

**APPLICATION OF SEPARABLE PROGRAMMING  
TO REGIONAL WATER QUALITY MANAGEMENT**

by

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## CHAPTER 1

### INTRODUCTION

Often interrelated and competing uses of water give rise to complex water quality problems, especially in areas where the available water resources are hardly adequate enough to meet the growing demands. One such area is the Utah Lake drainage area, characterized by growing urbanization and also by extensive water uses for agricultural purposes. Water quality deterioration is caused by both urban and agricultural users. However, the nature of the water quality problems posed by urban and agricultural return flows, respectively, are quite distinct. Urban return flows contain large amounts of bacterial wastes and require treatment to reduce the biochemical oxygen demand (BOD). On the other hand, agricultural return flows contain large amounts of dissolved salts, and pose a salinity problem.

It is quite apparent that any efforts to maintain water quality in the area should aim at coordinating pollution abatement strategies among both types of users, the required water quality standards being met at minimum total costs. This involves setting up a mathematical model for the urban-agricultural water quality control system.

Huntzinger (1971) has carried out a comprehensive study on the future water usage models of Utah Valley to determine the shortages and surpluses of water under present conditions, and those resulting from changing future demands. A number of water management alternatives have been analyzed to determine their relative worth in efficiently