

PLATTE RIVER WATERSHED

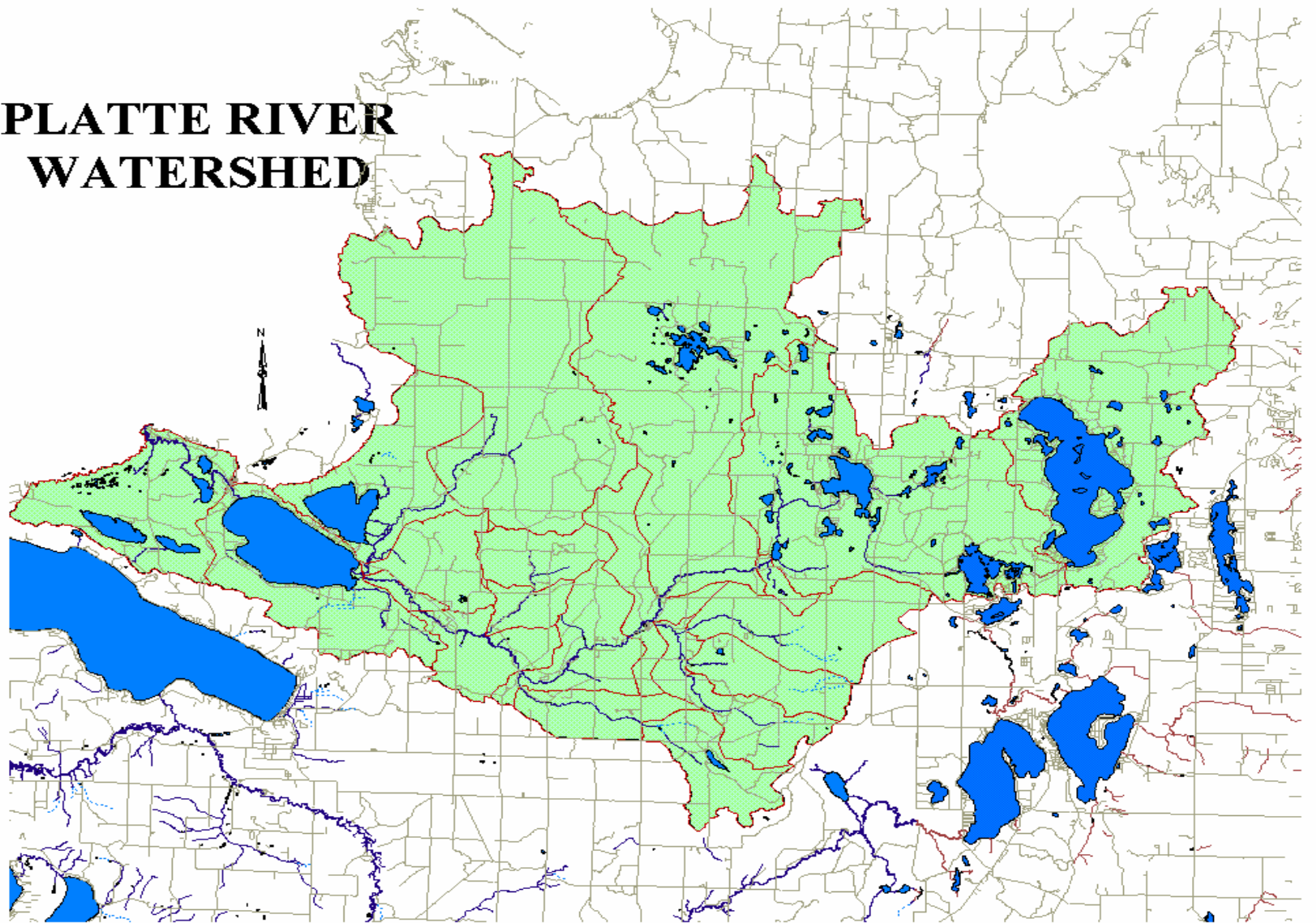


Figure 1. Map of Platte River Watershed.

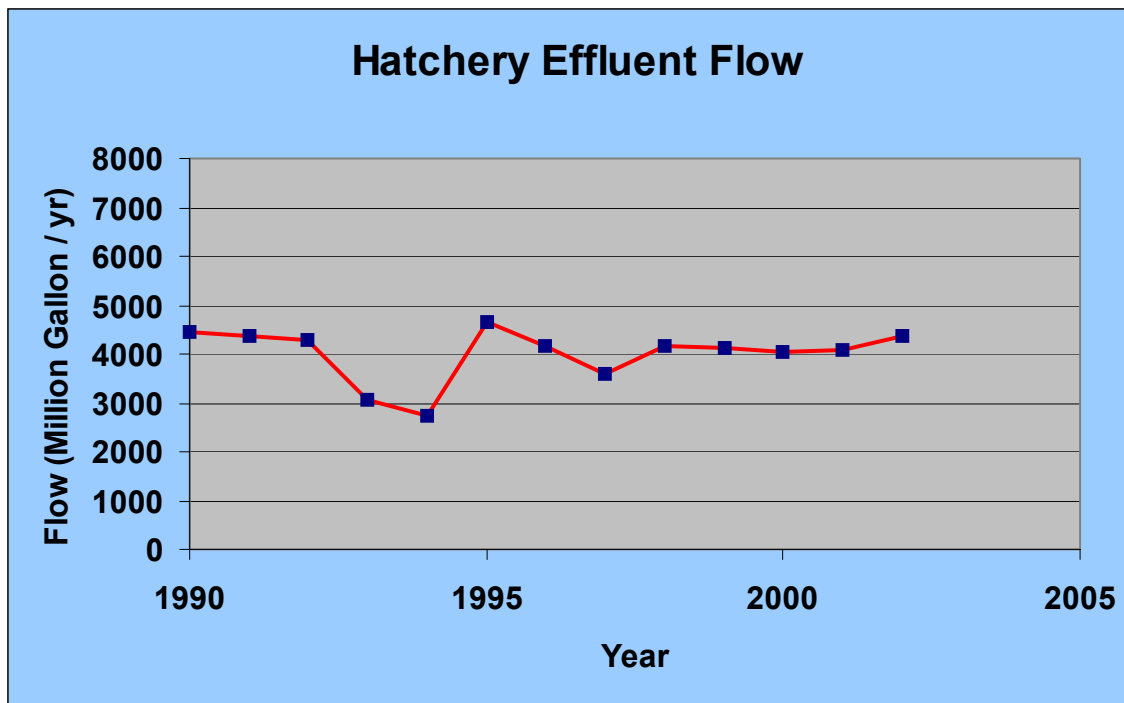


Figure 2. Long-Term Trend of Hatchery Flow.

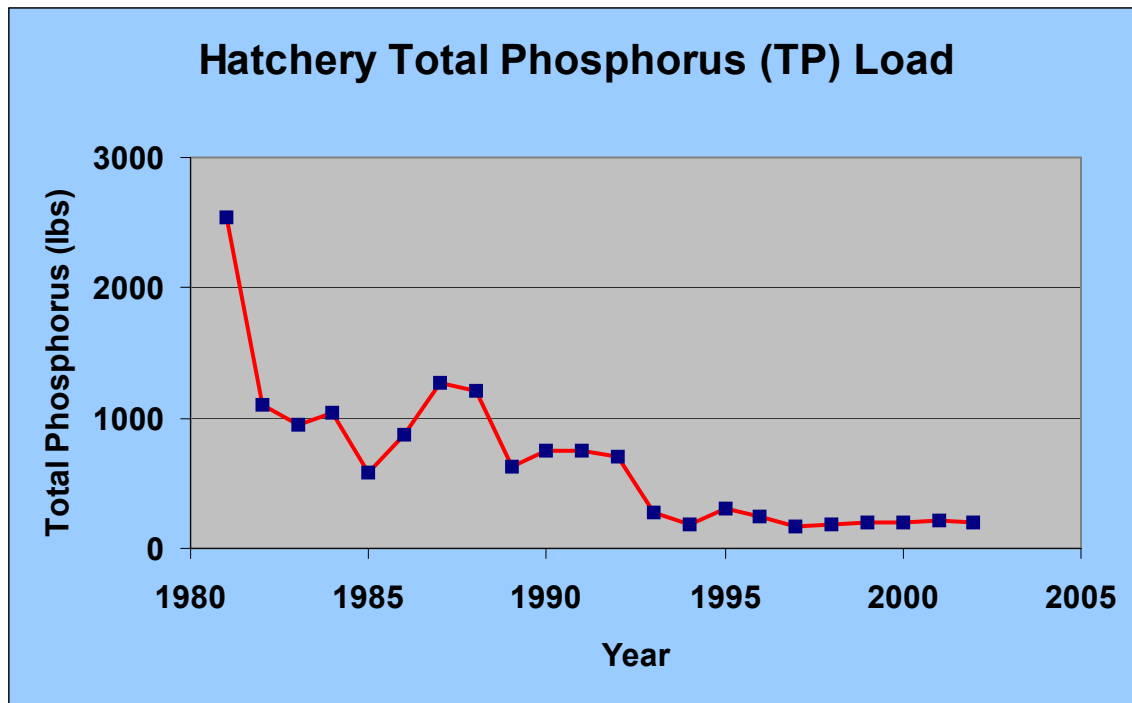


Figure 3. Long-Term Trend of Hatchery Net Total Phosphorus Loads.

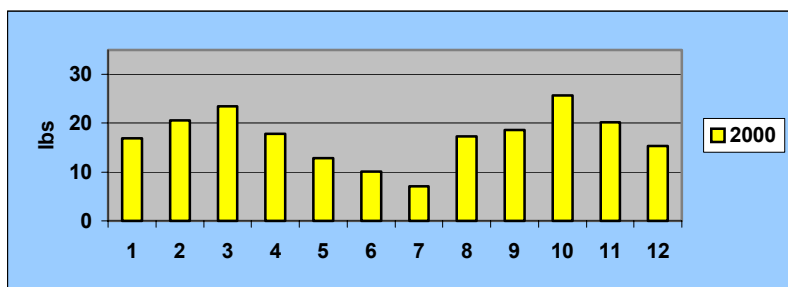
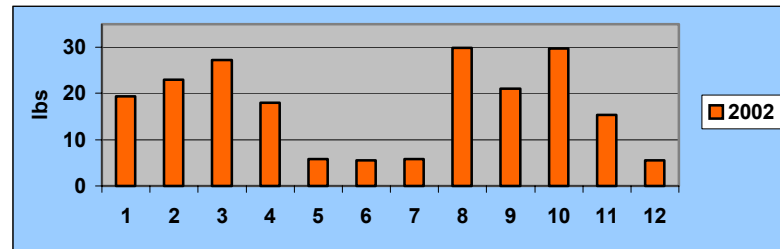
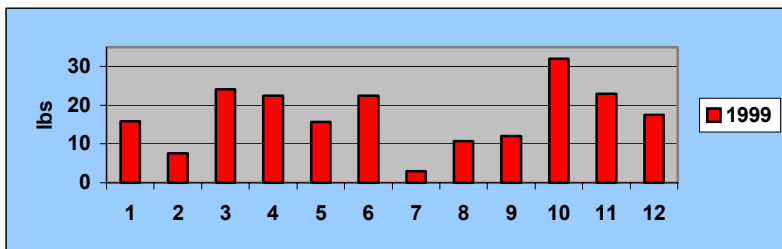
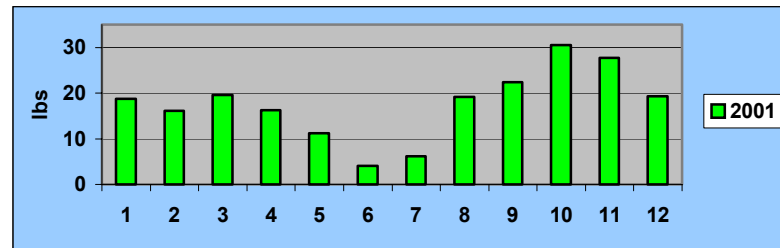
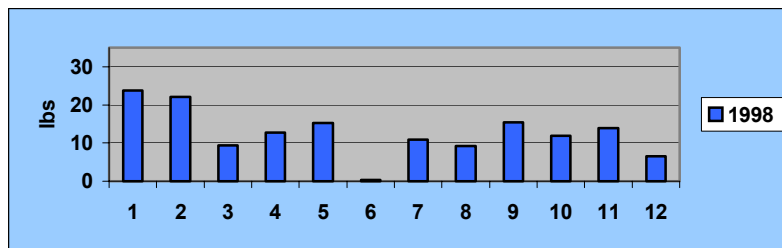


Figure 4. Monthly Hatchery Net Total Phosphorus Loads for 1998 to 2002.

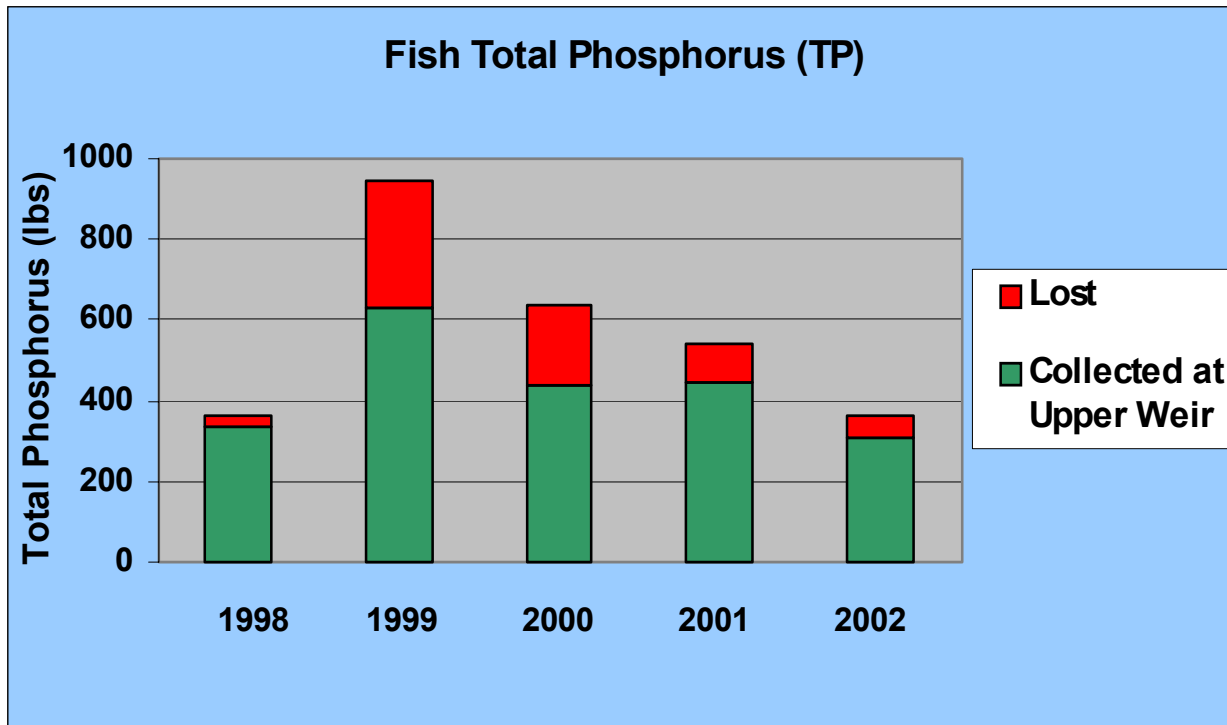


Figure 5. Phosphorus Associated with Salmon that Pass the Lower Weir for 1998 to 2002.

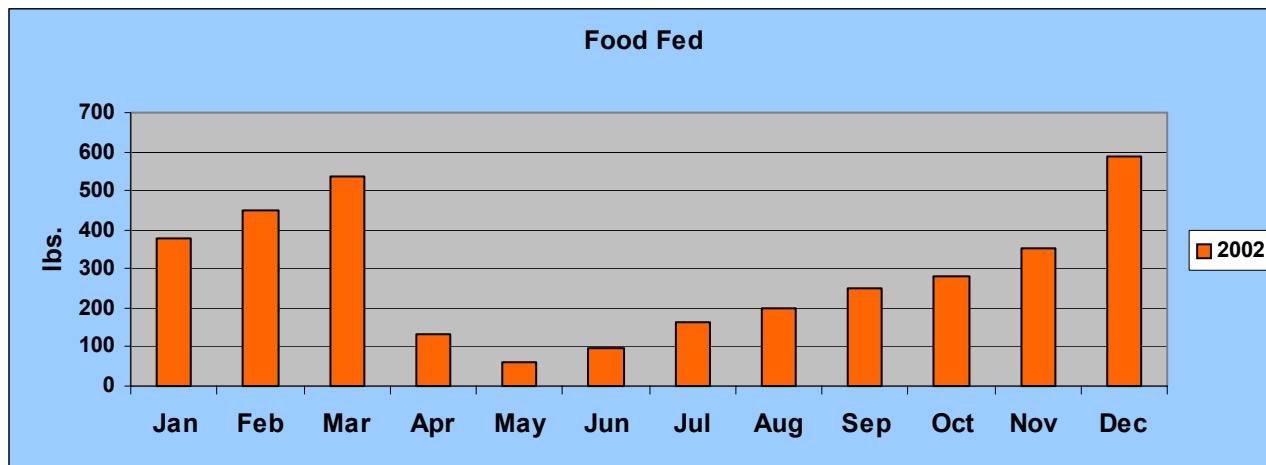
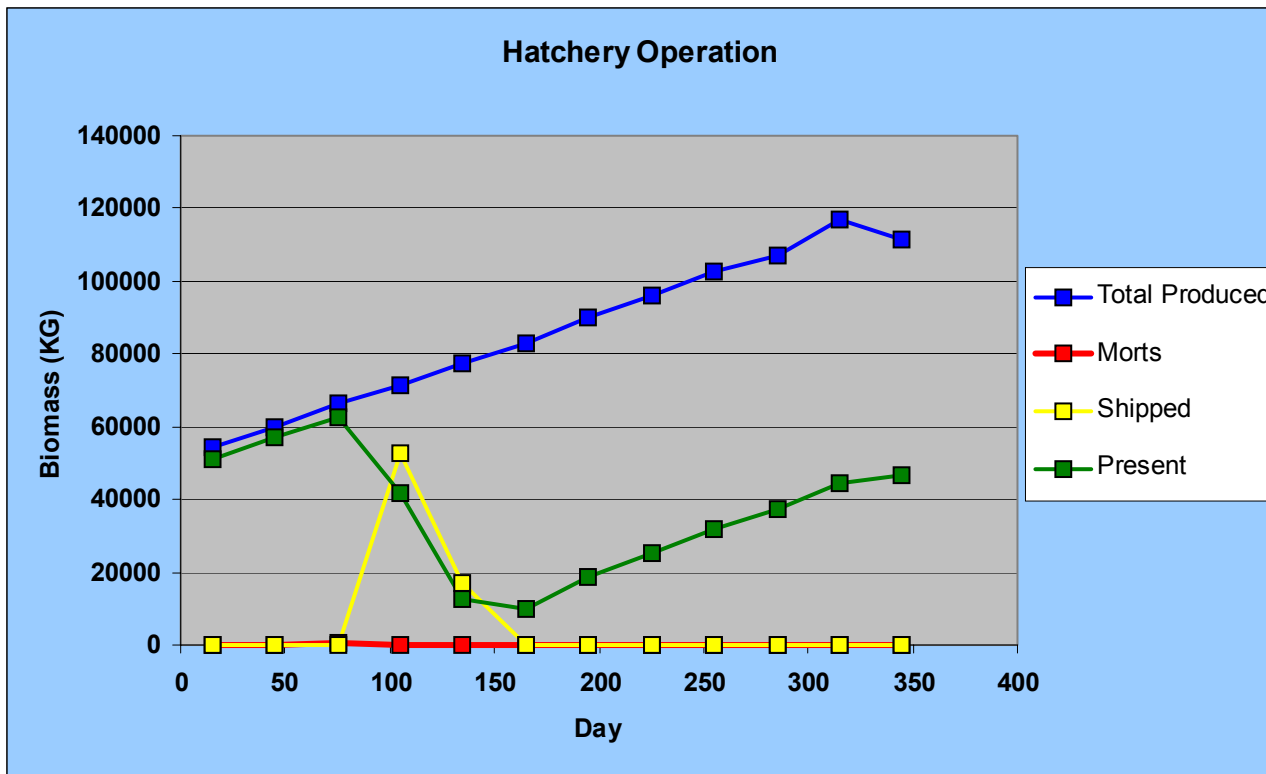


Figure 6. Hatchery Fish Production and Food Use for 2002.

