

FIGURES

Figure 1.–Legend.

1. Locke Creek
2. Helmer Creek
3. Taylor Creek
4. Wolfe Creek
5. Shoepac River
6. Portage Creek
7. Black Creek
8. Fork Creek
9. Manistique River
10. East Branch Fox River
11. Fox River
12. Little Fox River
13. West Branch Fox River
14. Grays Creek
15. Pine Creek
16. Sand Creek
17. Driggs River
18. Marsh Creek
19. Meade Creek
20. Tad Creek
21. Mazik Creek
22. Boucher Creek
23. Bear Creek
24. Rose Creek
25. West Branch Manistique River
26. Creighton River
27. Hickey Creek
28. Prairie Creek
29. North Branch Stutts Creek
30. Stutts Creek
31. Sturgeon Hole Creek
32. Indian River
33. Big Murphy Creek
34. Bear Creek
35. Carr Creek
36. Little Murphy Creek
37. Little Indian River
38. Deer Creek
39. Grassy Creek

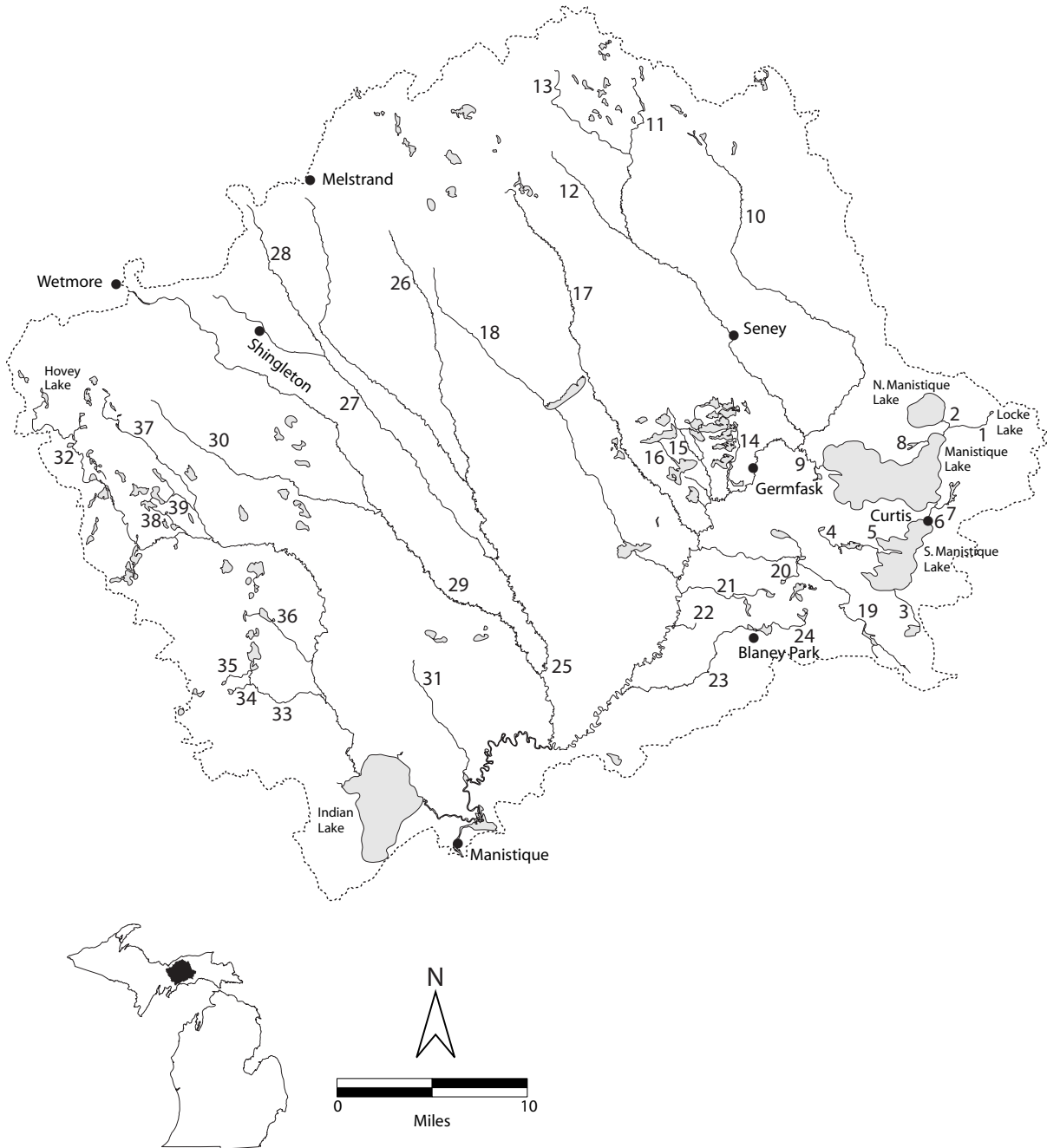


Figure 1.-The Manistique River system with major tributaries and its watershed boundary.

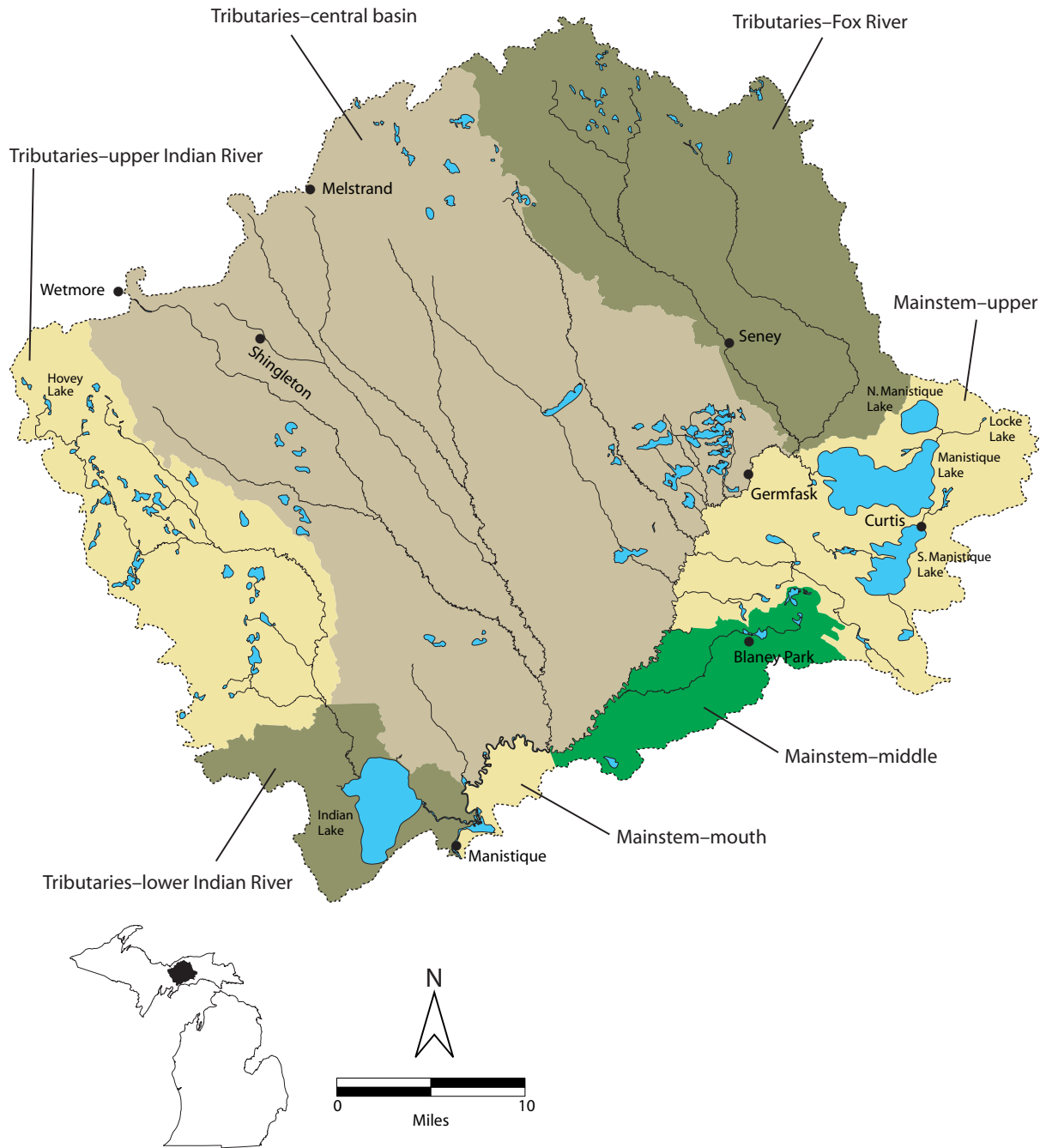


Figure 2.—Manistique River subwatersheds.

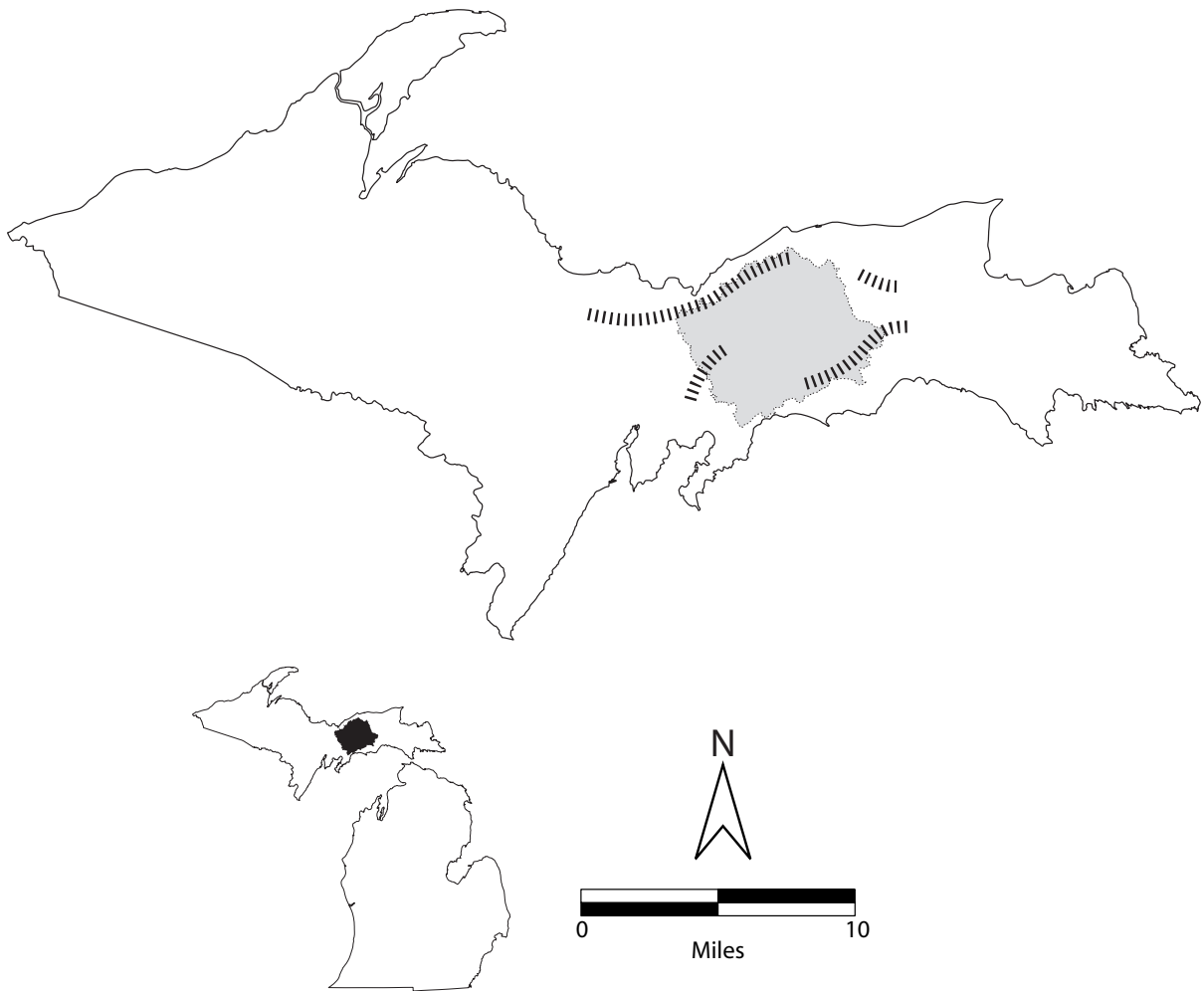


Figure 3.—Glacial advance borders (hash marks) forming the Manistique River watershed (modified from Farrand 1988).

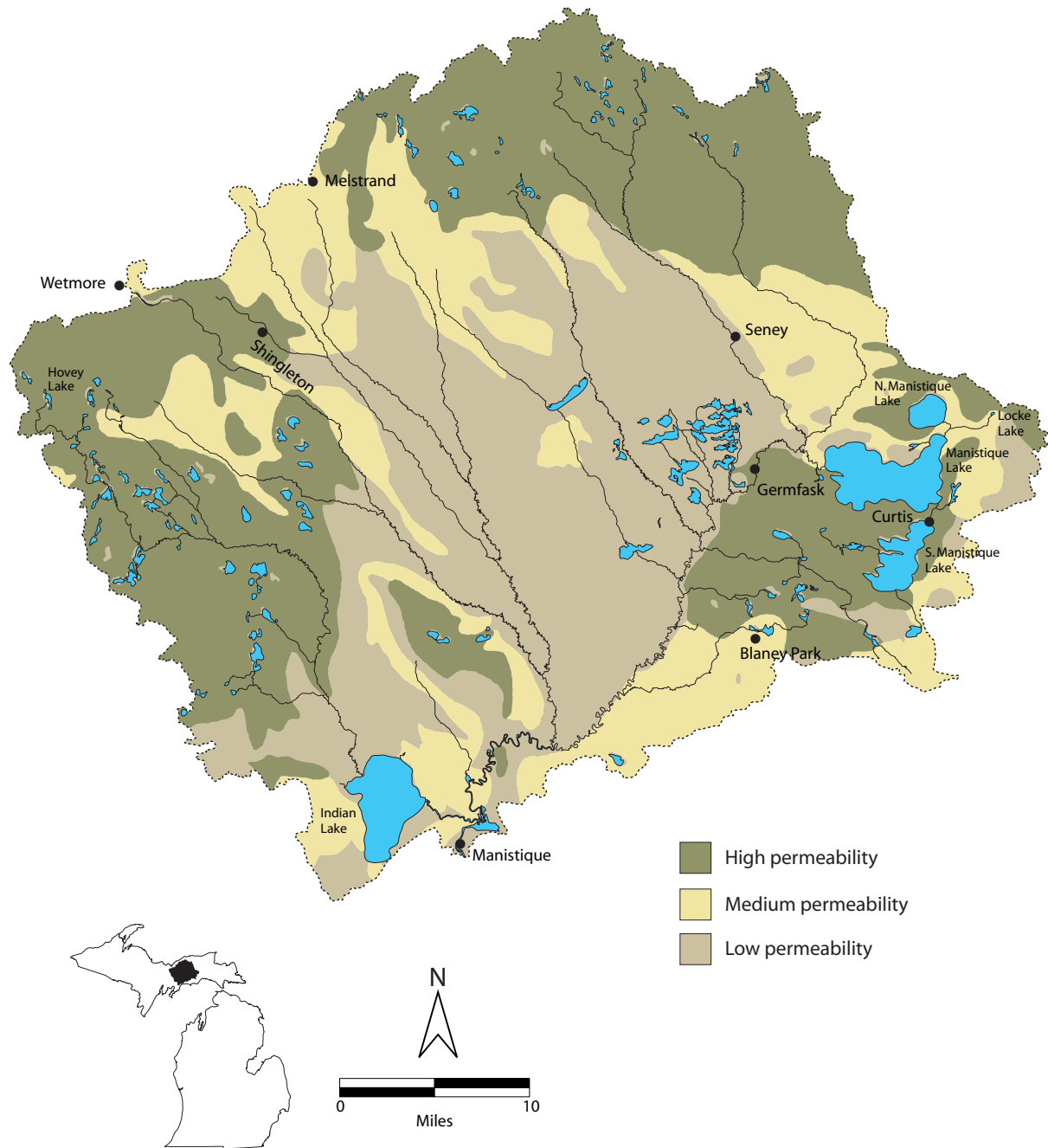


Figure 4.–Surficial geology of the Manistique River watershed.

