FLOOD BOUNDARIES AND WATER-SURFACE PROFILES FOR THE COMPUTED 50-, 100-, AND 500-YEAR FLOODS, CHILDS DRAW AND TRIBUTARY NEAR CHEYENNE, WYOMING, AUGUST 1991

by George F. Ritz

INTRODUCTION

On the evening of August 1, 1985, severe thunderstorms struck the area in and around Cheyenne, Wyoming, with damaging hail, torrential rain, and winds up to 70 miles per hour. Between 6:20 and 9:45 p.m. (Mountain Daylight Time), 6.06 inches of rain and hail were recorded at the National Weather Service office located at the Cheyenne Municipal airport, with the maximum recorded 1-hour precipitation of 3.51 inches between 8 and 9 p.m. (Druse and others, 1986). Substantial flooding occurred in areas of Cheyenne, causing 12 storm-related deaths, numerous injuries, and $61.1 million in damages (Druse and others, 1986). Subsequent concern about flood risks in areas adjacent to Cheyenne prompted Laramie County officials to support studies to delineate potential flood boundaries.

This report delineates the boundaries of the 50-, 100-, and 500-year floods on Childs Draw and an identified tributary (fig. 1). The study was done by the U.S. Geological Survey in cooperation with Laramie County.

DESCRIPTION OF CHILDS DRAW AND TRIBUTARY

Childs Draw is an ephemeral stream that originates about 3 miles west of Interstate Highway 25 and continues generally east-southeast along the northern boundary of the city of Cheyenne (fig. 1). The reach of Childs Draw considered in the analysis extends upstream from the eastern edge of Section 15 (T. 14 N., R. 66 W.) to Hynds Boulevard, while the identified tributary was evaluated from the confluence with the mainstem of Childs Draw upstream to Hynds Boulevard. Total length of channel analyzed was about 9 miles. Channel widths of Childs Draw and the tributary generally range from 60 to 300 feet, with an average of 100 feet, and channel slopes average 0.01 foot per foot. Vegetative growth consists mainly of short grasses, scattered weeds, and shrubs. Numerous side-cuts, headcuts, and wind-scoured "holes" were observed in the mainstem and tributary channels, but no flowing water was encountered during the field work for this study. Historically, much of the reach was used for pasture, but hydrologic conditions and flow paths in Childs Draw and tributary have been altered by urbanization, primarily residential development. Home and road construction have caused increased soil compaction and runoff from impervious surfaces, and have caused re-routing of natural flow paths at foundations, driveways, road embankments, and culverts.

DATA COLLECTION

From July through September of 1989, personnel of the U.S. Geological Survey surveyed the main channel of Childs Draw from Ridge Road to Yellowstone Road (fig. 1). The remainder of the main channel and tributary was surveyed from April through August of 1991. One hundred three channel cross sections, 9 road cross sections, and 10 culverts were surveyed along the main channel of Childs Draw, and 40 channel cross sections, 3 road cross sections, and 5 culverts were surveyed along the tributary. Channel roughness coefficients (Manning's "n") were selected onsite for each cross section at the time of the surveys. Personnel from the Laramie County Engineer's office assisted in the survey of the main channel from Ridge Road to College Drive in July of 1991.

CONVERSION FACTORS AND VERTICAL DATUM

The following factors may be used to convert inch-pound units used in this report to metric (International System) units:

Multiply	By	To obtain
foot	0.3048	meter
mile	1.609	kilometer
square mile	2.590	square kilometer
cubic foot per second	0.02832	cubic meter per second
cubic foot per second per square mile	0.01093	cubic meter per second per square kilometer

Sea Level--In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929--A geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

Figure 2.--Flood boundaries for the 50-, 100-, and 500-year floods, main channel of Childs Draw, eastern edge of study reach to Powderhouse Road.

