Hypoxia
Frequency of Occurrence
1985 - 1999

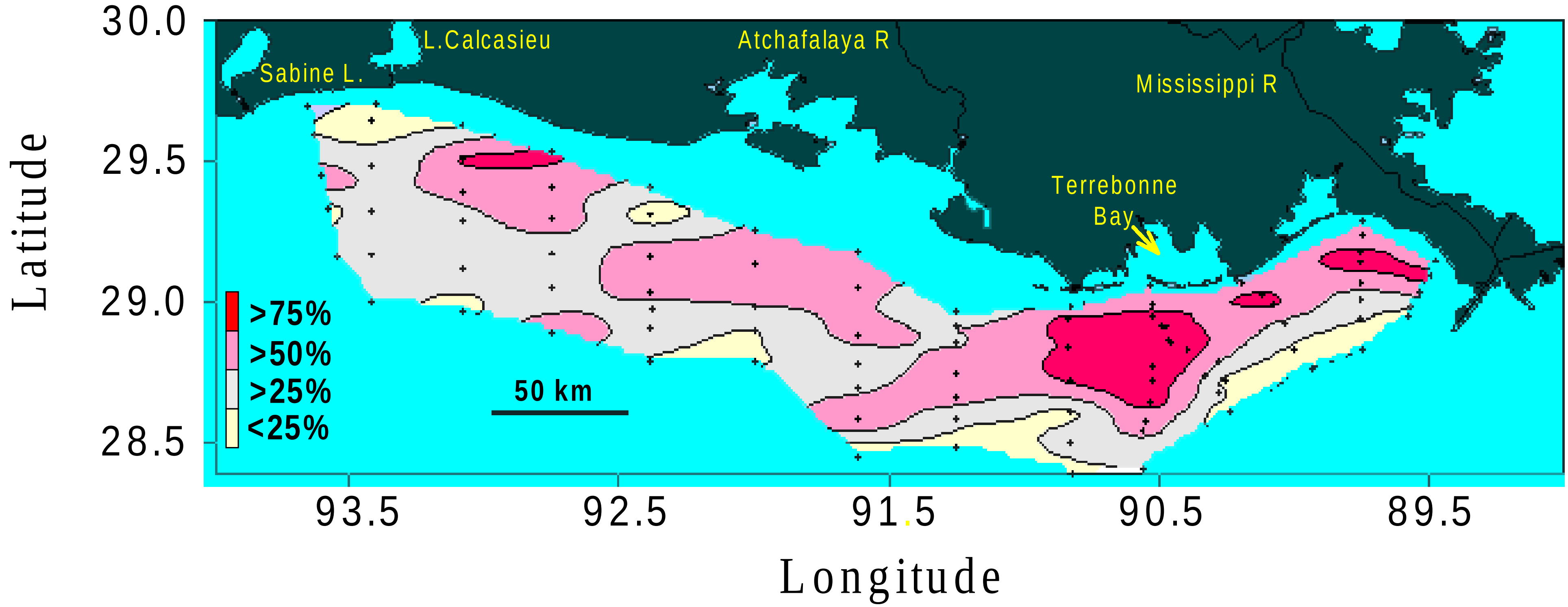

FIGURE 1.1 – Distribution of frequency of occurrence of mid- summer hypoxia — based on data from Rabalais, Turner and Wiseman from the 60 to 80 station grid repeatedly sampled from 1985-1999

