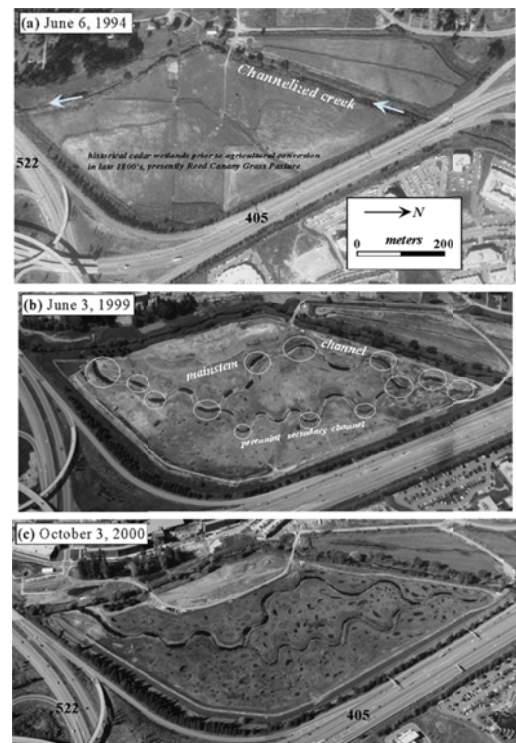


Evaluating North Creek channel conditions after restoration

Background

The North Creek ecosystem restoration—at the University of Washington Bothell/Cascadia Community College (UWB/CCC) campus located in Bothell, Washington—is one of the most ambitious and complex urban stream restoration projects in North America. By the early 20th century the campus site had been logged, and North Creek straightened, leveed, and transformed into a log flume for timber transportation to the Sammamish River and downstream market in Lake Washington. These alterations effectively decoupled North Creek from its floodplain, minimized channel length, removed the adjacent floodplain forest/shrub/emergent plant community, plowed under floodplain micro-topography, and removed in-channel wood. In short, the naturally occurring ecosystem functions of North Creek, and the adjacent floodplain, were significantly diminished or eliminated.



North Creek, which is 12.5 miles long, with an 18,000 acre watershed, is a salmon bearing tributary to the Sammamish River, Lake Washington, and Puget Sound. Given the highly degraded nature of the site, the goal of the State of Washington was to enhance the campus landscape while meeting all federal, state, and local regulatory requirements to mitigate impacts to waters of the United States, including wetlands, resulting from the UWB/CCC campus construction. To accomplish this, a restoration design was developed with the following objectives:

- hydrologic reconnection of North Creek with its floodplain,
- reintroduction of both in-channel and floodplain large wood,
- restoration of a native forested floodplain plant community,
- restoration of aquatic and terrestrial habitat, and
- use of regional reference site data from throughout the Puget Sound lowland to guide the ecosystem design.



In summer 2001, restoration construction diverted North Creek into a new channel and reestablished 58 acres of early successional floodplain forest. The old channelized section of creek was filled in and transformed into a tributary wetland complex. The new channel was designed to allow the river to re-meander across the floodplain (within project constraints) and overflow its banks approximately once every year.

Monitoring

Monitoring, an important part of any restoration project, provides information to evaluate the success of the project goals. Students from the Center for Streamside Studies and the Center for Urban Water Resources Management are monitoring how the stream channel morphology responds to floodplain reconnection and in-channel rehabilitation structures (large woody debris). Thirty-eight cross-sections of channel elevation and position were surveyed in fall 2001 along three major stream meander bends (see map) with extensive LWD and engineered large woody debris jams (ELJs). Preliminary results from January and September 2002 resurveys indicate that the channel is slowly adjusting to its new position. While no major channel change occurred (e.g., avulsions or major translations) following several moderate stream flow events, up to a meter of both channel incision and fill occurred in several sections. Scour typically occurred in areas of flow convergence around LWD structures and the outside of meander bends; fill was common in areas of flow divergence such as point bars and wide channel sections. This level of channel change was anticipated and encouraged during project design, as scour pools and bar deposits provide hydraulic flow diversity critical for complex instream habitat for fish, invertebrates, and vegetation.

Future monitoring

Channel morphology will continue to be monitored in the future. Other plans for future monitoring include hyporheic investigations (e.g., flow paths, biogeochemistry, and hyporheic invertebrates), benthic stream invertebrate sampling, and channel substrate assessments. Enormous opportunities exist for research and monitoring collaboration and expansion both with the University of Washington (Bothell and Seattle Campuses) and the surrounding scientific and public communities.



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Above pictures: North Creek channel conditions before, during and after restoration, graduate students survey in October 2001, graduate students Jeff Shellberg and Chris Brummer discuss who has to hold the rod in the thalweg.