ASSESSING FLOOD CONTROL BENEFITS IN LAKE FLOODPLAINS-- A DYNAMIC PROCESS

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Introduction

During 1982, 1983, and 1984, unusually high precipitation produced exceptionally large flows into Utah Lake. The lake drains through a gate structure into the Jordan River that, in turn, flows through an urbanized area of Salt Lake City into the Great Salt Lake. The control structure was built more than 100 years ago to add storage in the lake for summer irrigation. It has also been used to constrain Jordan River flows, thereby reducing flood damage along the river. During the last three years, the lake level rose to record levels. This resulted in flood damages exceeding $20 million and inspired local agencies to investigate three flood control measures: 1) a new outlet control structure, 2) dredging to increase the Jordan River channel capacity, and 3) a new operational plan for lake releases.

In the study described in this paper, the economic feasibility of these three flood control measures was evaluated by estimating the benefits from the alternatives for each measure. A stage-damage curve was developed and used for this purpose. The dynamic nature of stage-damage curves used in assessing flood control benefits in the Utah Lake and other lake floodplains is specifically addressed.

Riverine Stage-Damage Curves

The damage caused by a riverine flood depends primarily on the maximum flood stage. Consequently, stage-damage curves are developed to estimate flood damages corresponding to a peak water surface elevation.