

Mapping the North Creek Forest Surface Water: A GPS Project

Rob Turner Hydrogeology Winter 2013

William Hanson, Ruby Kwong, Alex Johnson, Scott Le, Duncan Medlin, and Sarah Witte

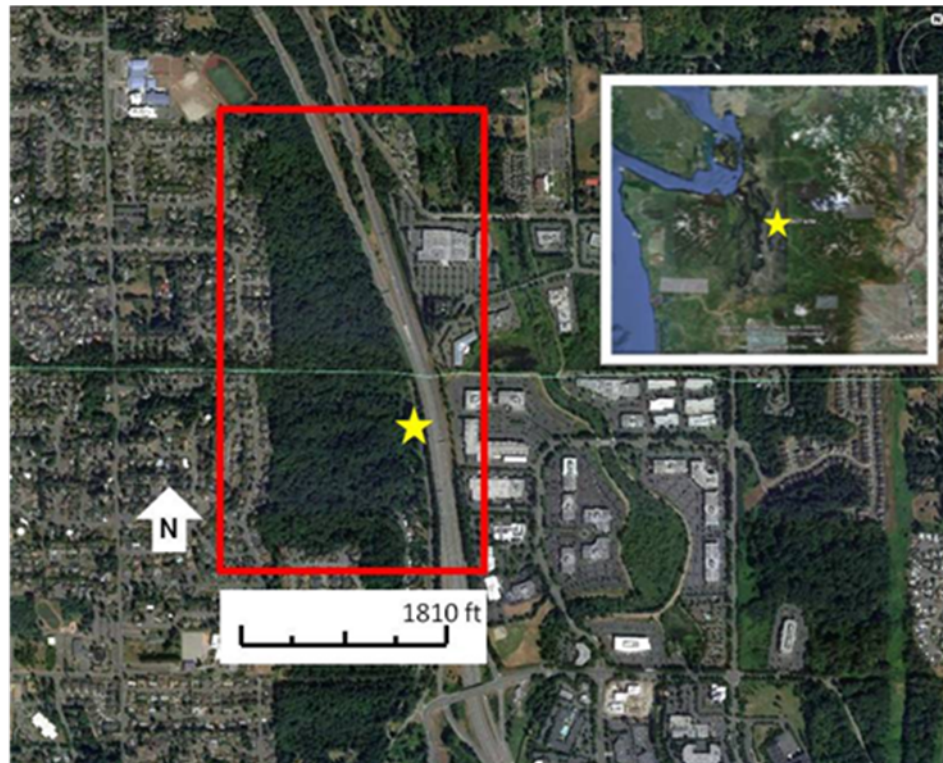


Figure 1. Project site location within North Creek Forest (highlighted in red), and in the greater Puget Trough region (inset). Images: Google Earth.

Introduction:

The 2013 Hydrogeology project site is located in the North Creek Forest which sits in the North Creek watershed (Figure 1). The North Creek Forest is bordered to the east by interstate highway 405 and to the north, south, and west by residential development. The North Creek Forest was logged in the early 1900's and has been regenerating since. The forest lies on a steep, eastern-facing slope, and provides a nearly mile-long natural filter for water that drains into the North Creek on the other side of I-405, which drains much of south Snohomish County and flows into the Sammamish River and ultimately Lake Washington and Puget Sound. The neighborhood group Help Our Woods (HOW) claims on their website that the forest contains 7 streams and 9 wetlands, but efforts to inquire about their sources of that information were unsuccessful (Help Our Woods).

Different parts of the forest have been purchased by different property owners, creating a complex network and history of ownership and land rights. In 2012 the City of Bothell purchased the northern 35 acres and preserved the forest from further development and fragmentation as a protected open space (Haglund, 2011). Many community groups lent their support of this purchase including Friends of North Creek Forest, Help our Woods, The Boy Scouts of America and a variety of others. The northern 35 acres of forest is current supervised by the City of Bothell Parks and Recreation.

