

Model Results

The calibrated WLEEM model was used to assess the potential impact of open-lake placement on ambient total suspended solids and SRP concentrations. A rigorous model calibration process was conducted as part of the previous Toledo Harbor deposition study and the calibration was tested using actual measurements from this study. Concentrations predicted by the WLEEM reasonably reproduce observed concentrations for 2013. Therefore, the WLEEM was only modified to include the release of solids to the water column following a placement event. Dredging records and water column observations collected for summer-fall 2013 informed representation of the sediment placement load in the WLEEM.

Table ES-1 presents the 2013 loads of total phosphorus, SRP, and suspended solids from external and internal sources on a mass basis. The loads were compiled during the model development process and represent a summary of the model inputs. The Maumee River is the dominant source of total phosphorus to western Lake Erie and is a major component of the SRP and total suspended solids loads. Estimated contributions from the placement area represent a fraction of one per-

Figure ES-10 Decrease in Suspended Solids Mass after a Placement Event

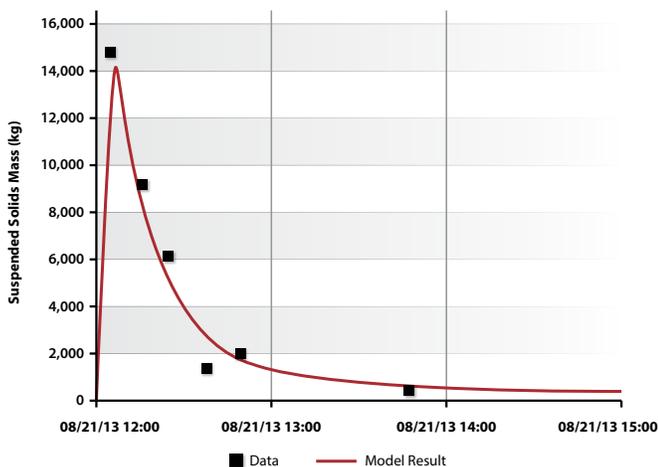


Table ES-1 Mass Balance (%) of External and Internal TP, SRP, and SS Loads for 2013

Source	TP	SRP	SS
Detroit	37%	43%	62%
Maumee	43%	22%	35%
Other	6%	6%	3%
Placement	0.22%	0.02%	0.48%
Internal Flux*	13%	30%	
Total	100%	100%	100%

* Includes both resuspension and pore diffusion from rest of WLEB sediments.

Key:
 SRP Soluble Reactive Phosphorus
 SS Suspended Solids
 TP Total Phosphorus

centage point of the total load. Loads of SRP to western Lake Erie are of particular concern due to its ability to stimulate algal growth. Placement activities contribute 0.02% of the total annual SRP load to western Lake Erie. Further, contribution of SRP arising from placement is less than 1% of the annual internal load and external loads from the Maumee and Detroit Rivers.

The comparison between the model-simulated residual suspended solids mass and the data-based estimates of residual mass demonstrate that the model closely reproduces both the initial mass remaining in suspension five minutes after the barge opening and the deposition rate of the residual suspended sediment mass following the placement event (*see Figure ES-10*). Results show that immediately after a placement event, only approximately 1% to 5% of the material remains as residual suspended solids in the water column to discretely settle and be transported by currents.