Tipaporn Wechagama 2007: Application of QUAL2K Model for Estimating Total Maximum Daily Load and Water Quality Prediction in Lum Se Bai Watershed. Master of Science (Watershed and Environmental Management), Major Field: Watershed and Environmental Management, Department of Conservation. Thesis Advisor: Associate Professor Patana Anurakpongsatorn, D.Tech. Sc. 119 pages.

The objectives of this study are to assess BOD loading from point and non point sources in Lum Se Bai watershed and to estimate the total maximum daily load (TMDL) and predict water quality in Lum Se Bai watershed using QUAL2K model particularly for alternative water quality management. Model running was based on typically secondary data which is adopted from related organizations. The river was divided into 4 reach. Two parameters, dissolved oxygen (DO) and biochemical oxygen demand (BOD), were carried out in wet and dry periods.

In 2006, the pollution loading as calculated BOD from point and non point sources in wet and dry periods were 11,358.99 and 828.26 kilogram per day, respectively. However, the results either simulation of water quality using QUAL2K model or observed data in the field were significantly similar trend. The estimation TMDL in wet and dry period were 45,534.25 and 2,259.15 kilogram per day, respectively. When compared with present condition, the additional BOD loading could be 7,617.10 and 672.87 kilogram per day in wet and dry period, respectively. The application of QUAL2K in prediction for 2013, 2017, 2021 and 2025 shown that DO may not significantly vary from present status, meanwhile, BOD may increase significantly which can be accepted for water quality standard class 3 except in the 4^{th} reach. The prediction of water quality using simulation model to 2 scenarios with loading point source. In the first scenario, only Amnacharoen municipality had wastewater treatment plant and second scenario every municipality had wastewater treatment plants. It was found that both cases BOD was significantly decrease. The second case had more decrease BOD than the first case. The QUAL2K can be used for water quality management and as a tool in assessment for decision making.

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