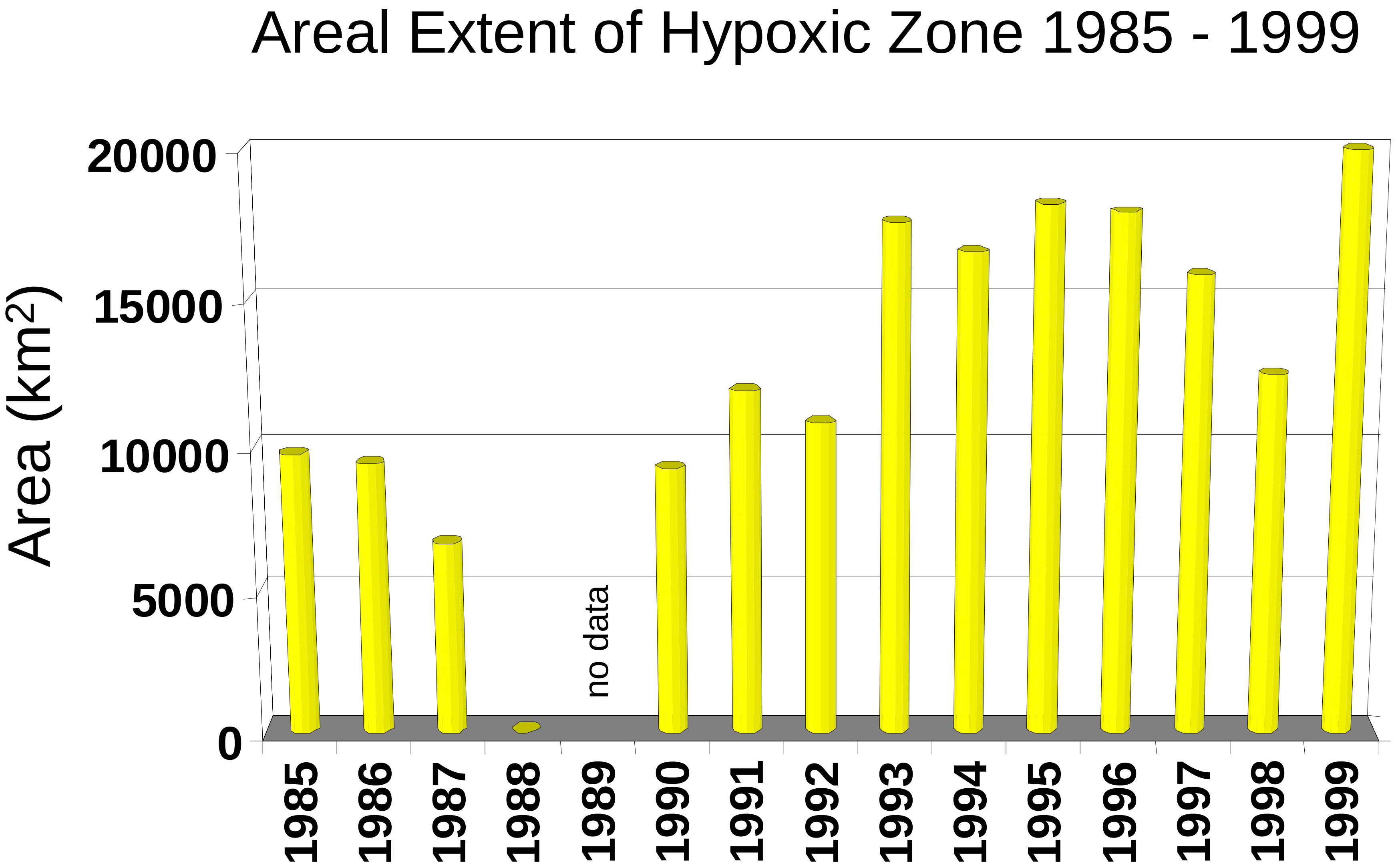

FIGURE 1.2 – Histogram of estimated areal extent of bottom water hypoxia for mid-summer cruises 1985-99 --- based on data from N. Rabalais, Louisiana Universities Marine Consortium