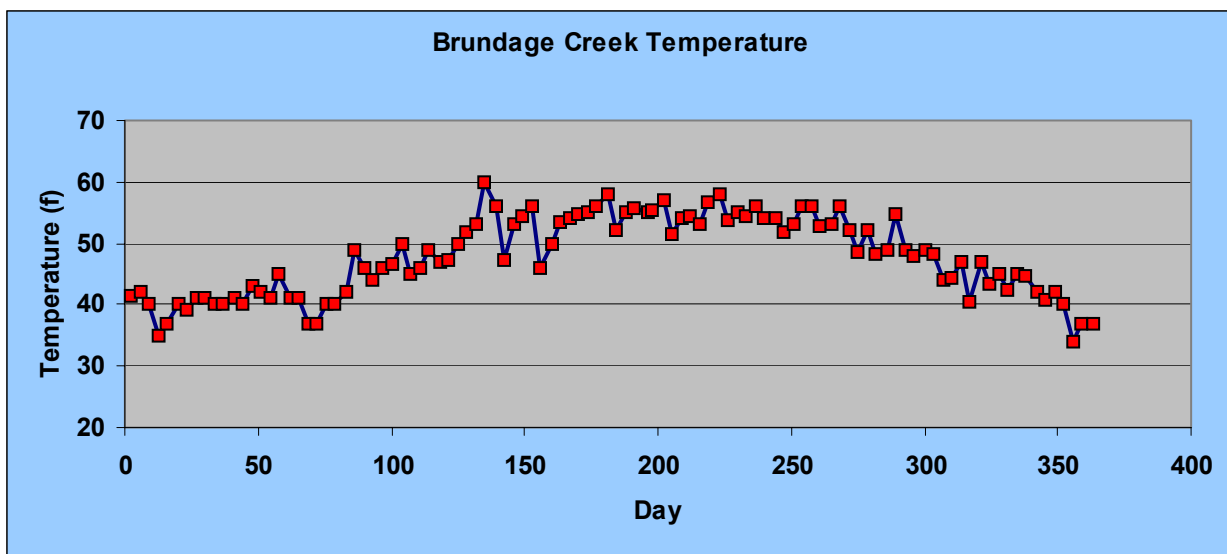
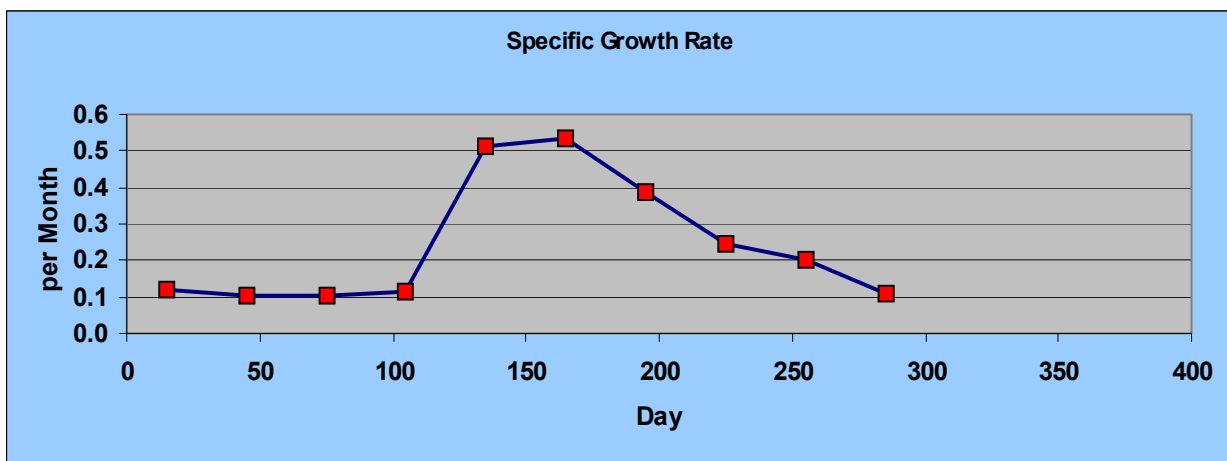
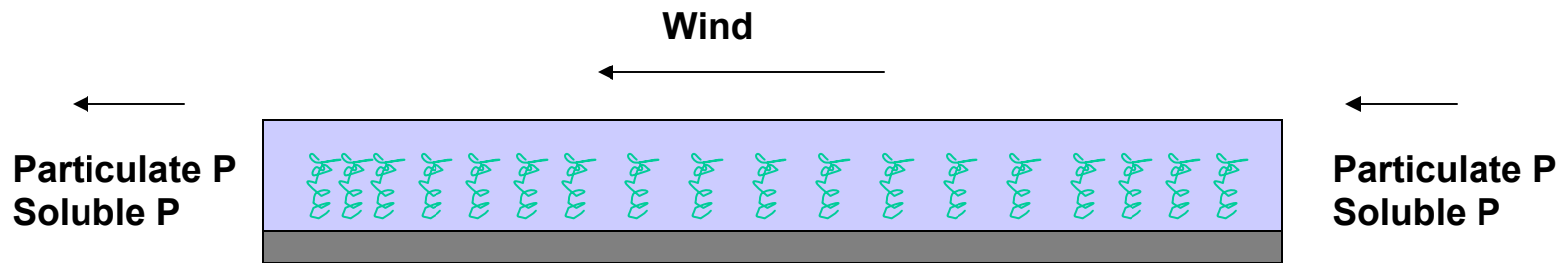


Figure 7. Fish Specific Growth Rate and Brundage Creek Temperature for 2002.

Kinetic Processes

Settling vs Resuspension
Hydrolysis vs Algal Uptake
Macrophyte Uptake and Growth vs Excretion and Sloughing
Sediment release



Measurements

Soluble and Total P
Chlorophyll
Water Fowl
Turbidity

Sediment TP
Macrophyte species, area, density, tissue P
Wind velocity and temperature
Flow

Figure 8. Processes that Affect Pond Total Phosphorus Removal Efficiency.

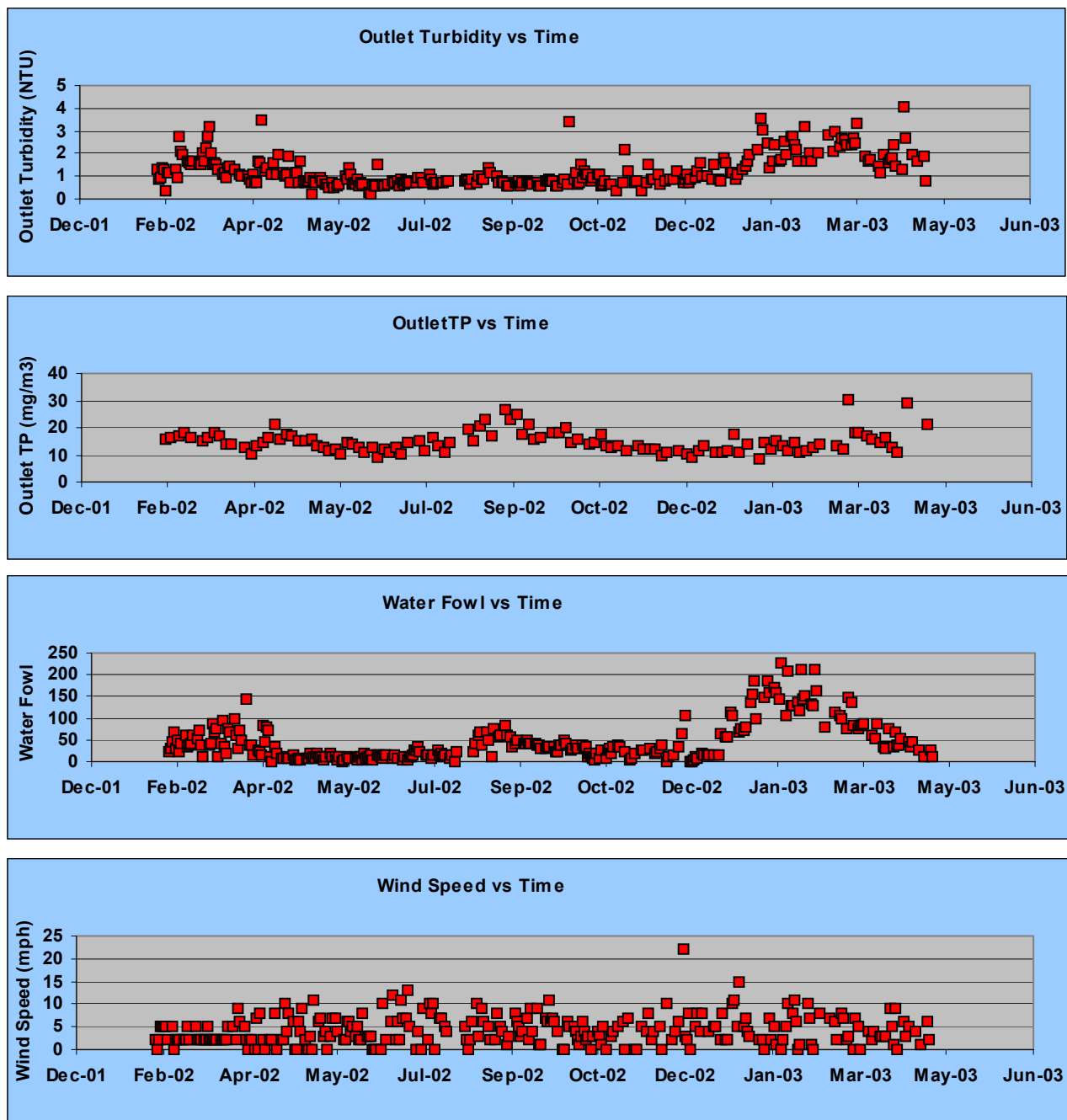


Figure 9. Time Variation of Pond Performance Parameters.

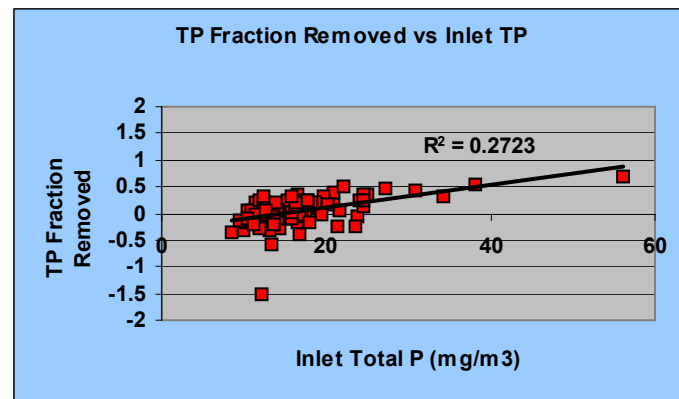
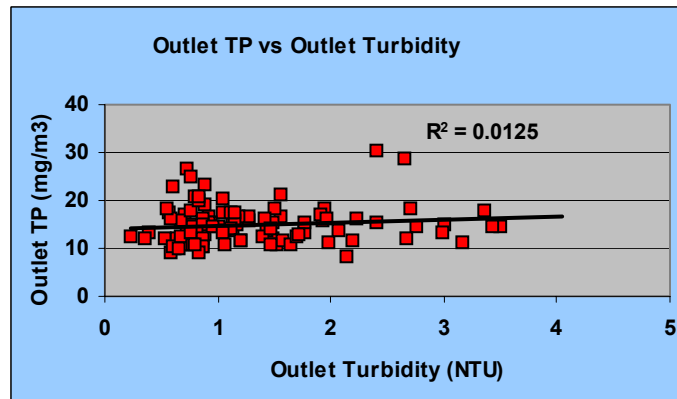
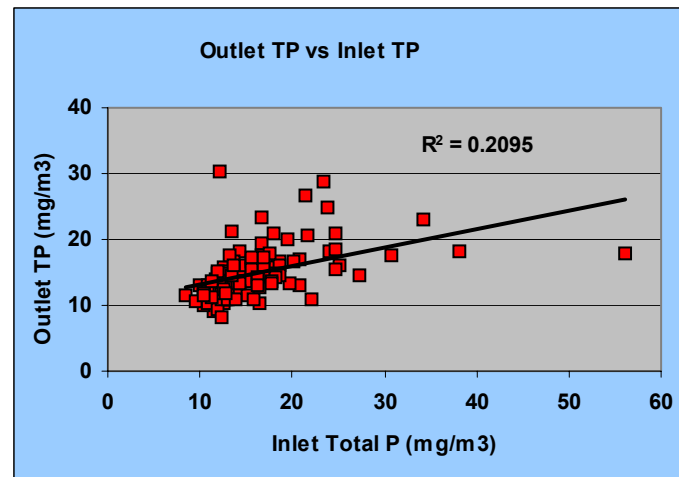
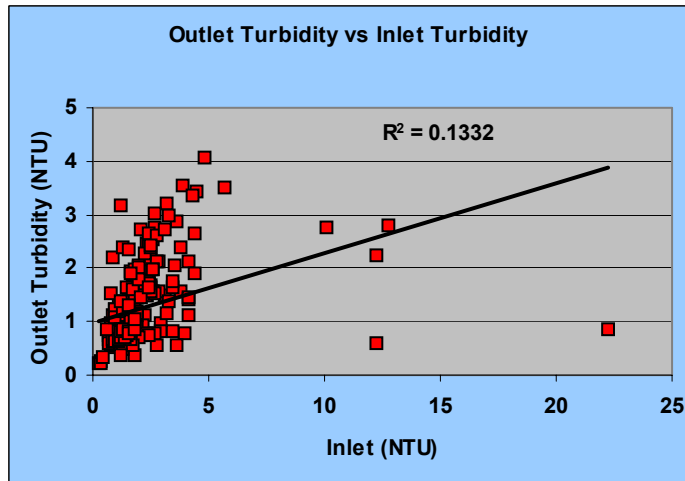


Figure 10. Plots of Various Parameters Related to Pond Performance.

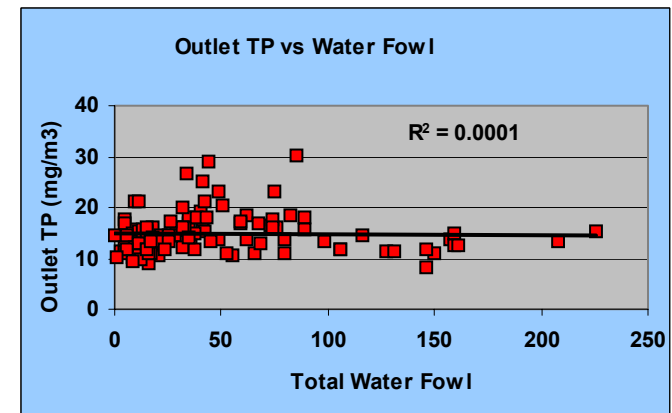
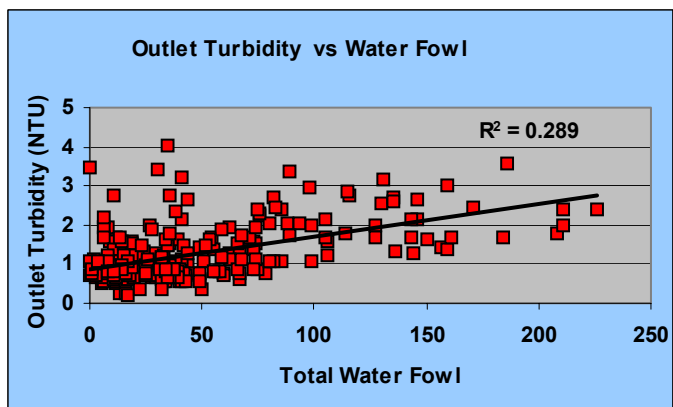
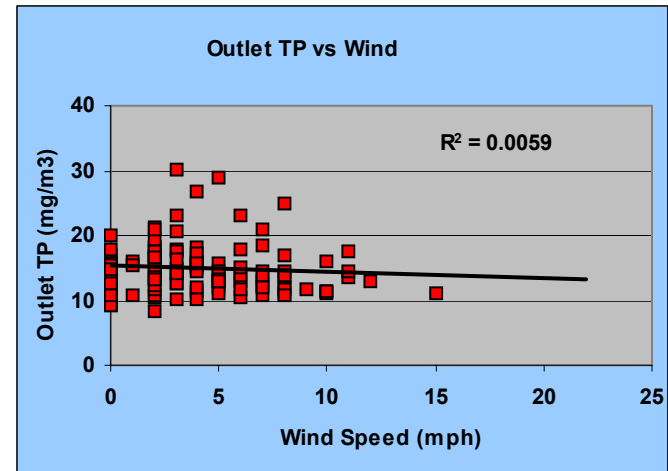
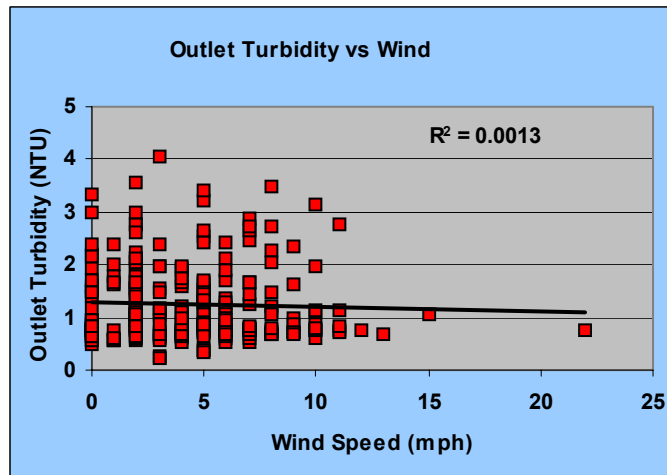
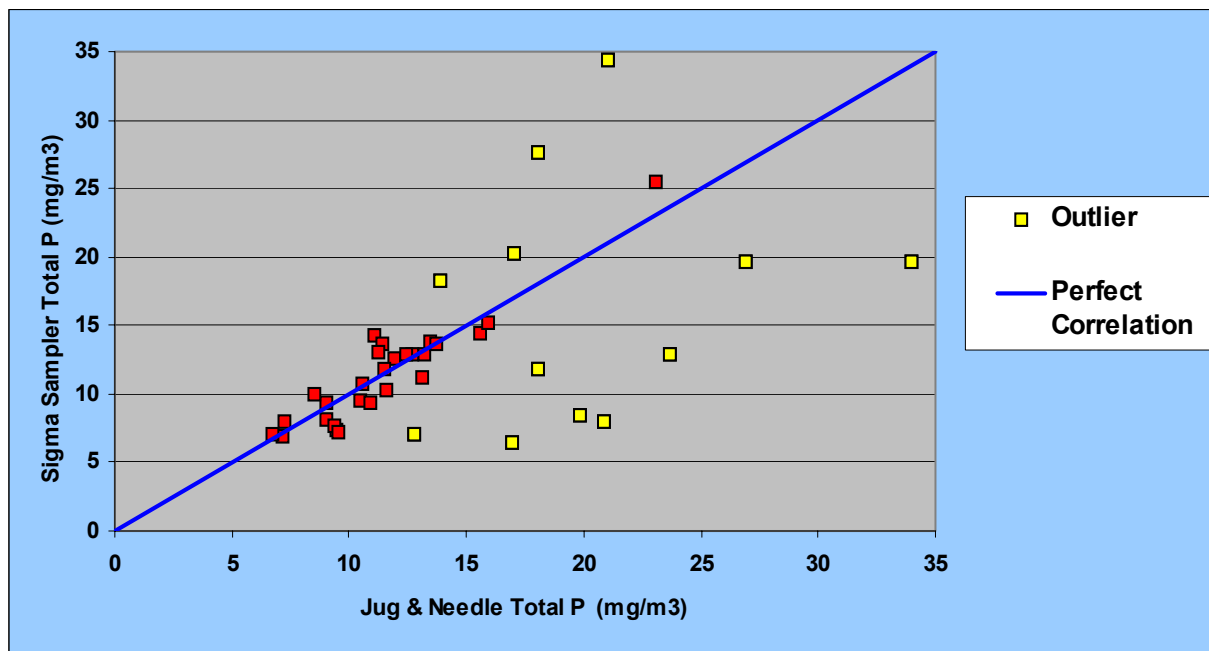


Figure 11. Pond Performance Correlations with Wind and Water Flow.



