vegetation through the garden helps process pollutants and reduces amounts of stormwater by taking water up through roots.
- The stream itself was reshaped to move it away from steep slopes and to lower the slope of the banks. In combination with erosion control fabric and “step-pools” constructed of large rocks, the stream now has greater access to its floodplain and the energy of flowing water is reduced. With less energy there is less erosion of the streambanks.
- Invasive plant species were physically removed and some directly treated with aquatic-safe pesticides to prevent their regrowth. Native tree and shrub species that are adapted to streamside conditions were planted up to 15 feet from either bank. To help cover the bank while these plants get established, native grasses and herbs were also planted in this strip. These areas will no longer be mowed all the way to the bank.

What is the status of the project?

- Construction of the rain garden, reshaping of the stream channel, and installation of step-pools are complete. Riparian grasses, herbs, shrubs and trees were planted in March 2011, and the rain garden was similarly planted in April. A dedication ceremony was held by the two Towns in April 2011. A Carrboro gardening group is in the process of

starting a community garden in the park. We are currently working with NCSU to address small remaining instability on the nearby OWASA easement.

What are the next steps?

- The Town of Carrboro will maintain the rain garden and riparian zone.

What monitoring or data collection have we done?

- We currently monitor stream temperature and flow. We also make monthly collections of stream water to analyze for amounts of suspended fine sediment, nitrogen, and phosphorus. Stream macroinvertebrates were collected in spring of 2010 for comparison to post-construction conditions.

Links and Resources

- Baldwin Park Stream Restoration [Poster](#)
- NCSU Stream Restoration Program - [Bolin Creek](#)