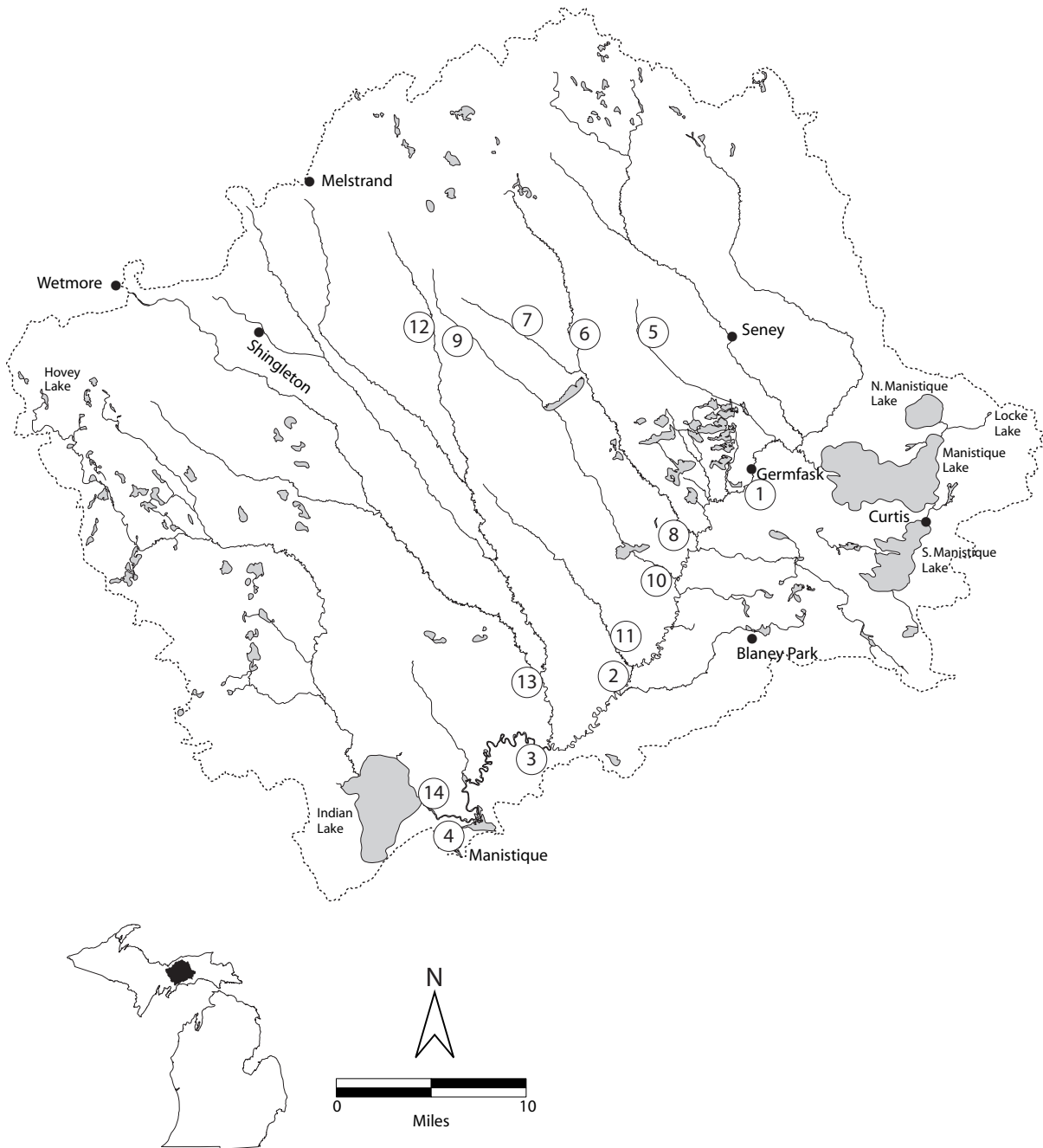


Figure 5.—Location of United States Geological Survey gauge sites in the Manistique River watershed. See Table 2 for gauge site descriptions.

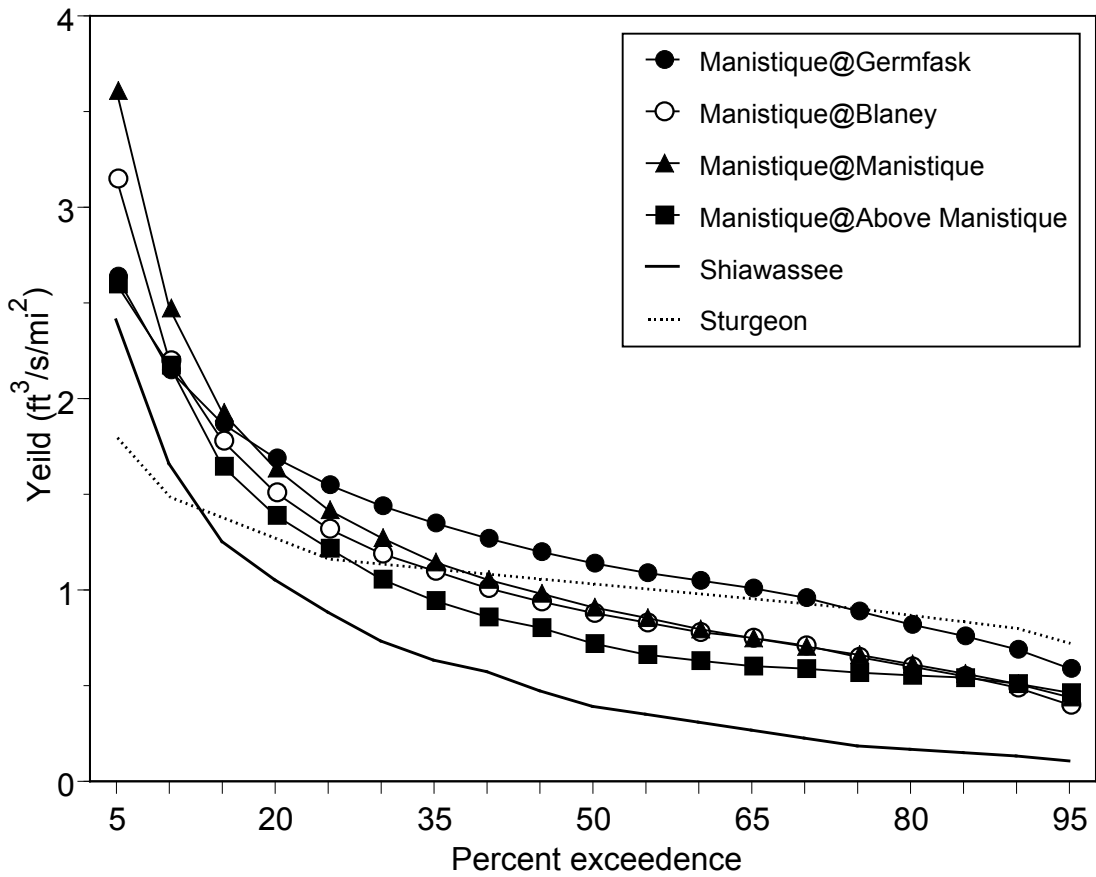


Figure 6.—Yield (ft³/s/mi²) exceedence curves for the Mainstem—upper (Manistique River @ Germfask), Mainstem—middle (Manistique River @ Blaney), Mainstem—mouth (Manistique River @ Mansitique and Manistique River @ Above Manistique). Comparison exceedence curves are given for the Shiawassee and Sturgeon rivers. Exceedence curve represents the frequency of a discharge exceeding a given rate. Data from the United States Geological Service for period of record.

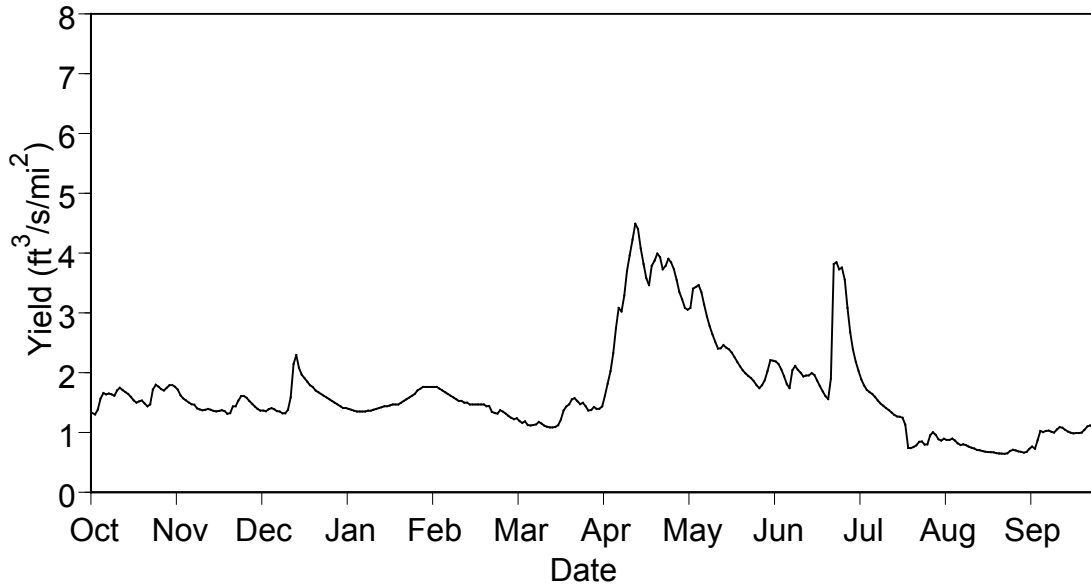


Figure 7.—Mainstem—upper Manistique River daily yield for water year 1969. Data from United States Geological Survey.

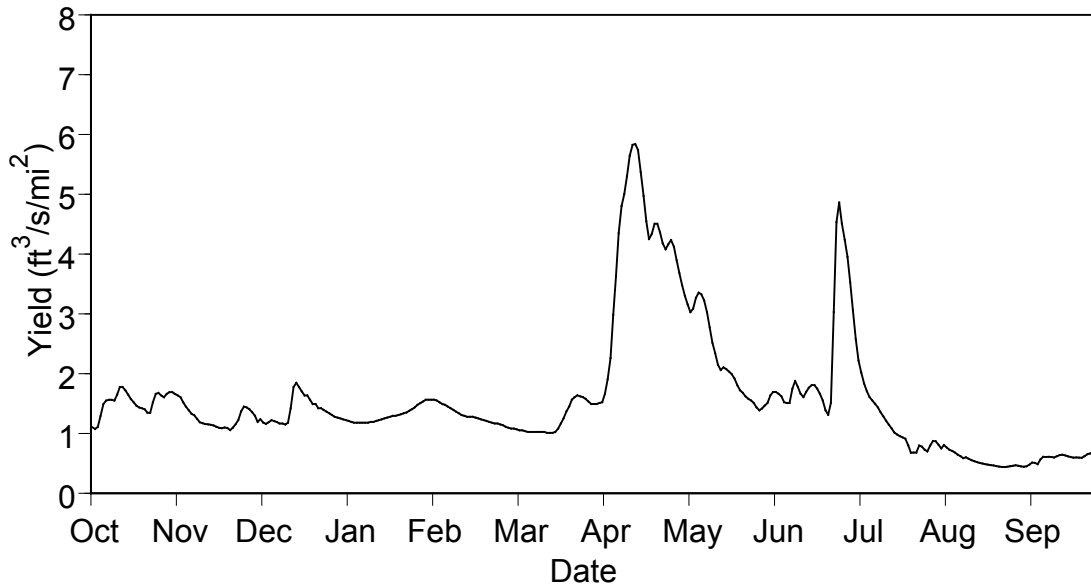


Figure 8.—Mainstem—middle Manistique River (Blaney) yield for water year 1969. Data from United States Geological Survey.

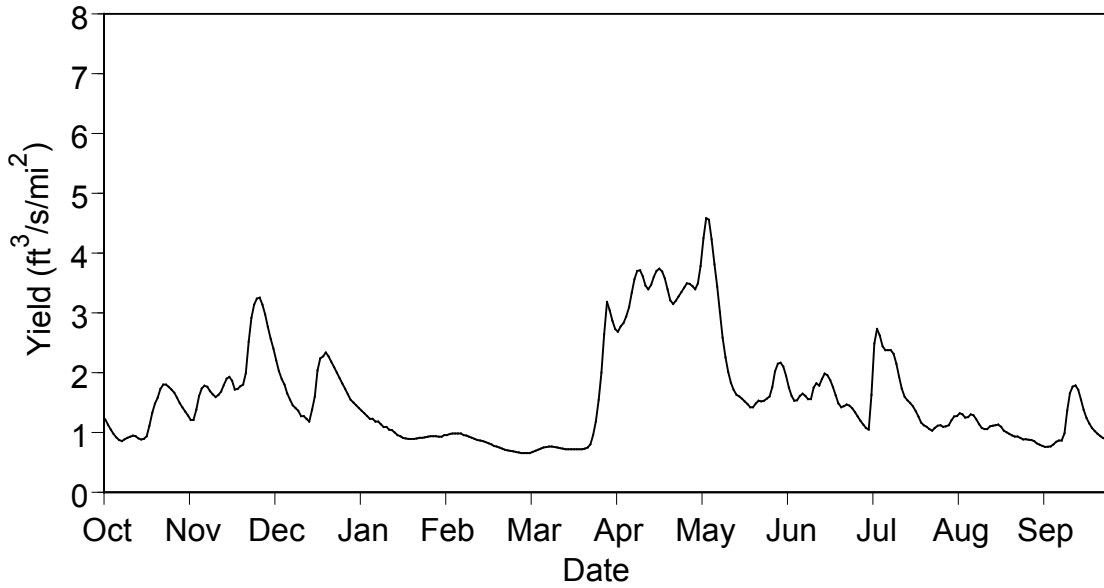


Figure 9.—Mainstem—mouth Manistique River (Manistique) yield for water year 1993. Data from United States Geological Survey.