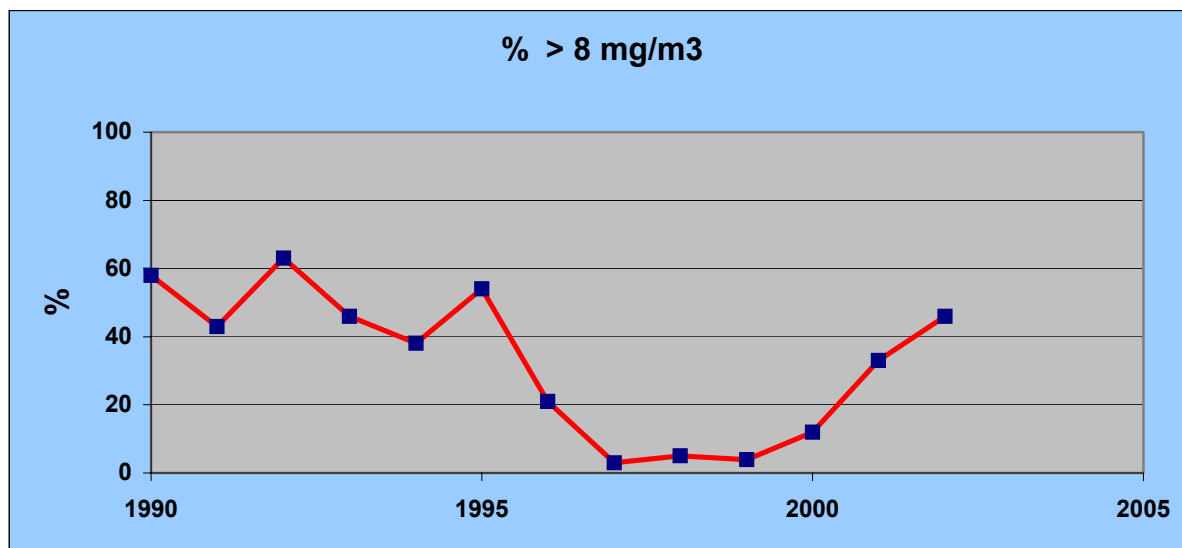
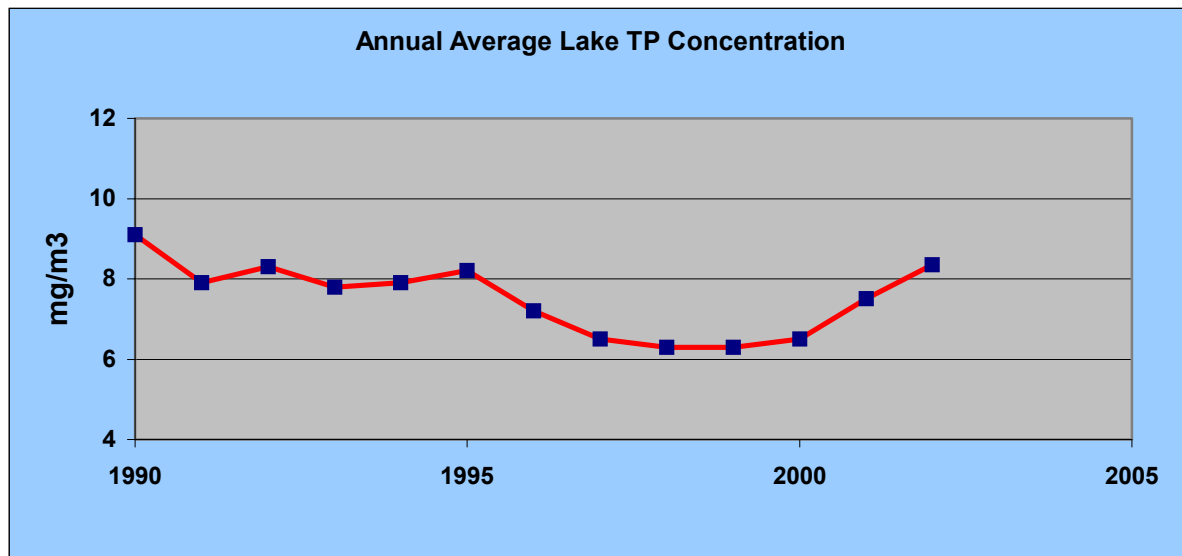


Figure 13. Long-Term Average Total Phosphorus and % > 8 mg/L in Big Platte Lake.

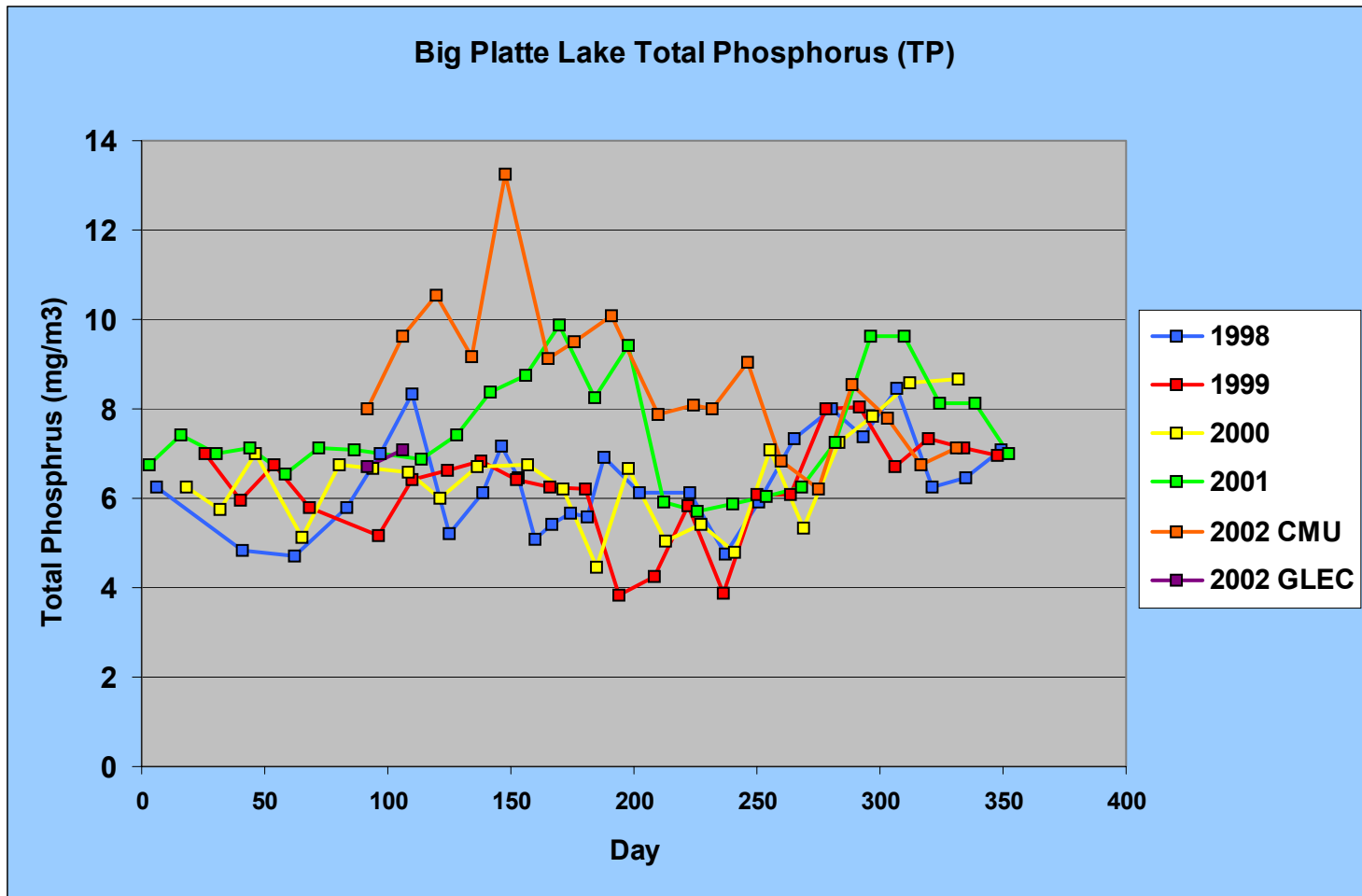


Figure 14. Volume-Weighted Total Phosphorus in Big Platte Lake for 1998 to 2002.

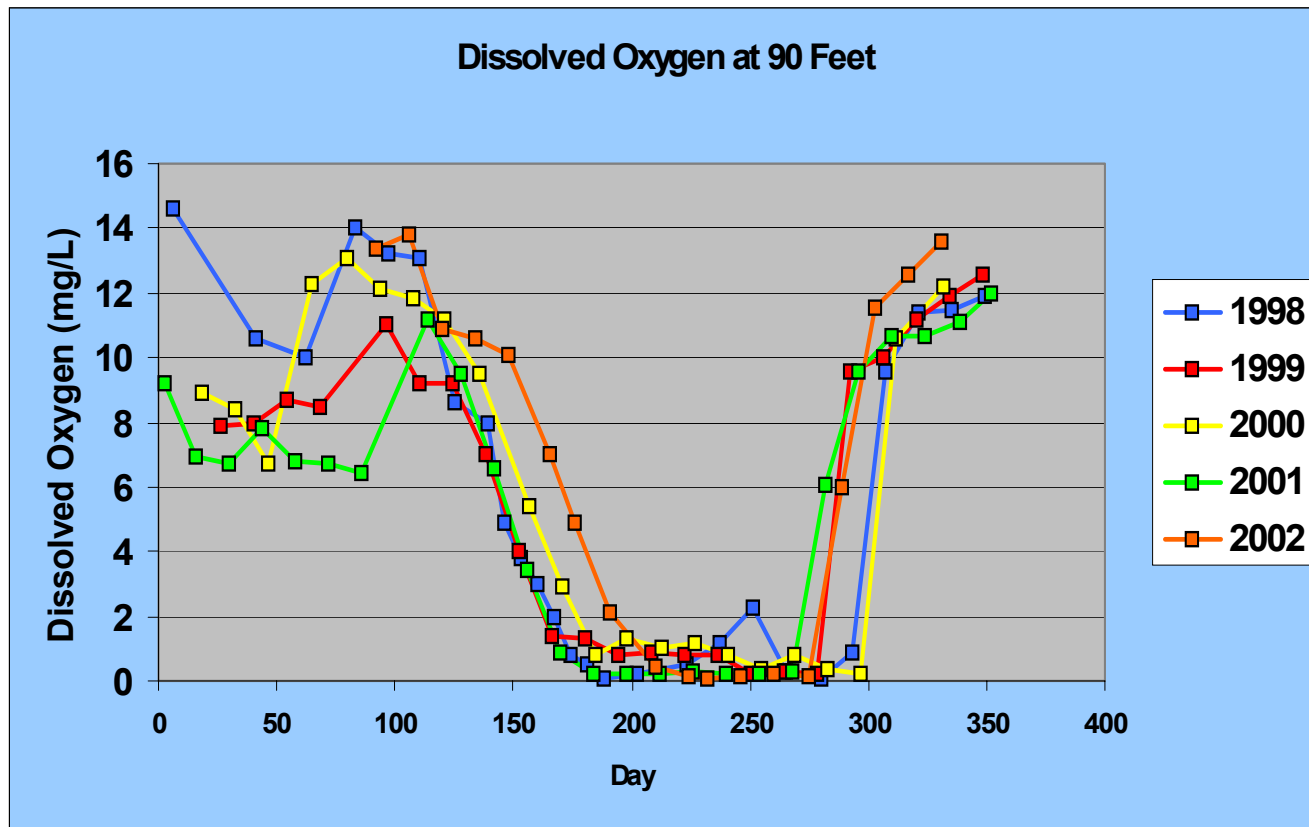


Figure 15. Dissolved Oxygen at 90 Feet in Big Platte Lake for 1998 to 2002.

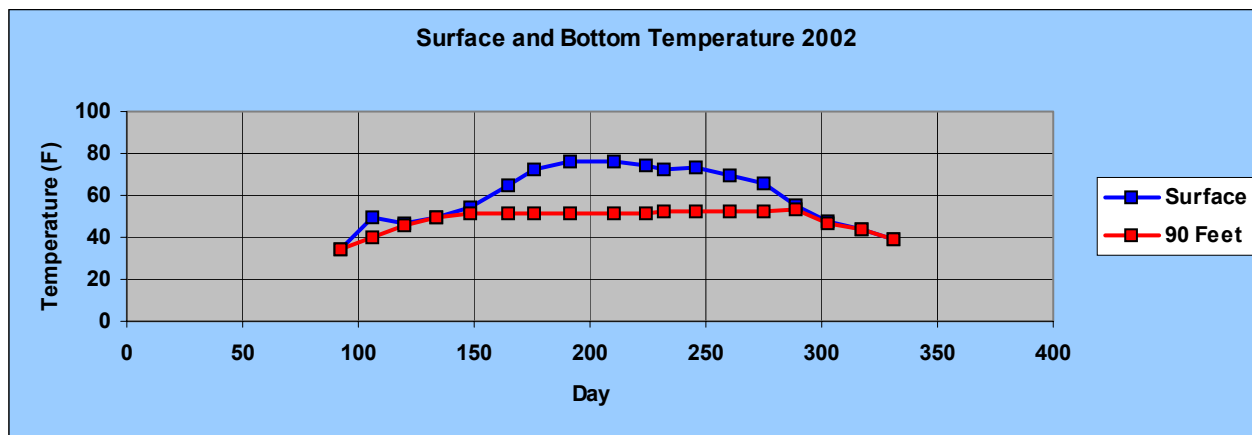
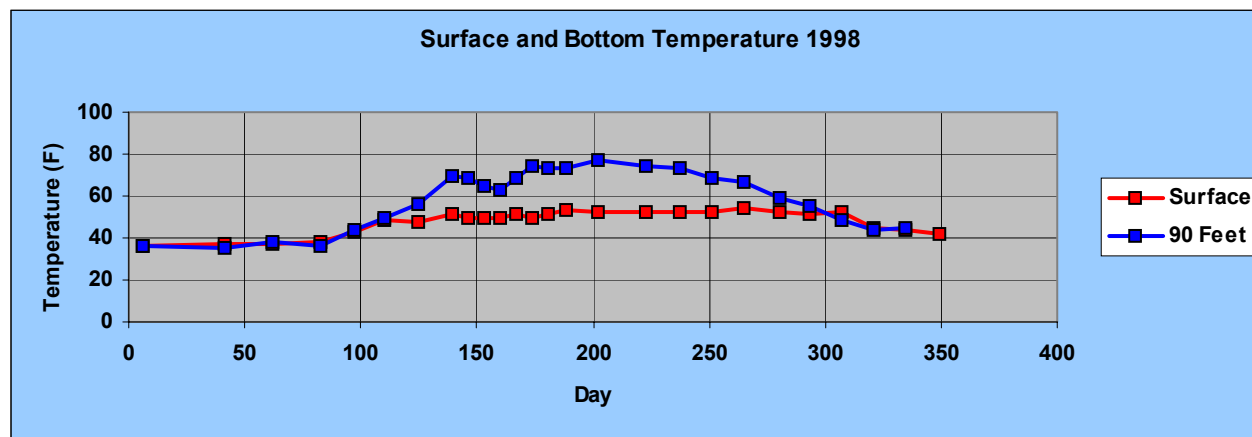
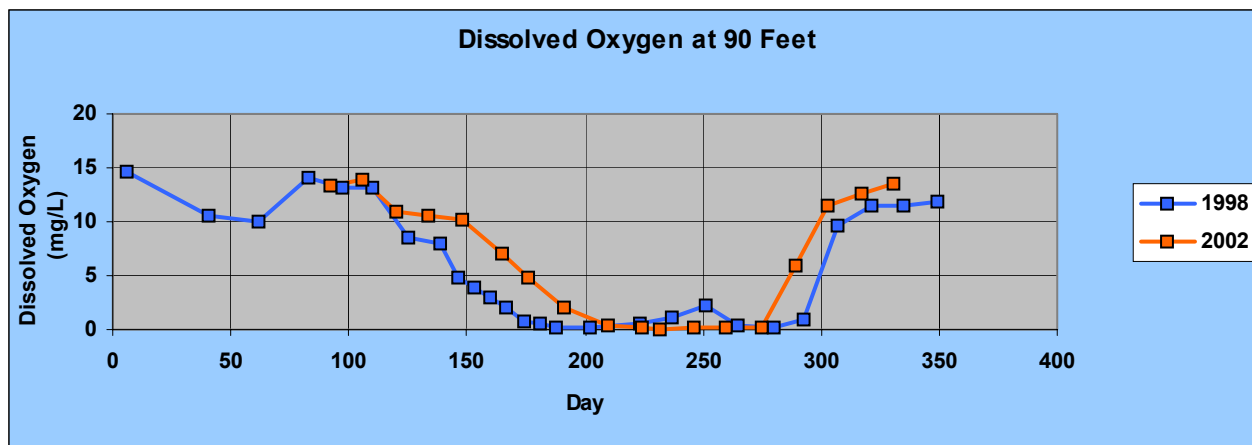


Figure 16. Surface and Bottom Dissolved Oxygen and Temperature for 1998 and 2002.

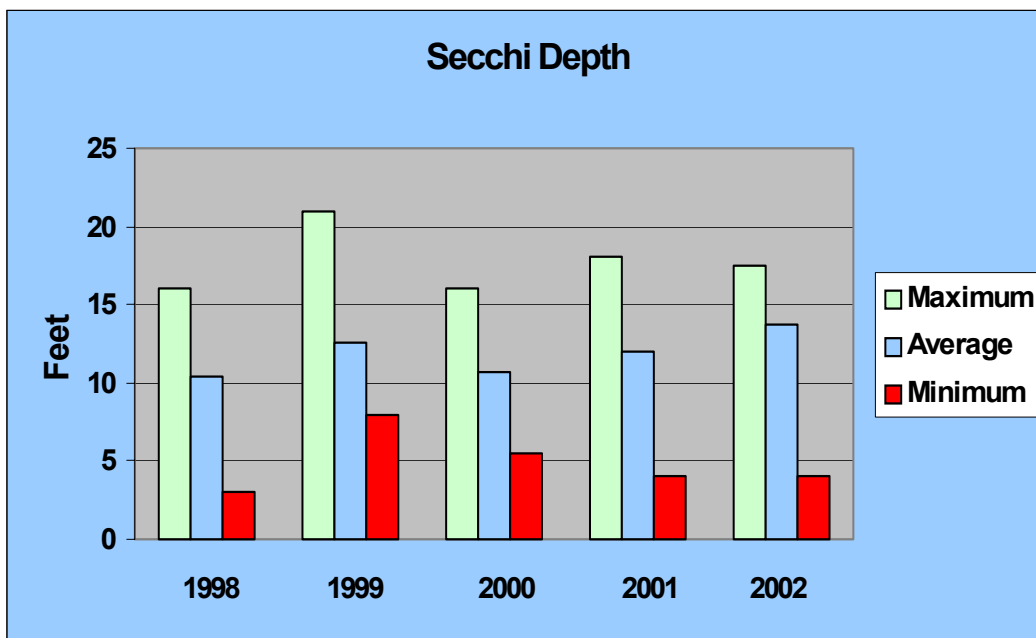


Figure 17. Secchi Depth (PLIA) in Big Platte Lake for 1998 to 2002.

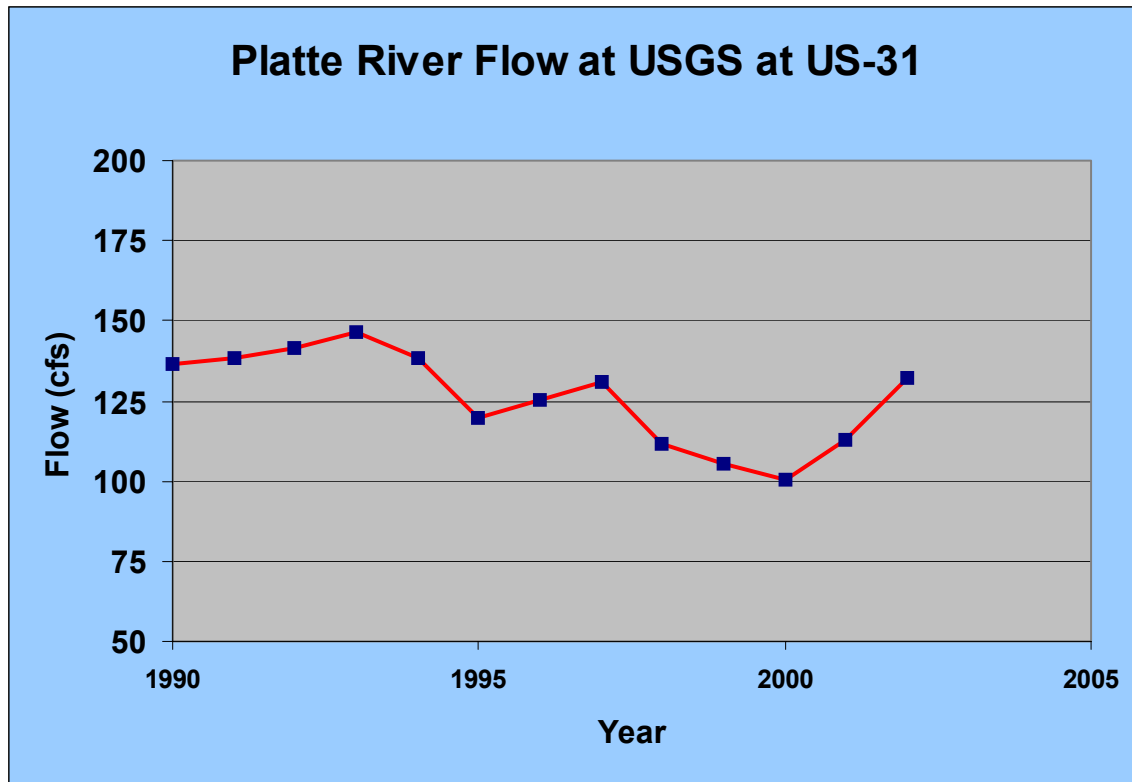


Figure 18. Long-Term Mean Annual Discharge at USGS Station at US-31.