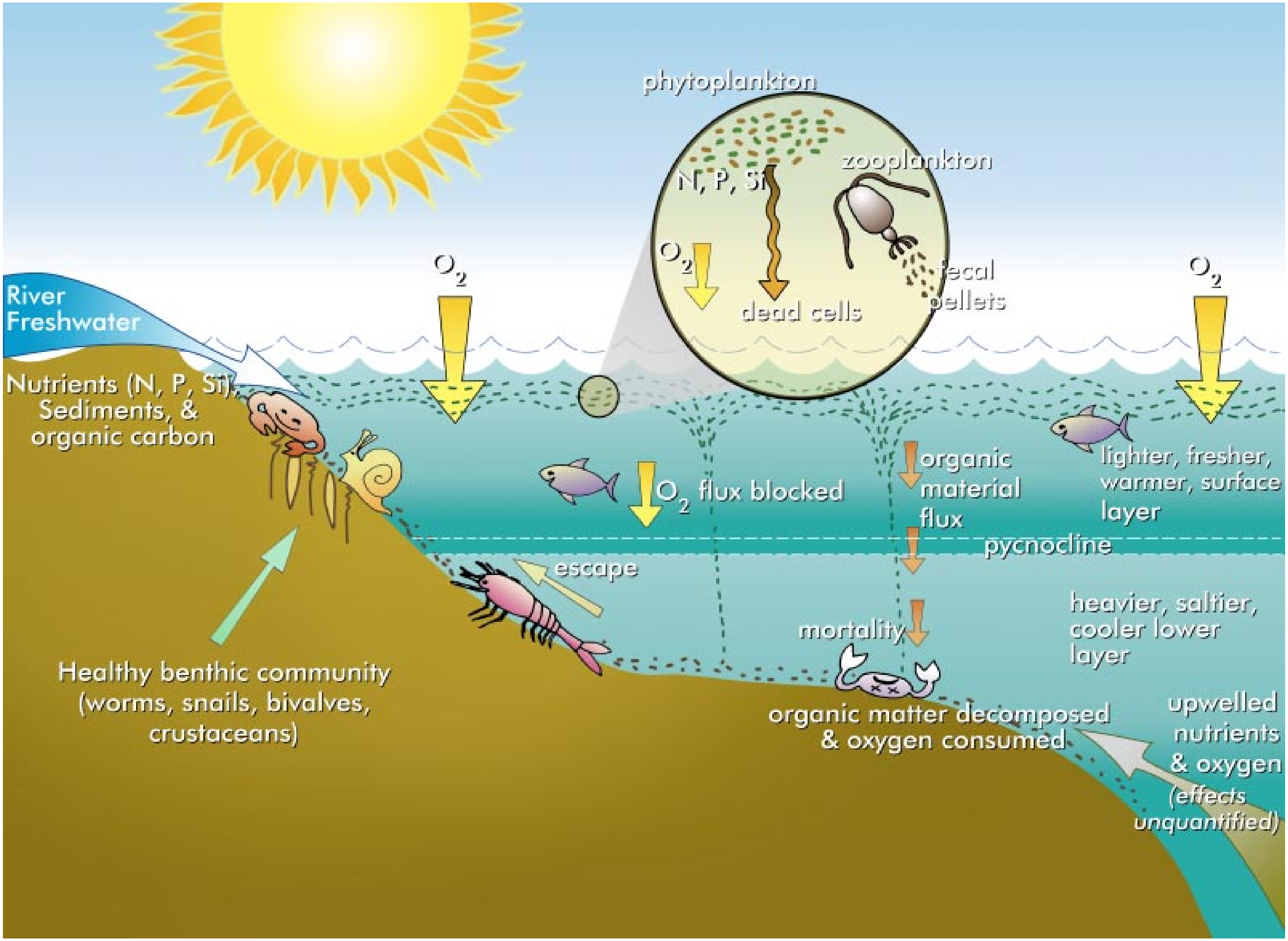

FIGURE 2.1 - The "Eutrophication Process" (modified from Downing et al. 1999) – Eutrophication occurs when organic matter increases in an ecosystem. Eutrophication can lead to hypoxia when decaying organic matter on the bottom depletes oxygen and replenishment is blocked by stratification. The flux of organic matter to the bottom is fueled by nutrients carried by riverflow or, possibly, from upwelling that stimulate growth of phytoplankton algae. This flux consists of dead algal cells together with fecal pellets from grazing zooplankton. Organic carbon from the river can also contribute to the flux of organic matter.