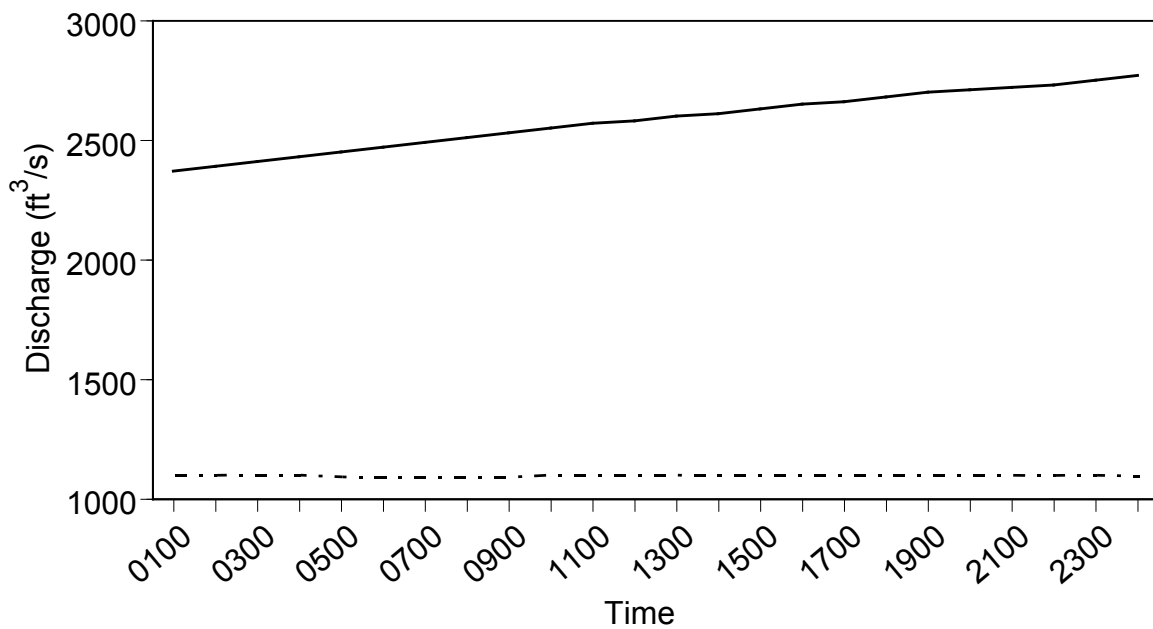


Figure 10.—Instantaneous discharge of the Manistique River at Manistique on February 28, 2000 (solid line) and hourly means (dashed line) for the water year 2000. Data from United States Geological Survey.

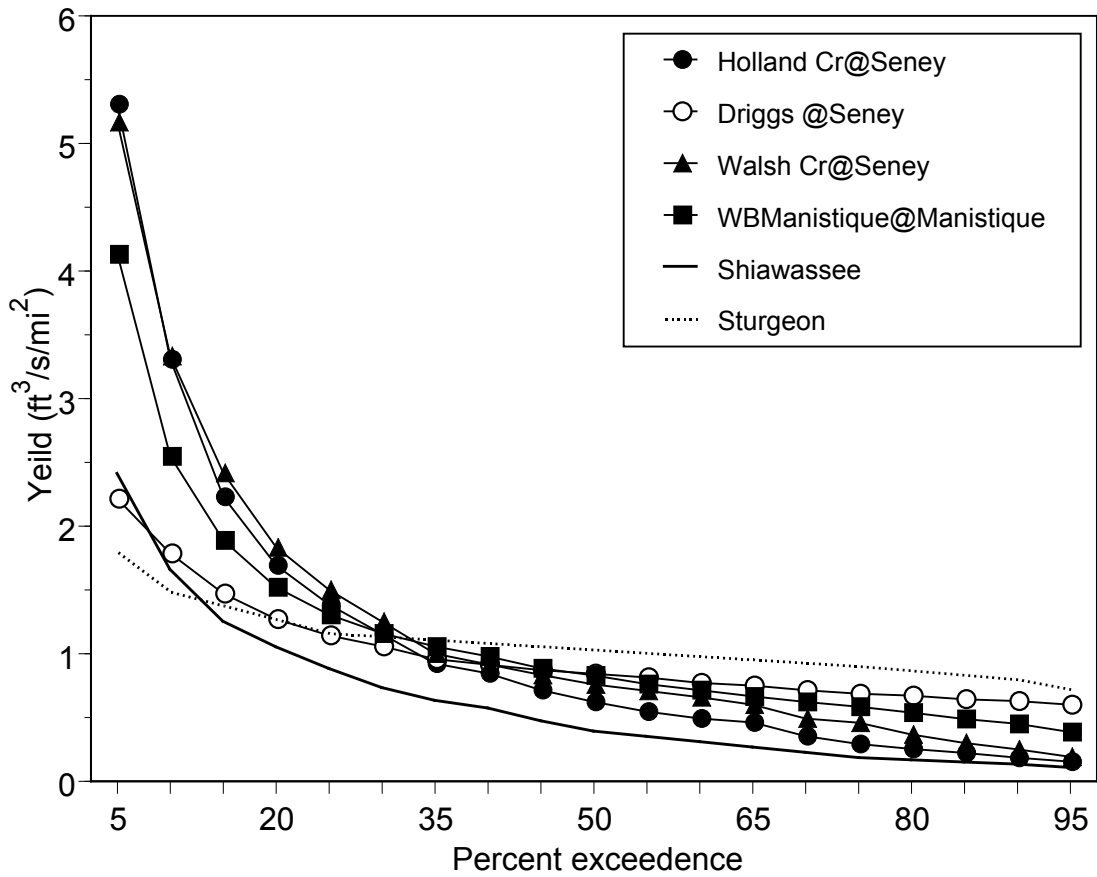


Figure 11.—Yield (ft³/s/mi²) exceedence curves for the Tributaries—central basin sites (4). Comparison exceedence curves are given for the Shiawassee and Sturgeon rivers. Exceedence curve represents the frequency of a discharge exceeding a given rate. Data from the United States Geological Service for period of record.

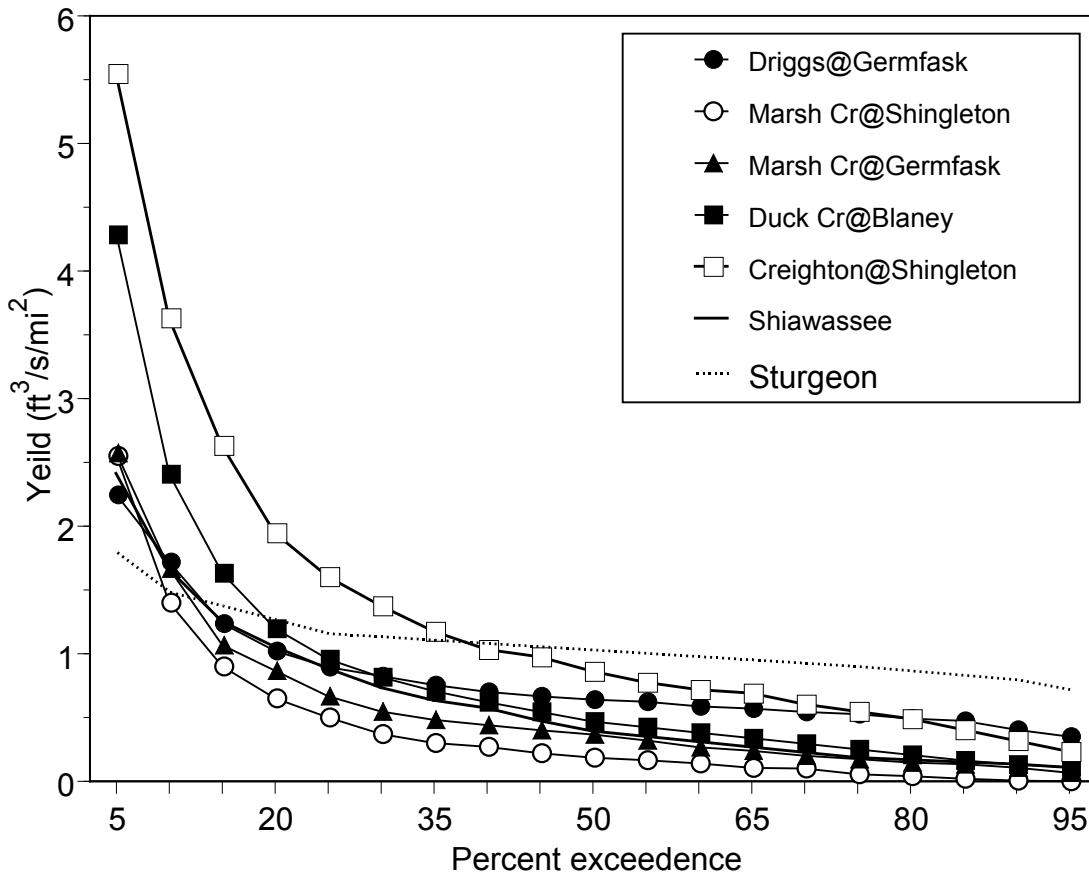


Figure 12.—Yield (ft³/s/mi²) exceedence curves for the Tributaries—central basin sites (5). Comparison exceedence curves are given for the Shiawassee and Sturgeon rivers. Exceedence curve represents the frequency of a discharge exceeding a given rate. Data from the United States Geological Service for period of record.

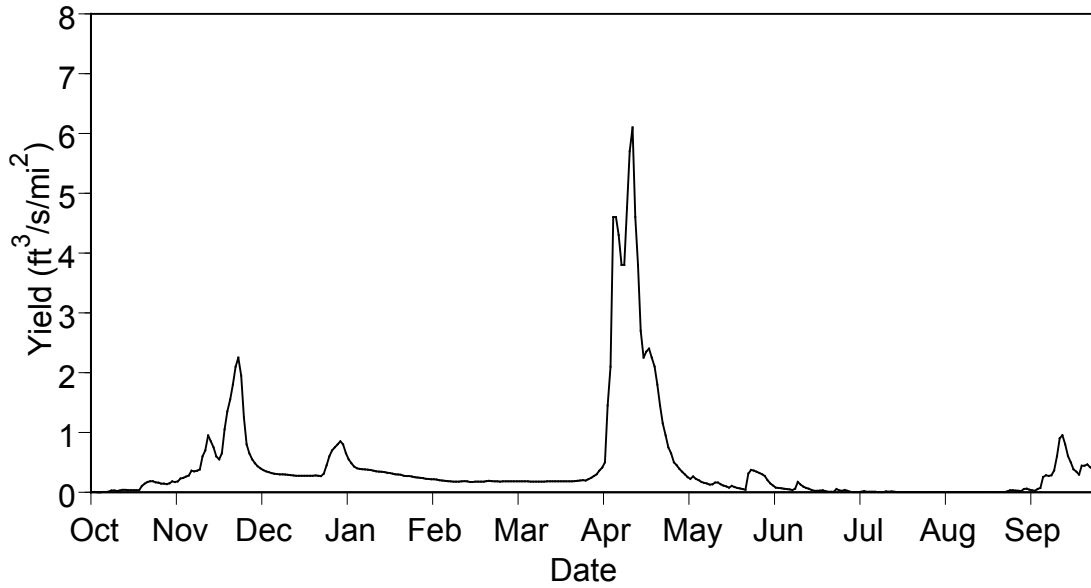


Figure 13.—Tributaries—central basin Marsh Creek (Shingleton) yield for water year 1941. Data from United States Geological Survey.

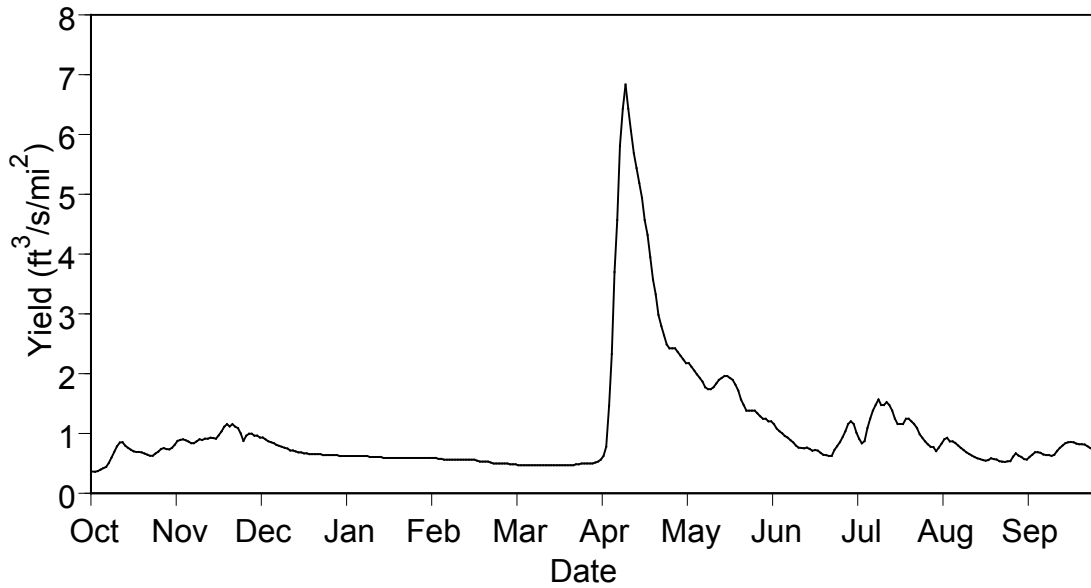


Figure 14.—Tributaries—central basin West Branch Manistique River (Manistique) yield for water year 1956. Data from United States Geological Survey.

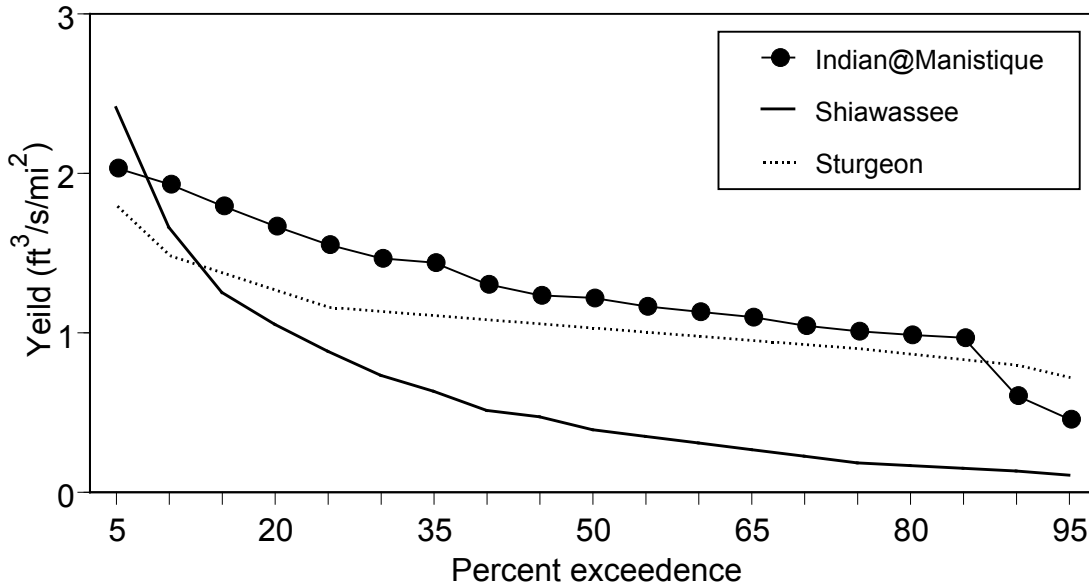


Figure 15.—Yield ($\text{ft}^3/\text{s}/\text{mi}^2$) exceedence curves for the Tributaries—lower Indian River. Comparison exceedence curves are given for the Shiawassee and Sturgeon rivers. Exceedence curve represents the frequency of a discharge exceeding a given rate. Data from the United States Geological Service for period of record.