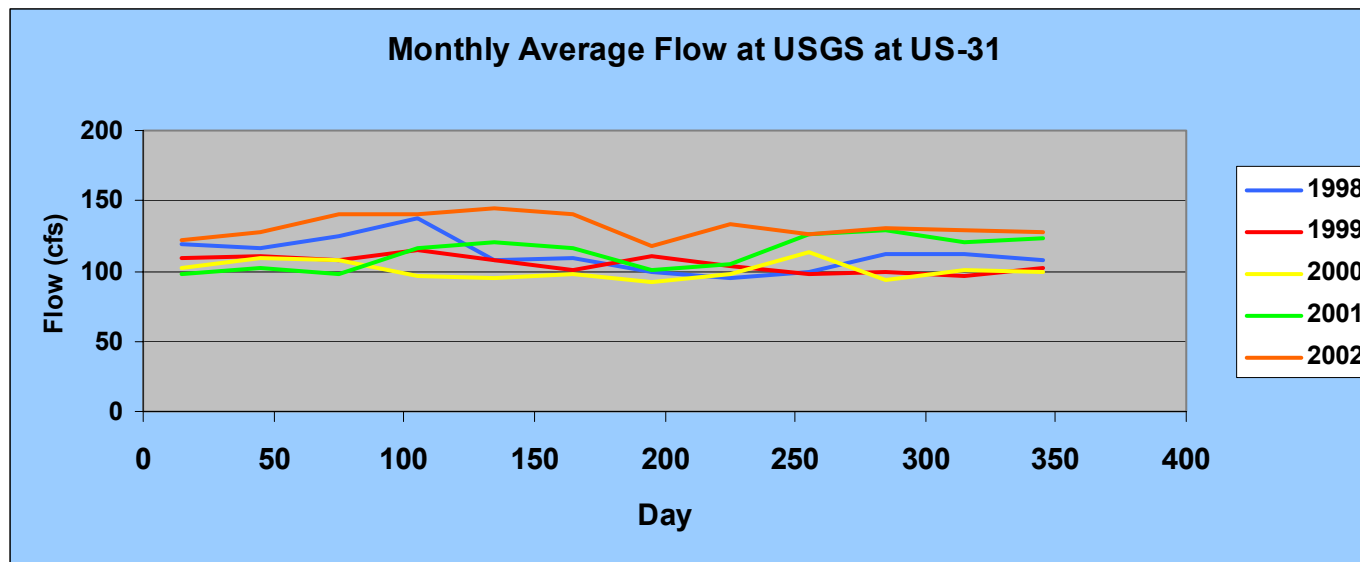
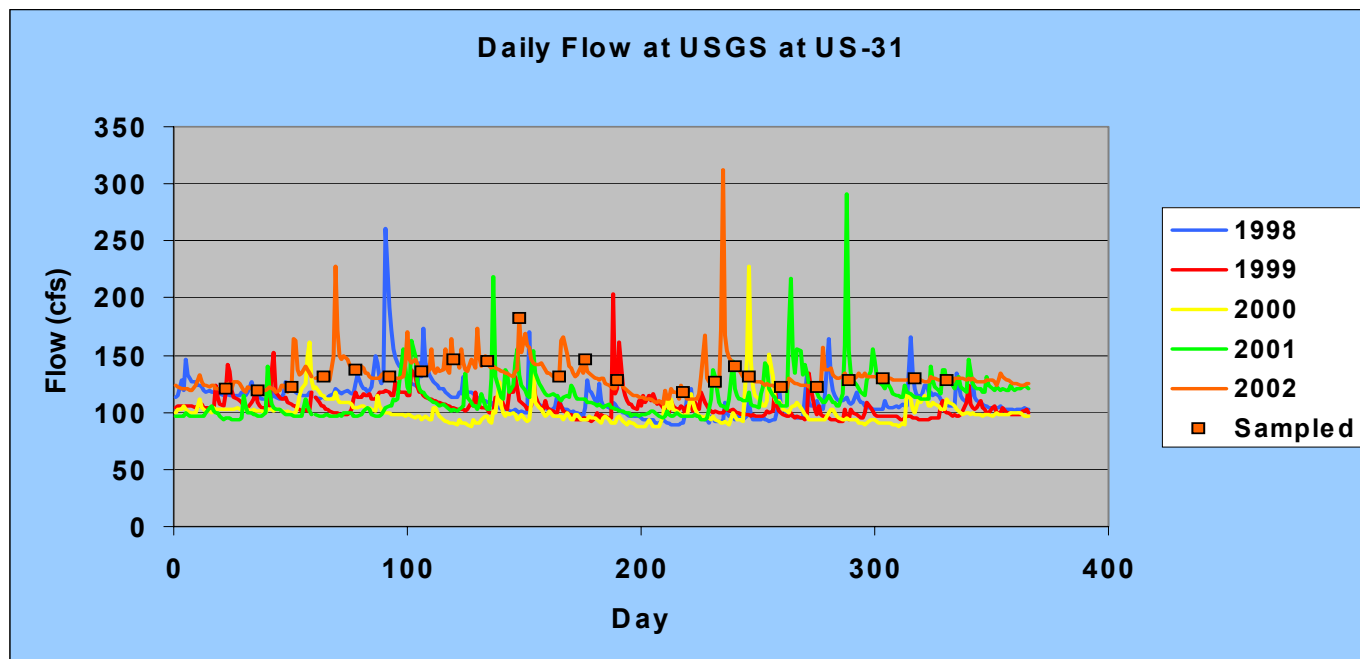


Figure 19. Daily and Monthly Flows of Platte River at USGS Station at US-31 for 1998 to 2002.

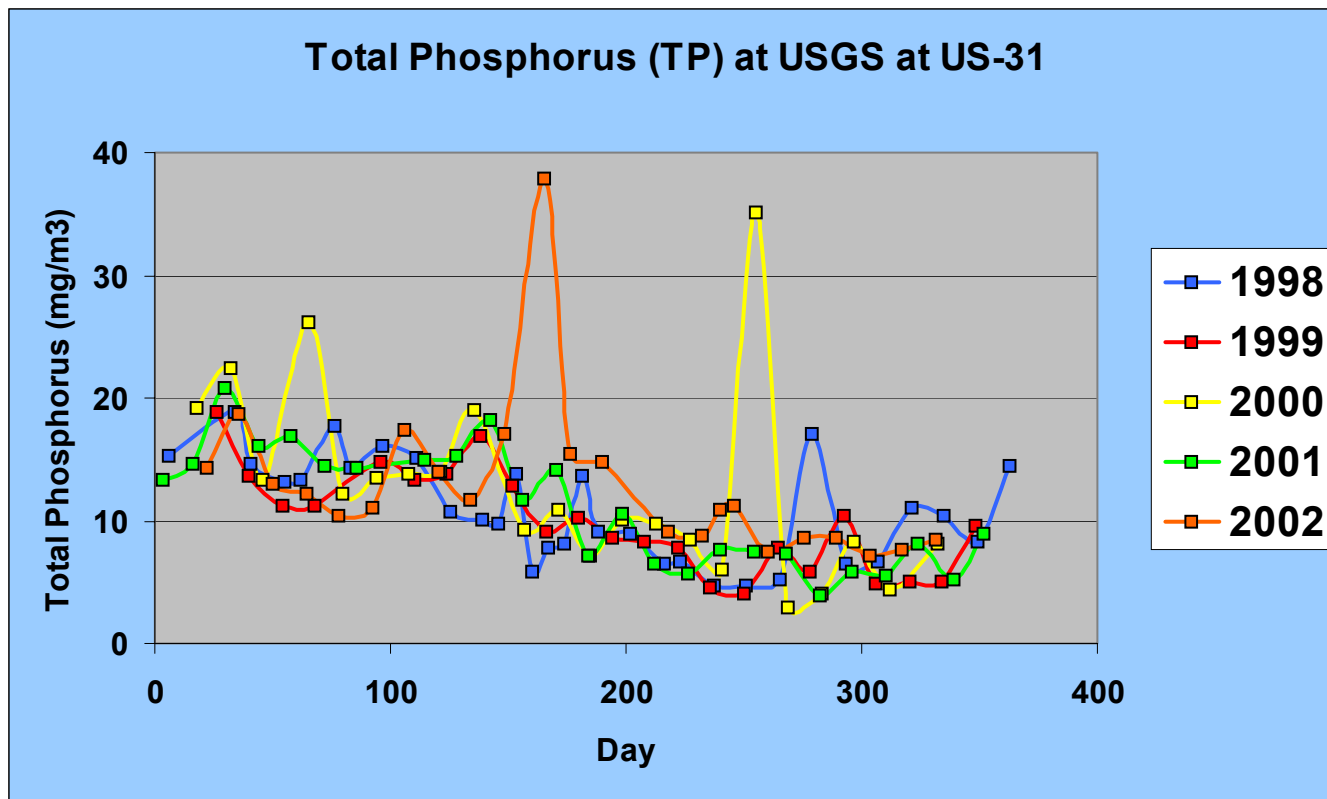


Figure 20. Measured Total Phosphorus at USGS Station at US-31 for 1998 to 2002.

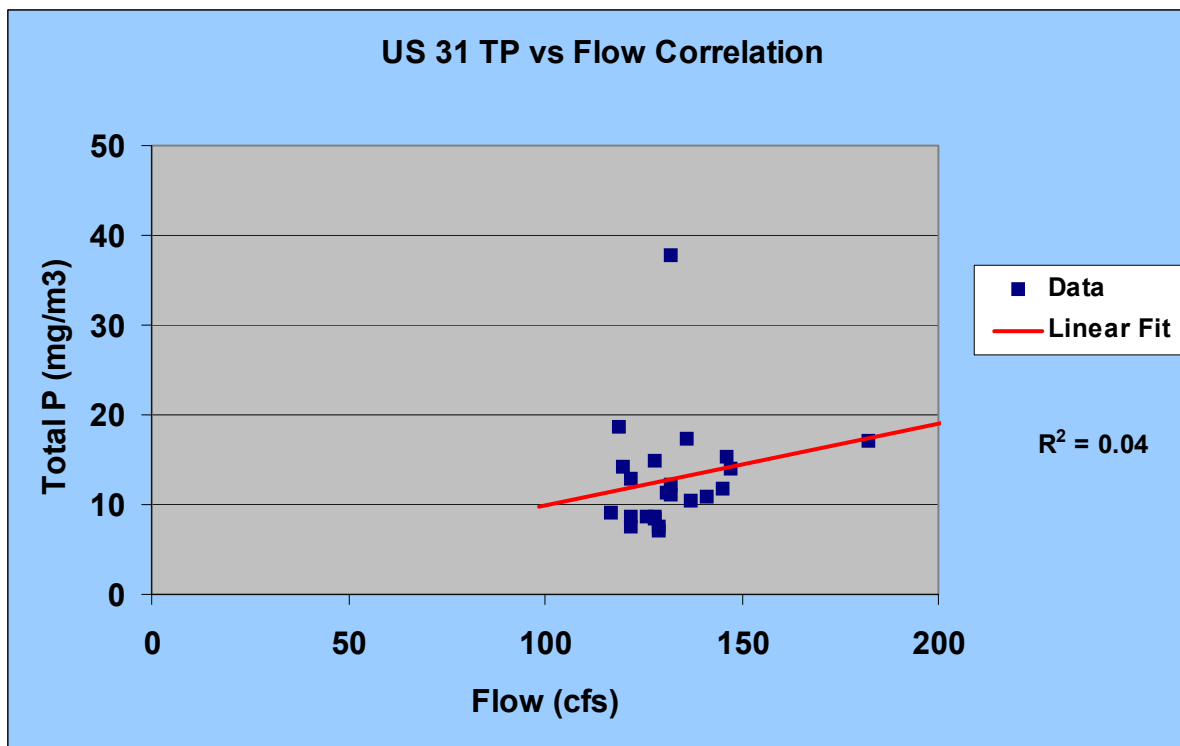


Figure 21. USGS Flow at US-31 Correlation with Total Phosphorus for 2002.

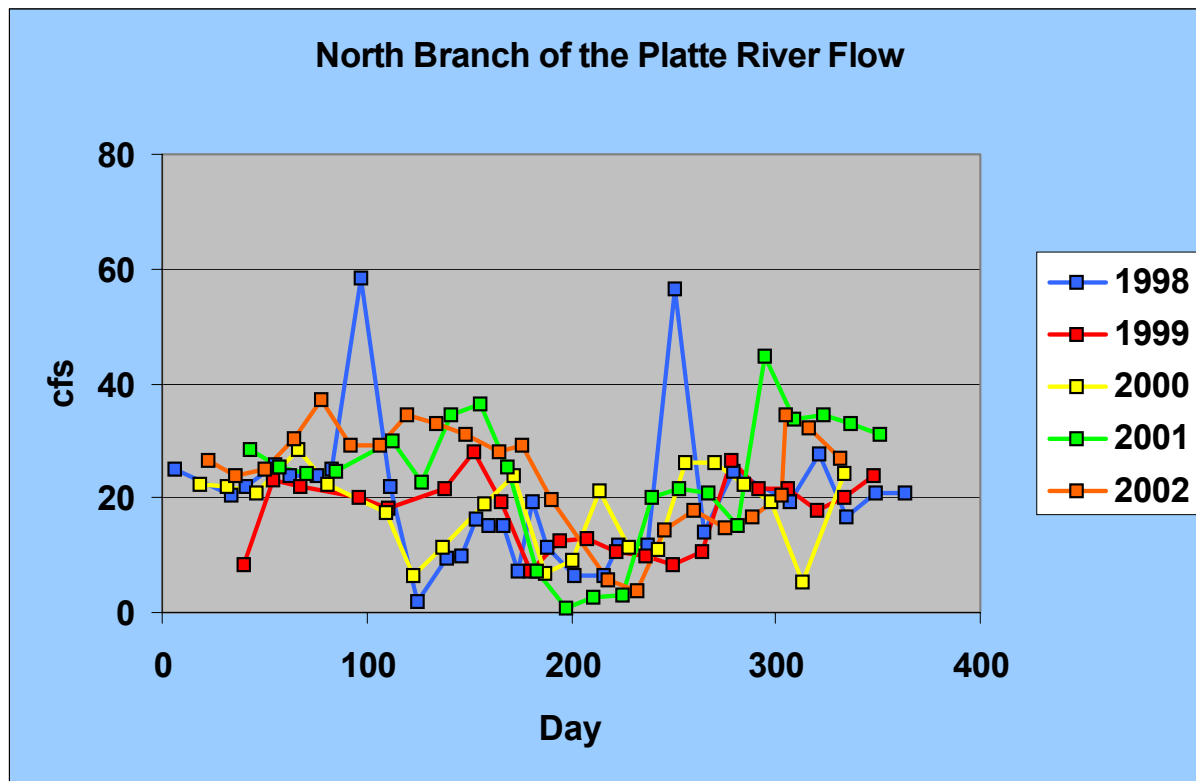


Figure 22. Flow of the North Branch of the Platte River for 1998 to 2002.

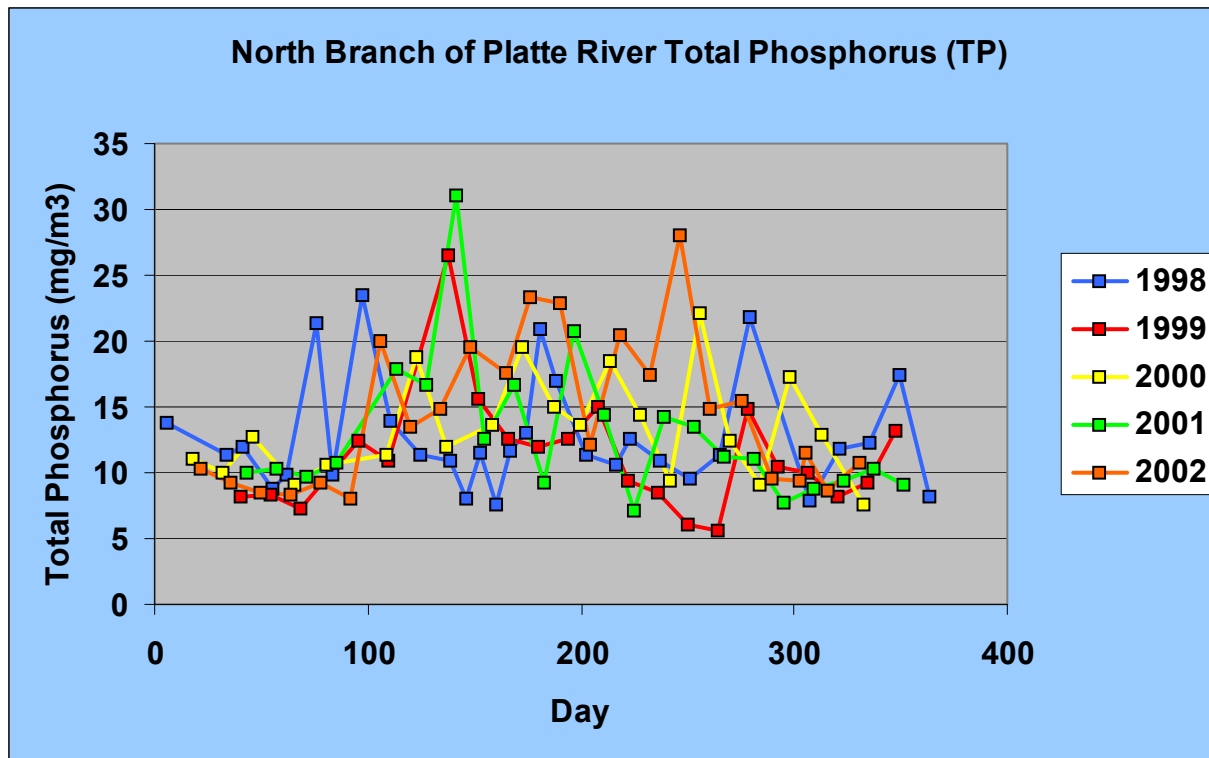


Figure 23. Total Phosphorus (TP) of North Branch of Platte River for 1998 to 2002.

