

## **1. INTRODUCTION**

The Lake Tahoe Basin lies near the crest of the Sierra Nevada Mountains along the California-Nevada border about 150 miles northeast of San Francisco. Lake Tahoe has a surface area of approx. 191 square miles. The total land area of the Tahoe Basin's watershed is approx. 300 square miles, 70% of which is publicly owned. The volume of inflow and outflow from the lake is very small relative to lake volume. This results in a fragile ecosystem in which the actions of man and nature are tightly linked.

Over the past 40 years, a sharp increase in development has occurred around the lake, especially in the southern basin. During this period, lake water quality decreased dramatically. Increased nutrient and sediment discharge caused increased algae growth in lake water. In Lake Tahoe, algae productivity has been found to accelerate with the addition of phosphorous and nitrogen. Numerous studies have been conducted and remediation measures have been implemented to reduce the discharge of nutrients to the lake. Studies indicate that groundwater may play a significant role in this discharge. Water exchange between the lake and the adjacent groundwater at South Lake Tahoe is not well understood. Groundwater flow provides a mechanism for the transport of nutrients to the lake. The delineation of potential subsurface transport pathways will help aid future remediation efforts.

In July 2002, the U.S. Army Corps of Engineers-Hydrologic Engineering Center (HEC) was contacted by the Sacramento District of the U.S. Army Corps of Engineers to provide technical assistance with an on-going environmental study at the southern Lake Tahoe Basin in California. Specifically, HEC was requested to develop a groundwater flow model to better understand lake-groundwater interaction.

A numerical model was developed to estimate the volume, rate, and distribution of groundwater flux to the lake along its southern shore. Model results will be used to guide future nutrient remediation efforts. The model consisted of 6 layers with cells 200 ft square. Model layers generally varied from 10-50 ft thick. The model was calibrated to water levels and stream flows measured in fall 1996 and spring 2002.

## **2. SITE DESCRIPTION**

### **2.1 Overview**

The study area encompasses about 6 miles by 6 miles (Figure 1). General site boundaries include: Lake Tahoe to the north, the South Lake Tahoe airport to the south, and the mountain front recharge zones to the east and west. The eastern end of the study area extends to the California-Nevada border. The study area includes the city of South Lake Tahoe, the most populous city (pop. 23,609; 2000 census) in the Tahoe Basin.