

SECTION 1. BACKGROUND

1.1 Project Authority. This report is prepared under the authority of Section 1135 of the Water Resources Development Act of 1986 (P.L. 99-662), as amended. Section 1135, P.L. 99-662, authorizes the Secretary of the Army to modify the structure and operation of water resource projects to improve the quality of the environment in the public interest.

1.2 Study Purpose and Scope. This report is a final response to the Section 1135 study authority and addresses the need for and desirability of undertaking a plan for habitat restoration within the Columbia Slough watershed. The proposed plan includes actions along 7 miles of Columbia Slough, its southern arms (Buffalo Slough and Whitaker Slough), and the surrounding riparian area. Analyses presented in this report were primarily conducted in the Columbia Slough General Investigation study, which was terminated on May 19, 2000. The General Investigation study was sponsored by the City of Portland, Bureau of Environmental Services (BES), with additional contributions by the Multnomah County Drainage District No. 1 (MCDD).

1.3 Project History. Columbia Slough represents a portion of the historic flood plain of the Columbia River extending about 20 miles eastward from the Willamette River to the Sandy River (Figure 1) In its natural state, the Columbia River seasonally inundated this area. A network of lakes, waterways, and wetlands spread over the entire area. It was thickly forested along shorelines and low areas, and was also made up of wetland prairie and oak savannah, bordered by riparian forest. It supported vast populations of waterfowl and other birds, elk, deer, river otter, and other smaller mammals. In the 150 years since the first settlers began to adapt the flood plain to their own uses, the area has been transformed from a natural system of lakes, sloughs, and wetlands into a highly managed water system of levees and pumps to provide drainage and flood damage reduction. Forested habitat has declined from about 3,600 acres in 1935-1936 to about 1,400 acres in 1991.

To promote floodplain use, local property owners established four drainage districts in 1917 and constructed levees to protect their lands from high water in the Columbia River. This effectively cut off the entire Columbia Slough from any Columbia River water supply. However, within a few years, the Peninsula Canal was dug by private interests to reconnect the lower slough to the Columbia River for flushing and navigation purposes.

The first levees were constructed by the drainage districts primarily from 1919 until 1921. The Corps of Engineers reconstructed 53,000 feet and revetted 4,000 feet of levees along the Columbia River in these areas (now incorporated as Peninsula Drainage Districts No. 1 and No. 2, Multnomah County Drainage District No. 1 (MCDD #1), and Sandy Drainage Improvement District) between 1939 and 1941. In 1949, the Corps improved MCDD #1, pump station No. 1 (near Peninsula Canal) by reconstructing the outlet structure, upgrading the pumps and adding a new tide box. The Corps restored the levee and the main pumping plant following the railroad embankment failure caused by