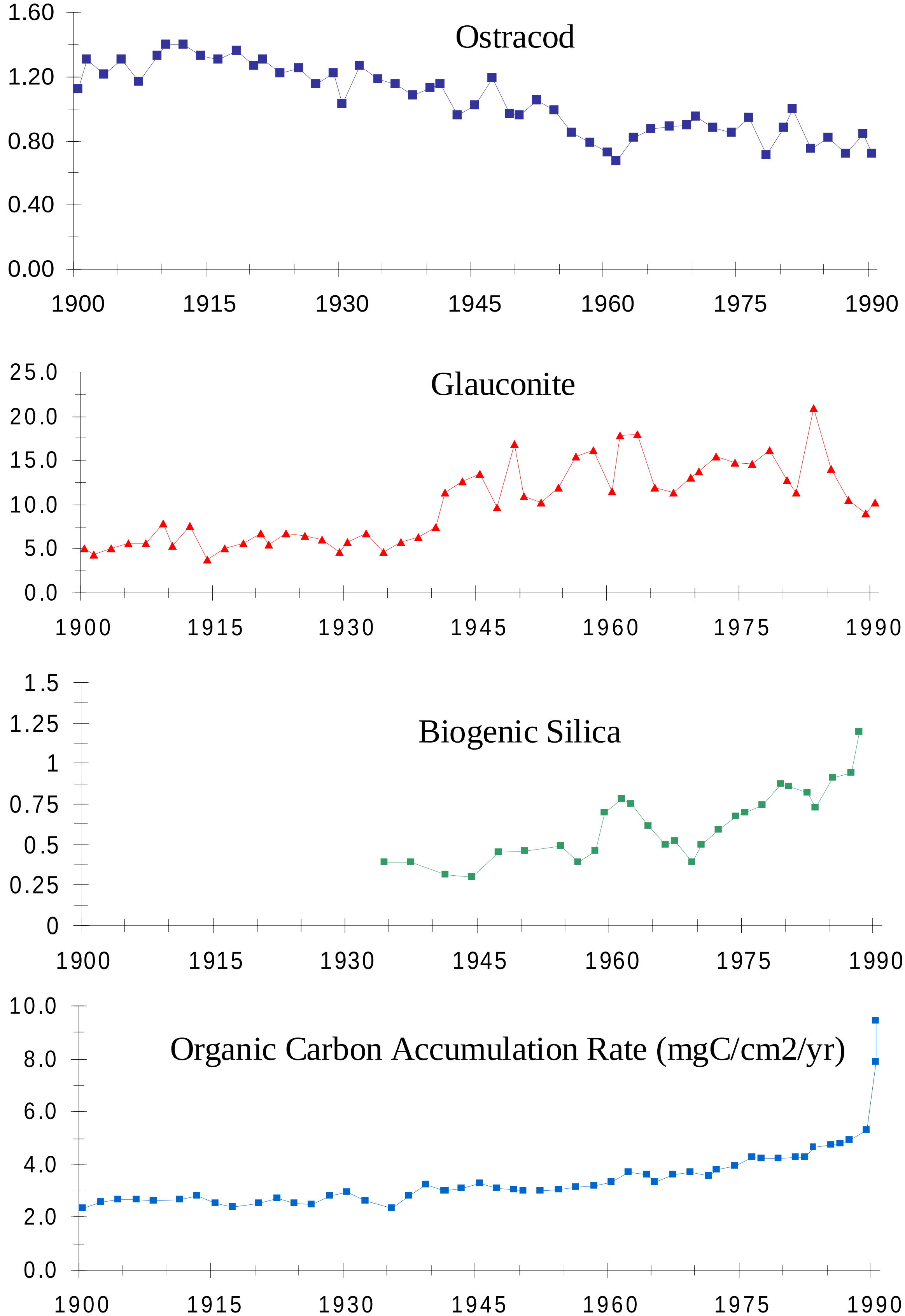

FIGURE 2.2 – Long-term records of Gulf ecosystem changes - Include organic carbon profile (#1 fig 70 - 1 profile (station 10), without terrestrial/marine breakout); biogenic silica profile (#1 fig 69 - 1 profile from E30), and glauconite and ostracod profiles (both from #1 fig 72)

