

WATER QUALITY INDICATORS FOR PEABODY CREEK

This report card format is intended to give an overview of the health and status of Peabody Creek, based primarily on information collected by volunteer monitors working with WSU Cooperative Extension and Clallam County Department of Community Development, with information from other sources in italics. Volunteers monitored five reaches in the lower one-and-a-half miles of Peabody Creek (see previous part of this report for locations), using protocols identified in the 8 Streams Quality Assurance and Monitoring Plan (1997), approved by the Washington State Department of Ecology. Data here has been averaged for all monitored reaches over the eight quarterly monitoring sessions between July 1997 and April 1999. (Raw data from individual monitoring sessions is available as a separate document, "8 Streams Project Stream Monitoring Data, Summer 1997-Spring 1999," available from the Streamkeepers office.) For certain parameters, a score is assigned in accordance with values suggested by the Global Rivers Environmental Education Network (Mitchell and Stapp 1996, *Field Manual for Water Quality Monitoring*), using a four-point poor-to-excellent scale. (These values are described in the "Water Quality Rating Criteria" section preceding the individual stream reports.)

I. MEASURES OF PHYSICAL INTEGRITY

PARAMETER	STANDARD FOR A HEALTHY STREAM <i>(Sources: Streamkeeper's Field Guide, Field Manual For Water Quality Monitoring, Stream Scene, Washington Administrative Code, & Joel Freudenthal, Clallam County Planning Biologist)</i>	PEABODY CREEK <i>(Information in italics was compiled from non-volunteer sources identified in Part IV below.)</i>
Instream habitat	Abundant woody and organic debris, shade, gravel bars, cover, riffles, pools. Natural meanders, not channelized.	<i>Little debris; limited spawning gravel; pool to riffle ratio averages 1:9; good shade. Good shade, some debris. General lack of pools. Channelized above and through Reach 1.</i> SCORE: 2 (FAIR)
Stream bank vegetation	Abundant vegetation (preferably native), root wads, logs	<i>Mostly native vegetation with some invasive species; vegetation removed at trailer park; few logs or root wads. A few logs and root wads.</i> SCORE: 2 (FAIR)
Tree canopy	Many layers and levels, abundant canopy cover (trees shading the stream) with conifers present	<i>Good canopy, but mostly deciduous with few conifers. Canopy removed at trailer park. Trees have been cut down at Reach 3.</i> SCORE: 2 (FAIR)
Stream banks	Mostly stable, as indicated by a diverse mix of mature riparian vegetation. Absence of runoff gullies & devegetated or collapsing banks.	<i>High flows are downcutting channels, but channels are mostly stable; some erosion in altered places, such as below 5th Street culvert and at Trailer Park.</i> SCORE: 3- (GOOD TO FAIR)
Stream bottom (substrate)	In moderate-gradient reaches, a high percentage of gravel (= rock sizes between 0.1 and 2 inches) and cobble (= rock sizes between 2 and 10 inches); little mud or silt	<i>Dominated by bedrock, boulders, and cobble; mobile gravel</i> Some gravel
Stream flow	Adequate summer flow and no human-caused fish blockages	<i>Fluctuating stream flow with impact from stormwater inputs. Some storm surge but fairly consistent.</i>
Human alterations to channel	Few objects or structures other than detention ponds. Absence of culverts, channelizing, rip-rap, other protection	<i>Some channelization; rip-rap; culvert blockages include about 1000 ft. at the mouth; loss of estuary; clearing of vegetation to the edge; in trailer park stormwater runoff; woody debris removed; garbage dumping; transient camps and play areas; urbanization. Large culvert and pool at Park St.</i>

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II. MEASURES OF BIOLOGICAL INTEGRITY