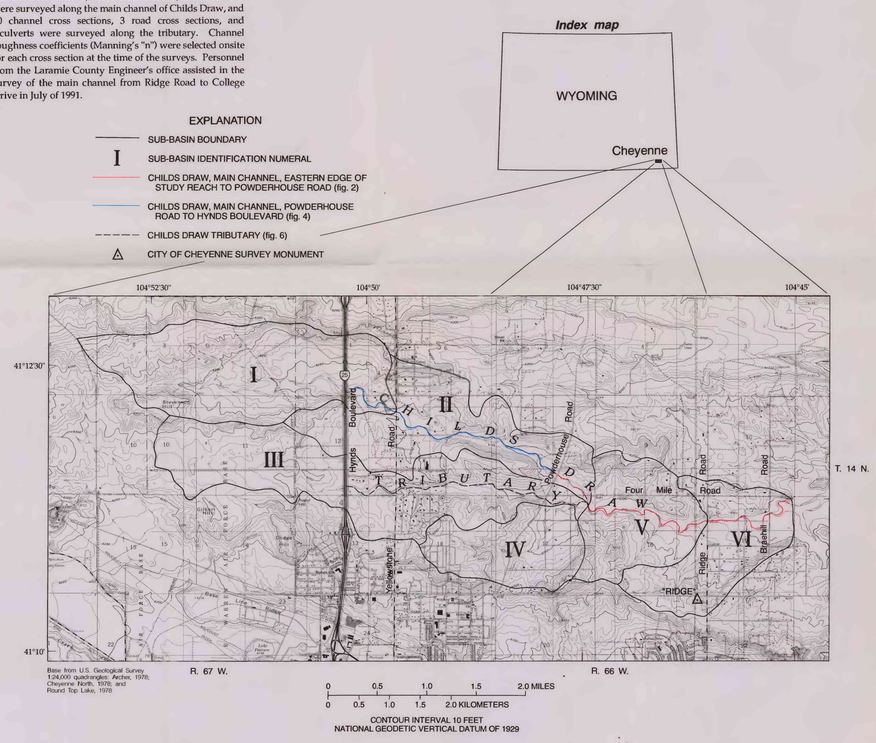

Figure 1.--Location of Childs Draw and tributary, with basin subdivision boundaries used in flood analysis.

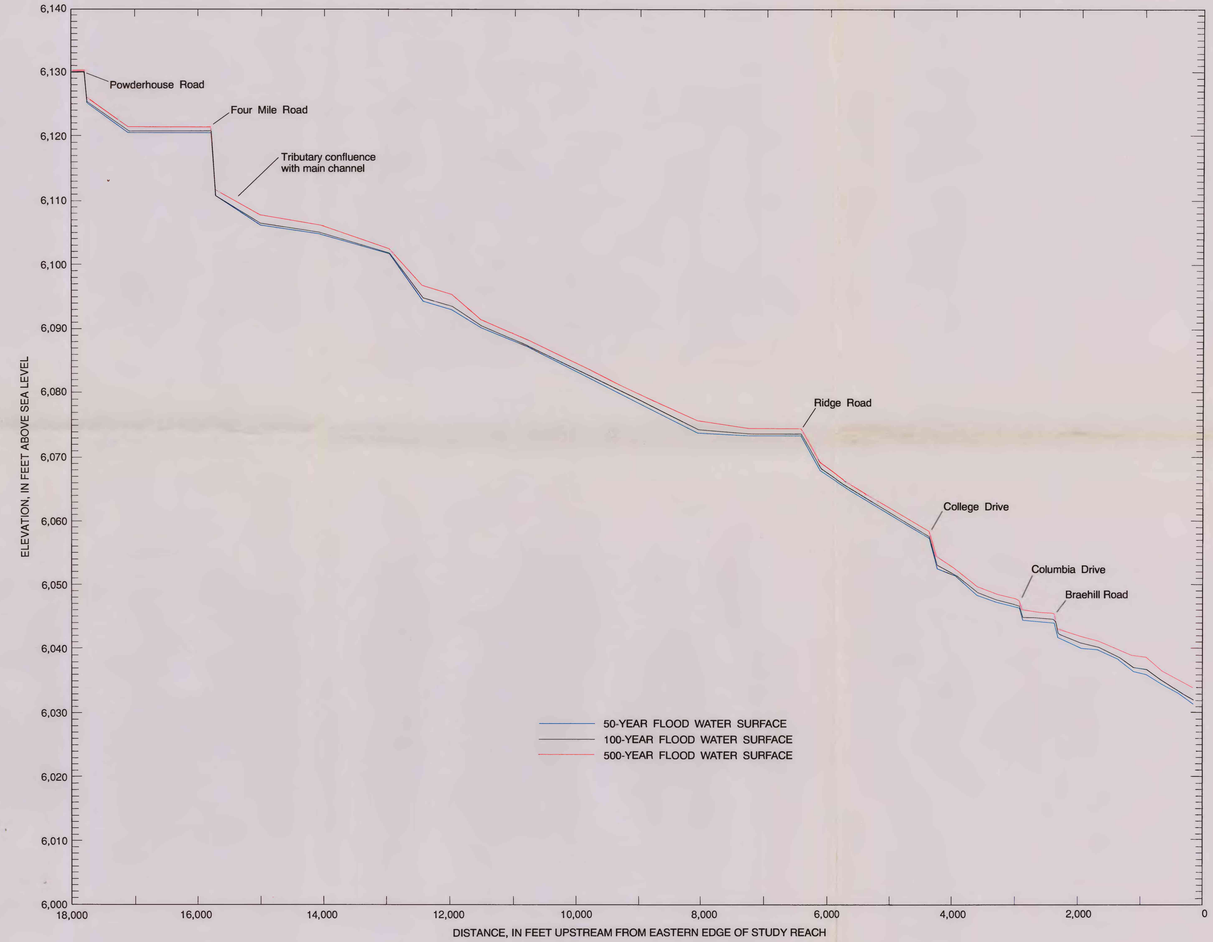

Figure 3.--Water-surface profiles for the 50-, 100-, and 500-year floods, main channel of Childs Draw, eastern edge of study reach to Powderhouse Road.

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