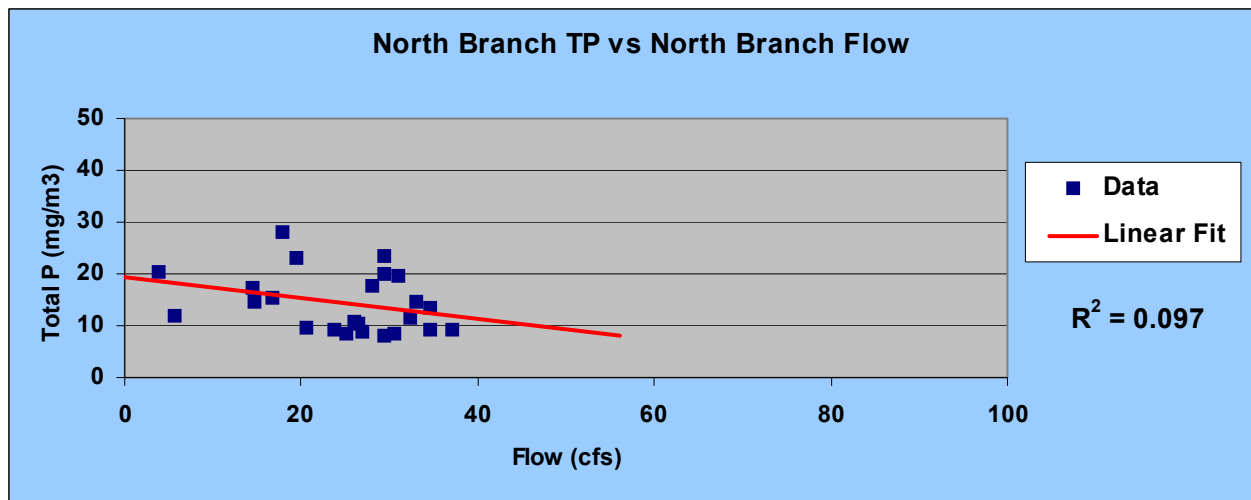
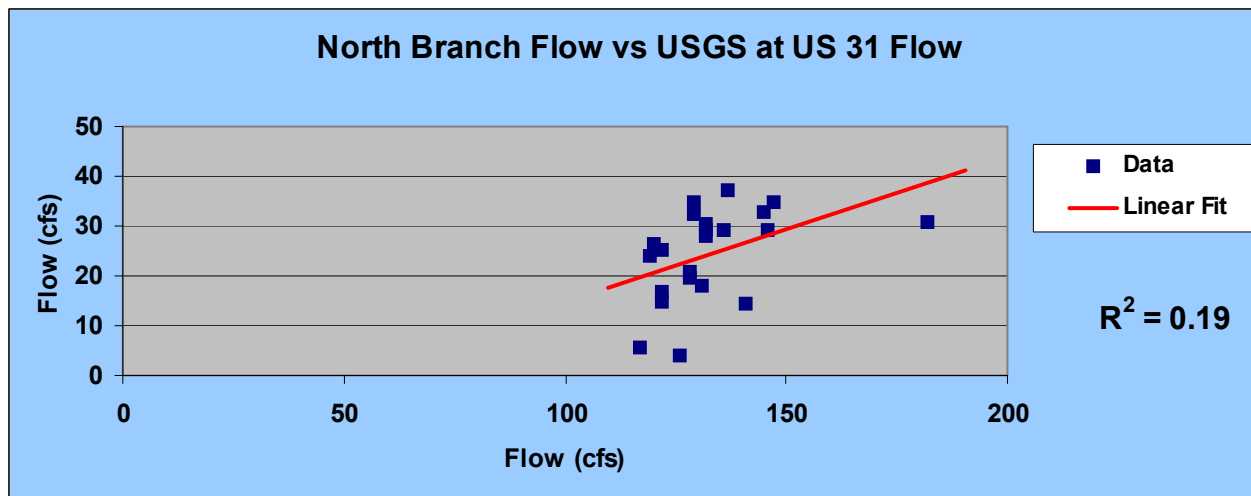


Figure 24. North Branch of Platte River Correlations for 2002.

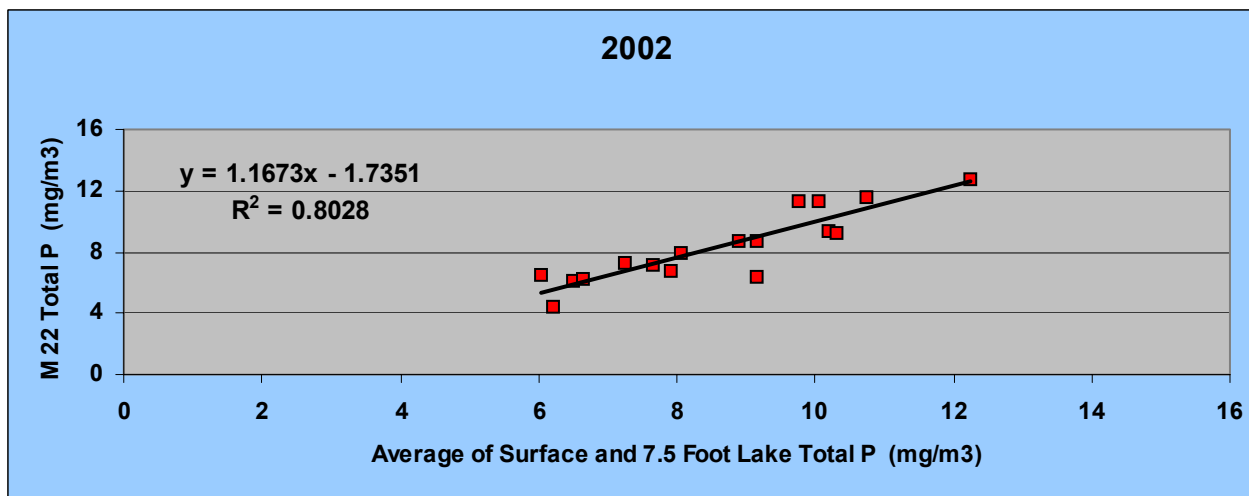
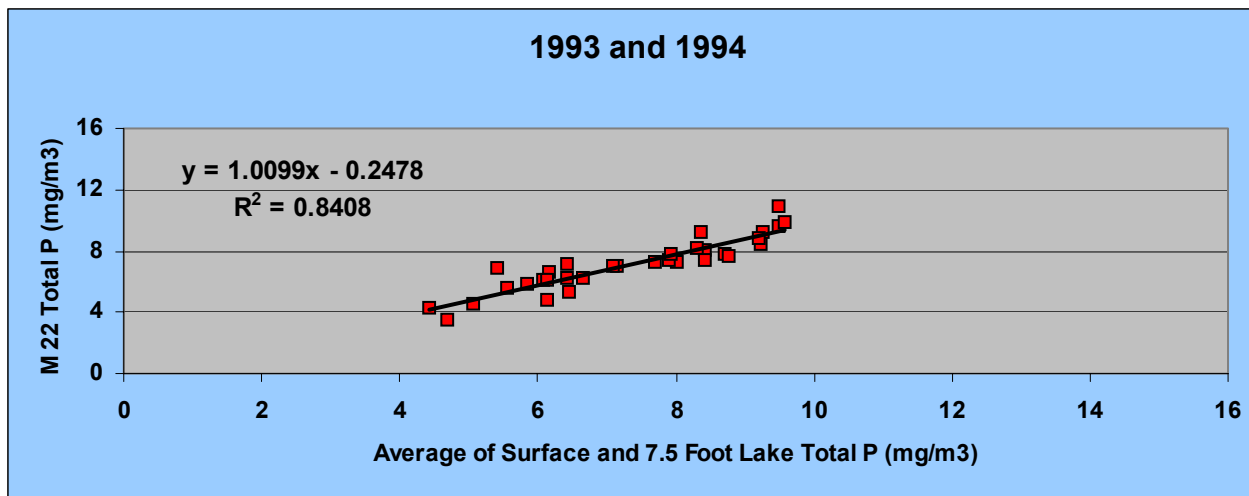
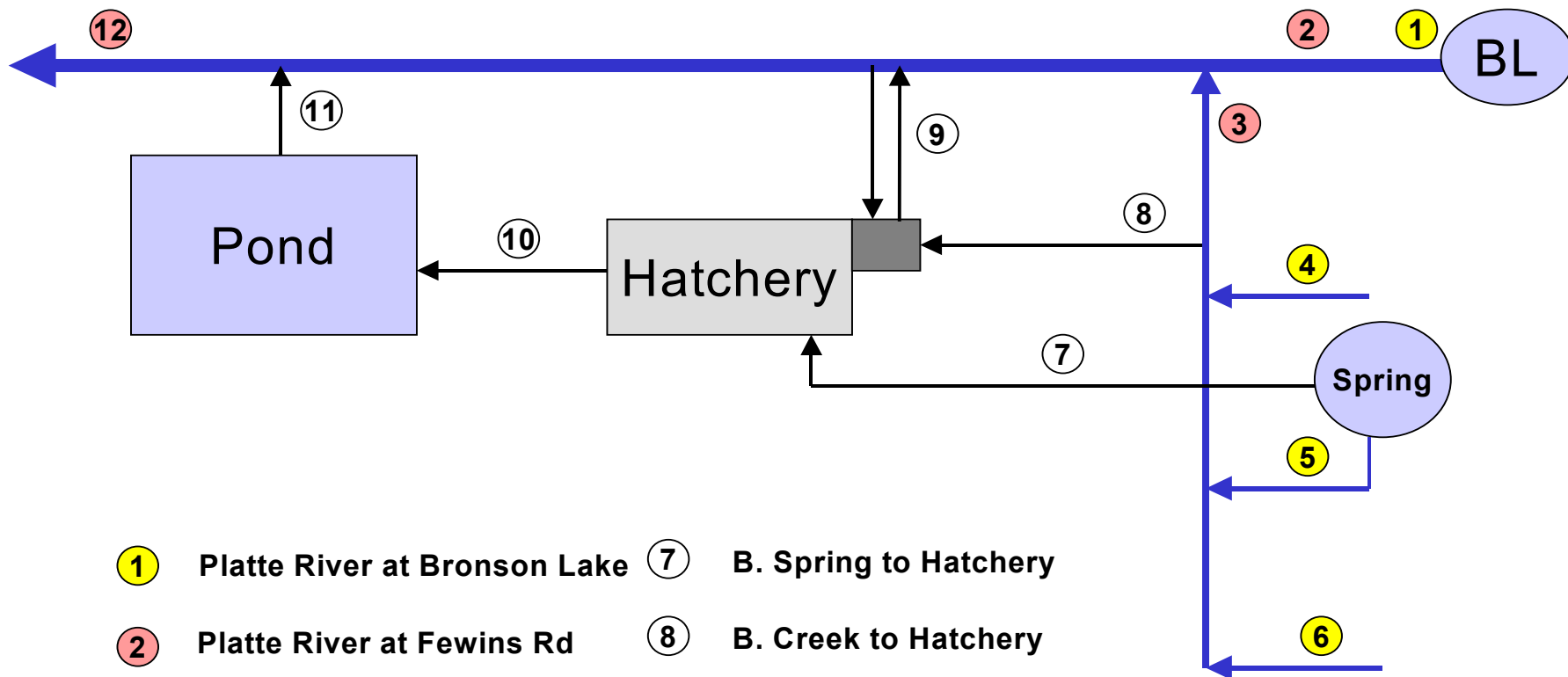
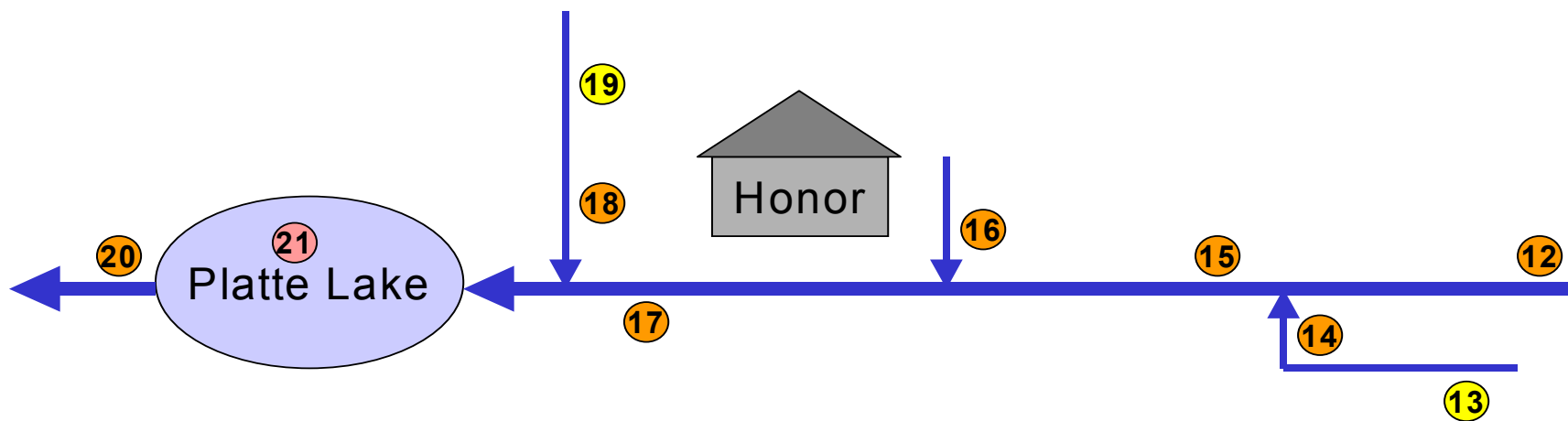


Figure 25. Correlation of Total Phosphorus for Outlet at M-22 and Big Platte Lake.



- | | |
|--------------------------------|--------------------------------------|
| ① Platte River at Bronson Lake | ⑦ B. Spring to Hatchery |
| ② Platte River at Fewins Rd | ⑧ B. Creek to Hatchery |
| ③ Brundage Creek | ⑨ Platte River in or out of Hatchery |
| ④ Stanley Creek | ⑩ Inlet to Pond |
| ⑤ Brundage Creek | ⑪ Pond Outlet |
| ⑥ Kinney Creek | ⑫ Platte River at US - 31 |

Figure 26. Proposed Hatchery and Tributary Sampling Stations for 2002.



- | | | | |
|----|----------------------------|----|------------------------------|
| 12 | Platte River at US - 31 | 17 | Platte River at USGS |
| 13 | Upstream Carter Creek | 18 | North Branch at Deadstream |
| 14 | Carter Creek at mouth | 19 | North Branch at Hooker Rd |
| 15 | Platte River at Pioneer Rd | 20 | Lake Outlet at M - 22 |
| 16 | Collison Creek | 21 | Platte Lake at Center - Deep |

Figure 27. Proposed Lake and Tributary Sampling Stations for 2002.

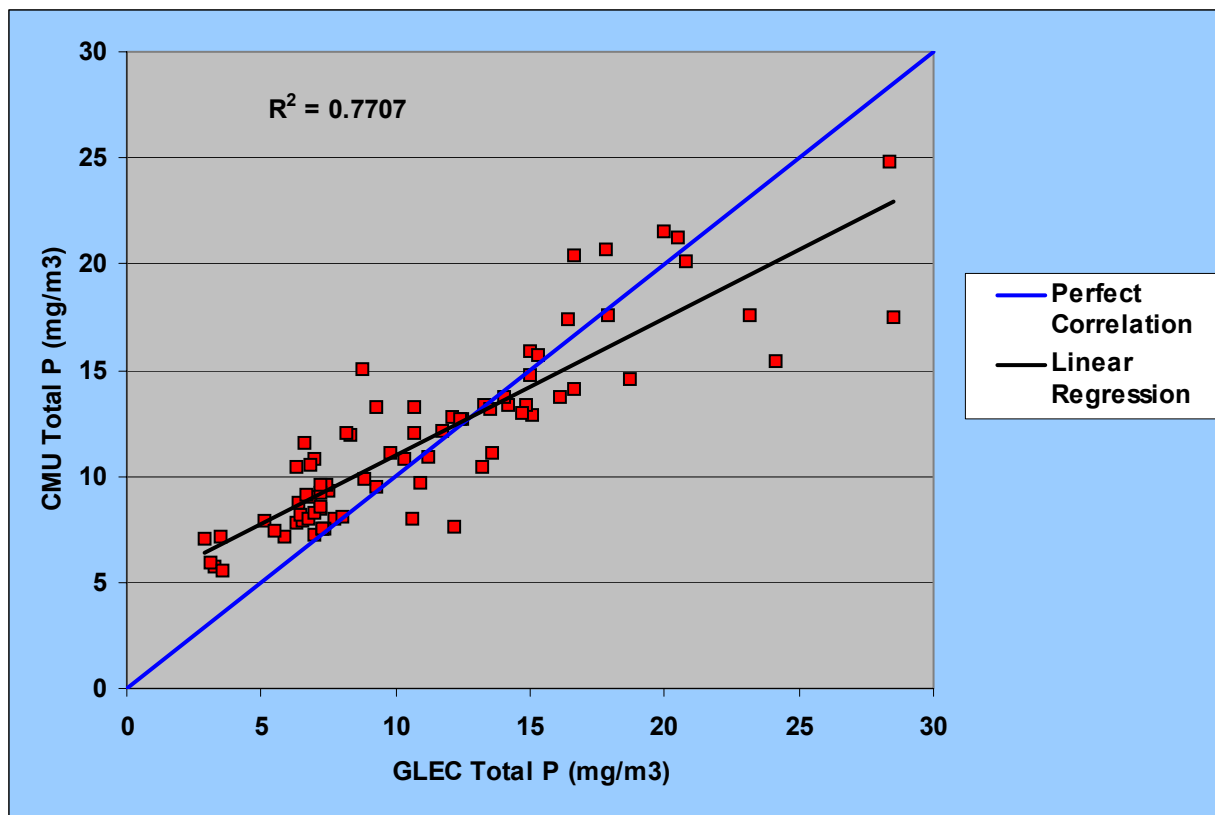


Figure 28. Comparison of GLEC and CMU Total Phosphorus Measurements.

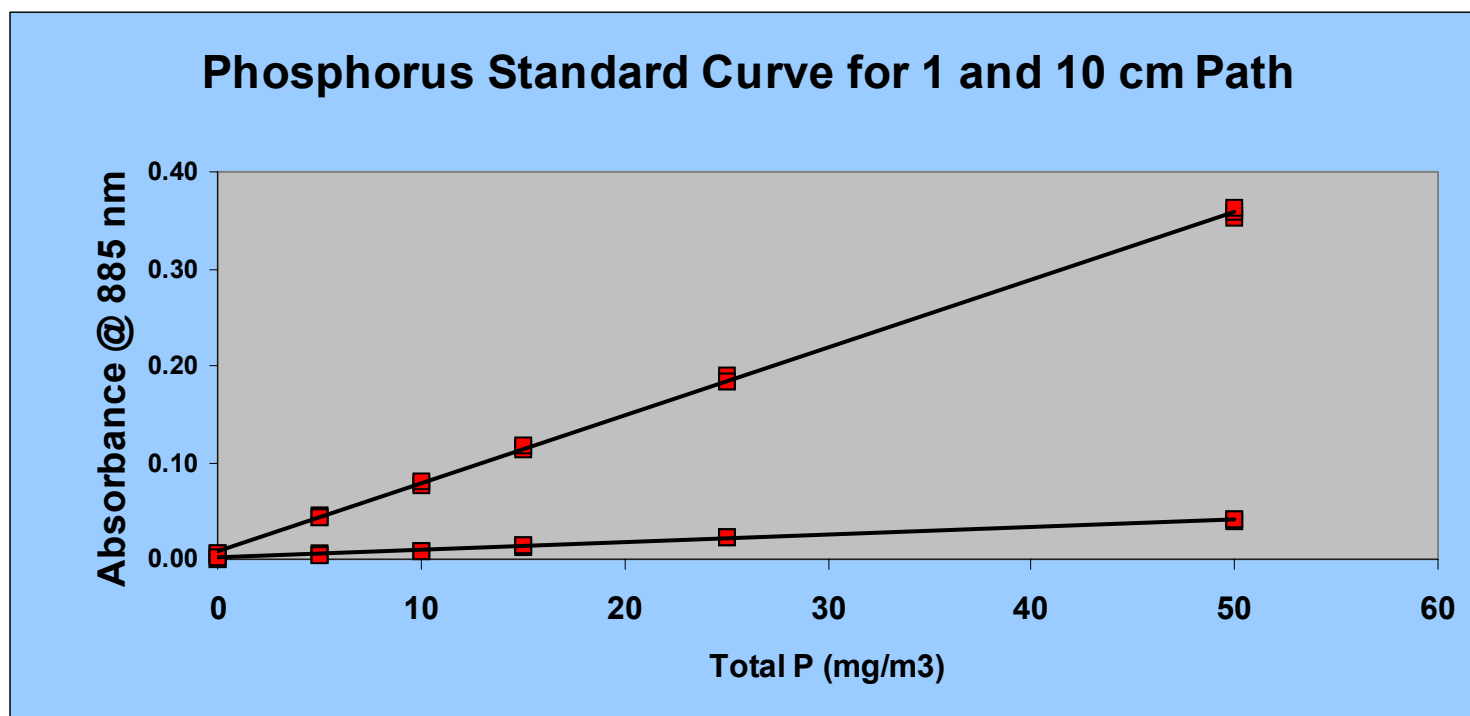
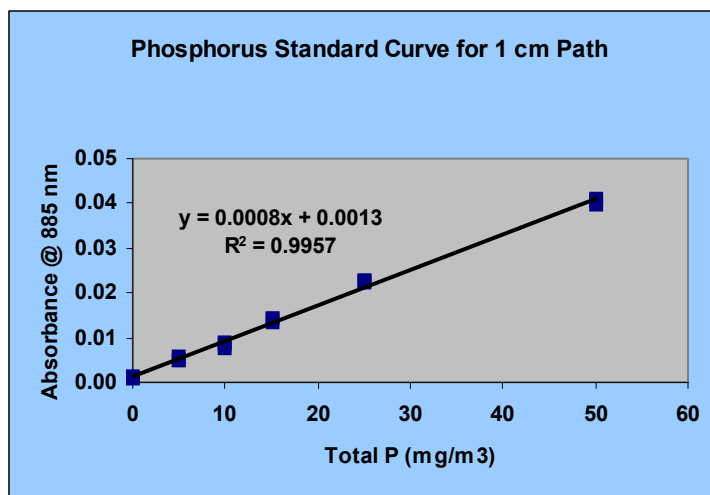
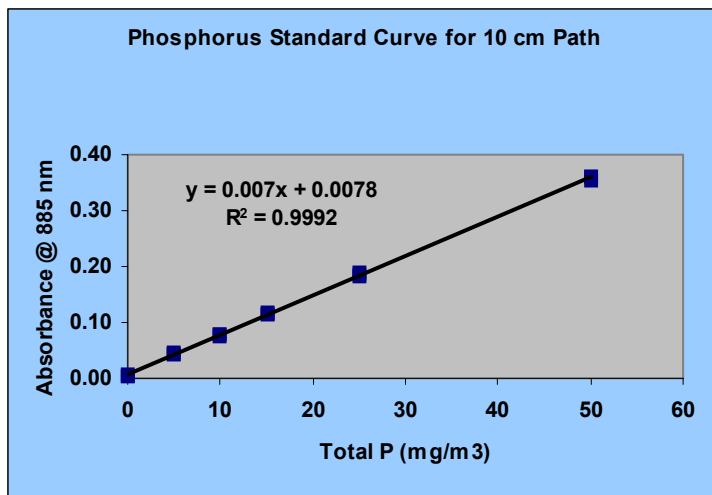


Figure 29. CMU Total Phosphorus Calibration Curves for 1 and 10 cm Cell Path Lengths.

