missing map

FLOOD HAZARDS OF PART OF CHELAN COUNTY, WASHINGTON

by

E. R. Artim
Division of Geology and Earth Resources
Olympia, Washington

This report describes the relative hazard of flooding in the Entiat Valley and the Lake Chelan area of Chelan County, Washington. The report is based on field investigations during the spring of 1974 as well as a review of available literature and an air photo geology investigation. Factors taken into consideration included rainfall data, landforms, drainage areas, gradient, and drainage length.

The greatest potential problem of flooding for these areas could be from flash floods in tributary valleys and draws. The definition of flash flood is "a local and sudden storm or torrent of relatively great volume and short duration, overflowing a stream channel in a usually dry valley (as in a semiarid area), carrying an immense load of mud and rock fragments, and generally resulting from a rare and brief, but heavy rainfall over a relatively small area having steep slopes." (Gary, M., et al, 1972, Glossary of Geology, American Geological Institute, Washington, D.C., p. 264). During such a storm, the rainwater and debris are channeled into the drainage system and discharged as a torrent upon the alluvial fan or down the incised channel. Such torrents have been clocked at 50 miles per hour and could obliterate anything placed in their path.

The major differerence between flash flooding and flooding is control. As a river system approaches flood stage, sand bagging or other forms of artificial river levees can contain or confine the water within the river channel. Flash flooding rarely gives people the opportunity to even make an attempt at control. Flash floods occur in channels or on alluvial fans that are sometimes virtually free of surface water for years. Loose rock debris, dead

vegetation, or other material collect over that period of time until that one intense storm occurs. The debris and water collect or rush down the channels and fans with such speed and intensity that there is no time to react.

The areas mapped are separated into five classes of decreasing hazard:

Map Unit	Physical Features and Flooding Characteristics	Flooding Probability	Suitability for Development
1	Flood plain—continuous low flow or active flow with measurable rainfall; high flow with intense rainfall. Liable to inundation by yearly floods.	100%	Not suitable.
2	Active alluvial fans and incised channels on inactive alluvial fans. Channels and active fans subject to inundation by flash flood debris during local intense storms of 10 to 100 year magnitude.	1-10%	Not suitable except for pasture, light agricultural use, forestry, or day use recreational sites.
3	Flood plain—high flow with intense rainfall. Located immediately above high water mark of unit 1. Liable to inundation by 50 to 100 year floods.	1-2%	Generally not suitable except for pasture, light agricultural use, or day use recreational sites.
4	Active alluvial fans and incised channels on inactive alluvial fans. Subject to inundations by flash flood debris during local intense storms of 100 year magnitude or greater.	Less than 1%	Marginal from safety standpoint for building development; usable for heavy agriculture, pasture, forestry, or recreational sites.
5	Inactive alluvial fans and abandoned alluvial fans. Virtually free from problems of flash floods or flooding.	Fractional	Generally suitable for development.

Limitations

The delineation of flash flood hazard zones is made difficult by the lack of local flood records, the inherent difficulty of predicting the frequency and behavior of such events, and the fact that field studies for this project were of a reconnaissance nature.

The conclusions and opinions made in this report are based on the presently available information and are made for land use planning purposes only. A detailed engineering and geology report is recommended for individual site evaluations within any of the hazard zones.