There are still a number of small areas within North Creek Forest which were cleared for limited settlements. Many structures were built and abandoned within these cleared area of the forest, and have since decayed down to rubble and concrete foundations. These areas containing abandoned structures were avoided during the GPS data collection.

This mapping study attempted to locate and map hydrologic features in Bothell's North Creek Forest. The six team members were William Hanson, Ruby Kwong, Alex Johnson, Scott Le, Duncan Medlin, and Sarah Witte. The study was performed for Rob Turner's Winter 2013 Hydrogeology class at the University of Washington Bothell. We mapped significant water features within the northern 35 acres of the North Creek Forest and photographed many features to create a baseline database for the future conservation and restoration of the forest.

Methods

The six team members visited the forest during, and shortly after rain events and used Garmin GPS rented from the UWB Tech center to map the specific locations of each water feature. We used personal cameras to photograph the features. Google Earth was used to combine all the GPS points together, and then to name the points corresponding to photographs taken at the same location. We used great care to prevent our study from disturbing the forest or water features in any way. Because the forest is under the care of the City of Bothell Parks and Recreation, all students who participated in this mapping study received explicit permission to access the forest, and Pat Parkhurt retained copies of liability waivers from all team members.

Results:

The initial intent if the study was to locate and record significant hydrologic features within the forest. Through the course of examining the hydrologic features of North Creek Forest, the team found sites experiencing significant erosion and sediment transport. These locations have been noted on the results map. The runoff entering North Creek Forest from the West comes from road-side catch-basins, some of which are then piped through the entirety of North Creek Forest and under I-405. The areas of significant erosion were associated with the run-off/stream flow that has not been piped through the forest. The volumes of sediment relocated are different for each specific site ranging from approximately 5-15 cubic yards. The soil lost to erosion has either collected at the east edge of the forest before the streams are contained to pass under I-405, or passes under I-405 to be transmitted to wetlands associated with North Creek via a culvert.

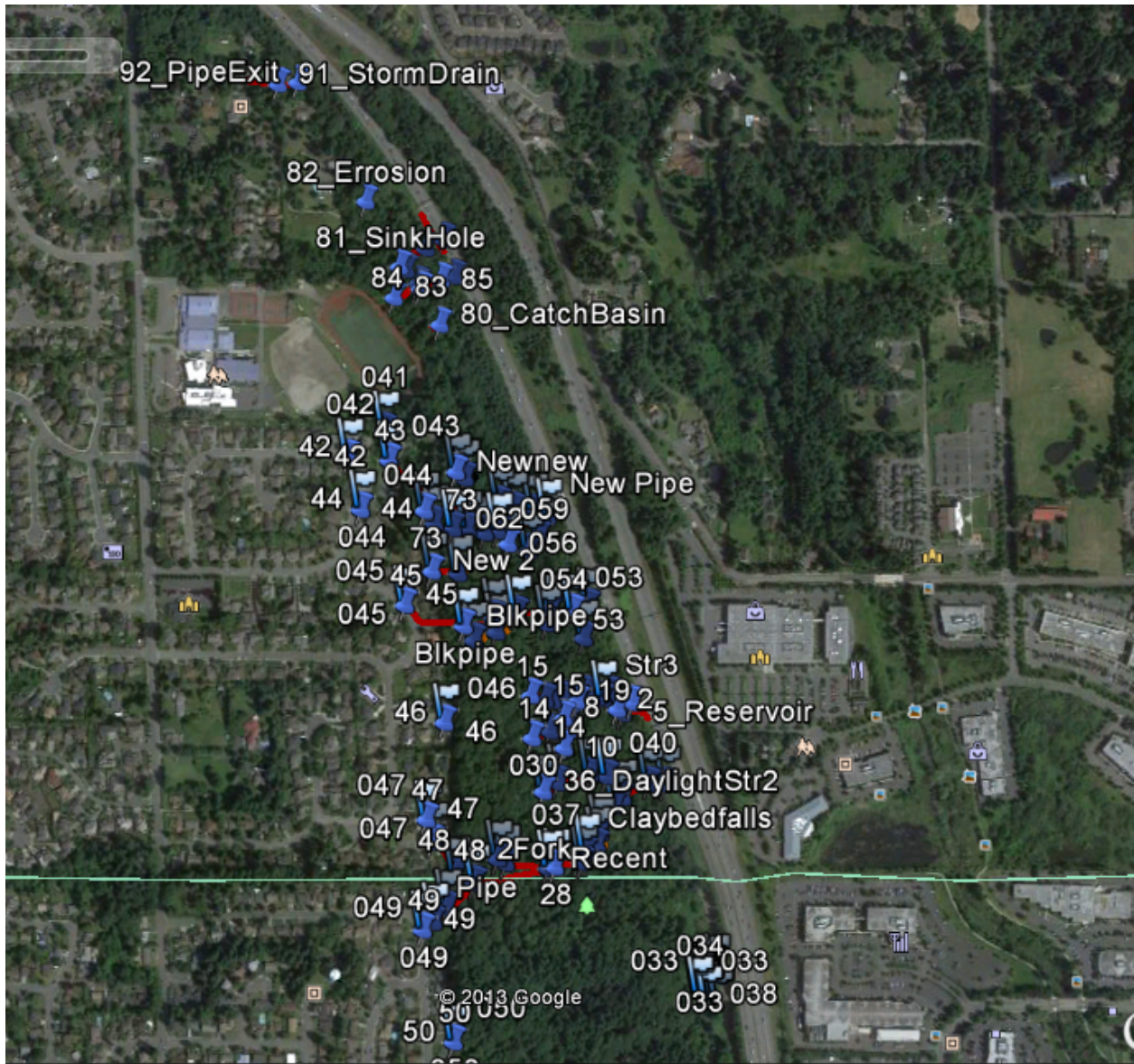
In addition to the sediment and erosion concerns, the water traveling through north creek forest is also likely to contain significant levels of pollutants typical to residential runoff, like fertilizer and petroleum.

