

SPECIAL FLOOD HAZARD INFORMATION
BURNT BRIDGE CREEK
IN THE VICINITY OF VANCOUVER, WASHINGTON

INTRODUCTION

This report describes the overflow characteristics of Burnt Bridge Creek which passes through the northeast corner of Vancouver, Washington, and discharges into Vancouver Lake. Because considerable development in the vicinity of Burnt Bridge Creek is expected in the next 10 years, Clark County Commissioners have requested that this report be made to support local plans to guide future land use in the area. Authorization to prepare this report comes under the Corps of Engineers' program to provide flood-hazard information to local, State, and Federal agencies.

The information presented summarizes past floods in Burnt Bridge Creek and contains flooded-area maps and water-surface profiles indicating the extent of expected future flooding. Both past floods and future floods should be considered when planning for the best use of the flood plains.

STREAM AND DRAINAGE AREA

Burnt Bridge Creek is located in southwestern Washington. A map of the study area is shown in plate 1. Burnt Bridge Creek drains approximately 27 square miles of moderately rolling terrain in an elongated basin where elevations range between 10 and 310 feet, mean sea level. The upper 7 miles of the creek has a relatively straight alinement, whereas the lower 6 miles has many oxbows and sharp bends. Most of the lower reach is confined in a narrow irregular ravine in which the stream gradient averages 25 feet per mile. Upstream the gradient is much flatter, about 7 feet per mile. Small farms occupy the lower end of the drainage while the middle section is more residential and commercial development. At the present time, the upper section is used mostly for agriculture and grazing.

TC
423
.P67
1972L

EO

PAST FLOODS

Flooding in Burnt Bridge Creek corresponds to the local precipitation pattern. Higher flows, which may fluctuate widely, prevail during the winter months, the season of high precipitation. The highest flow observed at the U.S. Geological Survey crest-stage gage in Vancouver, 176 cubic feet per second, occurred 11 December 1955. That flow does not represent a large runoff in terms of cubic feet per second per square mile.

Low-lying areas near the mouth of Burnt Bridge Creek also are in the flood plain of Columbia River. In June 1948, backwater from a major Columbia River flood inundated all of the low land downstream from Alki Road, a distance of 1.5 miles.

The only stream-gage records for Burnt Bridge Creek are those taken at the U.S. Geological Survey crest-stage gage at river mile 2.9. Only the maximum stage for the year has been recorded and published over a 22-year period from February 1949 to date. On Columbia River at Vancouver the Weather Bureau has maintained a staff gage since 1902. Stage and discharge measurements have been recorded at The Dalles, Oregon, since 1878.

FLOOD SITUATION

There are many roadway crossings along Burnt Bridge Creek. Nineteen crossings are earth embankments with culverts. Many of those culverts have inadequate capacity to pass high discharges, which causes ponding upstream and results in localized flooding. Agricultural damages have been the largest, but the potential for flood damages to urbanized development has increased in the last few years.

Since 1965 new development in and near the flood plain has increased the risk of greater flood losses. Besides the encroachment into flood susceptible areas, buildings and surfaced areas have increased the rate of runoff during and following heavy rains. New storm sewers are being constructed which will discharge into the creek and contribute to higher

TC
423
.P67
1972L

flood stages. Future peak flows will be higher than indicated by past records of peak flows.

At the present time, there is no proposed or authorized flood control project on Burnt Bridge Creek. In recent years, however, upstream storage projects in Columbia River Basin have significantly reduced the extent of backwater flooding in the lower reach of the creek.

No flood plain regulations have been adopted for the study reach, but flood plain zoning now is being considered in the county's comprehensive land-use plan.

Flood warning and forecasting services are not issued specifically for Burnt Bridge Creek. General weather forecasts of intense rainfall, however, are disseminated by the National Weather Service Forecast Office in Portland, Oregon.

FUTURE FLOODS

Future floods are classified by size according to how often they are expected to recur. Two specific flood magnitudes that can be expected to occur only infrequently are most significant: (1) Intermediate Regional Flood and (2) Standard Project Flood. Both floods should be considered in planning for development on the flood plains.

The Intermediate Regional Flood represents a major flood, but it is smaller than a Standard Project Flood. It is one that can be expected to recur, on an average, once in 100 years. Such a flood has a 1-percent chance of occurring in any single year.

The Standard Project Flood represents the reasonable upper limit of flooding, although it is possible for even larger floods to occur. The Standard Project Flood is defined as that flood which can be expected from the most severe combination of meteorological and hydrological conditions considered reasonably characteristic of the area. Although it is not practical to assign a frequency to the Standard Project Flood, it would be a very rare event. However, it too could occur in any year.

The following tabulation shows the estimated peak discharges for the Intermediate Regional Flood and Standard Project Flood at selected locations along Burnt Bridge Creek. The discharges have been adjusted upward from the observed peak flow data to reflect an increased rate of runoff as a result of future urban expansion.

<u>Location</u>	<u>Drainage area, square miles</u>	<u>Intermediate Regional Flood discharge, in c.f.s.</u>	<u>Standard Project Flood discharge, in c.f.s.</u>
Mouth	26.8	510	730
River mile 1.8	25.5	490	700
River mile 2.9	21.9	420	600
River mile 8.4	7.9	210	210

Columbia River floods which go overbank at Campbell Lake and back up through Lake River and Vancouver Lake will continue to cause flooding inside the mouth of Burnt Bridge Creek. Those floods, however, will crest at lower elevations than floods of the same relative magnitude (that is, frequency of occurrence) originating in the creek.