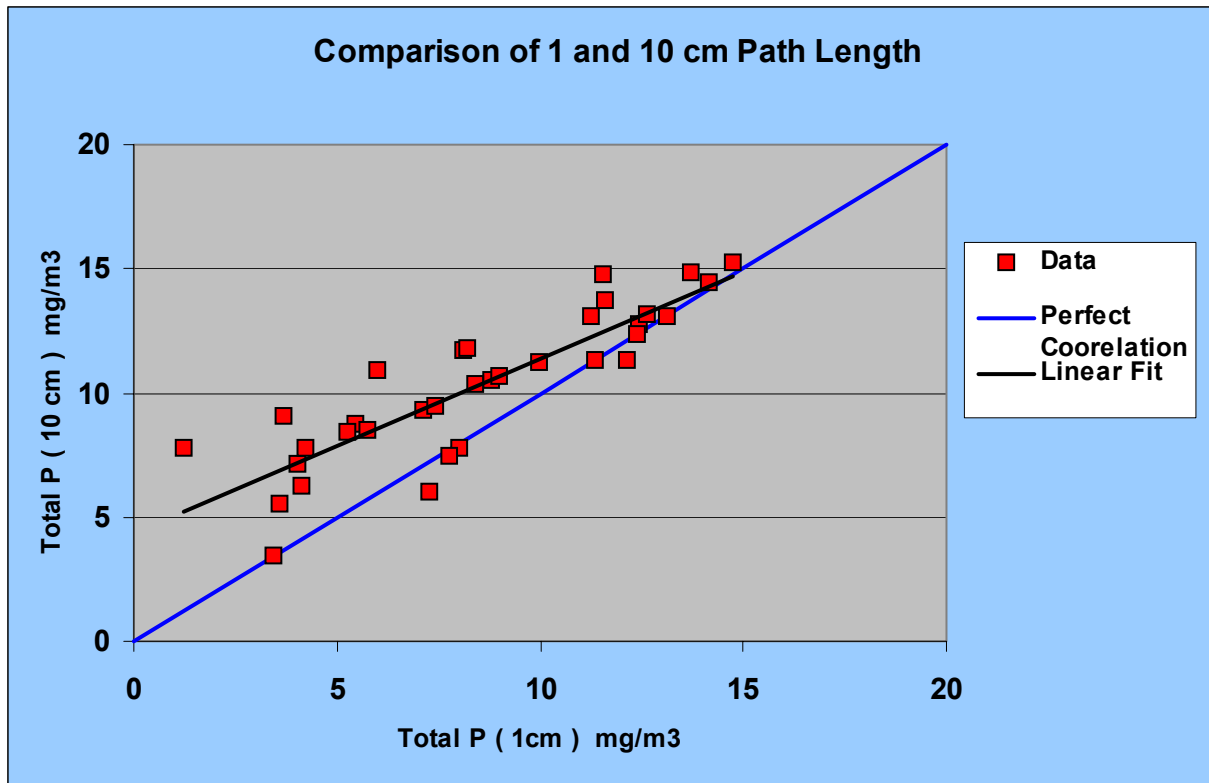
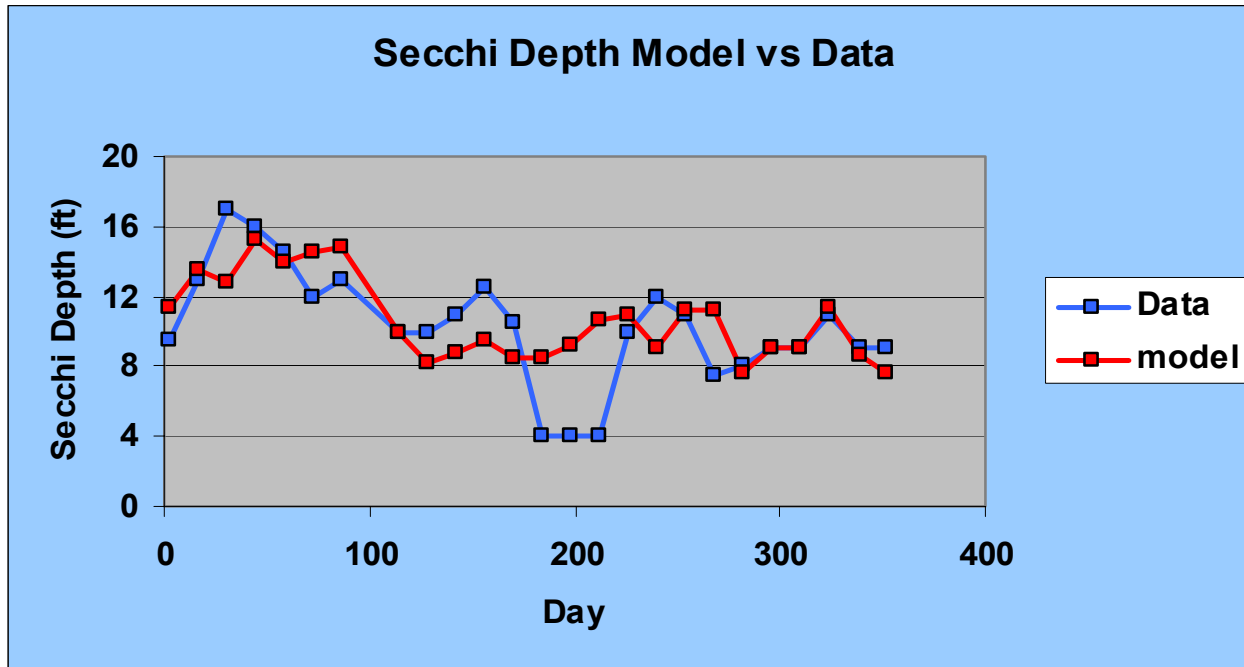


Figure 30. CMU Total Phosphorus Measurements Using 1 and 10 cm Cell Path Lengths.



$$K_e = 0.1 + 0.025 (\text{Chl}) + 0.05 (\text{SI})$$

And

$$K_e = 1.8/\text{SD}$$

Where:

K_e = Extinction Coefficient (1/ft)

SI = Saturation Index

Chl = Chlorophyll (mg/m³)

SD = Secchi Depth (ft)

Figure 31. Preliminary Model for Secchi Depth and 2001 Big Platte Lake Measurements.

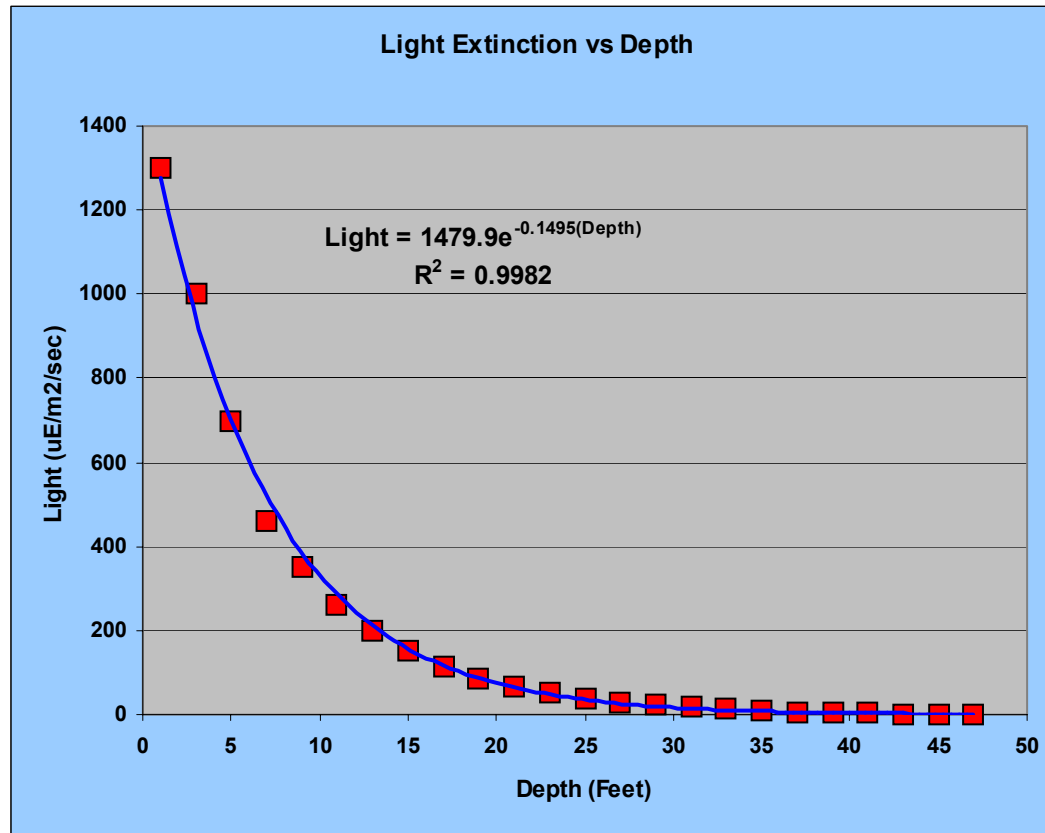


Figure 32. Light Attenuation with Depth and Calculation of Light Extinction Coefficient.

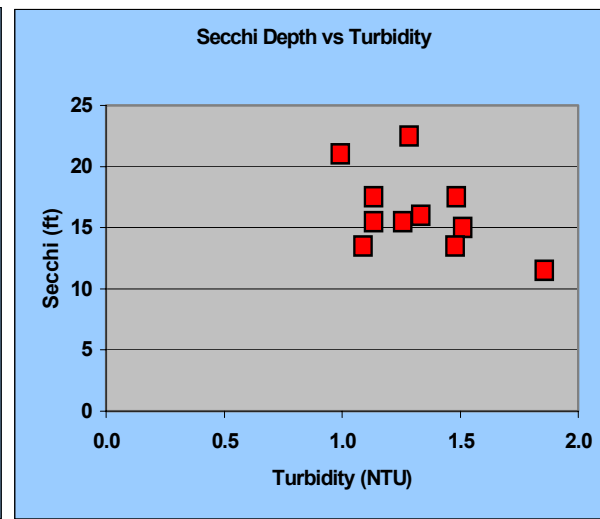
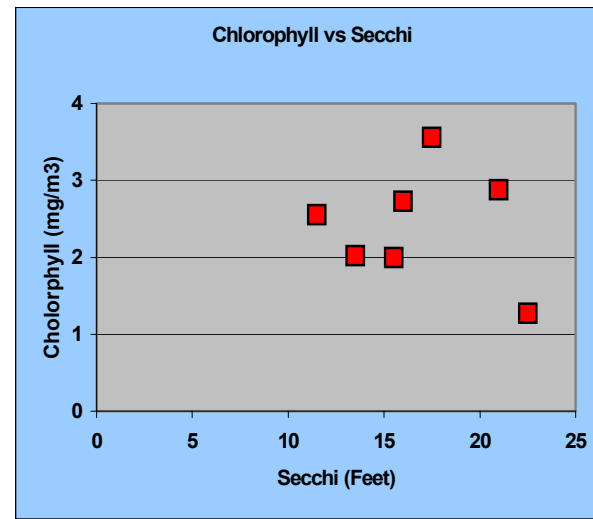
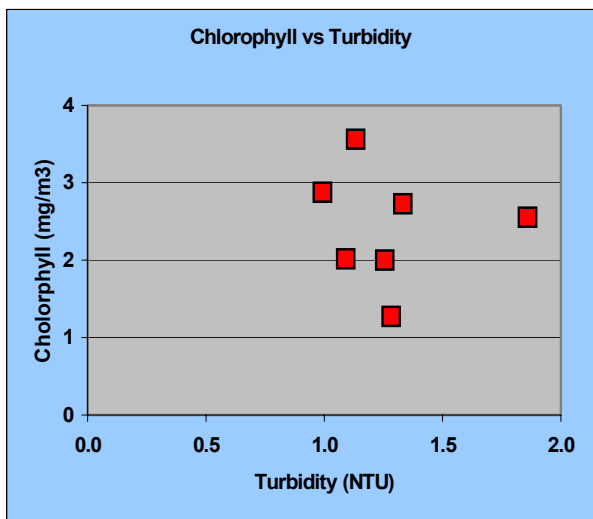
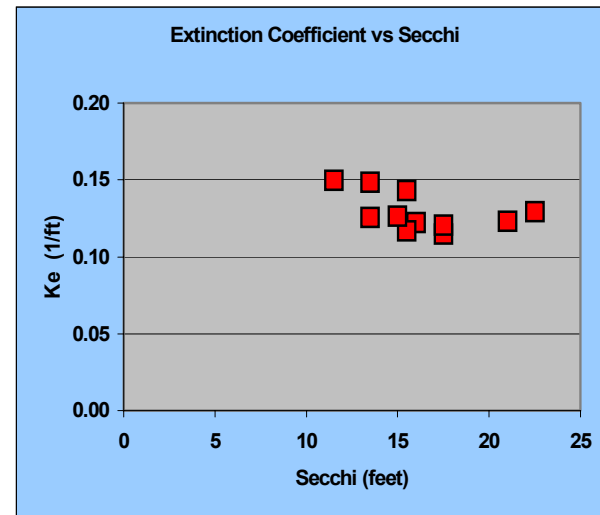
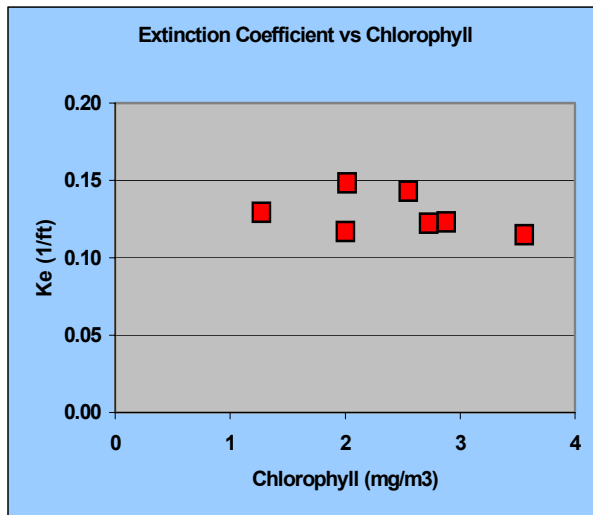
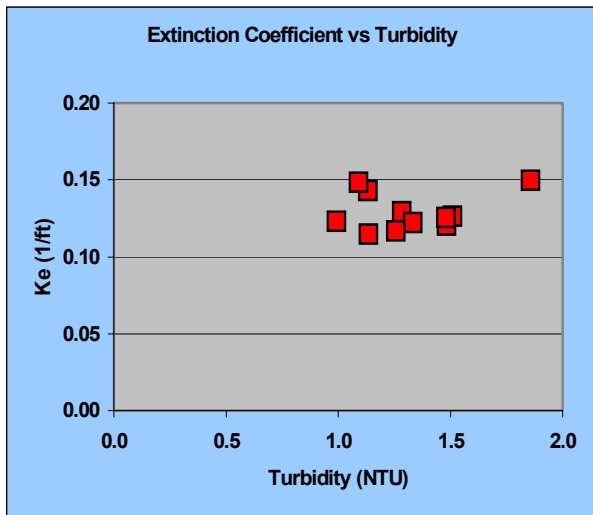


Figure 33. Correlations Among Various Light Parameters.

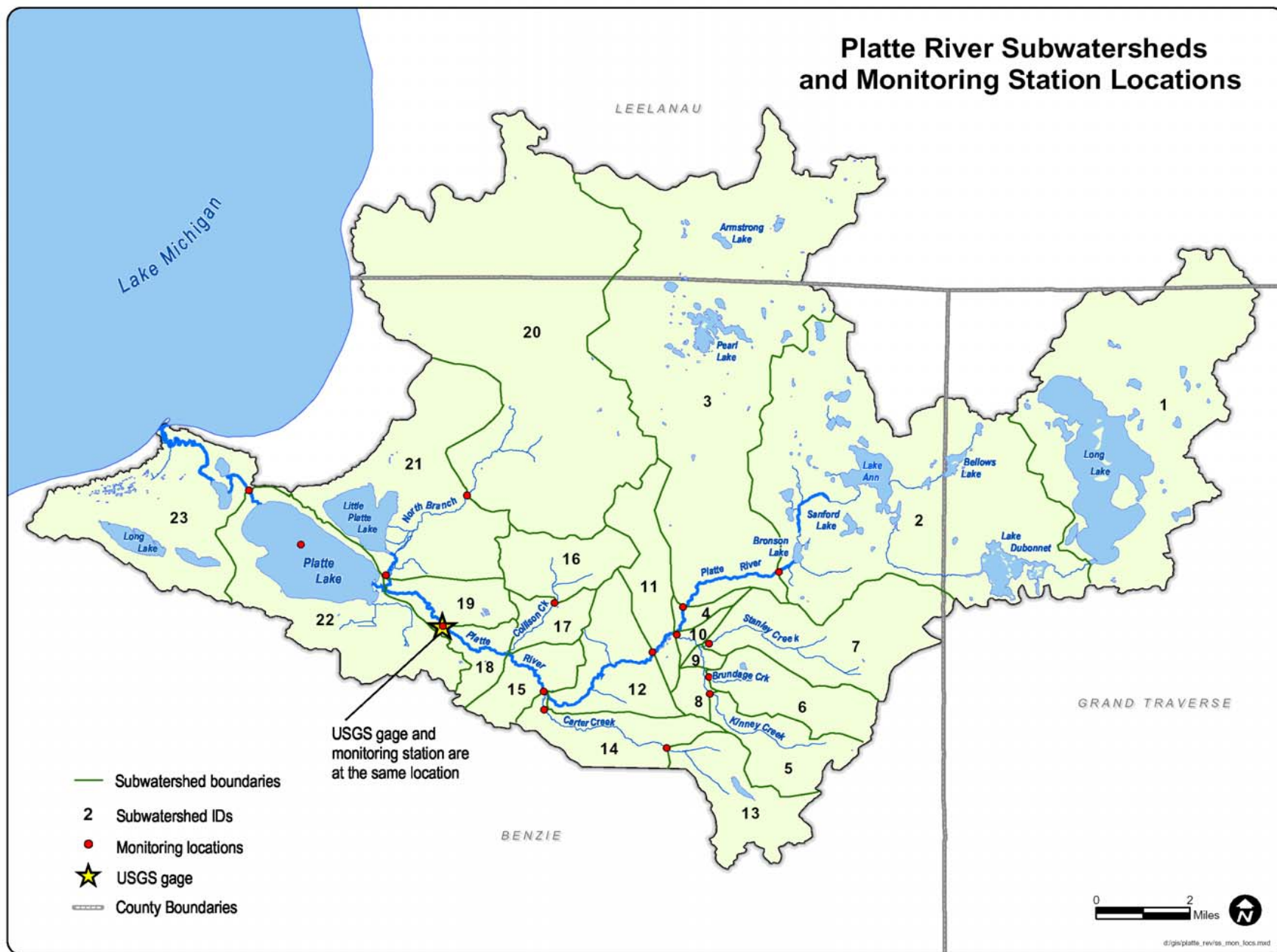


Figure 34. Platte River Sub-Watersheds and Monitoring Locations.