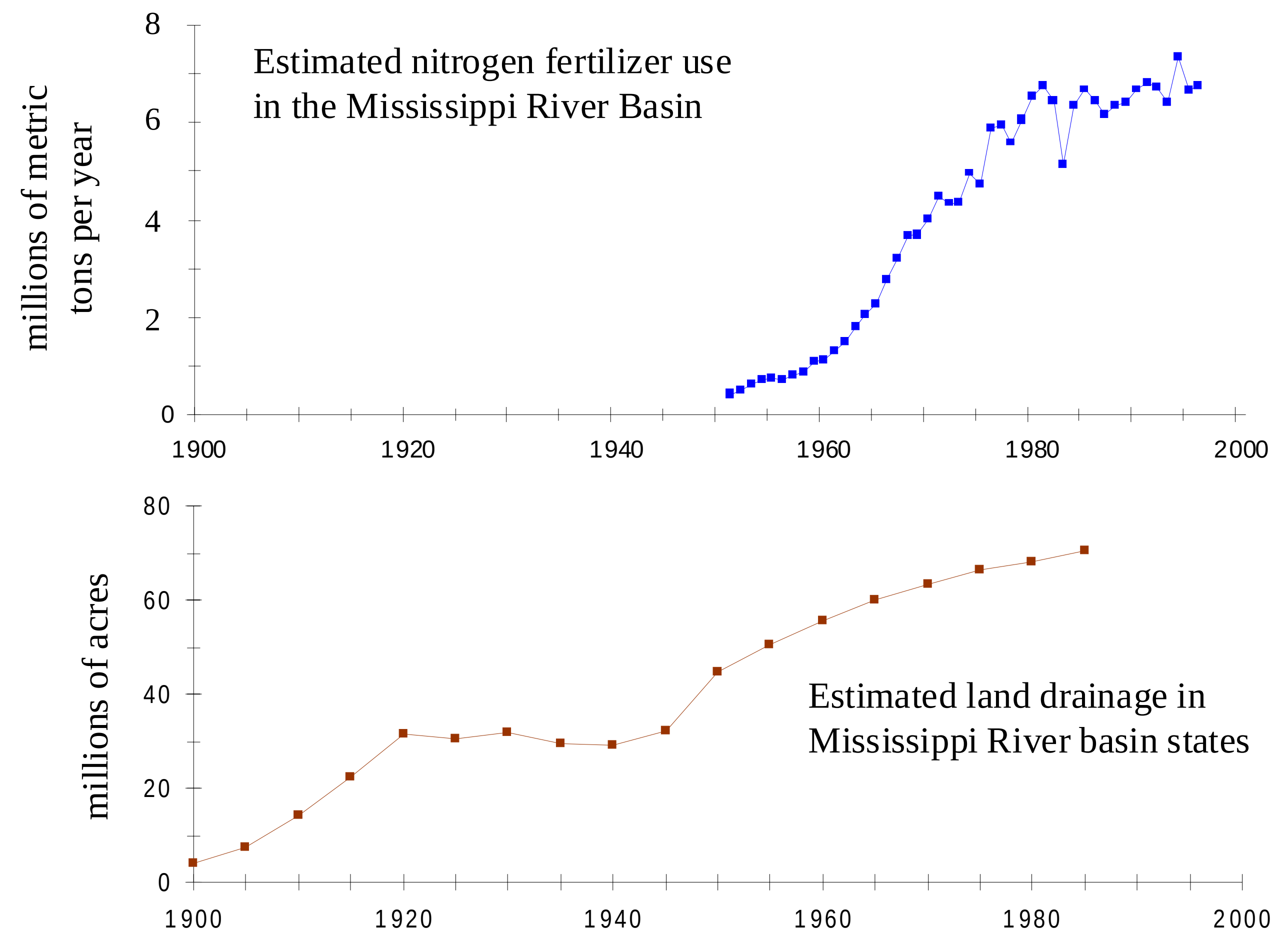

FIGURE 2.3 – Long-term records of drainage basin changes - annual amount of fertilizer application and area artificially drained (see #5 figure 1.2 and #3 page 44 for details)