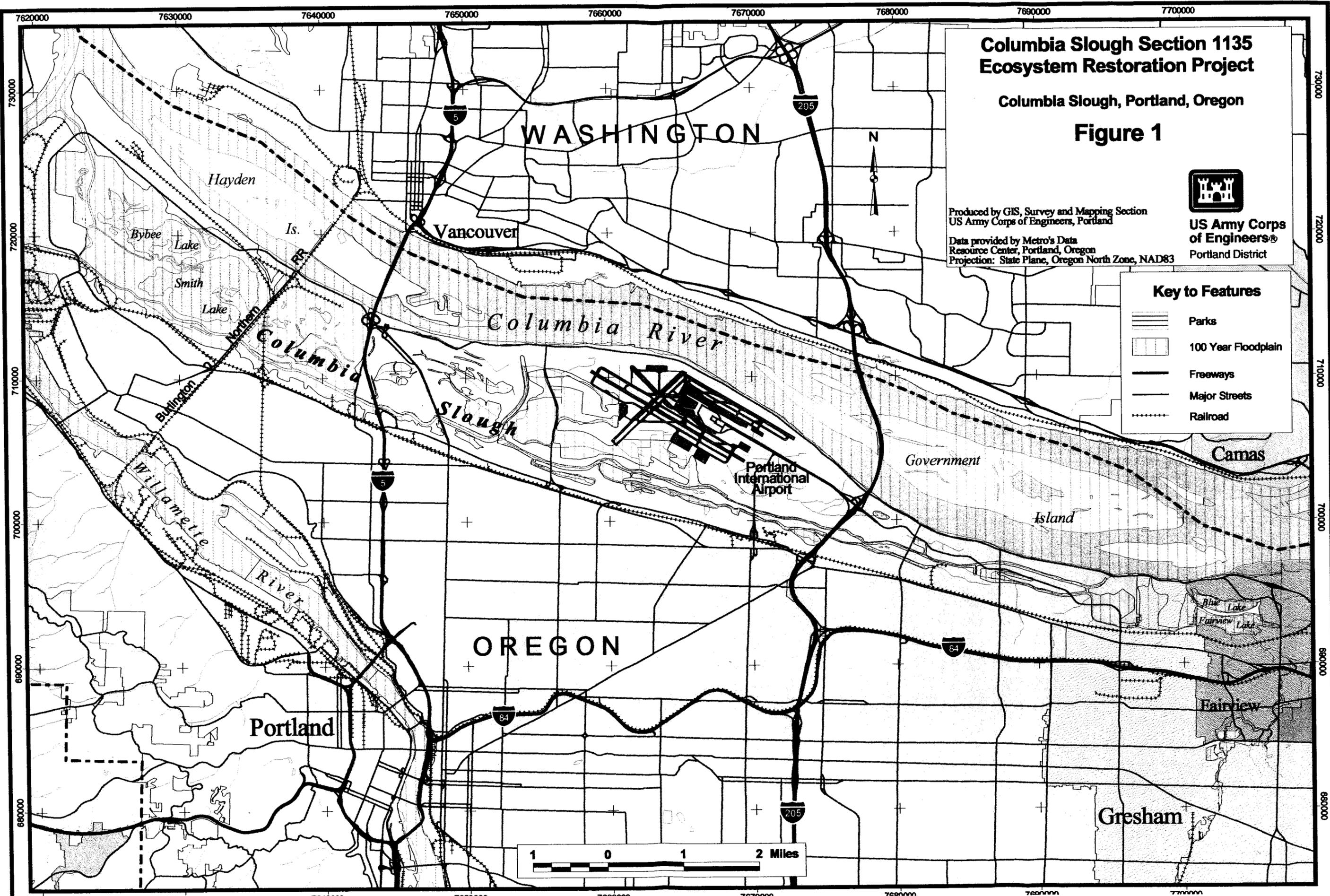
the 1948 flood. The Corps' levee improvements also included the blockage of the locally constructed Peninsula Canal. Additional Corps work was performed between 1956 and 1961, raising the effective height of the levee by about one foot and adding a second pump station (MCDD #1, pump station #4) near 174th Avenue to evacuate flood waters from the upper end of the slough. At approximately the same time, local interests constructed a cross-levee at 142nd Avenue and added other interior drainage improvements.

The lower Columbia Slough (lower 8 miles) is still heavily influenced by backwater from the Willamette River. Upstream of the Peninsula Canal and MCDD pump station No. 1, Columbia Slough is a heavily managed water system, with no connection to the Columbia River except by pumping from the slough at MCDD #1 pump stations No. 1 and No. 4 (west of NE 185th). The area is heavily industrialized, with the last remaining agricultural areas in the upper slough converting to commercial properties. There are a few areas designated as Conservation and Preservation zones, together with some mitigation wetlands in the upper slough. The entire watershed receives stormwater from urban areas south of Columbia Boulevard.

1.4 Resource Problems. This plan is one aspect of an overall Columbia Slough Revitalization Program being conducted by the City of Portland. This program includes combined sewer overflow (CSO) removal, assessment of health risks from sediment contamination, and a water quality program which addresses stormwater quality issues and eutrophication (which the Corps' program primarily addresses through flow management and habitat restoration).

The Columbia Slough is a designated water quality limited waterbody under the Federal Clean Water Act (CWA) and Oregon Revised Statutes (ORS 468.730). Over 100 stormwater outfalls (many of them municipal) discharge into the Columbia Slough. In particular, the CWA prohibits the unpermitted discharges of stormwater into jurisdictional waters, such as the Columbia Slough. Stormwater and groundwater, contaminated by old septic systems in the Mid-County area, are the principal flow inputs into the system. The majority of the watershed is designated as the Columbia Corridor, and has extensive industrial land-use. Industrial developments front on the both sides of the Columbia Slough, with both permitted and illicit industrial discharges entering the Slough. As a result of the above activities and past management practices, water quality of the Columbia Slough is impacted by municipal stormwater and industrial discharges, combined sewer overflows (CSOs), and contaminated groundwater.

