

SECTION 1: INTRODUCTION

1.1 OVERVIEW

The purpose of this document is to provide the Chehalis Basin Partnership (CBP) with an assessment of the Chehalis Basin Watershed. Through this process, gaps in available data were identified and recommendations for a second level of analysis were developed. The first section of this document provides an overview of the process leading to the Chehalis Watershed Assessment and a description of the basin. Section 2 provides a technical summary of the analyses (geology and hydrology, water rights and use, water quality, and fisheries). Section 3 provides a detailed analysis of the five subbasins selected for more detailed analysis (Chehalis River headwaters (#1), Lower Newaukum River (#7), Cloquallum Creek (#14), Mainstem Chehalis- Lower Reach-1 (#19), and Humptulips River (#25)). These subbasins were selected to represent the diversity within the Chehalis Basin. In addition to the detailed analysis, some conclusions have been formulated. Section 4 summarizes results, limitations, and datagaps from the Level 1 Assessment and provides recommendations for the Level 2 Assessment. In addition to these main sections of the document, technical appendices have been provided for the four assessment topics (Geology and Hydrology, Water Rights and Water Use, Water Quality, and Fisheries).

1.1.1 ESHB 2514/ESHB 2496

The 1998 Washington State legislative session produced a number of bills aimed at salmon recovery including ESHB 2514 and ESHB 2496. The Watershed Management Act (ESHB 2514) was established to address the diminishing water availability and quality, and the loss of critical habitat for fish and wildlife in the state. The bill aims to develop watershed planning and management that will support economic growth and promote water availability and quality for the state. The bill also provides a framework to collaboratively solve water-related issues and allows local citizens and governments to join together with tribes and state agencies to develop watershed management plans for entire watersheds. To complete the goals outlined in ESHB 2514, a Watershed Assessment needs to be completed for each Water Resource Inventory Area (WRIA) to evaluate water supply and use, and recommend strategies for satisfying water supply needs, meeting minimum in-stream flows, and improving water quality.

The 1998 state legislative session also produced ESHB 2496 the Salmon Recovery Planning Act. ESHB 2496 established, in part, a statewide process to identify habitat factors limiting salmon production in the state. This process requires assemble of a technical advisory group of basin experts, and utilizes a set of habitat criteria that will be applied statewide to produce what has been termed a Limiting Factor Analysis for each river. (It is important to note that this does not constitute a complete limiting factors analysis since it does not address non-habitat related parameters such as harvest rates, influence of hatchery programs and impacts of hydropower.)

1.1.2 STAGE 1 – APPROACH TO LEVEL 1 ASSESSMENT

The first step for completing the watershed plan was to develop an approach for the Level 1 Assessment. For the Chehalis Basin, a technical workshop was held in late October 1999. The goal of this workshop was to solicit ideas and agreement from professionals working in the Chehalis Basin about the specific direction that the Level 1 Assessment should take in the areas of water quantity, water quality, and fish habitat. In addition to getting input and agreement on specific data and tools to use in the analysis, the workshop also provided a means for gaining early participation and knowledge of the project by local professionals. Results and ideas from the workshop were used to formulate a specific approach to the watershed assessment that was then approved by the CBP. Some of the critical decisions made in development of the Level 1 approach were to; not assess marine or groundwater quality, and to avoid duplication of efforts with 2496 planning efforts.

Marine water quality was not addressed at this level primarily because it would not greatly benefit the focus of the planning effort, which is watershed based and water quantity driven. Groundwater quality was not specifically addressed due to the paucity of data for most of the basin.

To avoid duplication of fishery assessment efforts, close coordination was maintained with Conservation Commission staff including sharing resources and reviewing draft reports. Contract deliverables made some areas of overlap necessary (such as fish stock status summaries), although in other cases, responsibility was taken by the ESHB 2496 team (such as developing in-depth discussions of fish habitat conditions in the Grays Harbor estuary). Conversely, the ESHB 2496 team expects to utilize much of this assessment (such as hydrologic analyses and water quality summaries) for their work.

1.2 WATERSHED DESCRIPTION

The following description is largely adapted from the *Chehalis River Basin Action Plan* (Chehalis River Council, 1992) with additional information incorporated from this Level 1 Assessment effort.