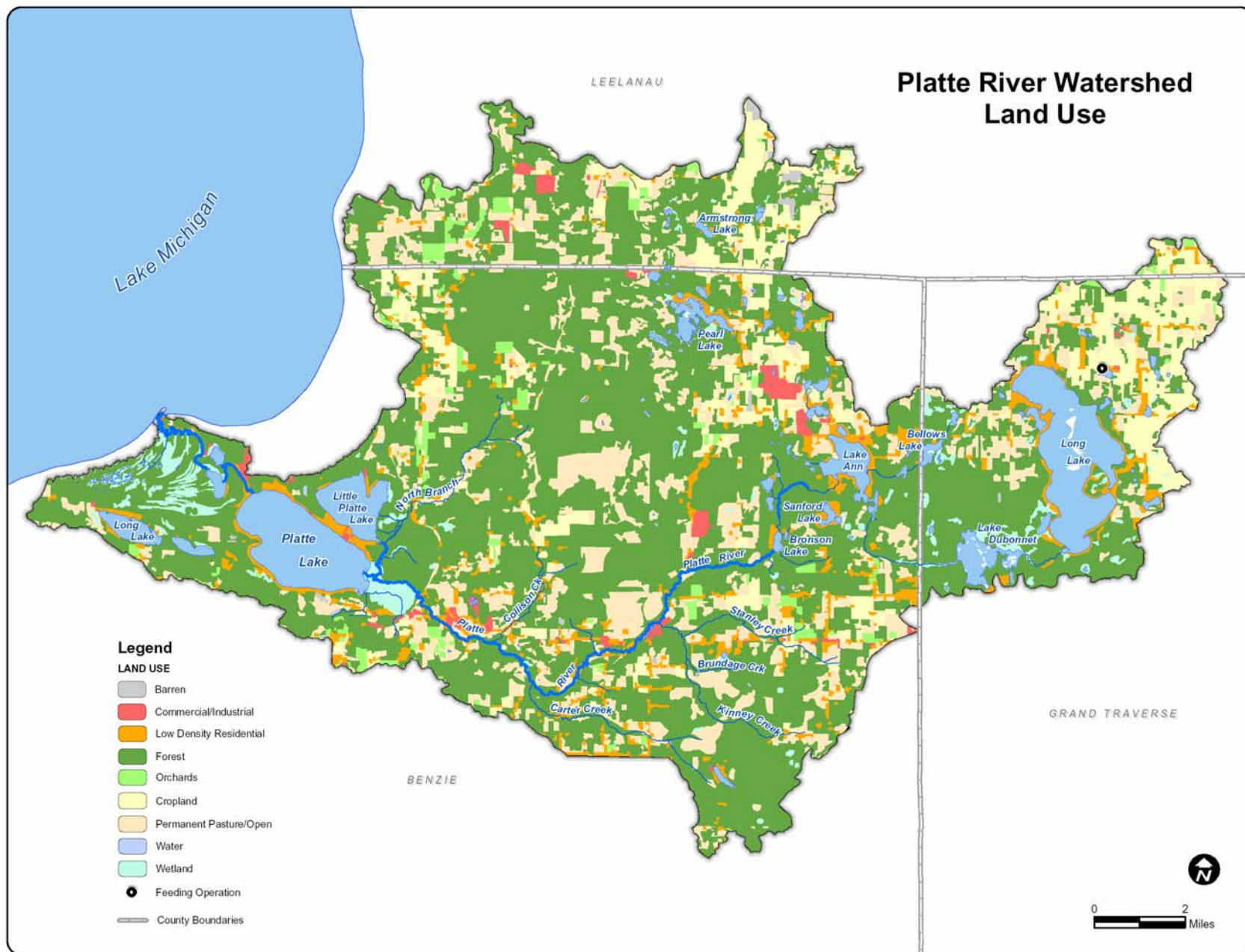


Figure 35. Platte River Watershed Land Use.

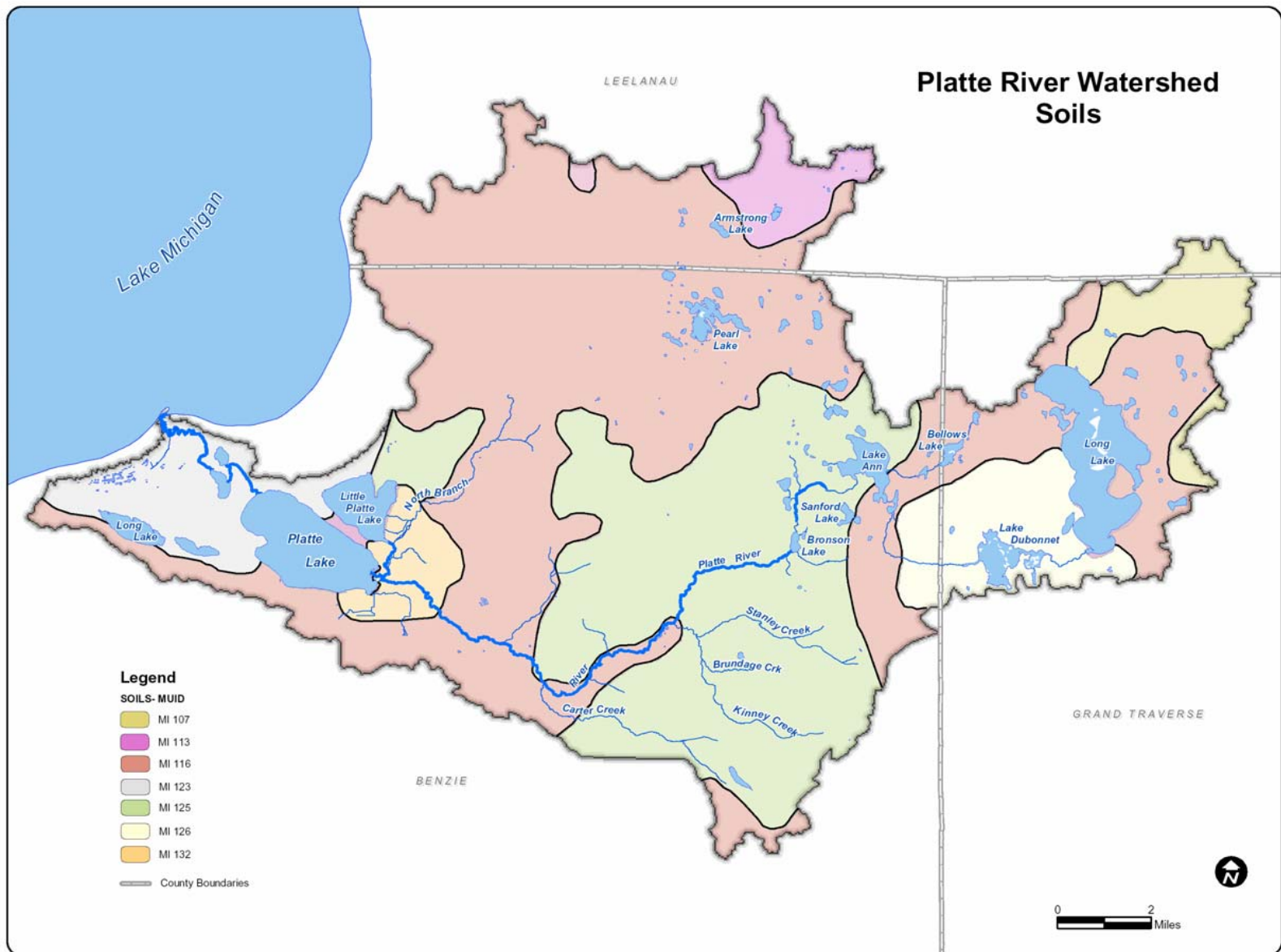


Figure 36. Platte River Watershed Soil Types.

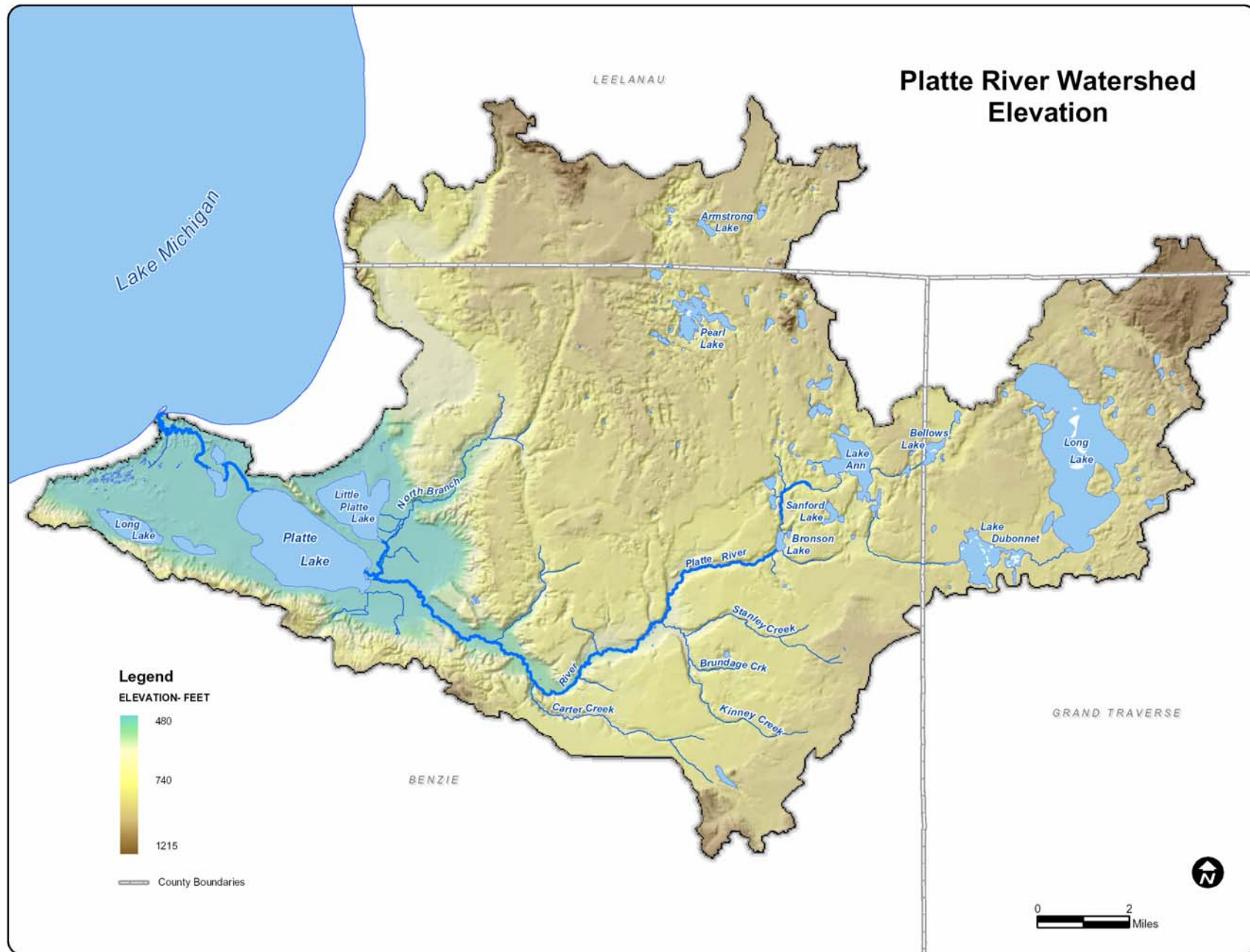


Figure 37. Platte River Watershed Land Elevations.

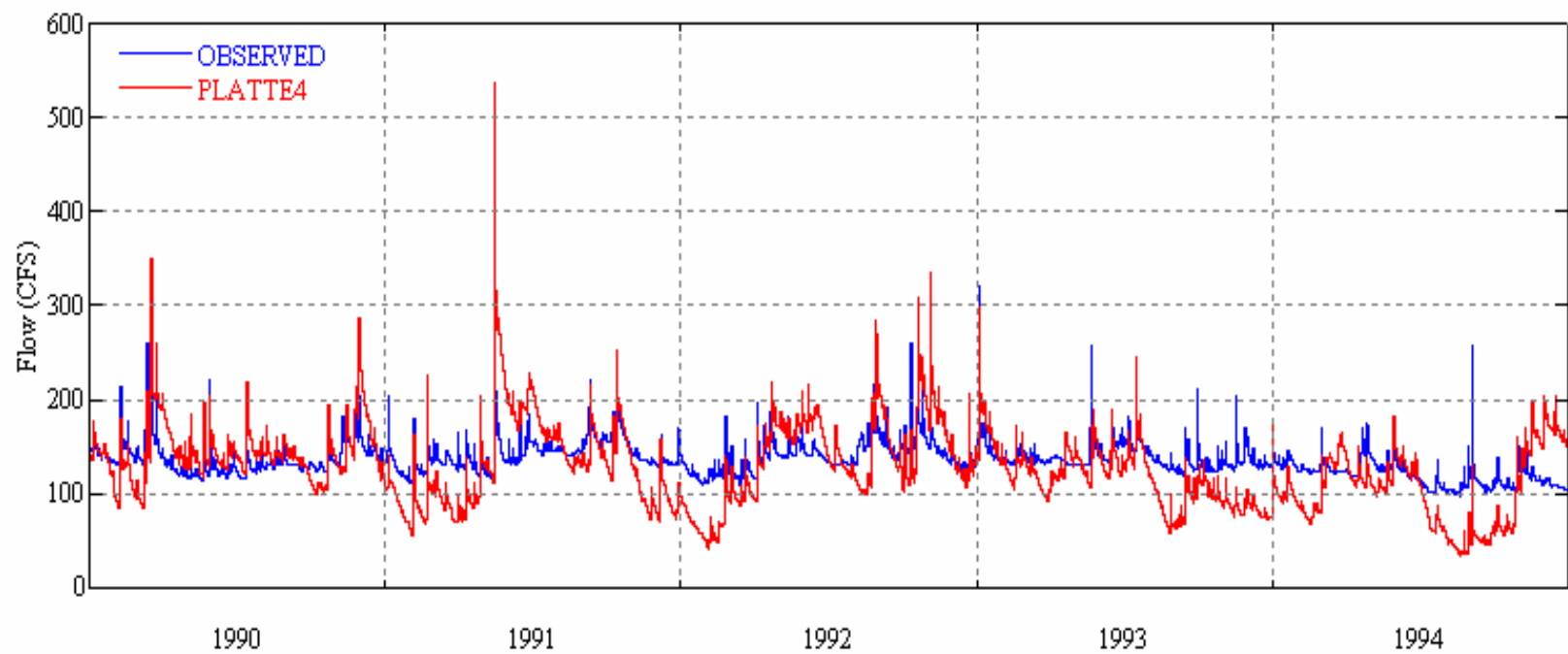


Figure 38. BASINS Model and Measured Flow Rates at Platte River at US 31.

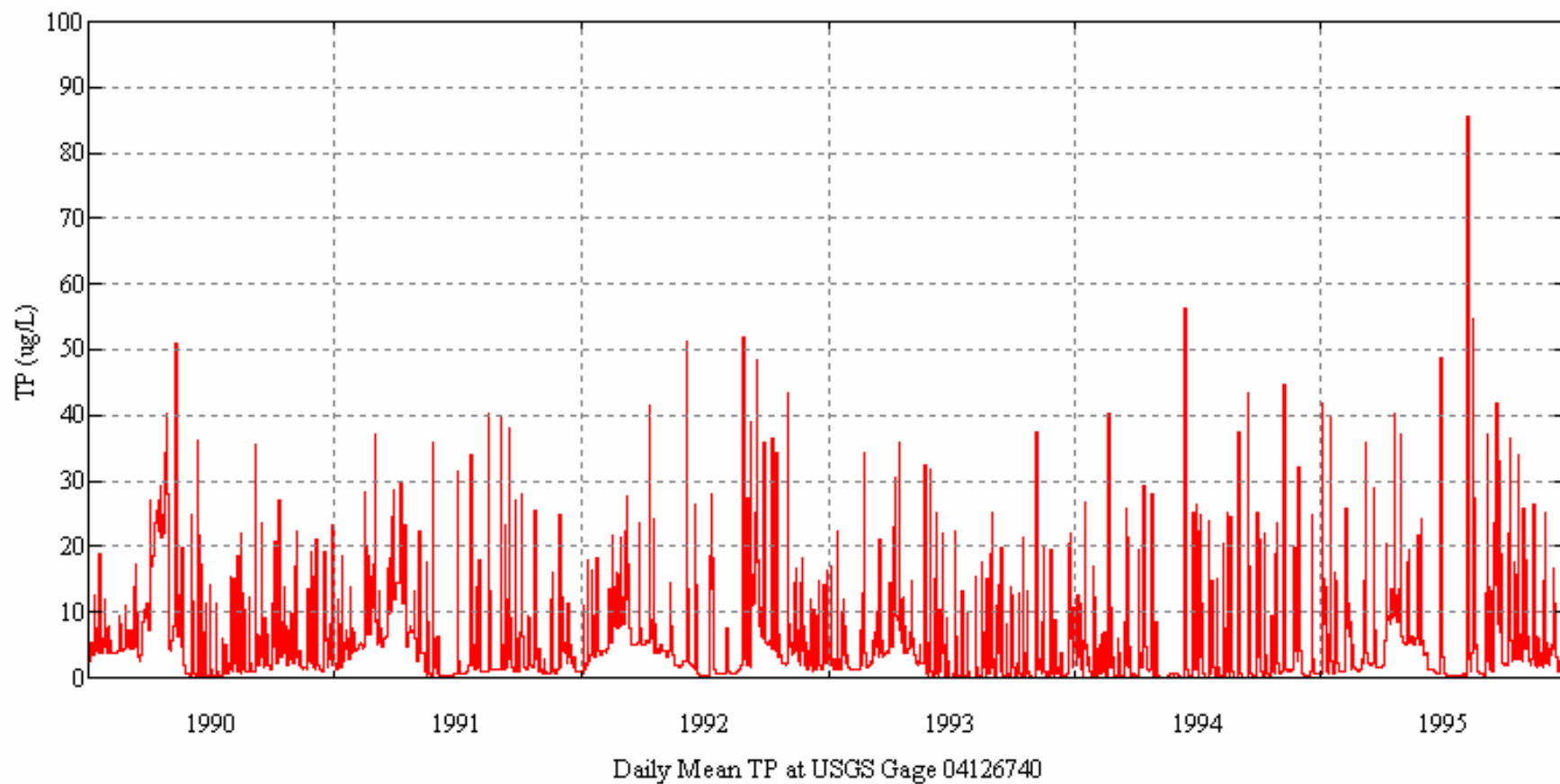


Figure 39. BASINS Model and Measured Total Phosphorus at Platte River at US 31.

