**Squalicum Creek Drainage Analysis**

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| Landscape Setting | Landscape Setting | | Squalicum Creek is a glacially formed stream that flows through a valley with a width of less than one-quarter mile in most places. The valley walls in the lower reaches rise approximately 60 feet from the valley floor with the south wall being much steeper than the north wall. The basin is approximately 15,800 acres. The headwaters of the creek are located in a broad area characterized by rural residential development and agriculture. Squalicum Lake, Toad Lake and Baker Creek all drain into Squalicum Creek.<br>(Ref# 8,13,37,47,62,71 for above) |
| | Geology | | Glacial drift and outwash. The creek valley is dominated by glacial outwash in the upper reaches and glacial drift is the lower reaches. The uplands surrounding the stream valley are characterized by un-stratified glacial drift. The mouth of Squalicum Creek is artificial fill.<br>(Ref# 21,103 for above) |
| | Soils | | • Soils in the watershed are dominated by Group D hydrologic soils which tend to have very slow infiltration rates and high runoff potential.<br>• Group B and C soils are also mapped in the valley (portions of Reaches 2, 3, 4 & 5). These soils tend to have moderate to slow infiltration and moderate runoff potential.<br>(Ref# 47,51,63 for above) |
| Land Use | Current Conditions | | • Land use is dominated by industrial development. Residential development and industrial zoning are prevalent through the entire length of the creek, with scattered pockets of commercial, service and industrial uses.<br>• Although land use is fairly dense in Reaches 1 through 6, significant vegetated buffers still remain along nearly the entire stream length despite the urban character of the landscape. Buffer widths are generally 50 feet or greater.<br>• A large percentage of Reaches 6 through 11 is undeveloped land. Most of the undeveloped properties in this area are zoned industrial and hospital. Several large parcels are also in public ownership.<br>(Ref# 8,16,33,34,71 for above) |
| | Zoning | | Public, industrial, and residential.<br>(Ref# 54,104 for above) |
| | Transportation and Utilities | | Transportation corridors and utilities parallel the creek in the lower reaches of the segment (Reaches 1, 2, 3 & 5). Several major arterials and Interstate-5 cross Squalicum Creek, however, crossings and arterials within the SMA decreases measurably in the upper portion of the segment.<br>(Ref# 14,35,36,39,40,41,42,44,45,46 for above) |
| | Public Access | | • Large tracts of publicly owned land are located along the entire length of the creek; however, public access is relatively limited.<br>• Cornwall Park is located in Reach 4, and offers many recreational opportunities.<br>• A park has also been established at Sunset Pond in Reach 6, which is geared toward more passive recreation, such as walking and fishing.<br>• Development of an additional park has been proposed in Reach 2, on old industrial property, but the majority of the property is located just outside the SMA.<br>(Ref# 33,34,36,48,54 for above) |

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| | Shoreline Modifications | | • In-water structures and dense development directly adjacent to the shoreline is relatively sparse over the entire length of the creek.<br>• Major modifications include: artificial fill and industrial development at the mouth of the creek, creek channel modification (including berms and culverts) due to Interstate-5 construction, and two long channel culverts in Reach 2.<br>• Outside of these exceptions, the creek meanders through the valley in a relatively undisturbed channel with buffers averaging 50 feet or greater.<br>• Impervious surfaces and structures are generally set back from the creek shoreline, except for Squalicum Parkway in Reaches 1, 2 and 3.<br>(Ref# 8,12,15,18,43,71,94 for above) |
| **Critical Areas** | Wetlands | | • A significant wetland/upland complex is present in Reaches 5 through 9. Nearly all of this system is directly associated with Squalicum Creek. The complex provides good, diverse habitat and good connectivity to upland habitat in the upper reaches of the watershed; and is significant based on the large size and connectivity within the system despite surrounding urban development.<br>• Scattered riparian wetlands are located along the creek in Reaches 1, 2 and 3.<br>(Ref# 11,52 for above) |
| | Streams | | One stream system, Baker Creek (#4), flows into Squalicum Creek. Baker Creek is regulated under COB Wetland and Stream Ordinance.<br>(Ref# 8,38,57,71 for above) |
| | Frequently Flooded Areas | | 100 year floodplain is mapped for the entire valley floor, from valley wall to valley wall, in Reaches 5 through 11. Floodplain is also mapped in Reaches 1 through 3, but the area of flooding is more immediate to the creek channel.<br>(Ref# 19 for above) |
| | Steep Slopes | | • Steep slopes are present on both the north and south valley walls in Reaches 1 through 3; the south valley wall of Reaches 6 through 8; and, the north valley wall in Reach 11.<br>• Seismic Hazard Areas based upon geologic units are indicated in the upper portion of Reach 2, Reach 3, and southern extent of Reaches 5 through 8.<br>• Seismic Hazard Areas based on artificial fill are indicated in Reach 1.<br>• Mine Hazard Areas are indicated in Reach 2.<br>(Ref# 21,103 for above) |
| | Wildlife | | PHS or SC documented in the creek include: Sea-run Cutthroat (FCo), Chinook (FT & SC), and Coho (FCo). Bull trout (FT) are documented up to the first long culvert in Reach 2 and presumed to be present in the remainder of the reaches.<br>(Ref# 24,60,61,70,92,93,94,105 for above) |
| **Ecological Functions** | Overall Function | | • Squalicum Creek is providing most ecological functions at moderate levels.<br>• Ecological functions of the creek and adjacent buffers are reduced down stream from Interstate-5, due to development, loss of habitat and reduced buffers.<br>• Moderate to high functions remain up stream of Interstate-5, where buffer widths are greater and native vegetation still remains in many areas.<br>(Ref# 71 for above) |
| | Water Quality | | • Squalicum Creek is listed by WA DOE as Category 5 Polluted Water for dissolved oxygen, fecal coliform, temperature, zinc and/or pentachlorophenol, except for the stream length between James Street and Hannegan Road (Reaches 6 & 7). |

