Identification of Critical Source Areas of Nutrient Loads using SWAT Model: Case study, Zrebar Lake Watershed, Iran

S. Imani
Tarbiat Modares University

M. Delavar
Tarbiat Modares University, m.delavar@modares.ac.ir

M. H. Niksokhan
University of Tehran

Follow this and additional works at: https://scholarsarchive.byu.edu/iemssconference

Part of the Civil Engineering Commons, Data Storage Systems Commons, Environmental Engineering Commons, Hydraulic Engineering Commons, and the Other Civil and Environmental Engineering Commons

https://scholarsarchive.byu.edu/iemssconference/2016/Stream-D/53

This Event is brought to you for free and open access by the Civil and Environmental Engineering at BYU ScholarsArchive. It has been accepted for inclusion in International Congress on Environmental Modelling and Software by an authorized administrator of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu, ellen_amatangelo@byu.edu.
Identification of Critical Source Areas of Nutrient Loads using SWAT Model: Case study, Zrebar Lake Watershed, Iran

S. Imani¹, M. Delavar²*, M.H. Niksokhan³

¹- M. Sc. Student, Water Resources Engineering Dept., Tarbiat Modares University, Tehran, Iran
²- Assistant Professor, Water Resources Engineering Dept., Tarbiat Modares University, Tehran, Iran
³- Assistant Professor, Environmental Engineering Dept., University of Tehran, Iran

*Corresponding Author: Email: m.delavar@modares.ac.ir

Abstract: Entrance of nutrients and sediments to water bodies (i.e. Lakes) originating from watersheds is a serious problem in the Iran and other countries. So, the identification of critical source areas (CSAs) of pollutants in terms of watershed hydrologic units is extremely important for effective management of pollutant sources and implementation of best management practices for better protection of water quality. The main objective of this study was to identify and evaluate critical source areas (CSAs) of Nutrient loads using an integrated modeling approach. For this, Soil and Water Assessment Tool (SWAT) was used to identify CSAs of nutrients in the Zrebar Lake watershed in West of Iran. This study used an integrated simulation approach under the limited data condition in Zrebar Lake catchment for simulation of water quality and quantity variations of the lake and their interactions with the watershed management practices. For this, we used the concentrations of nitrate and phosphate in the lake for calibration instead of their discharge loads. It requires some modifications in SWAT code that presented for the first time in this paper. This approach can increase the capabilities of SWAT for modeling the lakes based on the qualitative parameters and their concentrations. To determine the total phosphorus (TP) and total nitrogen (TN) CSAs, SWAT model was run at a monthly time scale from 1998-2008 to simulate hydrological processes and nutrient flux in the Upper Zrebar Lake Watershed. Then the critical source areas identified and prioritized based on contribution of each land use or land cover in TP and TN Loads. Results indicate the agricultural and pasture development around the lake have the major effect on the nutrient loads. Also the Sub-watersheds with alfalfa, apple and tobacco crops were identified as CSAs of TP and TN in the case study. The CSA information provided through the SWAT will be extremely useful for optimizing management resources to target critical sources of phosphorus in the Zrebar watershed.

Keywords: Nutrient, Critical source area, Zrebar Lake, SWAT Model.