



**Northwest Ecological Services, LLC**

## **M E M O R A D U M**

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To: Steve Sundin  
From: Northwest Ecological Services, Michele Bodtke  
Date: December 5, 2005  
Regarding: Shoreline Master Program Update

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The City of Bellingham has requested that Northwest Ecological Services (NES) provide recommendations regarding: 1) the channel migration zone of Squalicum Creek, and 2) the Shoreline Management Act (SMA) floodway for Squalicum Creek. This request is for the City Shoreline Master Program update and is a supplement to the shoreline inventory analysis provided to the City in 2004.

NES has reviewed the available data and hereby offers a channel migration zone and floodway boundary recommendation. The determination was made by analyzing and comparing existing data, elevation changes in the valley, historic road and railroad bed elevations, and historic aerial photographs.

### Channel Migration Zone

In-depth data review and extensive field verification is generally needed to assess a river channel and its potential migration zone. Migration zones are generally tied to a specific time horizon, anywhere from twenty (20) to one hundred (100) years. Time and financial constraints have limited our ability to provide in depth analysis of Squalicum Creek and its potential for migration. Our review in this case is only cursory, and is based primarily on existing available data, including historic land use practices and aerial photographs of the creek valley, and personal knowledge of NES staff. Because in-depth analysis was not available for this project, the recommendations provided are liberal in nature, allowing for the greatest extent of possible channel migration scenarios.

Squalicum Creek is located in a glacial outwash valley that is confined by moderately steep valley walls that are generally mapped as glacial marine drift. The valley is fairly narrow along the lower reaches (below Guide Meridian Road). The valley in the upper reaches of the creek is much broader and fairly flat, which historically has allowed for more over bank flooding (floodplain).

Historic aerial photographs dating back to 1951 show no significant channel change in the past 50 years, except for human manipulation of the channel. Events that have resulted in significant changes to the creek channel include: the construction of Interstate 5 (I-5), the extension of Hannegan Road through the Squalicum Creek valley, and the development of the Wilder Construction site. Pre 1950 modifications to the valley that may have affected the natural flooding and migration of the creek include: the construction of the railroad grade through the valley, and the construction of Squalicum Parkway and other roadways in the valley.

The construction of I-5 changed Squalicum Creek and the associated valley significantly. A berm was constructed across the valley as a roadbed for the new highway. The entire valley was essentially blocked by the berm, except for a bridge across the existing railroad grade. At this time, Squalicum Creek was directed into culverts under the roadbed, through the berm, at the southern most extent of the valley. Both Bug Lake and Sunset Pond are products of the gravel mining and excavation that occurred during highway construction. Squalicum Creek was directed through both of these water bodies after they were created.

The development of Wilder Construction along Hannegan Road resulted in a portion of the Squalicum Creek channel being re-located to its current position. The creek is now directed to the west of the Wilder property, flowing parallel to and along the railroad grade in what is essentially a ditch. A portion of the creek channel has also been widened through this reach.

Human influences in the valley (I-5, residential, commercial and industrial land uses, and utility infrastructure) have caused major modifications to the location and nature of the creek channel. Additionally, natural influences on creek flow (beaver activity, input of sediments, and vegetation inputs such as large woody debris) have either been reduced significantly, controlled or eliminated. All of these factors have contributed to reducing the occurrence of natural channel migration throughout the Squalicum Creek system within the City and its urban growth boundary. Evidence of this conclusion can be seen on the aerial photographs of the valley over the past 50 years. Very little change in the location of the creek channel can be seen on the photographs, except for the changes previously discussed.

Due to human influences and interests in the creek valley, no significant channel migration is anticipated for several tens of years. However, even though human controls of the creek exist, certain lengths of the creek have potential for channel migration if the right conditions or events occur, such as a large flood event, increased animal (beaver) activity, or recruitment of large woody debris in areas of the valley where trees are maturing. Given current constraints on channel migration and the potential for influencing factors, our recommendation for potential channel migration areas are outlined on the attached maps.

Shoreline Management Act (SMA) Floodway (will be provided at a later date.)