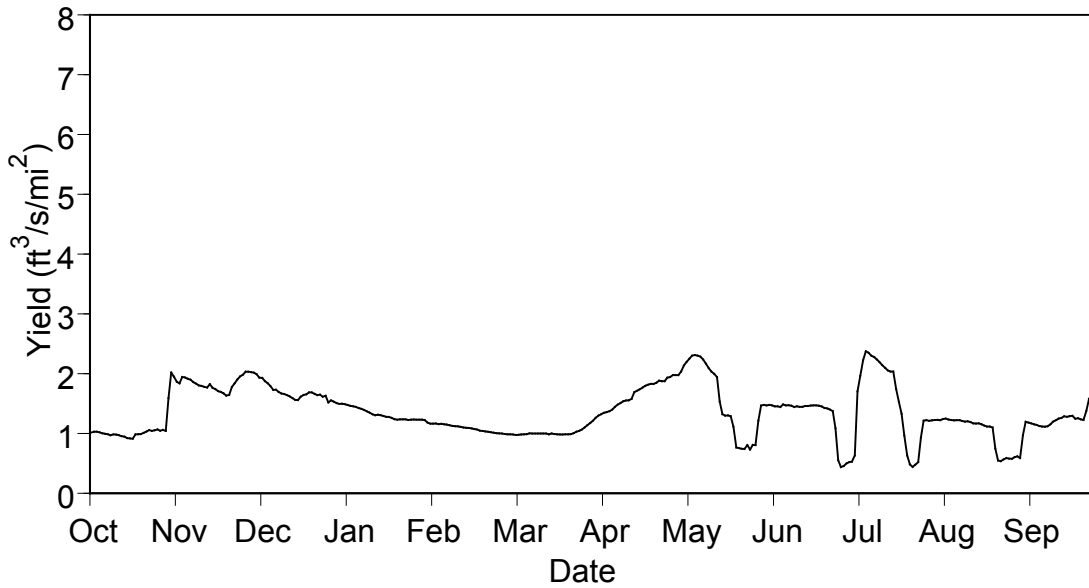


Figure 16.—Tributaries—lower Indian River (Manistique) yield for water year 1993. Data from United States Geological Survey.

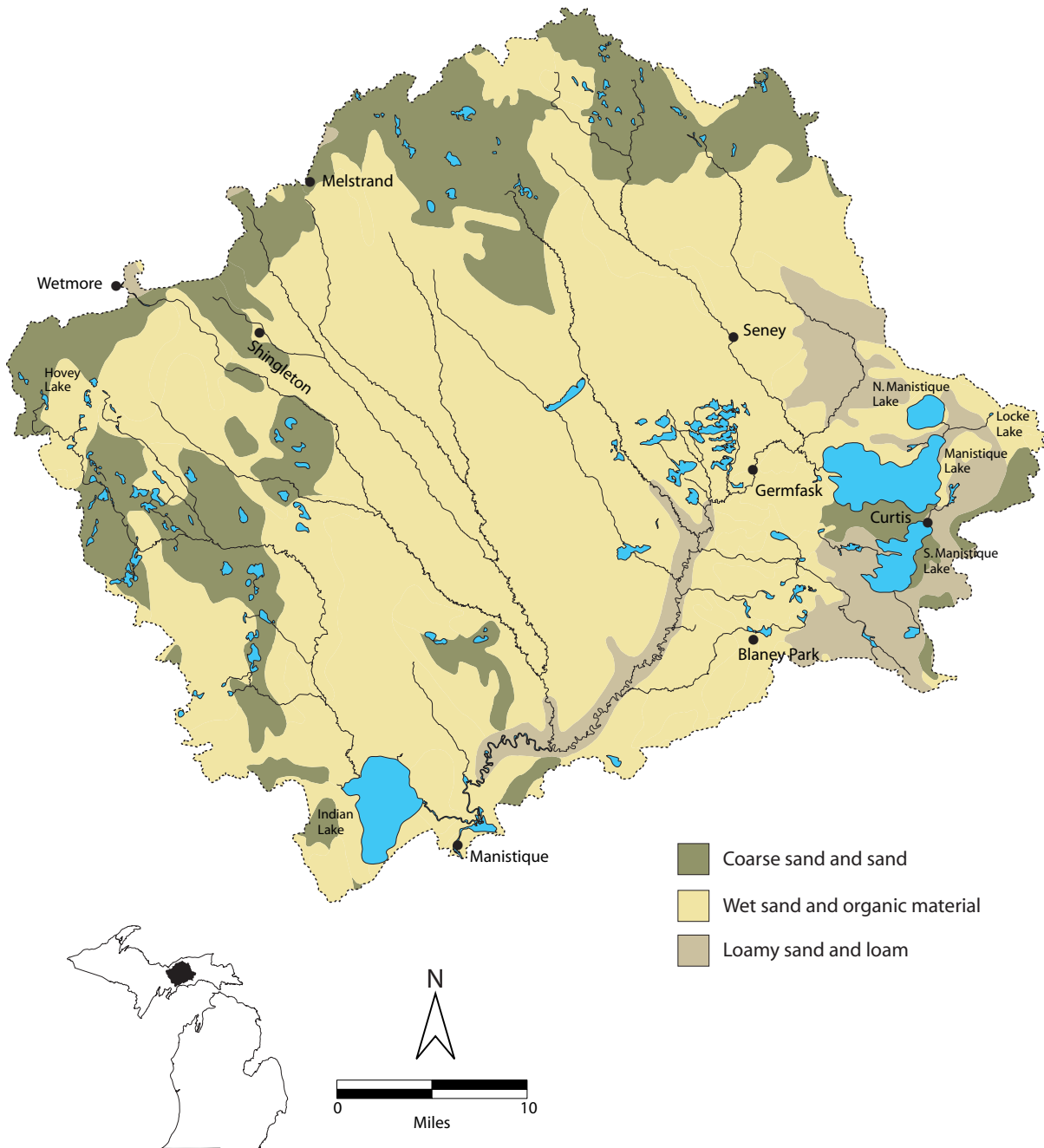


Figure 17.—Soil types of the Manistique River watershed.

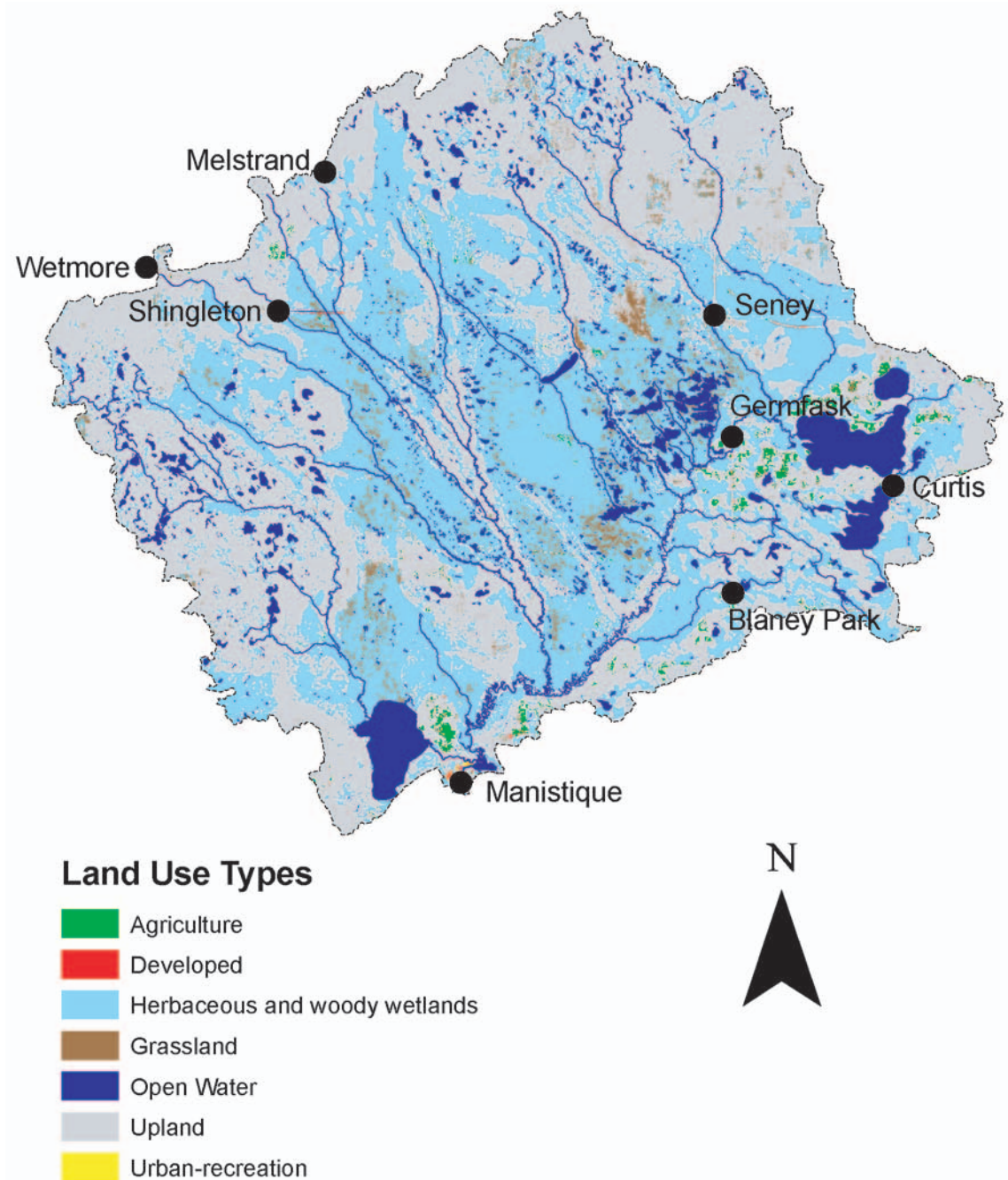


Figure 18.–Land use types within the Manistique River watershed.

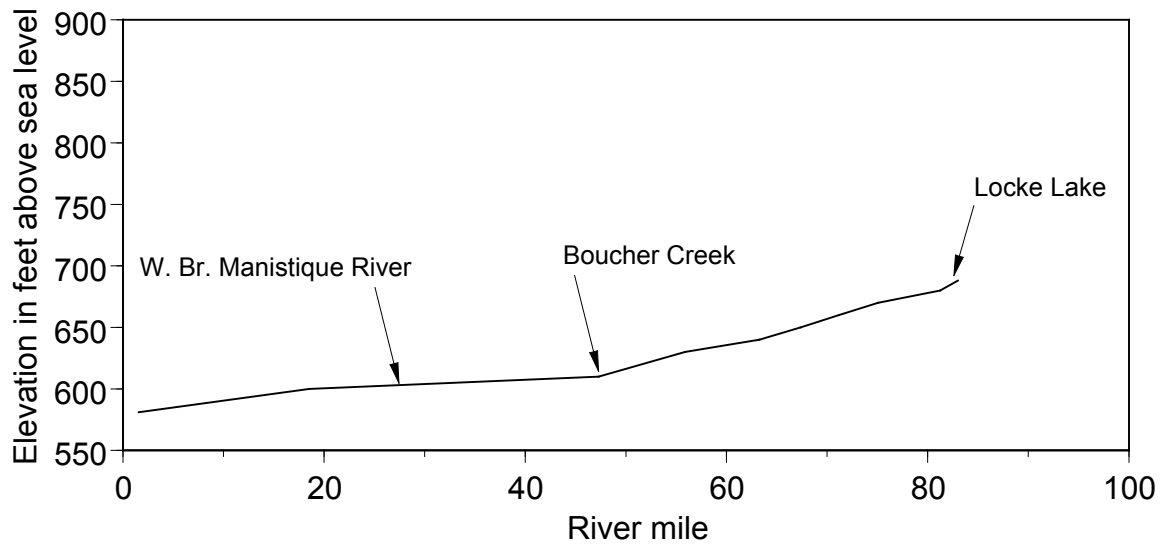


Figure 19.—Manistique River elevation in feet above sea level by river mile.

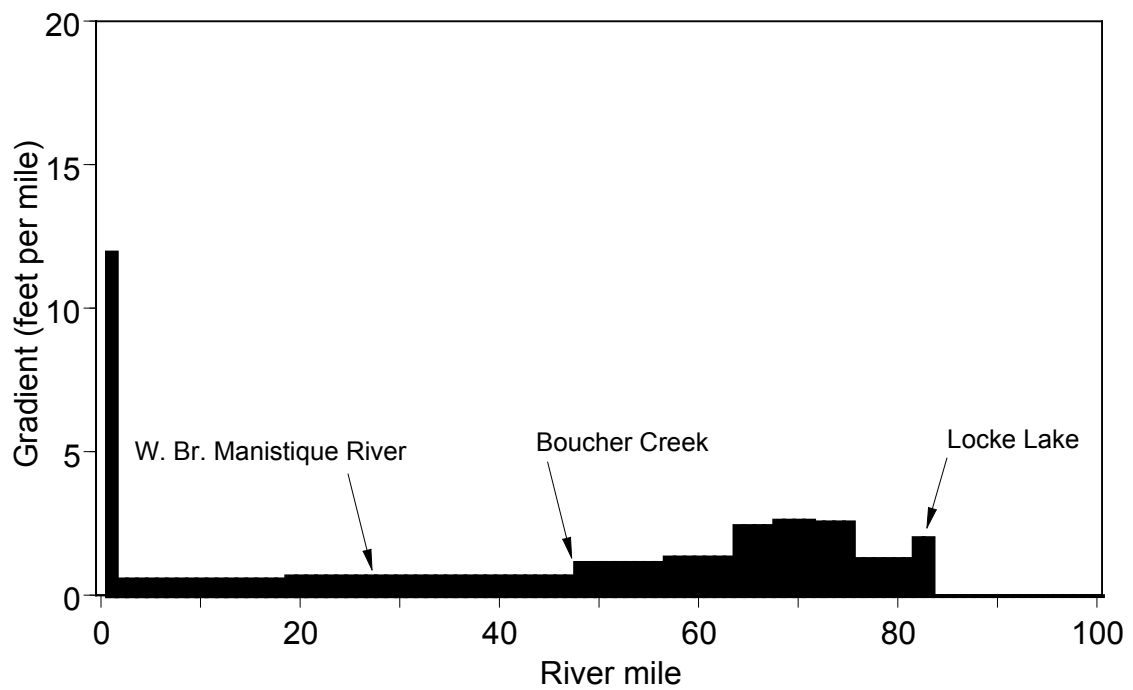


Figure 20.—Manistique River gradient in feet per river mile.