With the exception of the Columbia River Basin, the Chehalis Basin is the largest river basin in the state of Washington. The basin is bound on the west by the Pacific Ocean, on the east by the Deschutes River Basin, on the north by the Olympic Mountains, and on the south by the Willapa Hills and Cowlitz River Basin. Elevations vary from sea level at Grays Harbor, to 5,054 foot Capitol Peak in the Olympic National Forest. The basin encompasses 2,520 square miles and drains 2,660 square miles. The Chehalis River system flows through three distinct ecoregions; Cascade (including the Olympic Mountains), Puget Lowland, and Coast Range before emptying into Grays Harbor near Aberdeen (Omernik, 1987).

The geology and associated hydrogeologic conditions of the Chehalis Basin vary widely and reflect the complex geologic history of the area. The basic geology of the basin can be summarized as older bedrock of both sedimentary and volcanic origin exposed on hillslopes and

ridges, with more recent depositions of glacial and alluvial sediments overlying these rock units in the valley bottoms and lowland prairies. Groundwater in substantial quantities is present in the glacial deposits as well as alluvial sediments in the major river valleys. Five major soil groups are found in the Chehalis Basin (Table 1.2-1). These soil groups exemplify the diverse landscape, precipitation patterns, and vegetation communities across the basin.

**Table 1.2-1
Major soil groups of the Chehalis Basin.**

Soil Group	% Land	Location	Geographic Description	Dominant Vegetative Species
Group A	6	southern Olympic slope in the northern basin tip	steep & very steep well-drained soils	true fir, mountain hemlock
Group B	1	coast from Grayland - Westport & north beach area - Copalis	deep, sandy, poorly-drained deposits; tidal estuaries	shore pine; Sitka spruce, western redcedar, western hemlock adjacent to estuaries
Group C	27	eastern third of the basin, Chehalis-Centralia urban area	steep glacial plains & rolling grassy prairie terrain	Douglas fir & Oregon white oak interspersed with prairie areas; Scotch broom increasing
Group D	19	Chehalis floodplain & major tributaries	level & gently sloping alluvial soils	western redcedar, red alder, black cottonwood & willow on poorly drained floodplain fringes, cropland, & pastures; some Douglas fir on better drained soils
Group E	47	western two thirds of the basin between Thurston County line & coast	Forested foothills & steep slopes	Sitka spruce-western hemlock-western redcedar along coast; Douglas fir-western hemlock in eastern part of basin

Mild summer and winter temperatures characterize the Chehalis Basin. Average temperatures range from 38° to 40° F during January, and from 59° to 64° F during July. Temperature variations prevent snow from accumulating over any prolonged period of time, except in mountainous portions. The frost-free season varies from 163 to over 190 days except for mountainous localities. Wet winters and dry summers also characterize the basin. Annual precipitation varies from a minimum of 40 inches in the central portions of the basin (Chehalis/Centralia), to a high of 220 inches in the headwaters of the Wynoochee and Humptulips Rivers (Olympic Mountains). Precipitation usually falls as rain with snowfall in the higher elevations of the Olympics. River discharge peaks between December and March. Approximate average annual discharge of the entire basin is 11,208 cubic feet/second (cfs). Delayed runoff from snow melt is relatively minor, and likely restricted to the Wynoochee, Satsop, and Humptulips Rivers.

The basin encompasses large portions of Grays Harbor, Lewis, and Thurston counties, and lesser parts of Mason, Pacific, Cowlitz, Wahkiakum, and Jefferson counties. The mainstem and South Fork Chehalis drain uplands south and west of Chehalis. Two major tributaries in mid-basin, the Newaukum and Skookumchuck Rivers, have their headwaters in the foothills of the Cascade Range. Another mid-basin tributary, the Black River, originates in wetlands near Black Lake. The largest tributaries, the Satsop and Wynoochee Rivers, arise in southern extensions of the Olympic Mountains and join the mainstem shortly before its terminus at Grays Harbor. The Humptulips River, as well as the Hoquiam and Wishkah Rivers, also have their headwaters in the southern Olympic Mountains and flow into Grays Harbor; the Humptulips into North Bay, the Hoquiam into the inner estuary of Grays Harbor, and the Wishkah into the Chehalis River near the mouth. The Johns and Elk Rivers flow into the South Bay of Grays Harbor. The terminus of all rivers is where they enter another river or Grays Harbor (saltwater influence). For purposes of this assessment the Chehalis Basin has been divided into 30 subbasins for analysis. Map 1 depicts these subbasin boundaries for the basin. An additional subbasin (Grays Harbor) was added for the water right and water use assessment. These subbasins were largely determined by the location of in-stream flow stations.

