

X. Padden Creek SMA

Summary: The Padden Creek SMA has urban density development. Most areas are built out to near capacity, but some growth may be seen in the commercially zoned areas near the mouth. A variety of roads and utility service are present with the SMA, however stormwater retention and treatment is lacking. This SMA currently is functioning at moderate levels for most ecological parameters. Fecal coliform, temperature and dissolved oxygen levels have exceeded Washington State water quality parameters and their management should be a high priority for this SMA. An extended culvert under Fairhaven Parkway is a significant fish passage barrier replacement should be a high priority.

X.1 Watershed Analysis

X.1.1 Landscape Setting

The Padden Creek drainage lies entirely within the City of Bellingham limits. Padden Creek originates in Padden Lake. A control feature is located at the outlet of the lake. From Lake Padden, Padden Creek flows through a deep ravine, passes under Interstate 5 and flows through Happy Valley, south of Fairhaven Parkway. A long section of the creek has been placed in a culvert that extends from Fairhaven Parkway to 19th Street. Only the southern portion of Padden Creek actually occurs within the SMA, however for the purposes of this study the review area was extended to the culvert under Fairhaven Parkway.

Padden Creek flows within an incised ravine cut into sedimentary material. Within the SMA the channel is naturally confined within a narrow ravine with steep slopes. Ravine side range from 20% to 100% slopes and erosion is evident in a number of areas. The narrow nature of the ravine bottom is not conducive to significant channel migration. Squalicum-Chuckanut-Nati soils are the dominant soil types in this drainage, with areas of Whatcom-Labounty soils. The soils can be generally described as moderately deep to very deep, moderately well drained (poorly drained in Labounty soils), gently sloping to very steep soils, on foothills, plateaus and landslides. Whatcom-Labounty soils occur on glaciomarine drift and are mapped in portions of Reach 1. The side slopes of the ravine along most of this SMA area range between 20% to 100%. The ravine ends north and east of Fairhaven Parkway and at the mouth of Padden Creek in Reach 1.

X.1.2 Land Use

Land Use: Within the review area Padden Creek flows through areas with a wide range of zoning including residential, commercial, industrial and public zoning. Zoning upstream of the SMA is predominately residential single family mixed with pockets of residential multifamily, commercial and public zoning. The drainage has sustained moderate to high levels of impact, including extensive culverting, rerouting the channel and alteration within collector basins. A large portion of the Padden Creek SMA is publicly accessible through Greenways trails and Fairhaven Park.

Existing land use in the areas outside of publicly zone property is densely developed in most areas, although the area at the north end of Reach 1 appears underdeveloped. Existing platted lots and overlaying zoning indicate residentially zone property is mostly developed. Undeveloped plated parcels are mostly located on steep slopes of Padden Creek ravine. Fairhaven Park and associated Greenways trails dominate Reach 3 of this drainage. A well developed Greenways trail system parallels Padden Creek for the entire SMA.

Transportation and Utilities: Major roads within the Padden Creek SMA include Harris Street, 12th Street and Fairhaven Parkway. Harris Street crosses Padden Creek at the interface between Padden Lagoon and Padden Creek. Twelfth Street crosses over Padden Creek via a tall bridge in Reach 2. Fairhaven Parkway is the eastern extent of this review. Padden Creek passes under Fairhaven Parkway via an extended culvert that does not daylight until 19th Street. Smaller residential roads access the surrounding neighborhoods and business districts. Sewer mains are located under the Greenways trails for the entire length of the creek. Untreated, un-detained stormwater enters the creek from a number of outflows along the entire length of the creek.

Public Access: Public access is provided along most the SMA via a well developed series of Greenways trails maintained by the City of Bellingham. The trail system parallels the stream and is located on top of a city sewer main. The trail system connects to other Greenway trails and to adjacent neighborhoods and business districts. Fairhaven Park provides the other primary access to the Padden Creek SMA and connects to the Greenways trails.

Shoreline Modifications: Very few modifications were identified along Padden Creek within the SMA. Padden Creek flows within a naturally confined channel within the ravine. No bulkheads or shoreline armoring are identified within the SMA area, except where associated with culvert or bridge crossing. Three fish passage structures are located within the SMA. A footbridge crosses the creek in Fairhaven Park.

X.1.3 Critical Areas

Wetlands/ Regulated Streams: Wetlands are present adjacent to Padden Creek at the ravine bottom and on side slopes draining into Padden Creek. Identified wetlands include palustrine forested, scrub-shrub and emergent wetlands. Three tributary streams are mapped as flowing into Padden Creek.

FEMA: Portions of the Padden Creek SMA are indicated on the FEMA floodplain and floodway maps.