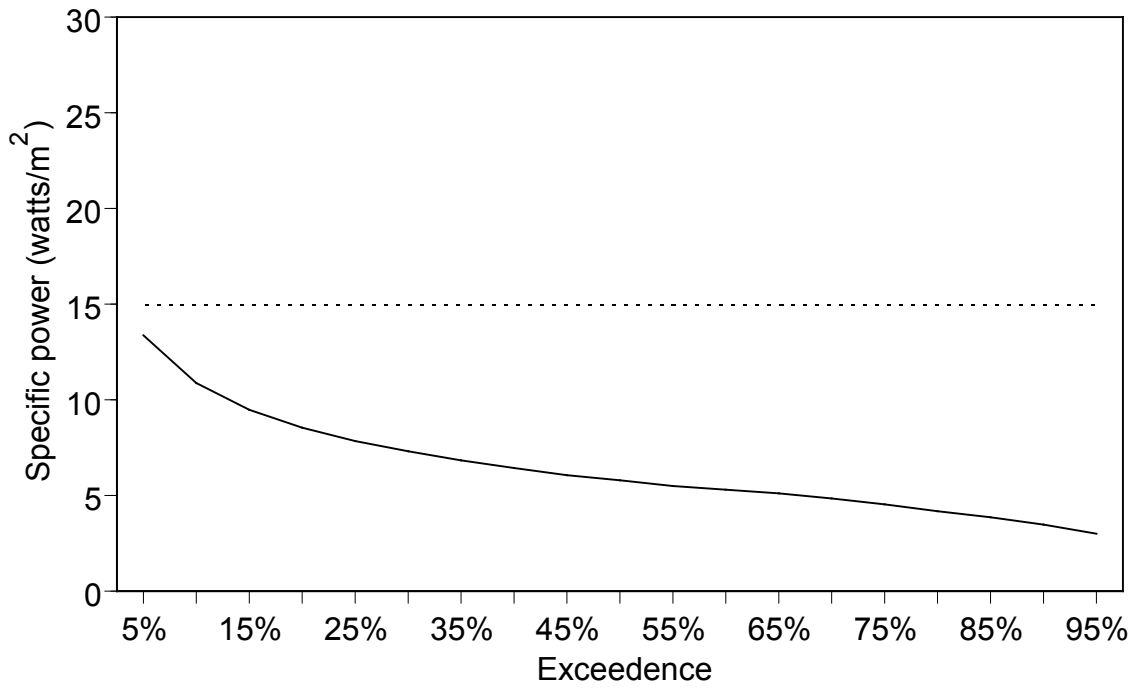


Figure 21.—Specific power for Manistique River at Germfask.

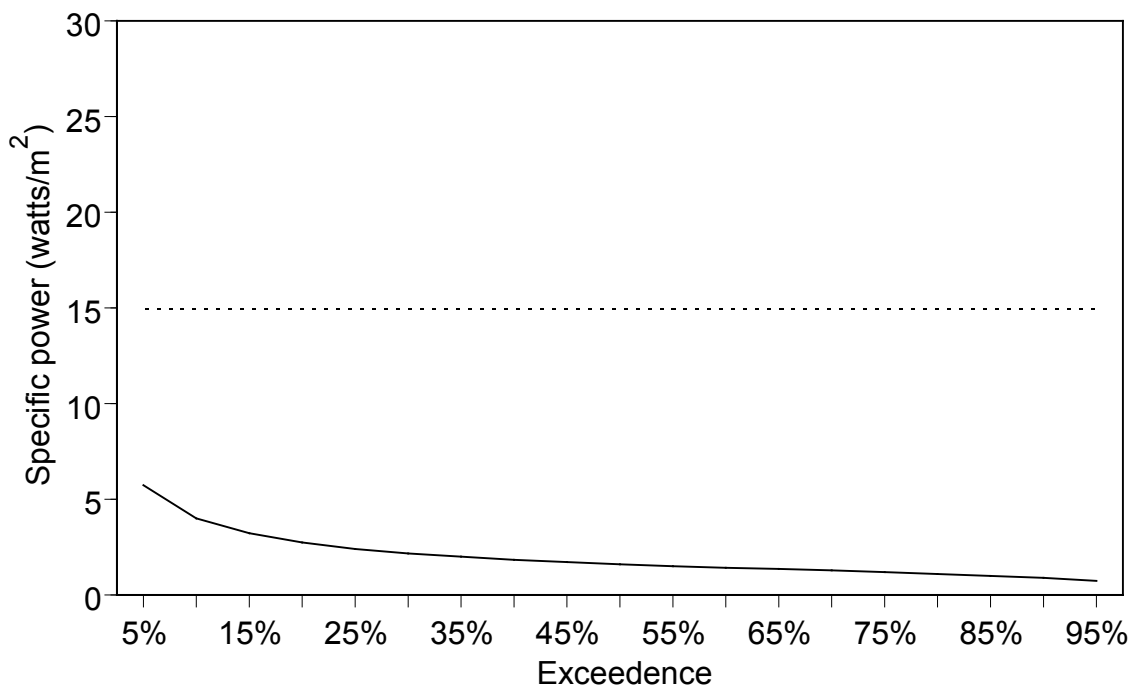


Figure 22.—Specific power for Manistique River near Blaney.

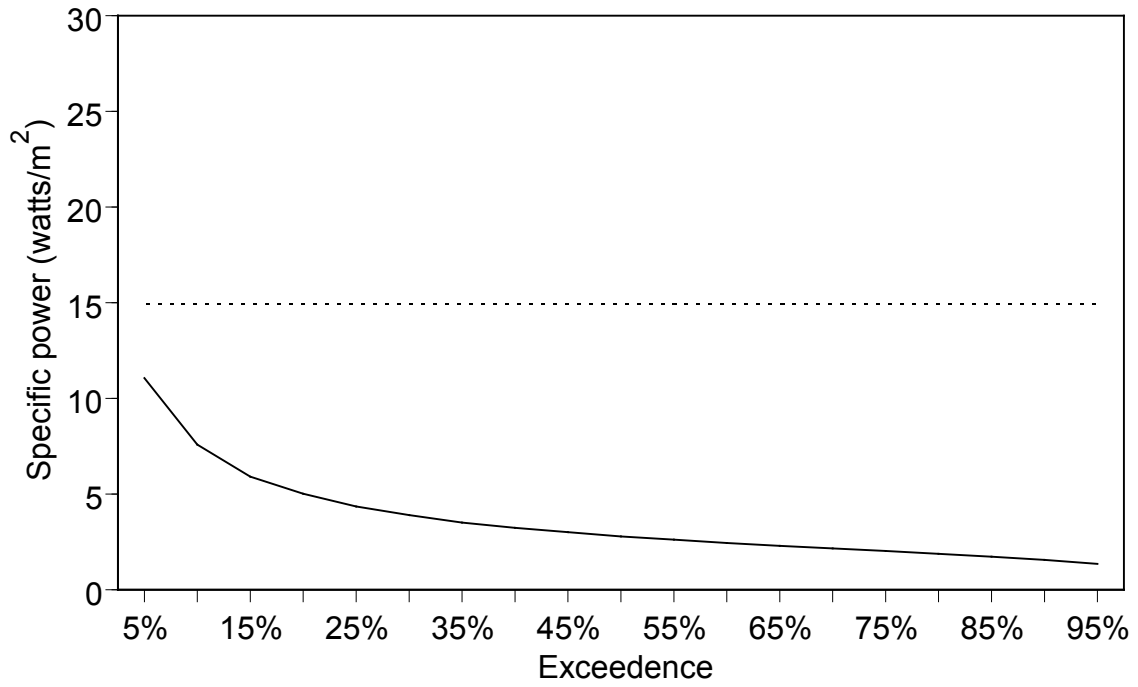


Figure 23.—Specific power for Manistique River at Manistique.

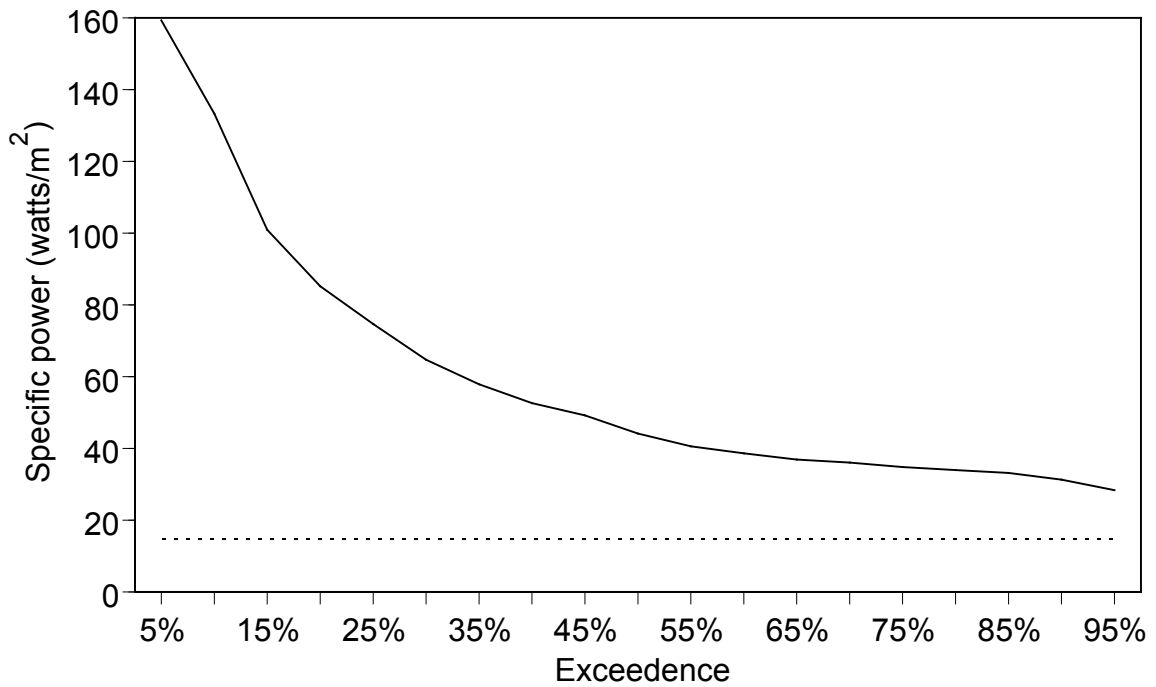


Figure 24.—Specific power for Manistique River above Manistique.

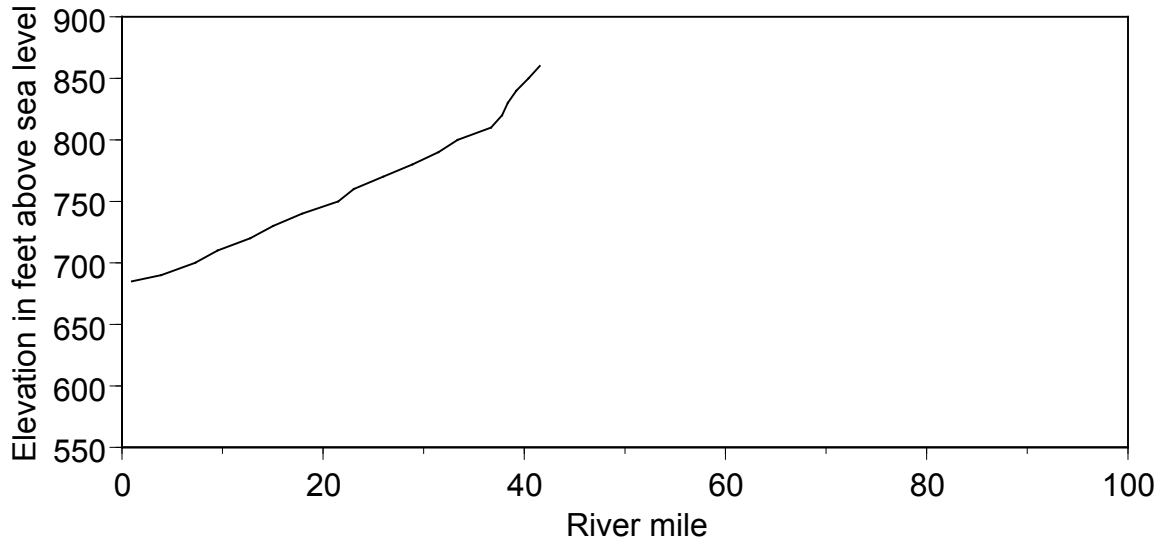


Figure 25.—Fox River elevation in feet above sea level by river mile.

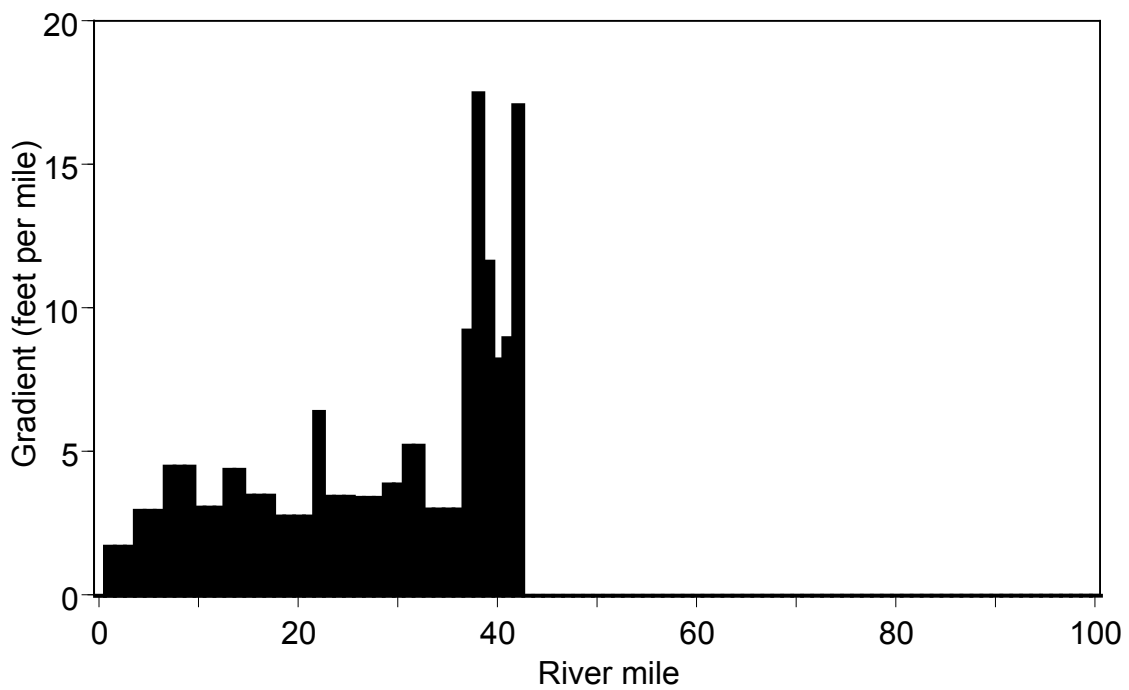


Figure 26.—Fox River gradient in feet per river mile.

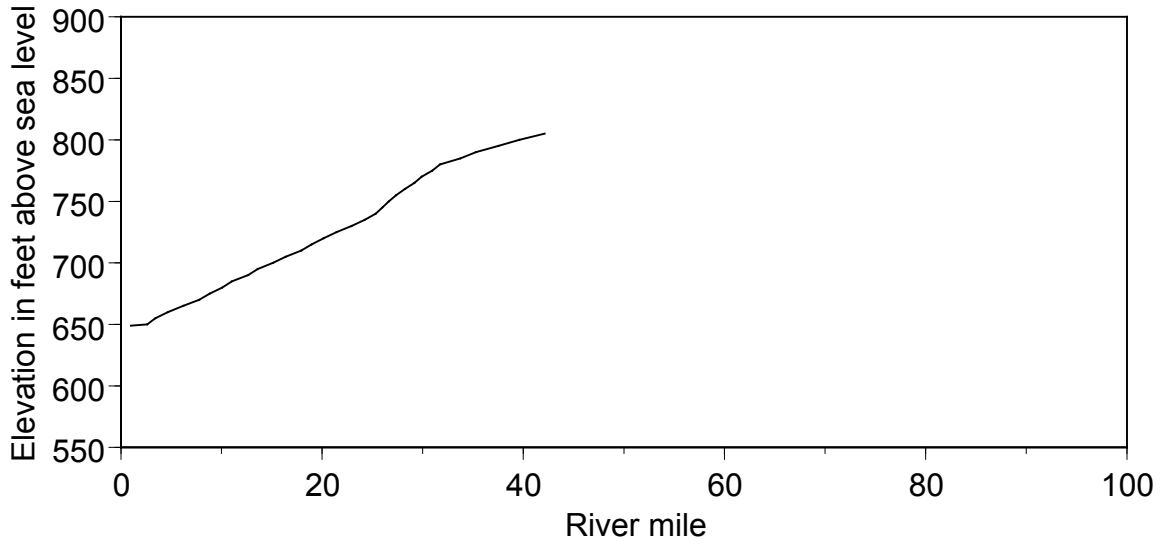


Figure 27.—Driggs River elevation in feet above sea level by river mile.