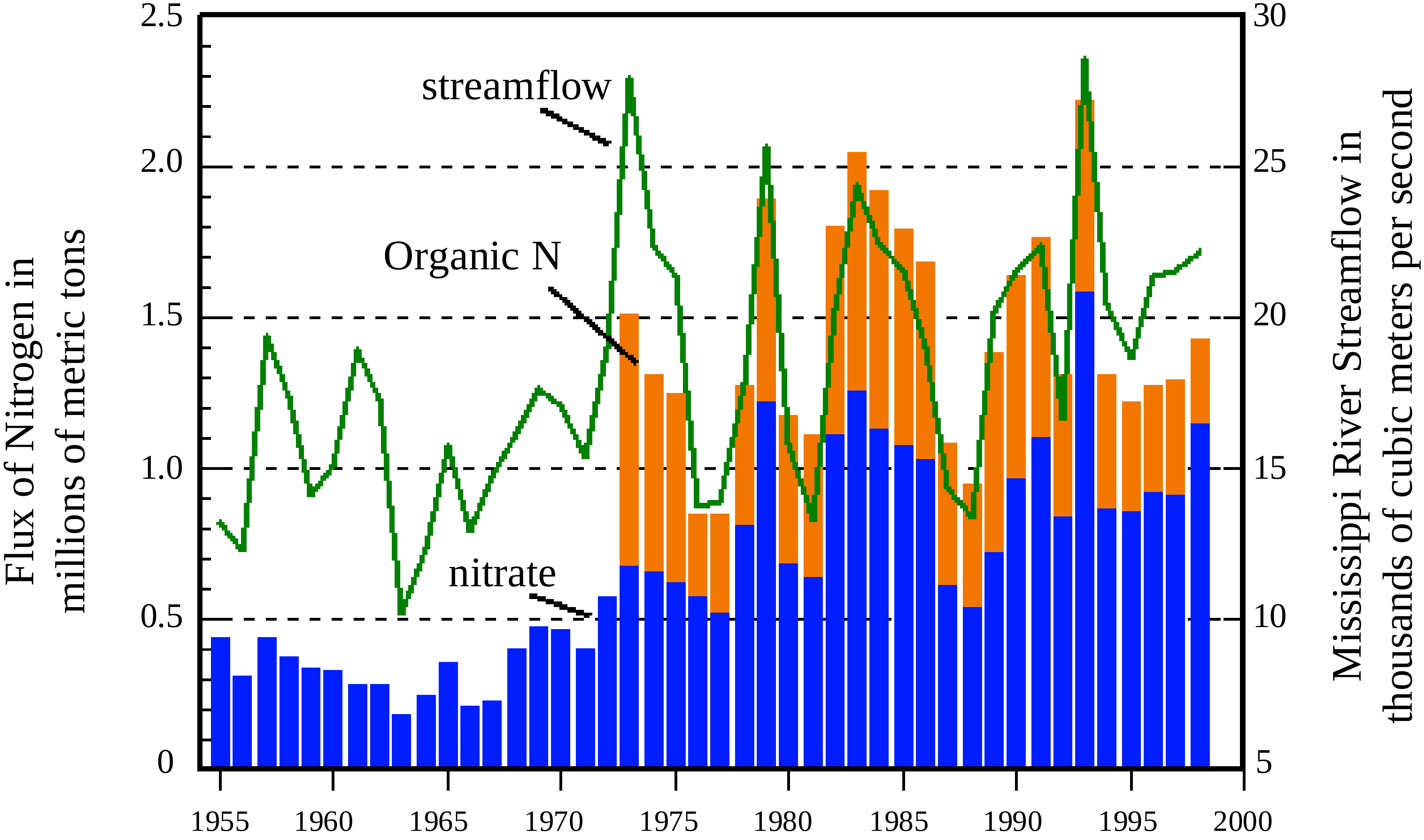

FIGURE 2.4 – Annual loads of nitrate, organic nitrogen and annual streamflow from the Mississippi River Basin to the Gulf of Mexico 1955-98