Slopes: Padden Creek is located in a ravine with steep slopes along most its length within the SMA. Side slopes within the majority of the ravine range from 20% to 100% slope. These areas are not depicted as geological hazards on the Whatcom County maps.

Potential PHS/TSE Species: The Padden Creek SMA includes potential habitat for federally listed bull trout and federal candidate species Puget Sound coho salmon. State Priority Habitats identified for the Chuckanut Creek include riparian habitat and wetlands.

X.1.4 Ecological Functions

Padden Creek provides ecological functions at a range of levels. Several limitations to ecological function have been identified for the Padden Creek SMA. Water quality standards are not being met for a variety of parameters and may affect the SMA reaches. Upstream reaches of the drainage also are not meeting standards for some parameters. Padden Creek has been listed by the WA Dept. of Ecology as: a Category 5 "Polluted Water" for Fecal coliform, temperature and dissolved oxygen; a Category 4 "Impaired Water" for bioassessment and fish passage. Studies in 2002 by Plotnikoff and Wiseman found biological degradation of aquatic life based on the *River Invertebrate and Prediction Classification System* at sample stations within the SMA (DOE Water Quality Website 2004). Instream habitat function ranges from moderate to high throughout the drainage. Upstream land use and stream condition have had deleterious affects on the SMA area.

Riparian vegetation with the SMA is dominated by a mixed deciduous forest in a narrow range of age classes averaging about 30 to 40 years of age. The understory generally lacks complexity and is dominated by native and non-native shrub species. Invasive plants have become well established throughout this SMA and have decreased the structure and species diversity. The natural topography and public land holdings have resulted in a broad forested corridor extending from the marine system, connecting the SMA riparian corridor with other terrestrial and wetland habitats.

The Padden Creek SMA provides moderate quality habitat to a variety of wildlife and fish species. None native, invasive eastern grey squirrels are well established in this corridor. Terrestrial habitat features such as snags and downed woody debris, are present, but not common. When present they represent a narrow range of age classes, species and decay levels. Anadromous trout and salmon use Padden Creek for spawning, migration and rearing. The drainage has a particularly healthy population of chum salmon. Wildlife species associated with mixed deciduous forests are well represented. No priority wildlife species have been specifically identified for this SMA, but could be present.

X.2 Reach Analysis: Segment A (reach Padden Creek 1)

X.2.1 Landscape Setting

This segment extends from Padden Lagoon upstream approximately 500 feet. This portion of the drainage is located in alluvium deposits in glaciomarine drift. Soils are upland soils in Drainage Class B or D. Soils in drainage Class B have moderate

infiltration rates when wet and moderate water transmission and Class D soils have very slow infiltration and have a very slow rate of water transmission. The risk of erosion within the reach soils ranges from slight to severe. Most of the soils have a slight risk of erosion, but a small area has a severe risk. Padden Creek flows within an unconfined to moderately confined channel with an average channel gradient of 1% to 4% in Reach 1.

X.2.2 Land Use

Land Use: The overlaying zoning for this 13.4 acre reach includes 3.5 acres of residential, 3.5 acres of commercial, 1.4 acres of industrial and 0.8 acres public area. Current land use includes high density single family residential and lightly utilized commercial and industrial properties. There are a number of undeveloped "paper plats" of small lot within and around the reach, but most of these are located on the steep side slopes of the ravine.

Current zoning and platted lots indicate the potential for greater density in the commercial and industrial portions of this reach, but little change is anticipated in the residential areas.

Transportation/Utilities: Harris Avenue is the largest road in this reach. Harris Ave crosses Padden Creek at the interface of Padden Lagoon and the Creek via concrete culverts. Utilities in the reach include storm and sewer mains. A sanitary sewer main parallels the Creek and the access road provides the base for the Greenway Trail. A sewer line is suspended above Padden Creek channel near the McKenzie Street easement.

Public Access: Public access is provided along this entire segment via the Greenway trails.

Shoreline Modification: No shoreline modifications have been identified for this reach except those associated with stream crossings. Padden Creek flows through three culverts. All of which appear to be fish passable. Impervious surface is calculated at 27% of reach and 36% of the reach groundcover is semi-pervious and 37% is pervious and 11% is water.

X.2.3 Critical Areas

Wetlands/ Regulated Streams: A palustrine scrub-shrub and emergent wetland (approximately 1.0 acre) is indicated on the 1992 City Wetland Inventory. This wetland is located where the ravine bottom widens out and a small drainage enters from the west. The unnamed drainage appears to be a surface water collector ditch that is fed by runoff from the surrounding industrial and residential properties. This ditch could be a source of contaminants.