A consent decree, resulting from a 1986 citizen lawsuit, required the Oregon Department of Environmental Quality (ODEQ) to develop Total Maximum Daily Pollutant Loads (TMDLs) for the Columbia Slough. In 1992, the City and ODEQ signed a Memorandum of Agreement (MOA), #27752, which committed the City to a detailed water body assessment of the Slough and to City compliance with TMDLs, established from this assessment, within 10 years.



**Columbia Slough Section 1135
Ecosystem Restoration Project**

Columbia Slough, Portland, Oregon

Figure 1



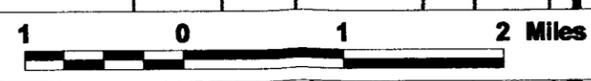
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Produced by GIS, Survey and Mapping Section
US Army Corps of Engineers, Portland

Data provided by Metro's Data
Resource Center, Portland, Oregon
Projection: State Plane, Oregon North Zone, NAD83

Key to Features

-  Parks
-  100 Year Floodplain
-  Freeways
-  Major Streets
-  Railroad



The water body assessment was completed in November 1995. The assessment provided the information needed to develop the TMDLs for the Columbia Slough. In addition, a consent order was signed between the City and ODEQ (ESR-NWR-93-09) to assess the nature and extent of sediment contamination in the Slough, which has resulted in a screening level risk assessment. The waterbody assessment identified stormwater as a potential source of metals discharge into the Slough. The screening level risk assessment identified some metals and organics as a risk to humans and the environment.

In June 1997, BES initiated an independent scientific peer review of the Columbia Slough Sediment Project. While toxic contamination poses increased human health cancer and non-cancer risks, the reviewers felt strongly that eutrophication and habitat destruction were more severe and pervasive threats to the fundamental structure and function of the Slough ecosystem than toxic contamination. If all threats from toxic contamination were eliminated, the Slough would still be a highly degraded, highly altered ecosystem that lacked many of the desirable qualities of a natural system. In contrast, addressing some of the broader threats to the Columbia Slough ecosystem may simultaneously reduce the impact of toxic contamination. Consequently, the study addresses eutrophication and habitat restoration issues.

1.5 Prior Studies and Reports. Many studies have been conducted for the Columbia Slough watershed. This list is a partial compilation, listing major reports relevant to the conclusions in this study. Additional references are listed after the conclusion of this report.

Bureau of Environmental Services (BES). 1988. *Columbia Slough Water Quality Management Plan, Water Quality Report*. City of Portland, Bureau of Environmental Services. September 1988.

Bureau of Environmental Services. 1995. *Environmental Assessment, Columbia Slough Revitalization Program*.

Department of Environmental Quality (DEQ). 1998. *Total Maximum Daily Load (TMDL) for: Chlorophyll a, Dissolved Oxygen, pH, Phosphorus, DDE, DDT, PCBs, Pb, fecal coliform and 2,3,7,8 TCDD in the Columbia Slough*.

U.S. Army Corps of Engineers, Portland District. July 1992 (Revised August 1993). *Columbia Slough Reconnaissance Study*.

1.6 Expected Successes. The project site has a high likelihood of successful restoration for the following reasons: (1) creation of a meandering channel in 1989 using dredged material, similar to that proposed for Columbia Slough, successfully created emergent wetlands in Whitaker Slough east of NE 122nd Avenue; (2) modeling of the modified culverts in Buffalo Slough and Whitaker Slough indicated decreased residence time, reduction in eutrophication, and increased areas for emergent wetland habitat; (3) the constructed wetland at NE 162nd Avenue is adjacent to mitigation wetlands, as well as Preservation and Conservation zones; and (4) the Galitzski Springs restoration site still

has extensive woodlands habitat which can be restored, and it is adjacent to the wetland mitigation sites and Preservation Zones.

Flood levels were modeled to determine the effect of the proposed wetland benches. The wetland benches had no effect on flood levels. Modification of the culverts in Buffalo Slough and Whitaker Slough will reduce water levels. The wetlands at NE 162nd, as well as the riparian restoration area at Galitzski Springs, are off-channel and will result in no increase in flood levels.