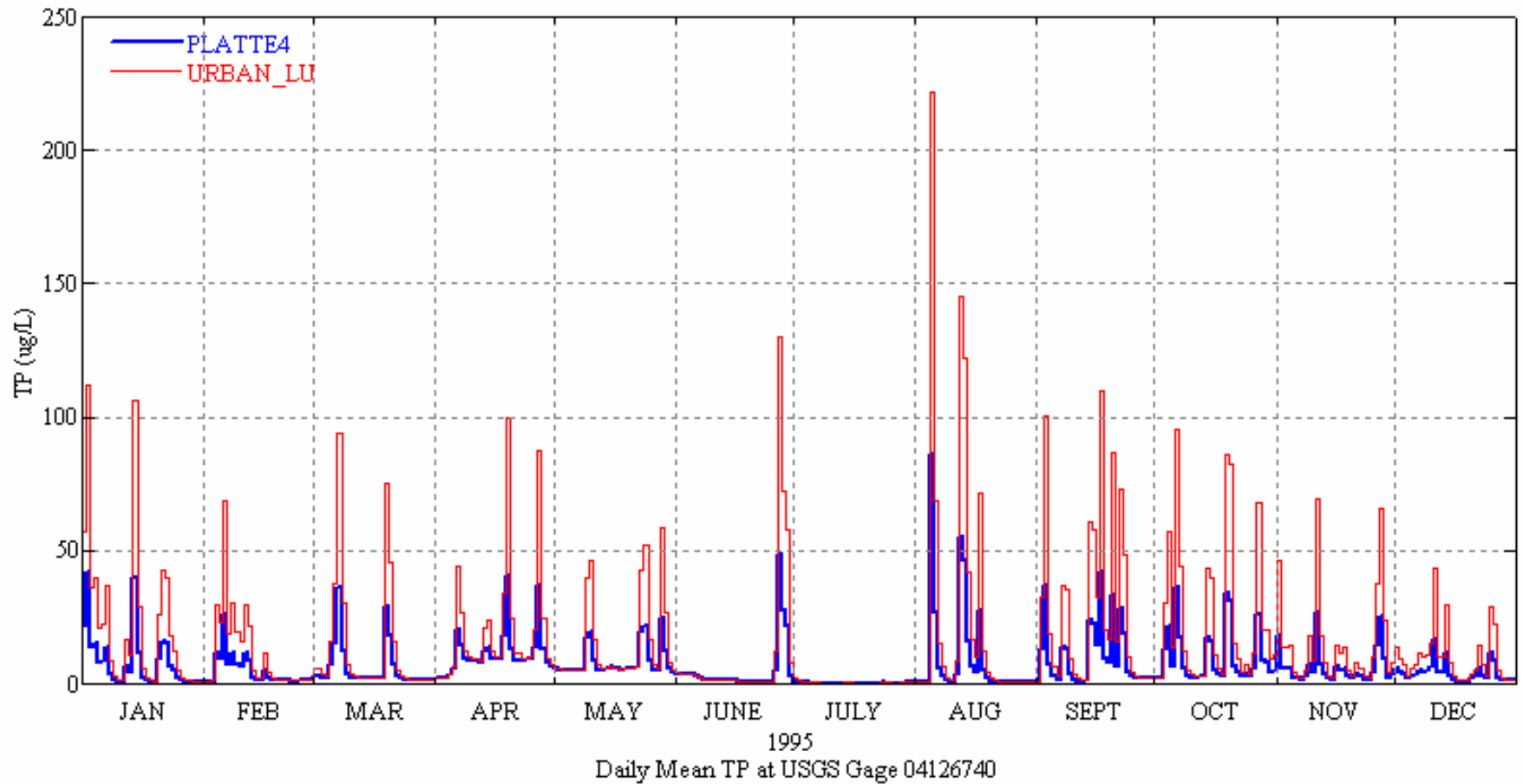


Figure 40. Hypothetical Application of BASINS Model for Urban Development.

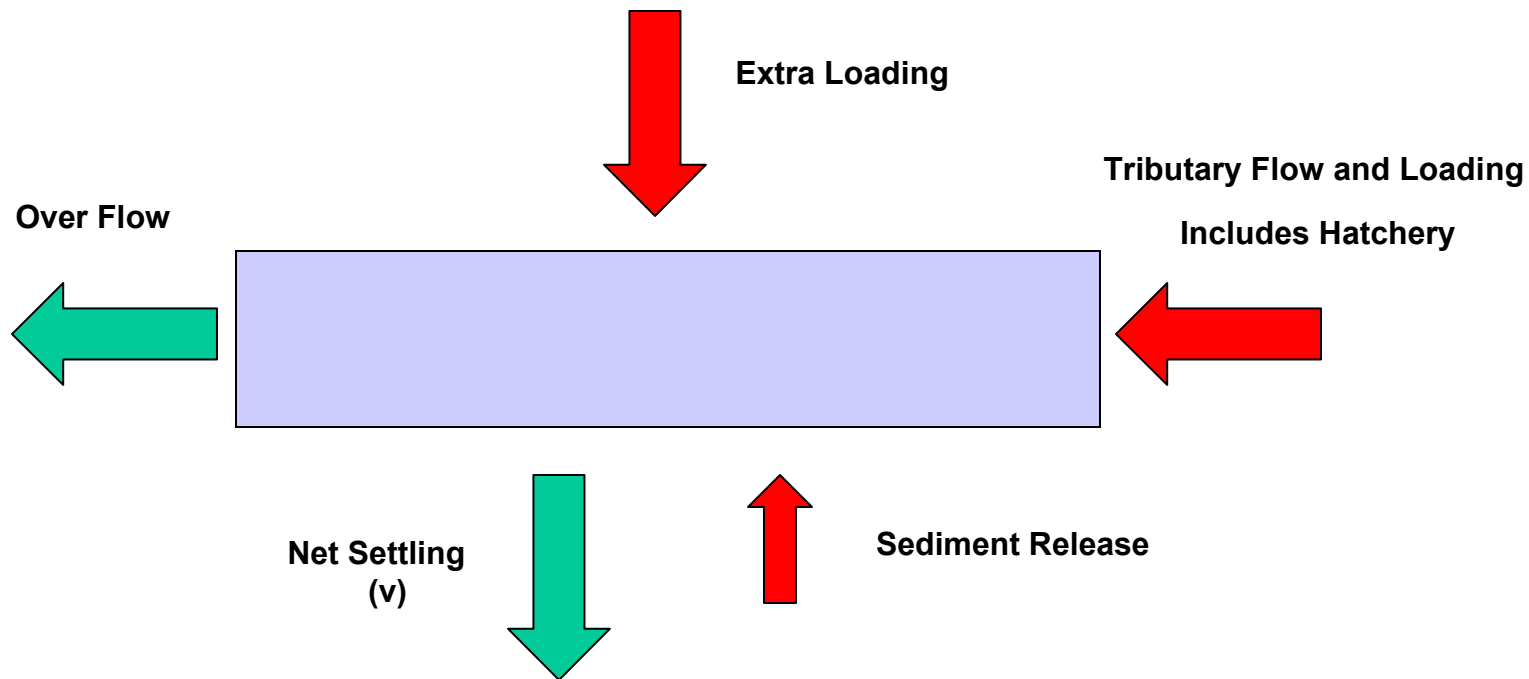


Figure 41. One Layer Water Quality Model Mechanisms.

Number	Name	Layer Boundaries	Layer Depth, m	Average Area, m2	Volume, m3
1	Surface	0 to 30 feet	9.14	6316734	57760214
2	Middle	30 to 75 feet	13.72	1726355	23678684
3	Bottom	75 to 95 feet	6.10	97223	592669
4	Sed-Sur	0 to 30 feet	0.1	4590379	459038
5	Sed-Mid	30 to 75 feet	0.1	1629132	162913
6	Sed-Bot	75 to 95 feet	0.1	97223	9722

Total Volume **82031567**

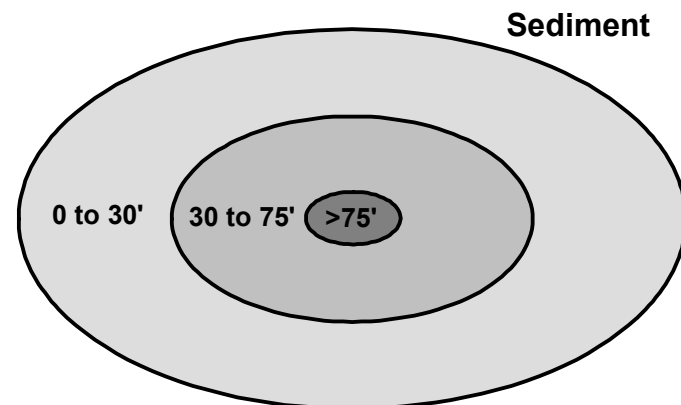
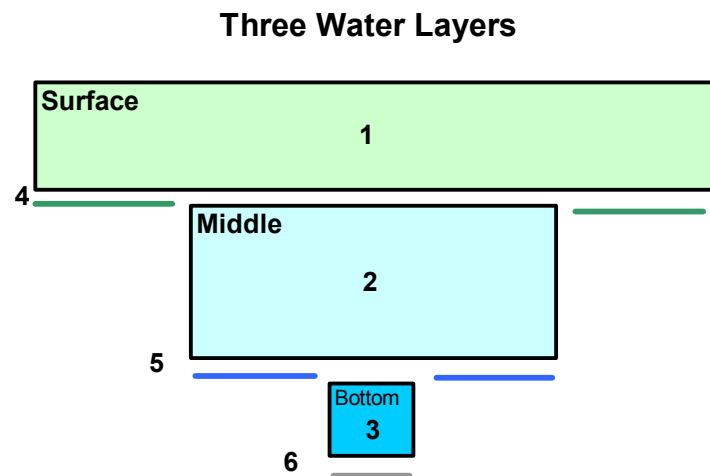


Figure 42. Geometry for Three-Layer Water and Sediment Model.

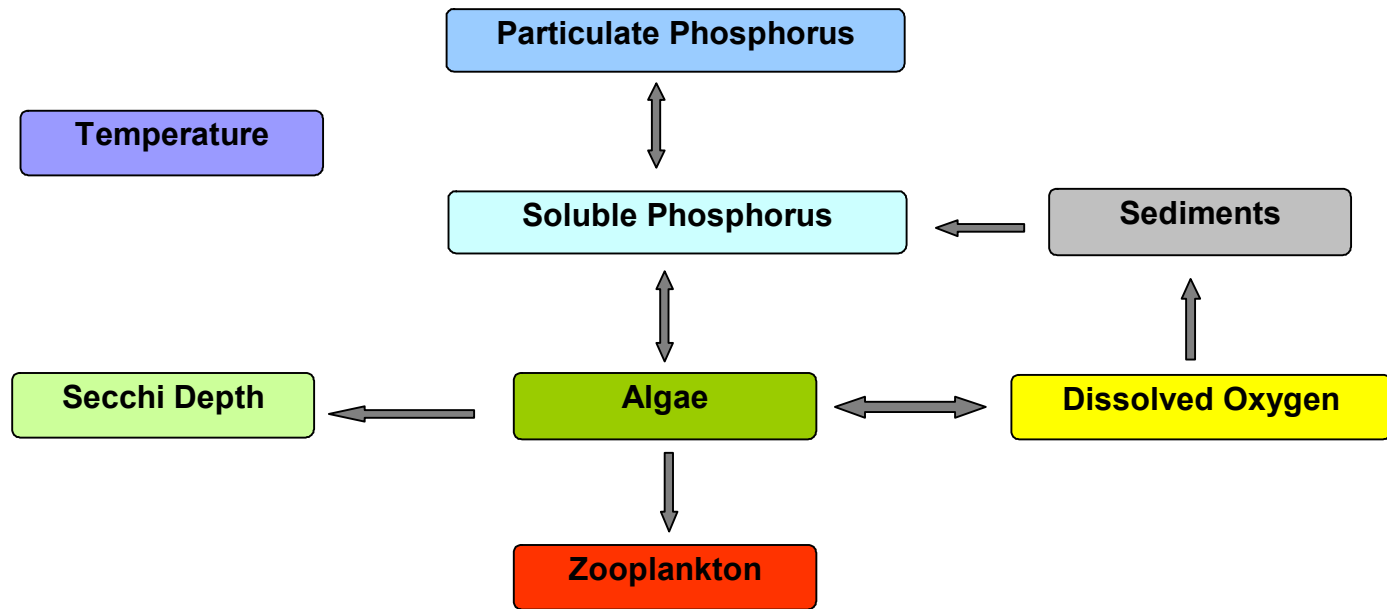


Figure 43. Kinetic Components of Big Platte Lake Water Quality Model.

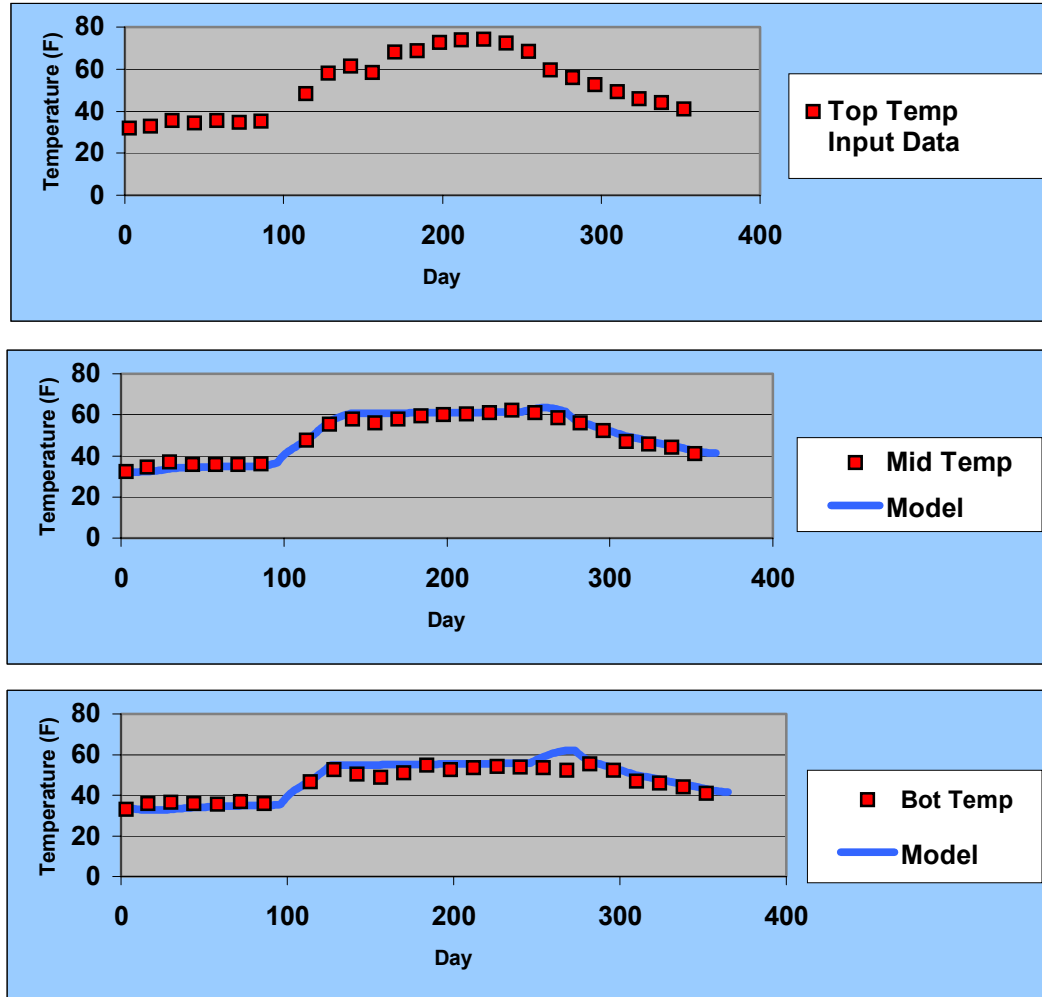


Figure 44: Three Layer Model Results for Temperature for 2000.

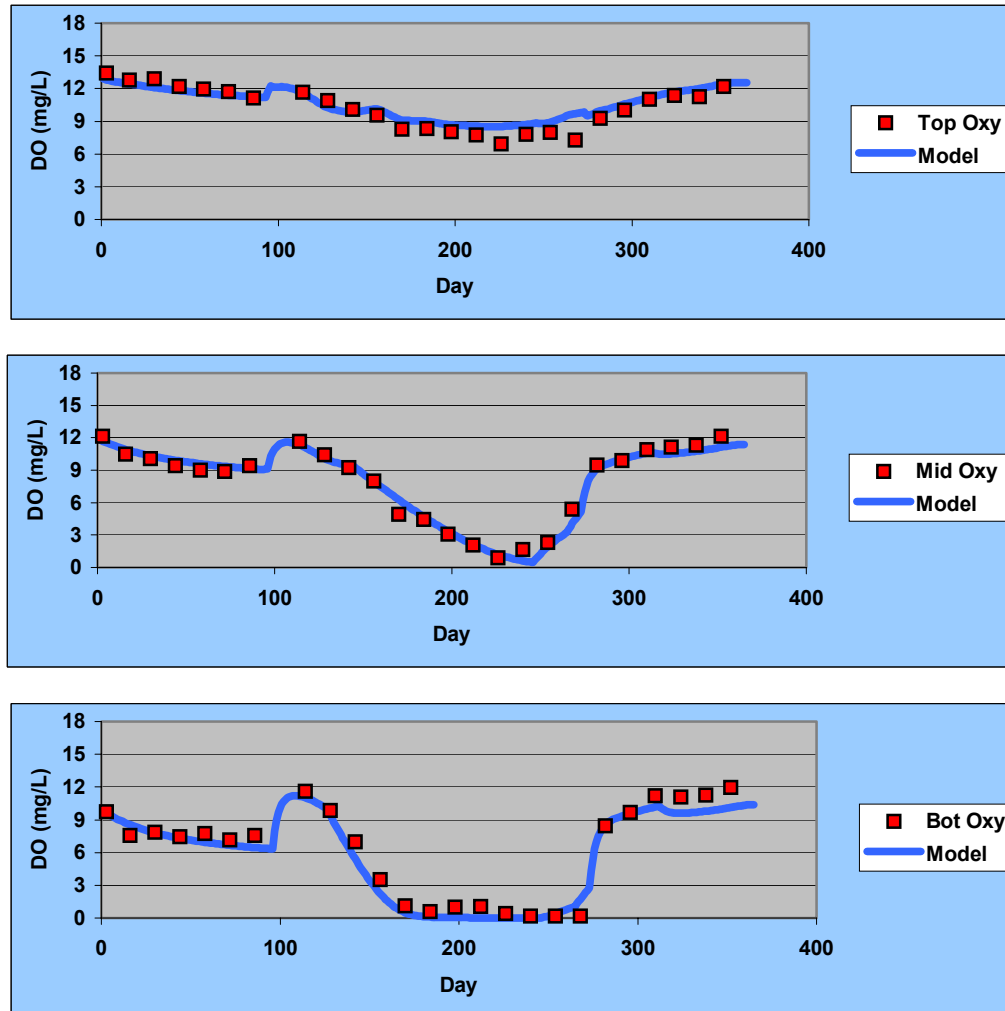


Figure 45: Three Layer Model Results for Dissolved Oxygen for 2000.

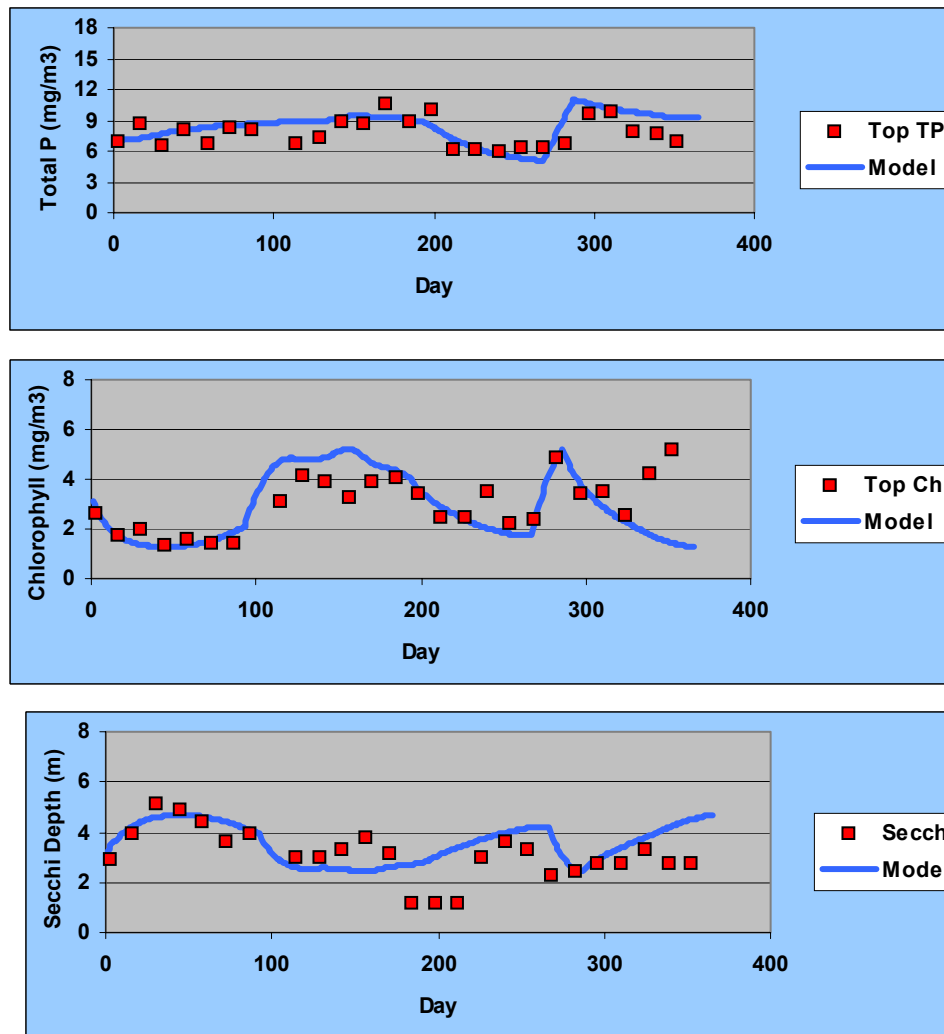


Figure 46: Model Results for Total Phosphorus, Chlorophyll, and Secchi Depth for 2000.