Recommendations:

To avoid further erosion and potential damages to slope stability or hydrologic function the velocity of the uncontained runoff through North Creek Forest needs to be reduced. This would be most readily accomplished by adding large woody debris to create pools and reduce channel velocity or increasing stream meander to lessen the gradient of the channel. From an ecological standpoint the water that is piped through North Creek Forest should be returned to a natural channel. This would also reduce the need for storm-water control when the water reaches I-405, and improve habitat diversity in the forest. Returning water to the valleys that has been removed would promote the riparian niches that will likely be lost if they continue to be denied water.

To avoid further surface-water household contaminants from running from the neighborhood into the forest, The Friends of North Creek Forest is attempting to partner with the City of Bothell Parks and Recreation Surface-Water division with Janet Geer (a UWB graduate) to re-label the catch basins with brighter cautionary warnings and distribute informational material to the neighborhood households to teach the community members about household pollutants entering the local surface water and the forest (Geer, Freese, personal correspondence). With increased awareness, the community may be able to prevent such contaminants as garden fertilizer, car-washing-soap, and other toxins from ever entering the forest's water system.

A significant concern for water quality is vehicular toxins entering storm water runoff and causing many adverse effects to aquatic species like salmon and steelhead and the aquatic insects that these fish eat. Animals and birds are also drinking from these water sources and subjected to the toxins. The City of Bothell Parks and Recreation Surface-Water division is also enacting a vehicle-contaminant identification and elimination program this summer to reduce vehicular toxins from dripping onto the roads and washing into the surface water in the larger Bothell area (Geer, personal correspondence). By helping the neighbors understand their vehicular emissions and how to reduce them, we can prevent toxins from entering any of Bothell's water system, including the North Creek Forest.



Bibliography

Haglund, Noah. "For Bothell park, housing bust means more forest". The Seattle Times. Published December 29th, 2011.

Help our Woods. Nonprofit organization found online at: <http://helpourwoods.com/page12.html>.