PARAMETER	STANDARD FOR A HEALTHY STREAM	PEABODY CREEK
Benthic macro-invertebrates (Underwater invertebrates visible to the naked eye, such as insects, worms, spiders, mollusks, etc.)	High number of macroinvertebrates of different types (taxa); variety of mayfly (taxonomic order Ephemeroptera), caddisfly (Trichoptera), and especially stonefly (Plecoptera) species. Collectively, these three crucial orders of underwater insects are known as EPT. If sampling has been done in accordance with the 10-metric genus-level Benthic Index of Biological Integrity (B-IBI; see "Water Quality Rating Criteria" for a description), scores are as follows: 46-50=Excellent; 38-44=Good; 28-36=Fair; 18-26=Poor; 10-16=Very Poor.	10/97: <i>Reach 1:</i> 26 individuals, 4 taxa, including 0E, 0P, 1T. <i>Reach 2:</i> 4 individuals, 4 taxa, including 1E, 1P, 0T. <i>Reach 3:</i> 12 individuals, 6 taxa, including 1E, 2P, 0T. 11/97: <i>Reach 4:</i> "several hundred" individuals from 8 taxa, including "100's" of E (3taxa), 4P (1 taxon), 4T (2 taxa) 4/98: <i>Reach 4:</i> 72 individuals, 11 taxa, including 58E (3 taxa), 5P (2 taxa), 4T (2 taxa). <i>Reach 5:</i> 141 individuals, 16 taxa, including 82E (4 taxa), 32P (2 taxa), 17T (4 taxa). 10/98: 10-metric BIBI attempted for each reach sampled. <i>Reach 1:</i> 1782 individuals, ADJUSTED SCORE 16: VERY POOR. <i>Reach 2</i> 631 individuals, ADJUSTED SCORE 22: POOR. <i>Reach 3</i> 772 individuals, ADJUSTED SCORE 10: VERY POOR. <i>Reach 5:</i> 53 individuals, ADJUSTED SCORE 34: FAIR, even though this is too few individuals to generate a truly valid BIBI. 20 taxa, including 5E (3 taxa), 25P (7 taxa), 6T (3 taxa).
Fish	Historical species still present in healthy numbers	<i>Sea-run and resident cutthroat trout; unconfirmed reports of Coho salmon. Sightings of salmonids to 8"; reports of cutthroat trout caught up to 12".</i>
Wildlife	Diversity of species, habitat corridor	<i>Diversity of small mammals, birds, and amphibians; corridor disrupted by culvert crossings.</i>

III. MEASURES OF CHEMICAL INTEGRITY

(Unless otherwise noted, standards are taken from Washington Administrative Code 173-201A, standards for Class AA waters. Scores are assigned for most parameters, using a four-point poor-to-excellent scale given by Mitchell and Stapp (see "Water Quality Rating Criteria" section preceding individual stream reports), and comparing the values in that scale to the high, low, and median values for the parameter over all quarterly samplings for all reaches.

PARAMETER	STANDARD FOR A HEALTHY STREAM	PEABODY CREEK
		<i>Highs, lows, and medians are for quarterly samplings between 7/97 & 4/99--not to be confused with absolute highs, lows, or medians.</i>
Dissolved oxygen (DO)	>9.5 mg/L; >90% DO saturation (Mitchell and Stapp, 1996)	High: Concentrations 13 mg/L; Saturation 100% Low: Concentrations 7 mg/L; Saturation 58% Median: Concentration 9.6 mg/L; Saturation 86% SCORE: 3 (GOOD)
pH	6.5 - 8.5	High: 8.9 Low: 6.9 Median: 7.5 Geo Mean: 7.6 SCORE: 1-4 (POOR TO EXCELLENT)
Temperature	<16°C	High: 13.5 C Low: 4.3 C Median: 8.5 C
Nitrates	No government standard established for surface waters; Mitchell and Stapp suggest a scoring scale—see "Water Quality Rating Criteria" section for details.	High 10.70 mg/L Low: 0.00 mg/L Median: 1.38 mg/L SCORE: 3 (GOOD)
Turbidity	Varies greatly under natural conditions. Nature Mapping Project sets standard of <5 NTU for Class AA waters. Impairments of fish health documented at >25 NTU.	2.0 - 3.5 NTU SCORE: 4 (EXCELLENT)
Fecal coliform concentration	<50 colonies per 100 mL	137 colonies per 100 mL SCORE: 2 (FAIR)
Conductivity	Streamkeepers Field Guide sets standard of 150-500 micromhos/cm	266 micromhos/cm

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IV. PROBLEMS NOTED BY NATURAL RESOURCE PROFESSIONALS

- Fish passage problems throughout system with long culvert at mouth.
- Major peak flow problems from stormwater tie-ins to Creek through the City; combined sewage overflow; creek has downcut 3 to 4 feet in places due to stormwater and flooding.
- Garbage dumping.
- Residential cleaning of creek and removal of vegetation from slopes.
- Large bicycle play area at site #3.
- Channel is scoured to bedrock from Park St. to 5th St.; no gravel/habitat - lack of pools, wood, spawning habitat.
- Degraded water quality
- Urbanization and loss of estuary

V. RECENT PROJECTS

- Repair of septic system problem at the RV Park.
- Trail and bridge construction from Peabody to 5th Street.
- Proposed project to purchase RV Park for public access and recreation.

VI. PROFESSIONAL DATA SOURCES

- Water quality monitoring for Port Angeles watershed plan by Clallam County Dept. of Community Development.
- Ongoing flow tote - volume and time at 2nd and Lincoln St. by City of Port Angeles.
- Fecal coliform monitoring, City of Port Angeles, 1993.
- Fecal, conventional settled solids, and total metal measured, 1995 (one-time sample).
- Stream Team volunteers monitoring through the Eight Streams Project with sites at upper end of culvert, Peabody St.; 5th St.; 8th St.; and Park St., 1997 to present.