The majority of the basin (87%) is upland mixed species forestland. Map 2 depicts general land use throughout the basin. Most forested acres are corporate-owned with the remainder being government owned. However, the Capitol State Forest, and portions of Mt. Baker-Snoqualmie National Forest and Olympic National Forest are located in the basin (DNR, 1990). Another 7% of the land base is agriculture (DNR, 1990). Commercial dairy, livestock and crop farming operations are predominantly located in the low-lying valleys adjacent to the Chehalis River and its major tributaries, including the South Fork Chehalis, Newaukum, Skookumchuck, Black, Satsop and Wynoochee Rivers, and Scatter Creek. Principal crops include pasture, hay, and silage, with some vegetables and small grains. Berries are grown in the Chehalis-Centralia area. Several Christmas tree farms are located along the Skookumchuck River and in the Chehalis-Centralia area. Several private aquaculture facilities are located in the Grand Mound/Rochester area. The remaining land base is spread among rangelands, lakes and reservoirs, urban and rural residential, commercial, industrial, and other minor categories (DNR, 1990). Industrial development is mostly limited to the Chehalis/Centralia and Aberdeen/Hoquiam areas and to the coal mine/power plant site south of Bucoda, with isolated industrial facilities located throughout the basin. The principal industrial use of water is in the manufacturing of wood, pulp and paper products.

Only 1.5% of the Chehalis Basin's land-base is urbanized, but as population continues to grow, more and more land is being converted to residential use. The basin's location halfway between Puget Sound and the Columbia River, the proximity of major transportation routes, a rich natural resource base, and the aesthetic beauty of the area are factors which contribute to its rapidly expanding population base.

The major population centers are Chehalis (~6,000) and Centralia (~12,000) in the upper basin, and Aberdeen (~19,000) and Hoquiam (~9,700) at the mouth of the Chehalis. However, the portions of Thurston County in the upper basin are undergoing rapid development along the I-5 corridor and around Black Lake. The Chehalis Indian Reservation is also located near the mouth of the Black River. The total population of the basin is approximately 130,000 people (Bureau of

Census, 1990). The four major population centers of the basin, Chehalis, Centralia, Aberdeen, and Hoquiam, depend on surface waters for a portion of their municipal and industrial supplies.

At the present time, there are few dams or diversion structures on the rivers of the basin. The Hoquiam and Wishkah Rivers have diversion structures to supply municipal and industrial water to the Hoquiam/Aberdeen area. These structures allow Hoquiam to remove 2.5 cfs from the Hoquiam River and Aberdeen to divert 10 cfs from the Wishkah River. Beneficial uses of the Wynoochee Dam on the Wynoochee River include fish and wildlife habitat, irrigation, recreation, flood control, and municipal and industrial water supply for the City of Aberdeen. The reservoir has a maximum retention capacity of 70,000 acre-feet. The Bloody Run Dam on the Skookumchuck River supplies up to 54 cfs for use in the Centralia Steam Electric plant. A dam on the North Fork of the Newaukum River contributes municipal and industrial water (up to 7 cfs) to the cities of Chehalis and Centralia. Other small dams scattered throughout the basin contribute to rural water supplies (USGS, 1992).

The lakes and streams within the Chehalis Basin provide vital habitat for numerous species of fish. Streams range in character from cold, swift-flowing, high elevation tributaries, to warmer, meandering, lowland valley rivers. There are 180 lakes, ponds, and reservoirs in the basin. Most of these are lowland waters supporting varied fish and wildlife species. The existing anadromous fish resources of the basin are of regional and national significance to sport, tribal, and, commercial fishing. The Basin is also important for a wide variety of wildlife and provides migrating and wintering area for waterfowl in the Pacific Flyway.