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| | | | • Category 2 Waters of Concern for pH and temperature.<br>• The upper portion of Reach 3 is indicated as impaired based on degradation of aquatic life.<br>(Ref# 60,83,89,71 for above) |
| | Vegetation | | • Buffer widths tend to be 50 feet or greater along the entire creek and 200 feet or greater in several areas.<br>• In the lower reaches, habitat has been degraded, percentage of native vegetation has declined, which has allowed non-native and invasive species to populate portions of these reaches.<br>• In the upper reaches, areas of diverse wildlife habitat are available due to large tracts of undeveloped land, wider buffers and diverse native vegetation provides canopy and structure.<br>(Ref# 8,20,24,71 for above) |
| | Wildlife | | • Development has reduced upland and wetland habitats in the lower reaches causing an increase in urban wildlife.<br>• In the upper reaches, wildlife usage tends to be more diverse and abundant, including a variety of non-urban animals and birds. Habitat specific species are present for mammals and birds. Movement is easy for medium to large animals.<br>• In addition to the aforementioned fish species, species documented in the creek include Steelhead salmon; and Chum, present in Reaches 1 through 5 and presumed in the remainder of the reaches, although Chum have difficulty passing the sandstone outcrop in Reach 4.<br>(Ref# 24,61,60,69,70,71,94,105 for above) |
| | Habitat | | • The best wildlife habitat along the entire length of the creek is between James Street (Reach 6) and Reach 9. Connectivity between habitats over this length of creek is very high and large areas of native vegetation are present.<br>• Tidal influence at the mouth of Squalicum Creek provides some estuary/marsh type habitat, but the area is very small and the tidal influence is greatly inhibited due to an in-water structure.<br>• Habitat corridors are present in the lower reaches of the creek but are more limited due to the closer proximity of development.<br>(Ref# 20,24,61,71 for above) |
| | Limiting Factors | | • Water quality<br>• Existing infrastructure<br>• Fish passage barriers<br>• Zoning<br>• Invasive species<br>(Ref# 4,62,71 for above) |
| | Priority Actions | | • Improve fish barriers (Reaches 1 & 6)<br>• Divert Squalicum Creek out of Bug Lake and Sunset Pond<br>• Preserve undeveloped floodplain and existing habitat (particularly in Reaches 5 through 9)<br>• Water quality improvement<br>• Control invasive species (Reaches 2 & 3)<br>(Ref# 62,71 for above) |
| | Current Enhancement Actions | | Shoreline vegetation planting projects in Reaches 2, 3, 5, 10<br>(Ref# 49,50,71 for above) |

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| | Preservation/Enhancement Opportunities | | • Stormwater treatment and detention<br>• Add in-water structures to creek<br>• Canopy cover enhancement; native shrub and tree planting to enhance buffer<br>• Control invasive species<br>(Ref# 62,71 for above) |