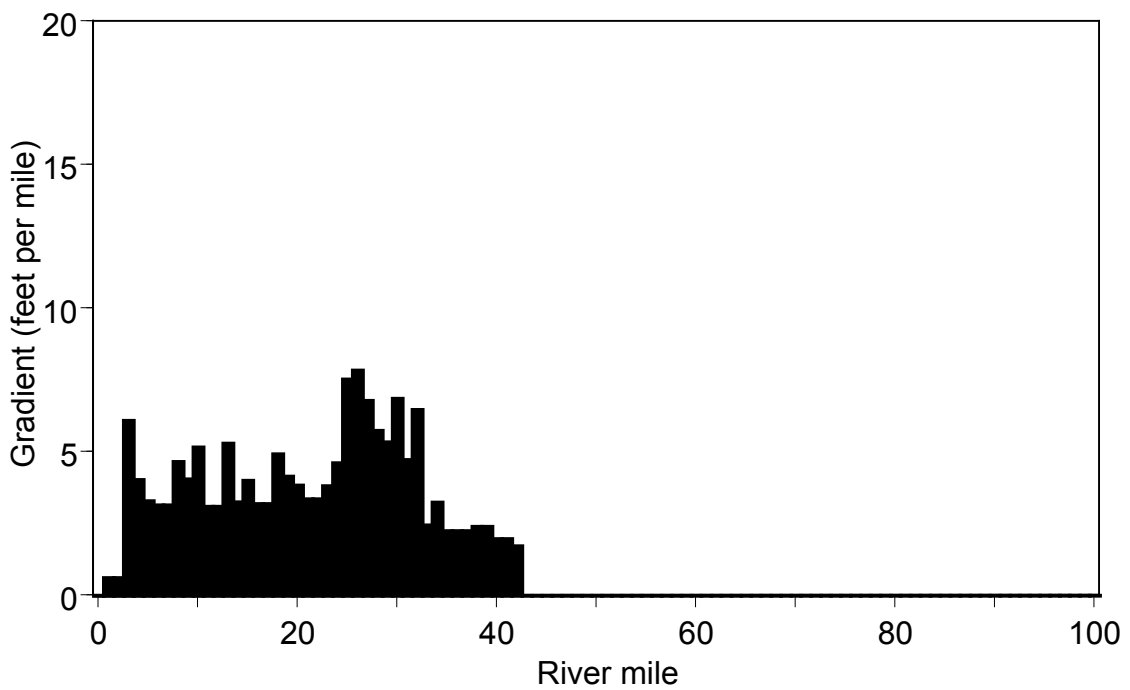


Figure 28.—Driggs River gradient in feet per river mile.

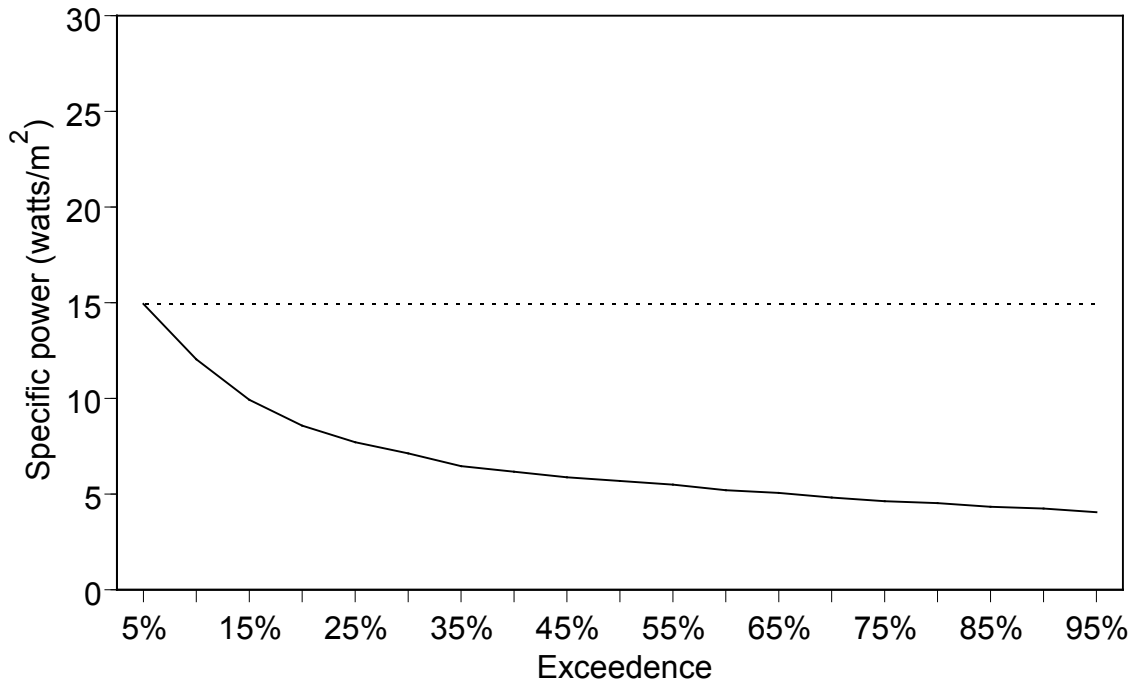


Figure 29.—Specific power for Driggs River at Seney.

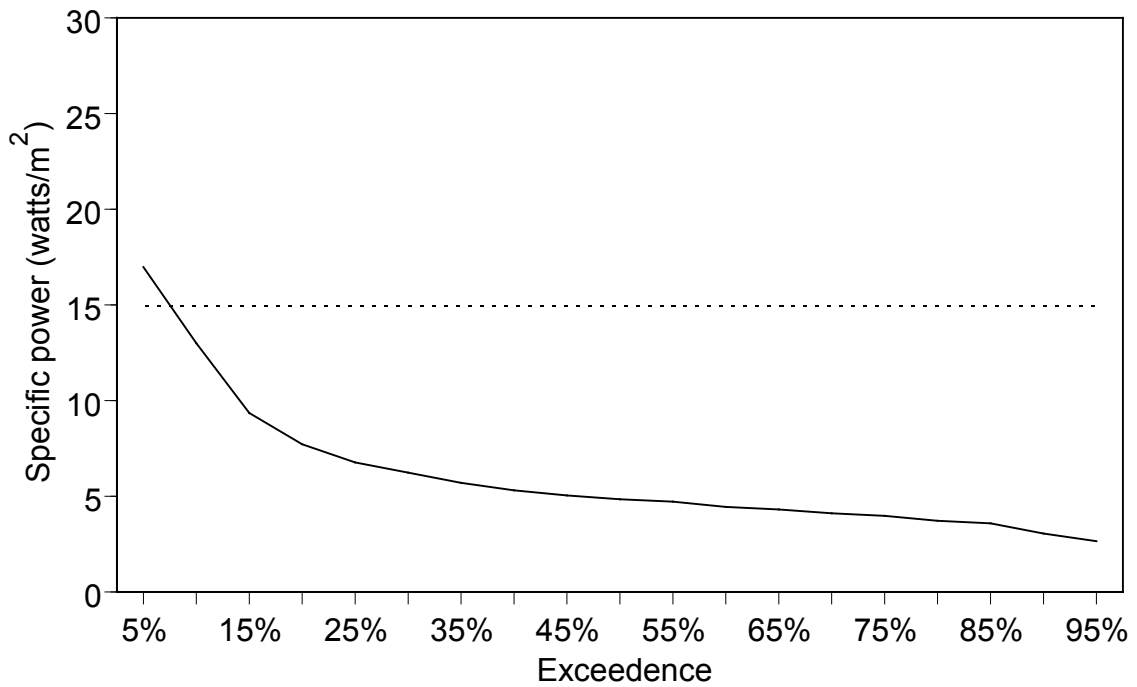


Figure 30.—Specific power for Driggs River at Germfask.

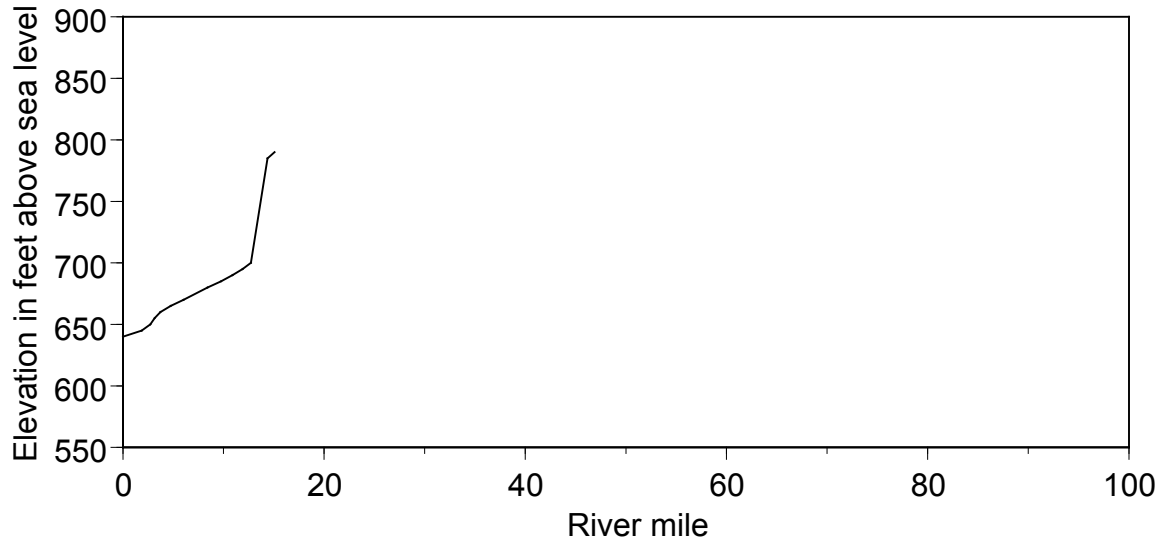


Figure 31.—Marsh Creek elevation in feet above sea level by river mile.

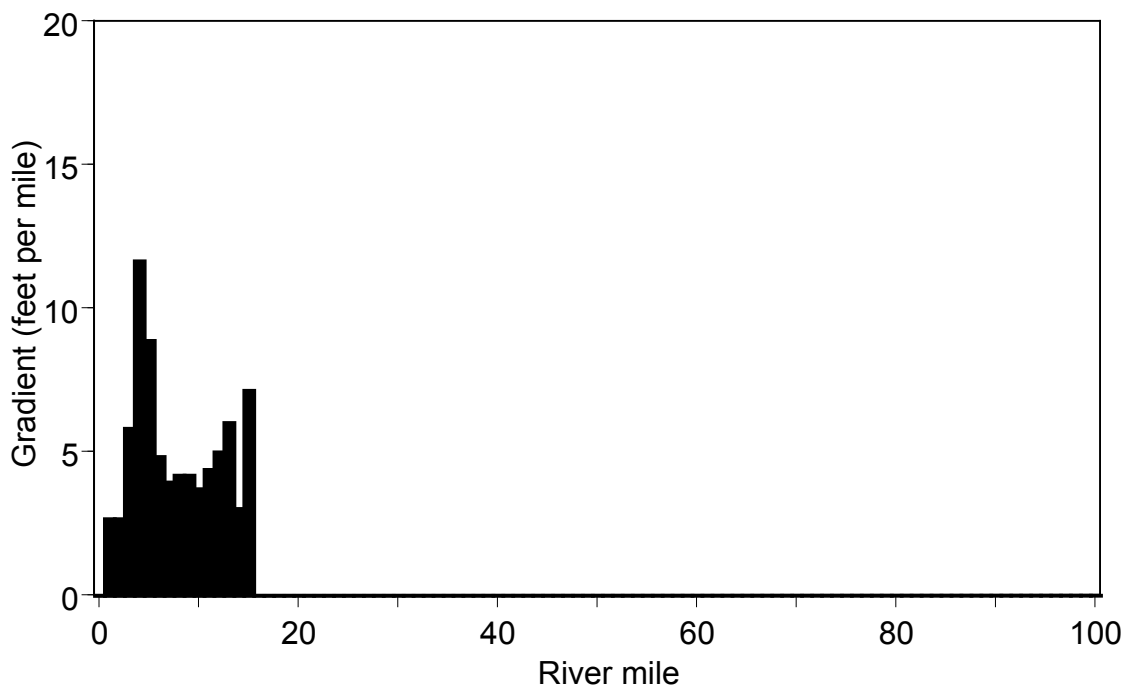


Figure 32.—Marsh Creek gradient in feet per river mile.

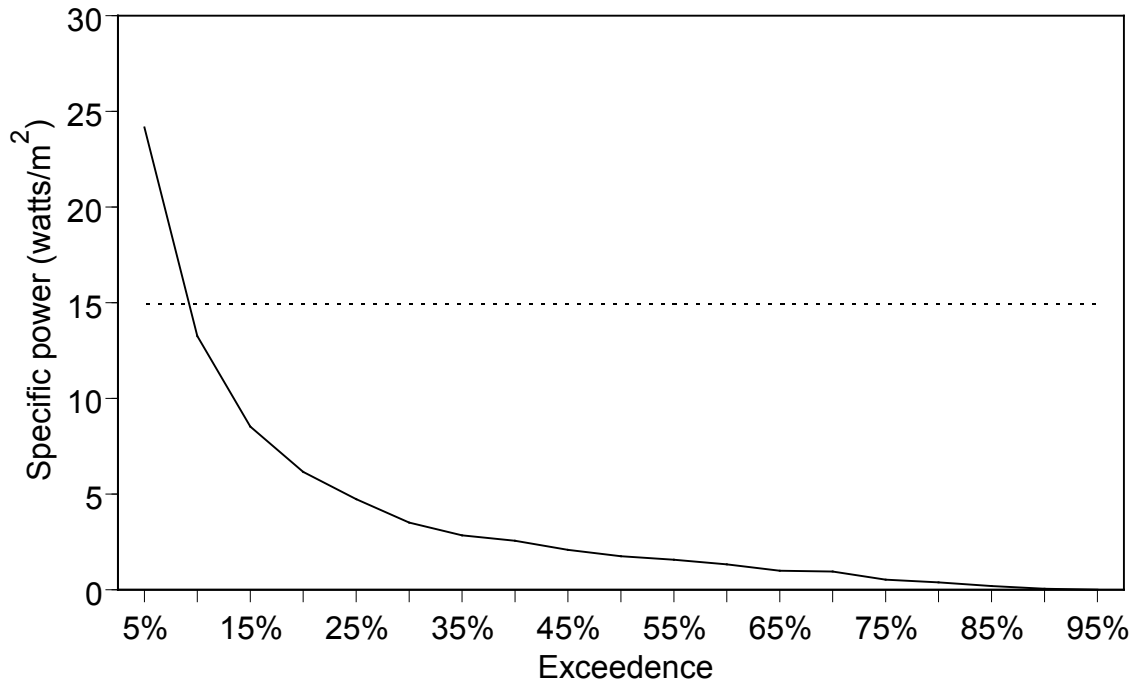


Figure 33.—Specific power for Marsh Creek near Shingleton.

