PART 2

LM3-EUTRO

Chapter 8. Results Provided for LM2-Toxic

2.8.1 Description

LM2-Toxic was developed to simulate congener-specific polychlorinated biphenyl (PCB) state variables. Due to the importance of organic carbon in the fate and transport of PCBs, the model also simulated three carbon states: biotic carbon (BIC), particulate detrital carbon (PDC), and dissolved organic carbon (DOC). LM2-Toxic relied on external calculations (measured or modeled) to estimate the autochthonous and allochthonous carbon loads. The internally produced carbon made up the majority of carbon entering the lake. Thus, a reliable estimate of this internal load was of utmost importance in accurately simulating the organic carbon in the system. The main purpose of the eutrophication model (LM3-Eutro) in the Lake Michigan Mass Balance Project (LMMBP) was to provide autochthonous (internally produced) phytoplankton carbon to the PCB fate and transport model (LM2-Toxic).

2.8.2 Manipulation of Results

LM3-Eutro and LM2-Toxic utilize very different modeling frameworks, with different segmentation schemes, hydrodynamics, and transport mechanisms. Several modifications were made to LM3-Eutro to ensure data compatibility when exporting the autochthonous carbon to LM2-Toxic. Because all necessary changes were made within LM3-Eutro code, no post-processing was necessary. LM3-Eutro generated carbon from primary production at each model time step. The model used a variable time step of approximately three hours. The carbon was totaled on a daily basis, and the high-resolution LM3-Eutro 5 km^2 segments were collapsed to the Level 2 segmentation scheme to generate daily allochthonous carbon loads for each of the 41 Level 2 segments. These loads were generated for the 1994-1995 calibration years, as well as a long-term simulation where the 1994 and 1995 loading and hydrodynamics data were repeated for approximately 28 years (see Part 2, Chapter 7, Section 2.7.1 – Constant Conditions Remain From 1994-1995).