

Table of Contents

Executive Summary	i
Acknowledgments	v
Table of Contents	vii
List of Tables	viii
List of Figures	viii
1. Introduction and Background	1
2. Methodology	7
3. Inventory Results	21
4. Grand Traverse Bay	23
5. White Lake and Muskegon Lake	31
6. Grand River	41
7. Kalamazoo River	49
8. St. Joseph River	59
9. Grand Calumet River	69
10. Waukegan Harbor	77
11. Milwaukee River and Estuary	83
12. Sheboygan River	89
13. Fox-Wolf River Basin	95
14. Door County	103
15. Menominee River	109
16. Manistique River	115
17. Lake Michigan Open Water and Basinwide Monitoring	123
18. Overall Discussion	133

19. Findings and Recommendations	137
Appendices	
A. Acronyms and Glossary	
B. Lake Michigan Tributary Monitoring Project Participants	
C. Lake Michigan Monitoring Inventory Form	

List of Tables

Table 1. Assessment of Monitoring Infrastructure for Tracking LaMP State and Pressure Indicators	134
--	-----

List of Figures

Figure 1. Watersheds included in the Lake Michigan Monitoring Inventory.	3
Figure 2. Proportion of survey responses by the primary medium monitored.	21
Figure 3. Proportion of survey responses by the type of monitoring staff.	21
Figure 5. Grand Traverse Bay watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	26
Figure 6. Grand Traverse Bay watershed with USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	28
Figure 7. The western portion of White Lake and Muskegon Lake watersheds with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	32
Figure 8. The eastern portion of the Muskegon Lake watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	33
Figure 9. White Lake and Lower Muskegon Lake watersheds with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	34
Figure 10. Upper Muskegon Lake watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	35
Figure 11. White Lake and Lower Muskegon Lake watersheds with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	36
Figure 12. Upper Muskegon Lake watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	37
Figure 13. The lower Grand River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	42
Figure 14. The upper Grand River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	43
Figure 15. Lower Grand River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	44
Figure 16. Upper Grand River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	45
Figure 17. Lower Grand River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	46

Figure 18. Upper Grand River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated. 47

Figure 19. The lower Kalamazoo River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured. 50

Figure 20. The upper Kalamazoo River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured. 51

Figure 21. Lower Kalamazoo River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated. 53

Figure 22. Upper Kalamazoo River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated. 54

Figure 23. Lower Kalamazoo River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated. 55

Figure 24. Upper Kalamazoo River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated. 56

Figure 25. The lower St. Joseph River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured. 59

Figure 26. The upper St. Joseph River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured. 60

Figure 27. Lower St. Joseph River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated. 61

Figure 28. Upper St. Joseph River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated. 62

Figure 29. Lower St. Joseph River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated. 63

Figure 30. Upper St. Joseph River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated. 64

Figure 31. The Little Calumet-Galien watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured. 70

Figure 32. Little Calumet-Galien watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated. 71

Figure 33. Little Calumet-Galien watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated. 72

Figure 34. The Waukegan Harbor AOC with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured. 78

Figure 35. Waukegan Harbor AOC with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated. 78

Figure 36. Waukegan Harbor AOC with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated. 79

Figure 37. The Milwaukee River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured. 84

Figure 38. Milwaukee River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated. 85

Figure 39. Milwaukee River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	86
Figure 40. The Sheboygan River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	90
Figure 41. Sheboygan River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	91
Figure 42. Sheboygan River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	92
Figure 43. The Lower Fox River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	96
Figure 44. Lower Fox River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	97
Figure 45. Lower Fox River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	98
Figure 46. The Door-Kewaunee watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	104
Figure 47. Door-Kewaunee watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	105
Figure 48. Door-Kewaunee watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	106
Figure 49. The Menominee River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	110
Figure 50. Menominee River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	111
Figure 51. Menominee River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	112
Figure 52. The Manistique River watershed with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	116
Figure 53. Manistique River watershed with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	117
Figure 54. Manistique River watershed with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated.	118
Figure 55. Lake Michigan with Lake Michigan Mass Balance project monitoring stations shown by media monitored.	123
Figure 56. Lake Michigan with Lake Michigan Mass Balance project monitoring stations shown by pollutant monitored.	124
Figure 57. Western Lake Michigan Drainages study unit with NAWQA monitoring stations shown by media monitored.	125
Figure 58. Lake Michigan with LaMP pollutant monitoring stations from U.S. EPA's STORET system displayed by indicators measured.	126
Figure 59. Lake Michigan with pollutant sources from the Permit Compliance System and Toxic Release Inventory databases indicated.	127

Figure 60. Lake Michigan with ambient water quality and bacteria monitoring stations from U.S. EPA's STORET system displayed by indicators measured. 128

Figure 61. Lake Michigan with National Sediment Inventory stations, USGS gage stations, U.S. EPA's Aerometric Information Retrieval System (AIRS) stations, and NOAA weather stations indicated. . . 129