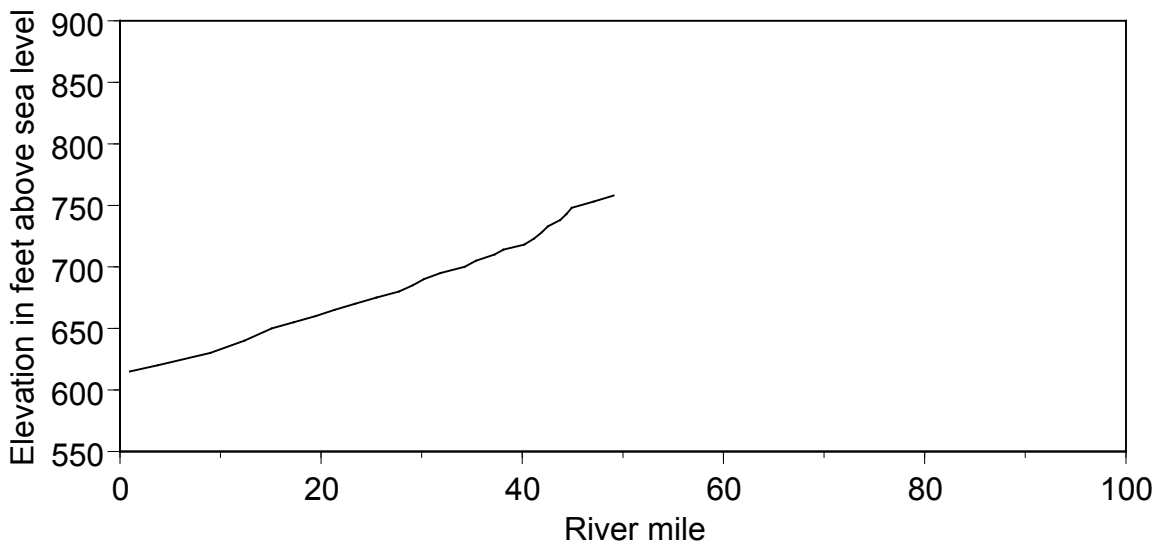


Figure 34.—Specific power for West Branch Manistique River elevation in feet above sea level by river mile.

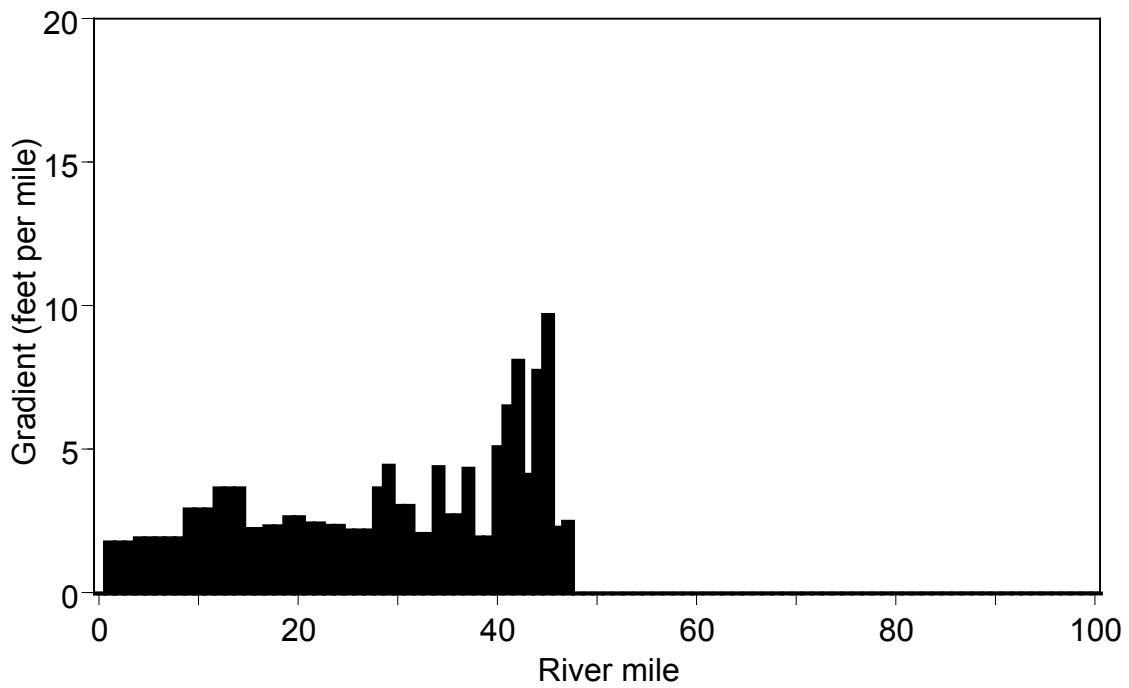


Figure 35.—West Branch Manistique River gradient in feet per river mile.

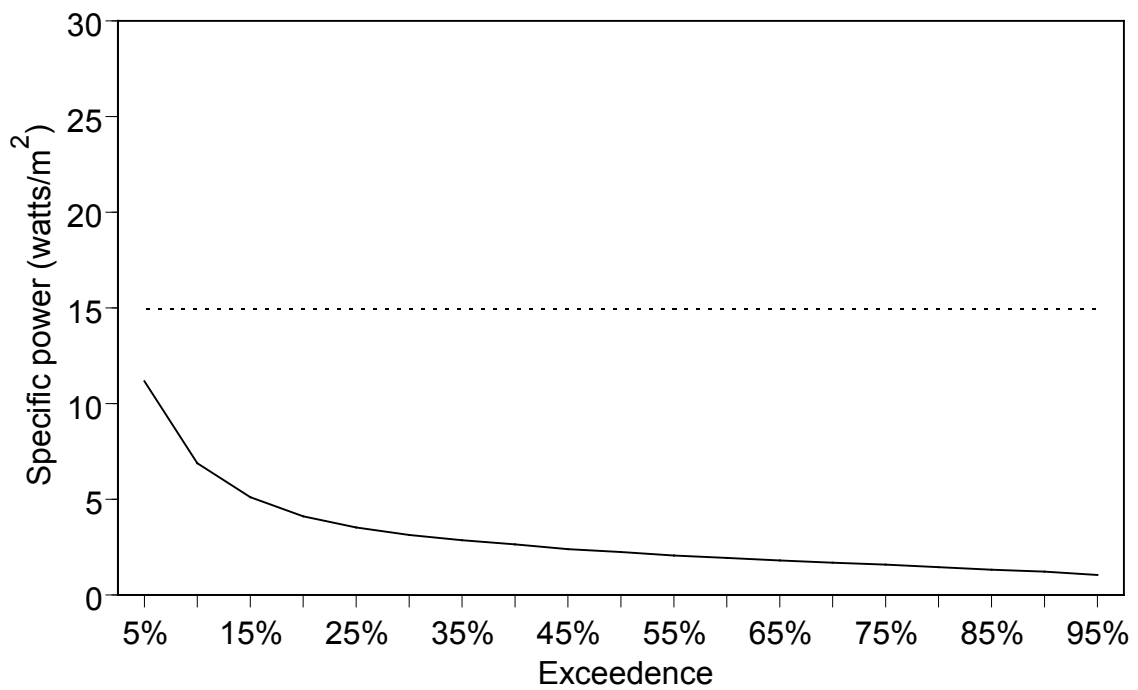


Figure 36.—Specific power for West Branch Manistique River near Manistique.

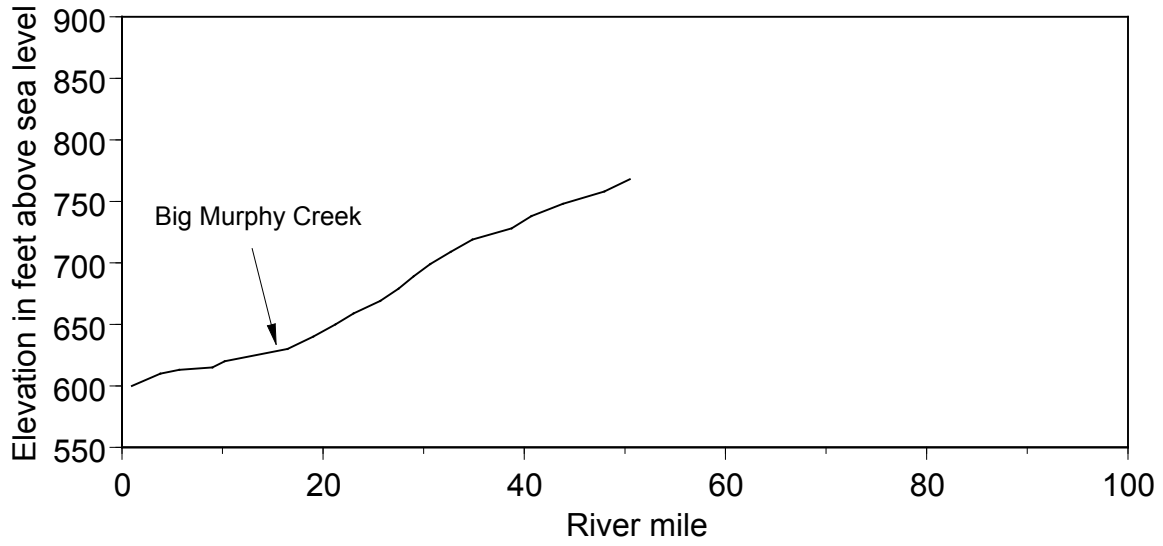


Figure 37.—Tributaries, Indian River elevation in feet above sea level by river mile.

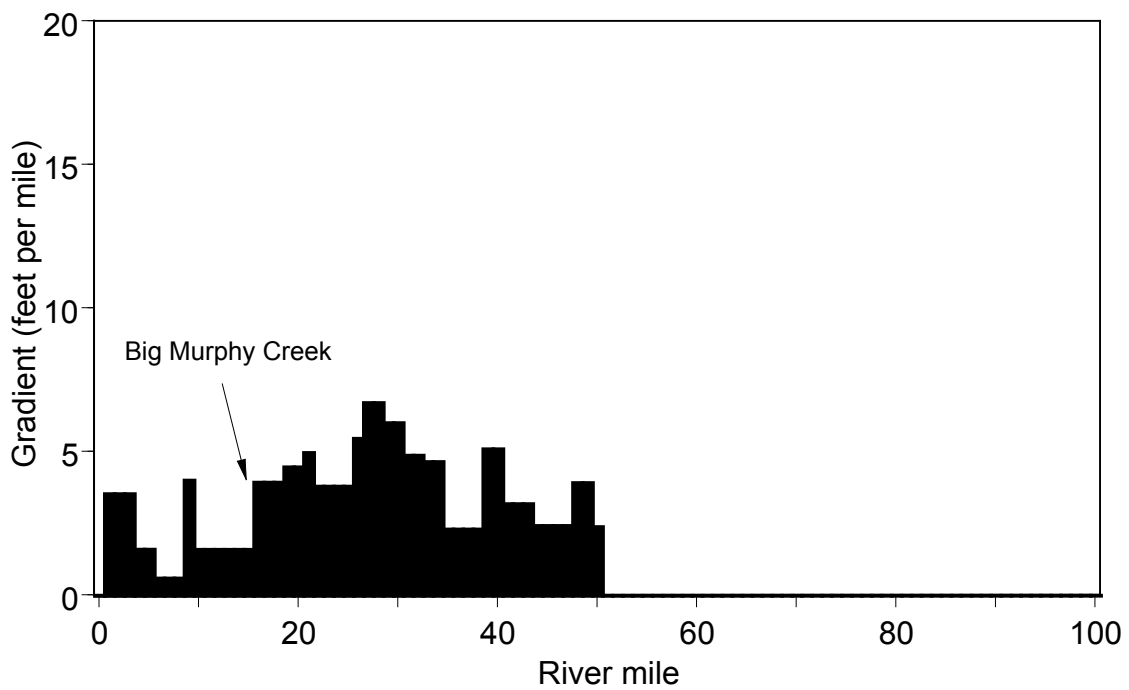


Figure 38.—Tributaries, Indian River gradient in feet per river mile.

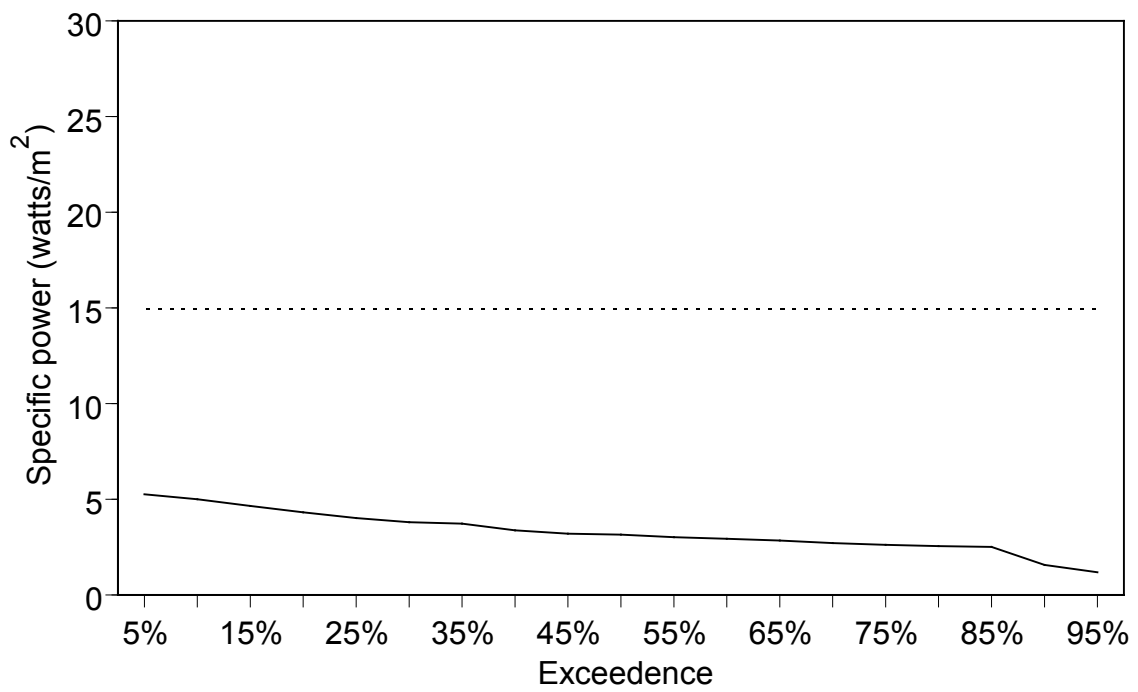


Figure 39.—Specific power for Indian River near Manistique.