FEMA: Portions of this segment are indicated on the FEMA floodplain and floodway maps. Mapping indicates 4.7 acres occurs within the 100 year floodplain and 1.2 acres are in the floodway. These areas are located in the ravine bottoms.

Slopes: Ravine sides along most of the segment have slopes ranging from 20% to 100%. Slopes are not mapped on the Whatcom County Geohazard Maps as “Landslide Hazard Areas”.

Potential PHS/TSE Species: This segment includes potential habitat for federally listed bull trout and federal candidate species Puget Sound coho salmon. Segment A is adjacent, and flows into the estuary in Padden Lagoon. State Priority Habitats identified for this segment include instream, riparian habitat, estuary and wetlands.

X.2.4 Ecological Functions

Water Quality: This segment has been listed by the WA Dept. of Ecology as a Category 2 “Water of Concern” for pH, temperature and dissolved oxygen (limited excursions from water quality standards).

Vegetation: An estimated average 75 foot forested buffer exists on both sides of the channel through this segment. The forested riparian buffer is well developed in the upper portion of the segment. The lower one-third of the segment passes through an industrially zoned area that currently is a gravel pad supporting weedy herbaceous species. The Tennis Club building covers a significant area of this segment. English ivy, holly and bindweed are invasive plants that are well established within this reach. Control is recommended.

Wildlife: Little data is available on specific wildlife use within this segment outside of anadromous fish. Anadromous fish species utilizing this segment include: coho, chinook and chum salmon, sea-run cutthroat and steelhead. Bull trout presence is presumed but not documented.

Habitat: This segment flows into Padden Lagoon estuary and provides important passage functions for anadromous fish species transitioning into and out of the marine environment. Most of this segment is tidally influenced and salt water enters the system. Data on instream habitat features and substrate is lacking for this segment. NES field review observed little large woody debris within the channel, a silty substrate in the lower reaches with mixed gravels behind the tennis club. Surrounding riparian vegetation is a young mixed deciduous forest dominated by red alder. The understory ranges from sparse to well developed with willow and salmonberry. The Greenways trail is located close to the stream bank and vegetation is trampled in a number of areas. The channel braids at the bend behind the tennis club and the ravine bottom is vegetated. Garbage is present in this area. The forested riparian area provides a travel

corridor from the marine environment and upstream terrestrial habitat as well as refuge for wildlife in this urban area.

X.2.5 Opportunities

Preservation

Protect existing forested and shrub vegetation within the ravine of this segment area.

Enhancement or Restoration Opportunities

- Retaining and enhancing native forest and shrub cover will assist in maintaining instream water temperatures, proper oxygen levels.
- The addition of large woody debris in this segment would increase the functional aspects of this segment for fisheries.
- Educational signage may assist in retaining riparian vegetation adjacent to the trail.
- Improved stormwater treatment and retention.
- The removal of invasive and noxious weeds (particularly bindweed) is highly recommended to maintain species and structural integrity and maintain supporting functions such as instream water quality, temperature control and general biotic support.

X.3 Reach Analysis: Segment B (reaches Padden 2 and 3)

X.3.1 Landscape Setting

This segment is located in continental sedimentary deposits and bedrock. The majority of the soils are upland soils that are in Drainage Class D with small areas of B. The erosion risk for soils in this reach is slight with a small area rated as severe. The channel is indicated to be confined within a ravine throughout these reaches with an average channel gradient of 1% to 2%. Channel migration is limited by the steep banks for the ravine and the sewer main/trail bed.

X.3.2 Land Use

Land Use: The current zoning overlaying this reach includes 20.2 acres of public, 12.3 acres residential and 3.0 acres commercial. Fairhaven Park dominates this segment. Multi-family complexes are located at the top of bank in the northwest corner of the segment. Areas within the ravine are predominately a mixed deciduous forest. Current zoning and platted lots indicate little change within this segment.

Transportation/Utilities: Fairhaven Parkway, Chuckanut Drive and 12th Street are the major roads that intersect the reach. Chuckanut Drive touches the segment on the south side near Fairhaven Park, Fairhaven Parkway defines the upstream end of the SMA, and 12th Street crosses Padden Creek via a tall bridge that spans the ravine. Footings from the 12th Street bridge are located within the ravine, but are not located in the active channel

bed. Small neighborhood roads are located in the SMA in the southwest corner of the segment. Add utilities and lack of storm water retention or treatment

Public access: Public access is provided along this entire segment via the Greenway trails and Fairhaven Park.