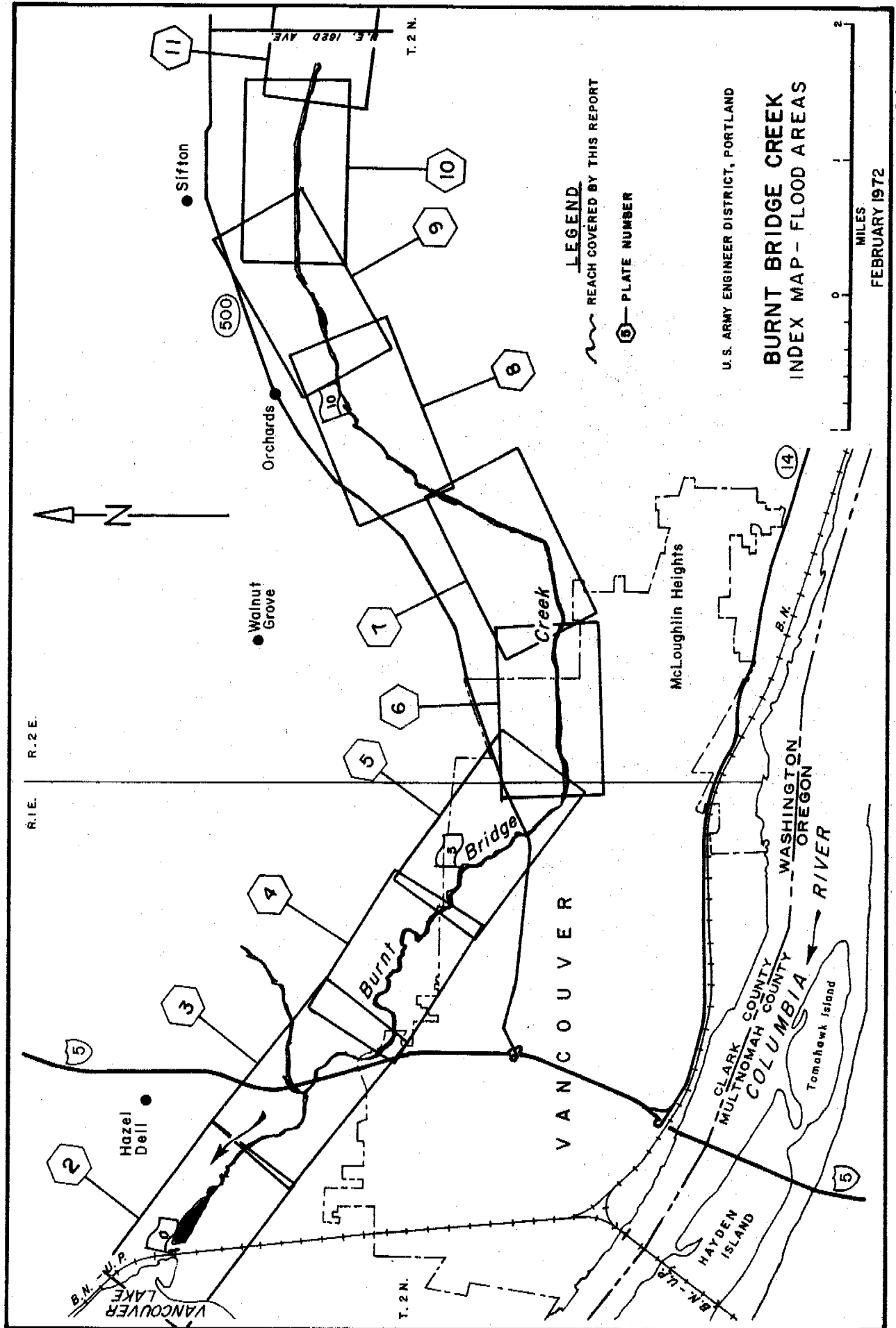
Plates 2-11 are photo maps showing the approximate areas, adjoining Burnt Bridge Creek, which would be inundated by an Intermediate Regional Flood in that stream. Actual limits of the overflow areas may vary somewhat from those shown on the maps because of limited topographical information; also natural and manmade changes in the future may affect the flow pattern of the creek.

During major floods, high stream velocities (up to 8 feet per second) are expected in the main channel of Burnt Bridge Creek. Velocities over the flood plain would vary widely, depending on location, topography, and vegetation, but would be generally less than 3 feet per second. Velocities greater than 3 feet per second, combined with depths of 3 feet or greater, are hazardous.

Floods in Burnt Bridge Creek usually will subside to within the streambanks in 1 or 2 days. However, overbank conditions occasionally

might be prolonged by flow restrictions resulting from a combination of undersized culverts and accumulations of debris in the channel. Where those conditions exist, several days may pass before the water recedes. Major Columbia River floods, which affect the lower creek, have durations of 30 days or more.

Flood heights for both the Intermediate Regional Flood and Standard Project Flood can be obtained for any point along Burnt Bridge Creek, from the water-surface profiles on plates 12 and 13. The profiles were prepared using hydraulic computations including a step-backwater analysis supported by 30 floodway cross sections. Peak flows for both floods were determined using observed stream data adjusted to compensate for expected future development in the watershed. The profiles, however, are based on existing channel conditions. New developments in the flood plain, or resizing of culverts, might significantly change the indicated flood heights.



LEGEND
 REACH COVERED BY THIS REPORT

⑤ — PLATE NUMBER

U.S. ARMY ENGINEER DISTRICT, PORTLAND

**BURNT BRIDGE CREEK
 INDEX MAP - FLOOD AREAS**

MILES
 FEBRUARY 1972