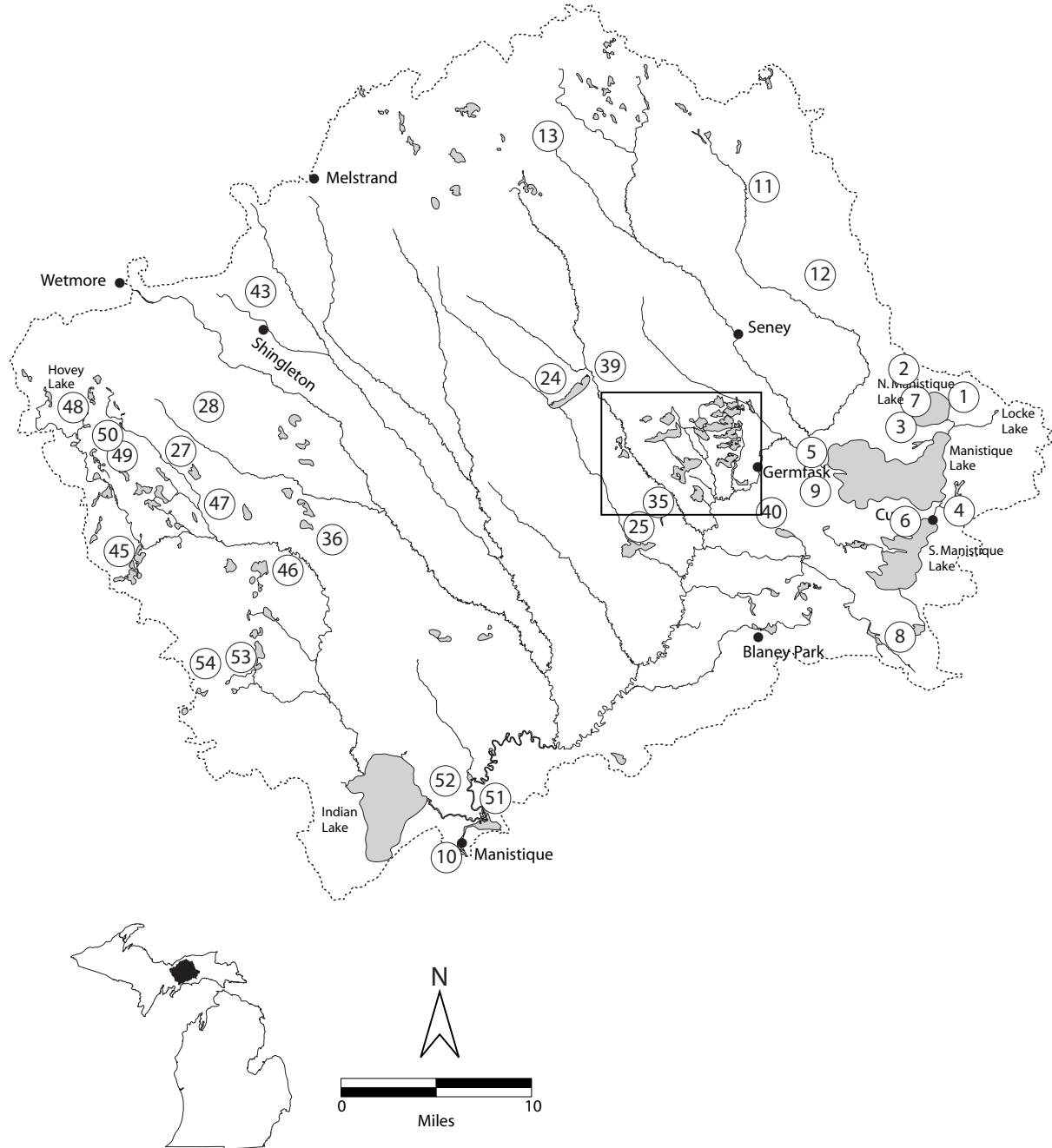


Figure 40.—Dams located within the Manistique River watershed. Boxed in area is Seney Wildlife Refuge dam system, see Figure 41 for close up of this dam system. Table 5 provides descriptions of dams indicated in Figures 40 and 41.

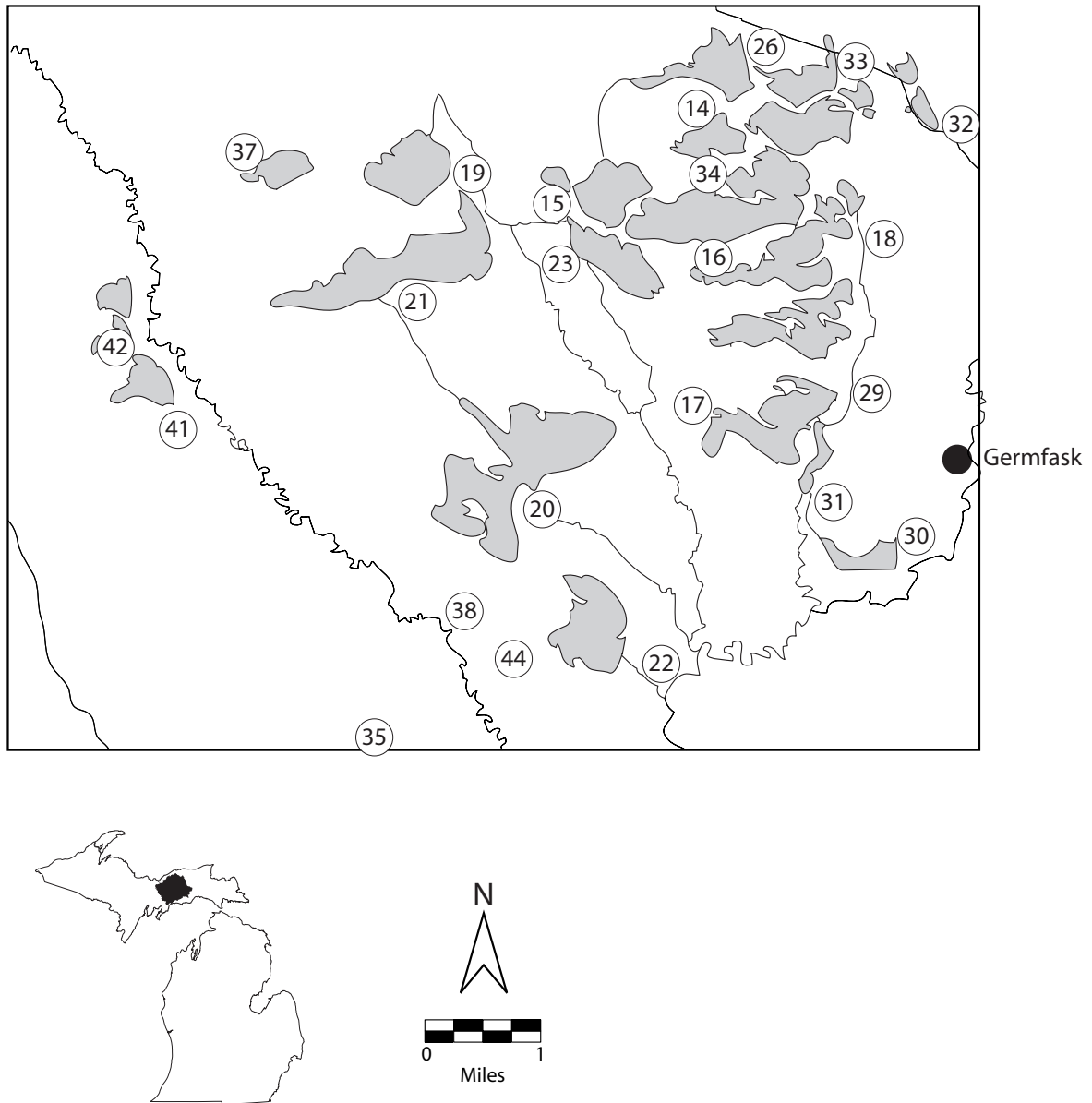


Figure 41.—Dams within the Seney Wildlife Refuge. See Figure 40 for dams outside the Seney Wildlife Refuge and Table 5 for dam descriptions.

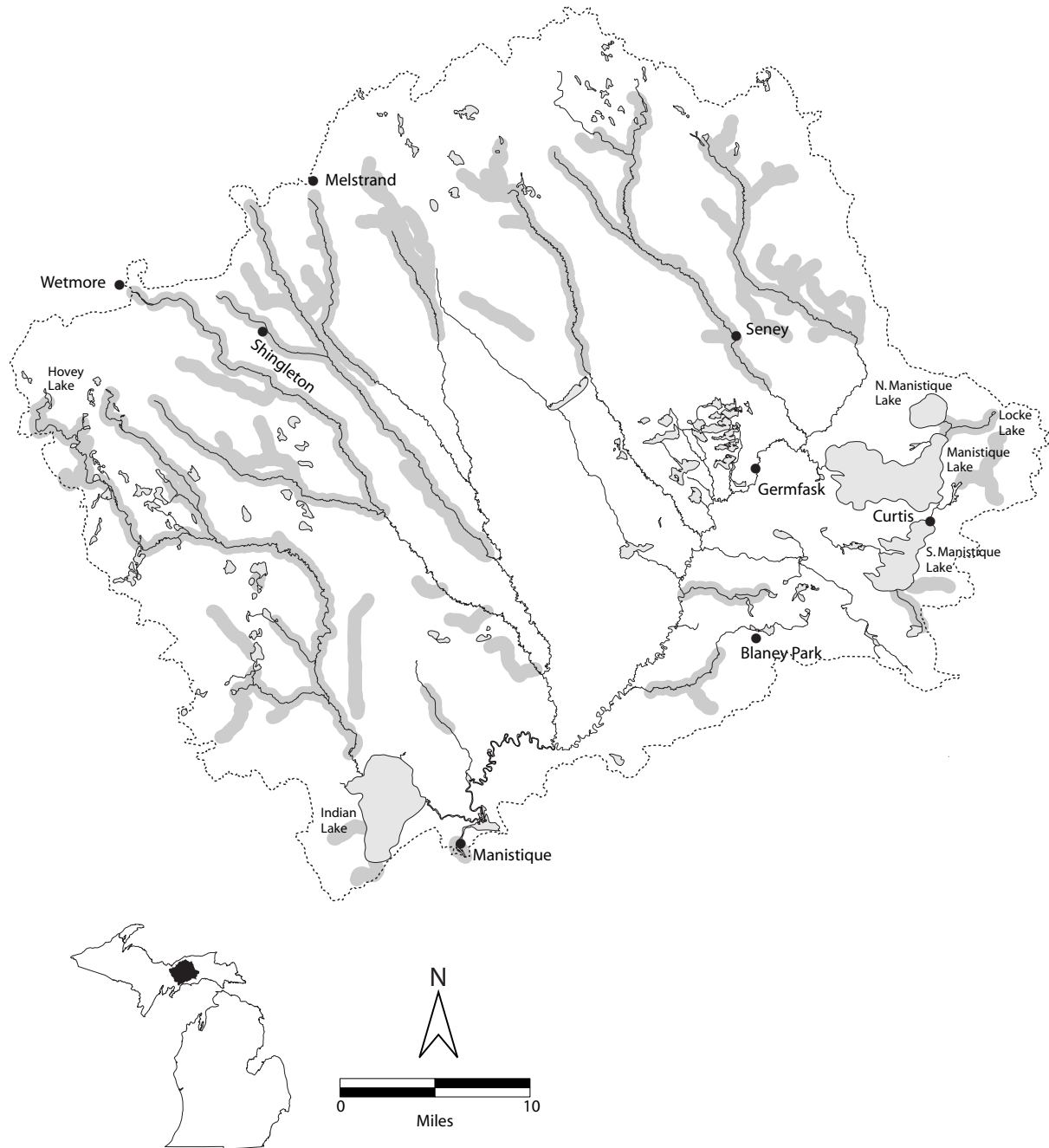


Figure 42.—Michigan Department of Environmental Quality, Water Division, water quality standards for enforcement of the Natural Resources and Environment protection act (1994 PA 451, part 31). Coldwater designation is shown in thick grey lines.

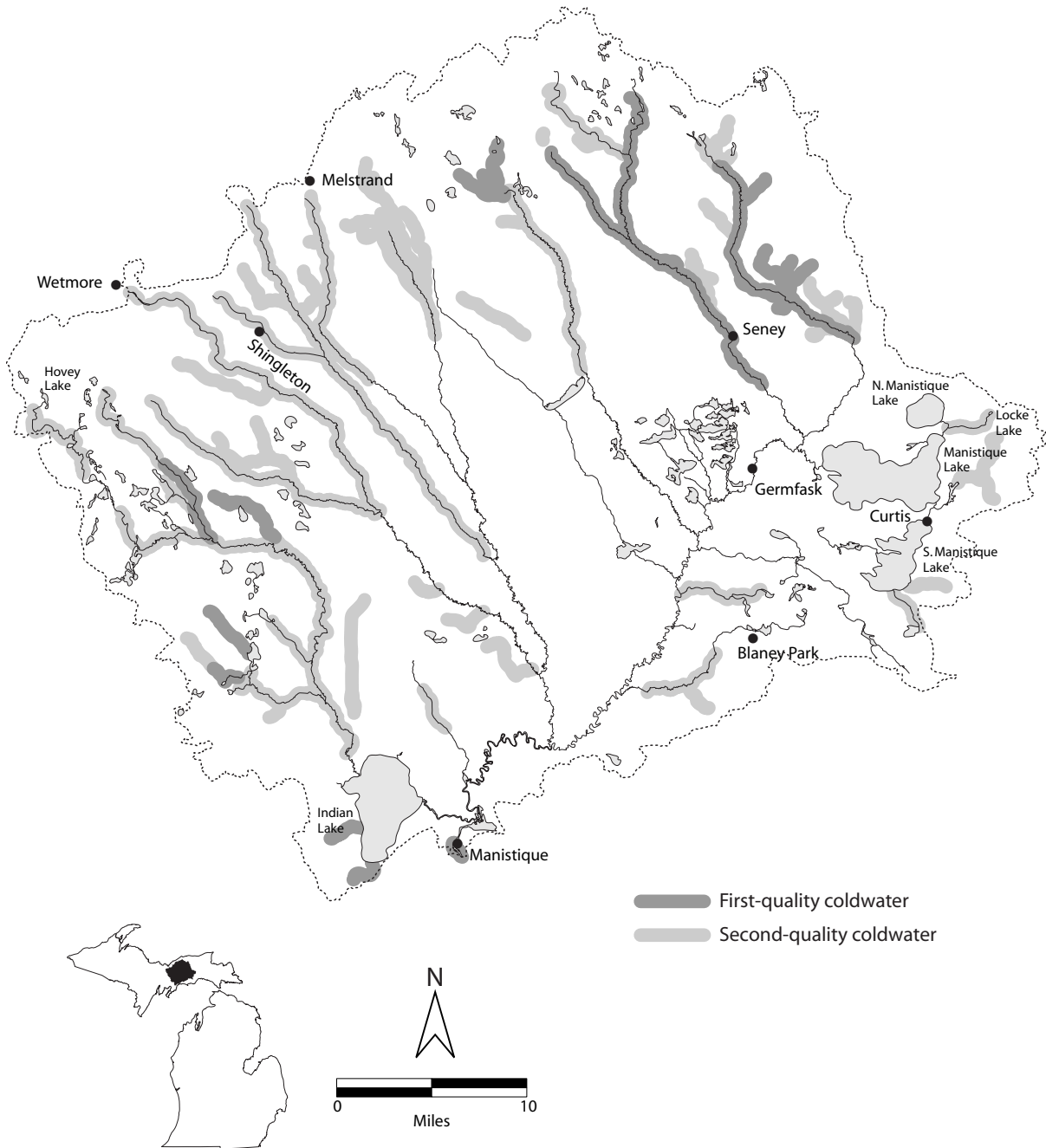


Figure 43.—Michigan Department of Natural Resources, Fisheries Division 1967 classification of the Manistique River watershed.