Shoreline Modification: Few shoreline modifications were identified for this reach. Bank modification has been made of concrete and riprap around culvert crossing. Three culvert crossings were identified for this segment; three where the sewer main/greenways trails cross the stream and one where Donovan and 10th Streets. None of the culverts are indicated as fish passage impairments. Three instream fish passage structures are located in this reach: two concrete fish ladders and one wooden weir system. Impervious surface coverage calculated to be at 24% of reach and 29% of the reach groundcover is semi-pervious and 47% is pervious and 10% is water (channel).

X.3.3 Critical Areas

Wetlands/ Regulated Streams: The 1992 City of Bellingham Wetland inventory indicates the ravine bottom contains has extensive palustrine scrub-shrub and forested wetland. Small slope wetlands also are present throughout this segment. A large palustrine scrub-shrub wetland enters drains into Padden Creek at the northern extent of the segment. This wetland appears to have important base flow and water quality contributions to Padden Creek. Although several small drainages enter this segment, none are regulated by the 1991 City Wetland and Stream Regulatory Chapter. This drainage appears to originate from surface runoff and untreated storm runoff.

FEMA: Portions of this segment are indicated on the FEMA floodplain and floodway maps. Mapping indicates 6.4 acres occurs within the 100 year floodplain and 2.9 acres are in the floodway. These areas are located in the ravine bottoms.

Slopes: Ravine sides along most of the segment have slopes ranging from 20% to 100%. Slopes are not mapped on the Whatcom County Geohazard Maps as "Landslide Hazard Areas".

Potential PHS/TSE Species: This segment includes potential habitat for federally listed bull trout and federal candidate species Puget Sound coho salmon. This segment includes the following PHS habitat: instream, riparian, wetland, urban natural open space.

X.3.4 Ecological Functions

Water Quality: This segment has been listed by the WA Dept. of Ecology as a Category 5 "Polluted Water" for Fecal coliform, Category 4 "Impaired Water" for a fish passage

impairment (Fairhaven Parkway culvert) and Category 2 “Water of Concern” for Diazinon and Chlorothalonil (limited excursions from water quality standards in 2001).

Vegetation: The existing forested buffer averages about 150 feet on both side of the channel through this reach and is restricted primarily to the side slopes and bottom of the ravine. Noxious weeds have been identified within this segment: English ivy, bindweed, holly and Himalayan blackberry. Himalayan blackberry is the dominant vegetation cover in several places, particularly immediately east of the Donovan/10th Street crossing. Purple loosestrife is located upstream, outside the SMA, in the vicinity of Happy Valley Park and 24th Street. This invasive species could spread downstream, particularly in disturbed wet habitats.

Wildlife: Little data is available on specific wildlife use within this segment outside of anadromous fish. Anadromous fish documented to utilize Padden Creek include: coho, chinook and chum salmon, sea-run cutthroat and steelhead. Bull trout presence is presumed but not documented. Grey squirrels are well established in this corridor. This species is not native and is invasive.

Habitat: NES field review observed little large woody debris within the channel, a silty substrate in the lower reaches with mixed gravels behind the tennis club. Surrounding riparian vegetation is a young mixed deciduous forest dominated by red alder. The understory ranges from sparse to well developed with willow and salmonberry. The Greenways trail is located close to the stream bank and vegetation is trampled in a number of areas. The channel braids at the bend behind the tennis club and the ravine bottom is vegetated. The forested riparian area provides a travel corridor for wildlife species connecting the marine system with other terrestrial habitats.

In stream habitat provides moderate to high function. No data on large woody debris was located, but NES field review noted moderate levels on instream woody debris. Future contributions from the terrestrial areas appear to be moderately good, however most the trees are of narrow range of age classes and species and may not provide a good long term supply of material to the stream. This segment has a large amount of undercutting on the ravine banks, resulting in undercut banks for fish refuge. A sample analysis of stream substrate and aquatic invertebrates was conducted by DOE in this segment. The substrate is as follows: 4% sand, 7% fine gravel, 26% coarse gravel, 62% cobble, 2% boulder. The aquatic macroinvertebrate inventory indicated moderate diversity. This analysis appears to be representative of most areas in drainage, except at the mouth where silt levels appear high.

X.3.5 Opportunities

Preservation

- Protect existing forested and shrub vegetation within the ravine of this segment area.

Enhancement or Restoration Opportunities

- Retaining and enhancing native forest and shrub cover will assist in maintaining instream water temperatures, proper oxygen levels.
- Educational signage may assist in retaining riparian vegetation adjacent to the trail.
- The removal of invasive and noxious weeds (particularly ivy and Himalayan blackberry) is highly recommended to maintain species and structural integrity and maintain supporting functions such as instream water quality, temperature control and general biotic support.
- Removal culvert under Fairhaven Parkway and vicinity or changed channel route to provide more day-lighted areas to improve fish passage.