Case Study: L-THIA use in South Korea.

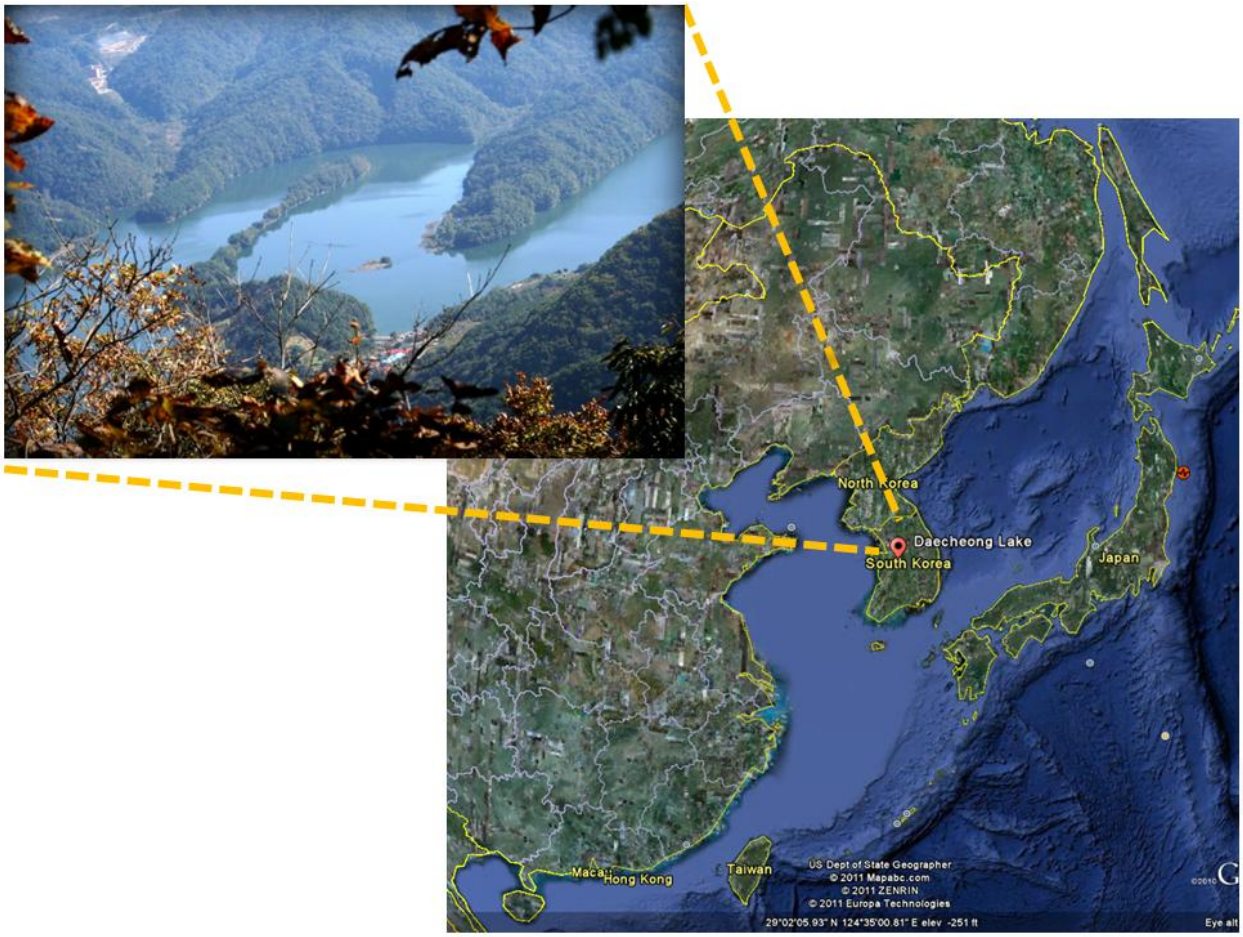
Larry Theller, YounShik Park

Purdue University

Daecheong Lake, Chungcheongbuk-do in South-Korea.

Using LTHIA in an Analysis of Runoff Effect on Embayment Water Quality in the Daecheong Lake , NEIR NO. 2010-61-1236

The Daecheong Lake at Chungcheongbuk-do in South-Korea has significant importance in Korea, providing drinking water to 3.5 million people in neighboring cities. The lake has a surface area of 73 km^2, a circumference of 80 KM, contains 1.5 billion tons of water and is the third largest lake in this nation of 50 million people. The lake has a watershed area of 3,204 km^2. The research was performed to analyze characteristics of the discharge from the upper watershed into the Daecheong Lake, which is influential to water quality in the lake.



This study was particularly interested in the impact of N and P on algae growth. Algae has been a problem occurrence on an annual average of 45 days in recent years (2005 – 2009.) The accumulation of N and P occurs through both dry and rainy seasons continuously. To support management of the lake (created by a dam in 1980,) discharge and water quality data were collected from five sites including two streams and three sites close to the lake. To estimate load under various conditions the research included simulation using the models Long-Term Hydrologic Impact Assessment (L-THIA) and Soil and Water Assessment Tool (SWAT).

For the analysis, Curve Number (CN) values were calculated based on growing season and dormant season and were used for the L-THIA simulation. The L-THIA model was calibrated against observed data and **produced a better fit than the SWAT model** in the calibration. The L-THIA results are used in the decision support process. Model results were produced to aid in the management of the watershed to control runoff. Eutrophication is the major problem in this lake, and management measures are designed to control the addition of N and P in to the lake.

As a quick and easy-to-use approach, L-THIA's results can be used to generate community awareness of potential long-term problems and to support planning aimed at minimizing disturbance of critical areas. L-THIA is an ideal tool to assist in the evaluation of potential effects of land use change and to identify the best location of a particular land use so as to have minimum impact on a community's natural environment.