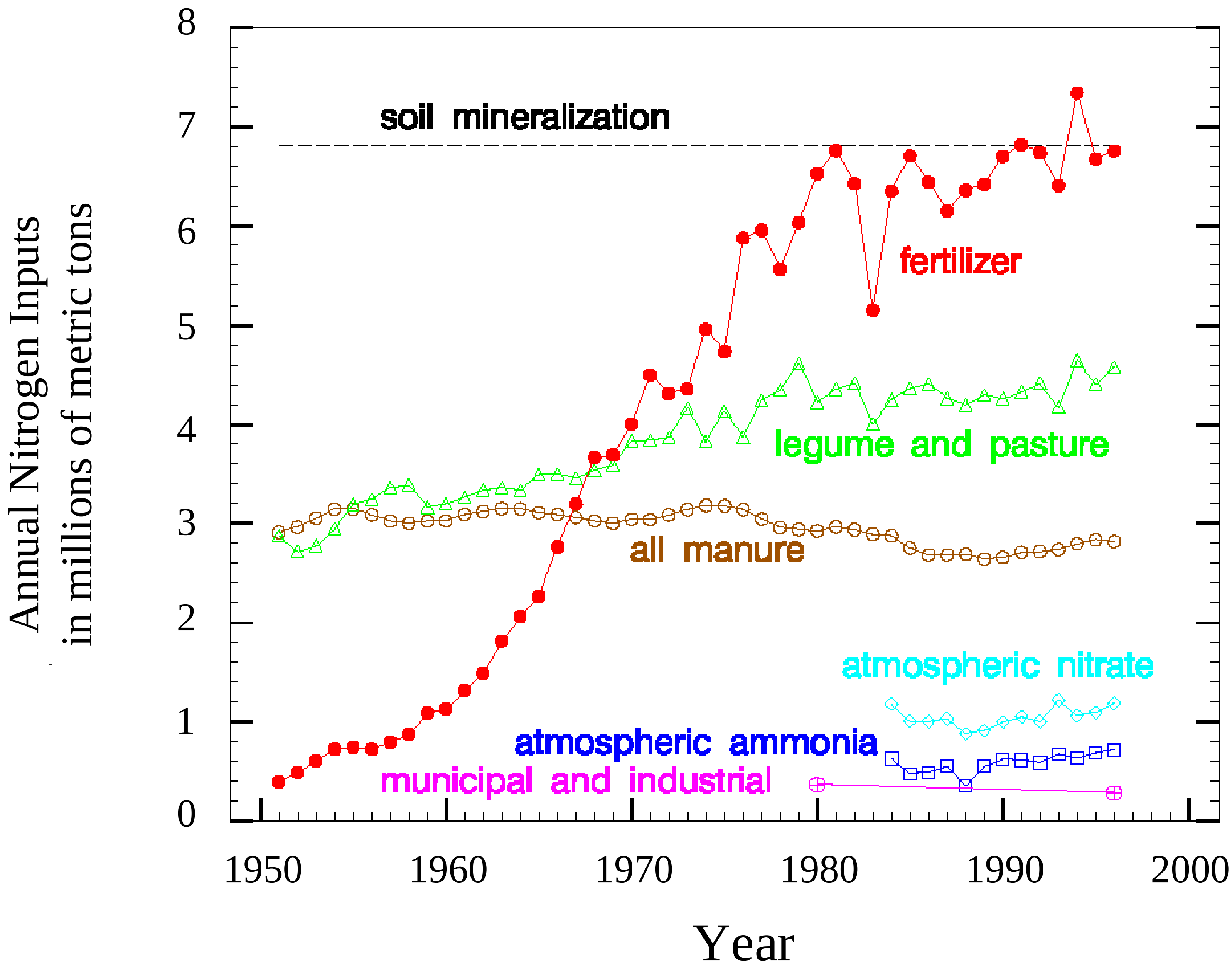

FIGURE 2.5A – Annual Nitrogen Inputs to the Mississippi/Atchafalaya River Basin

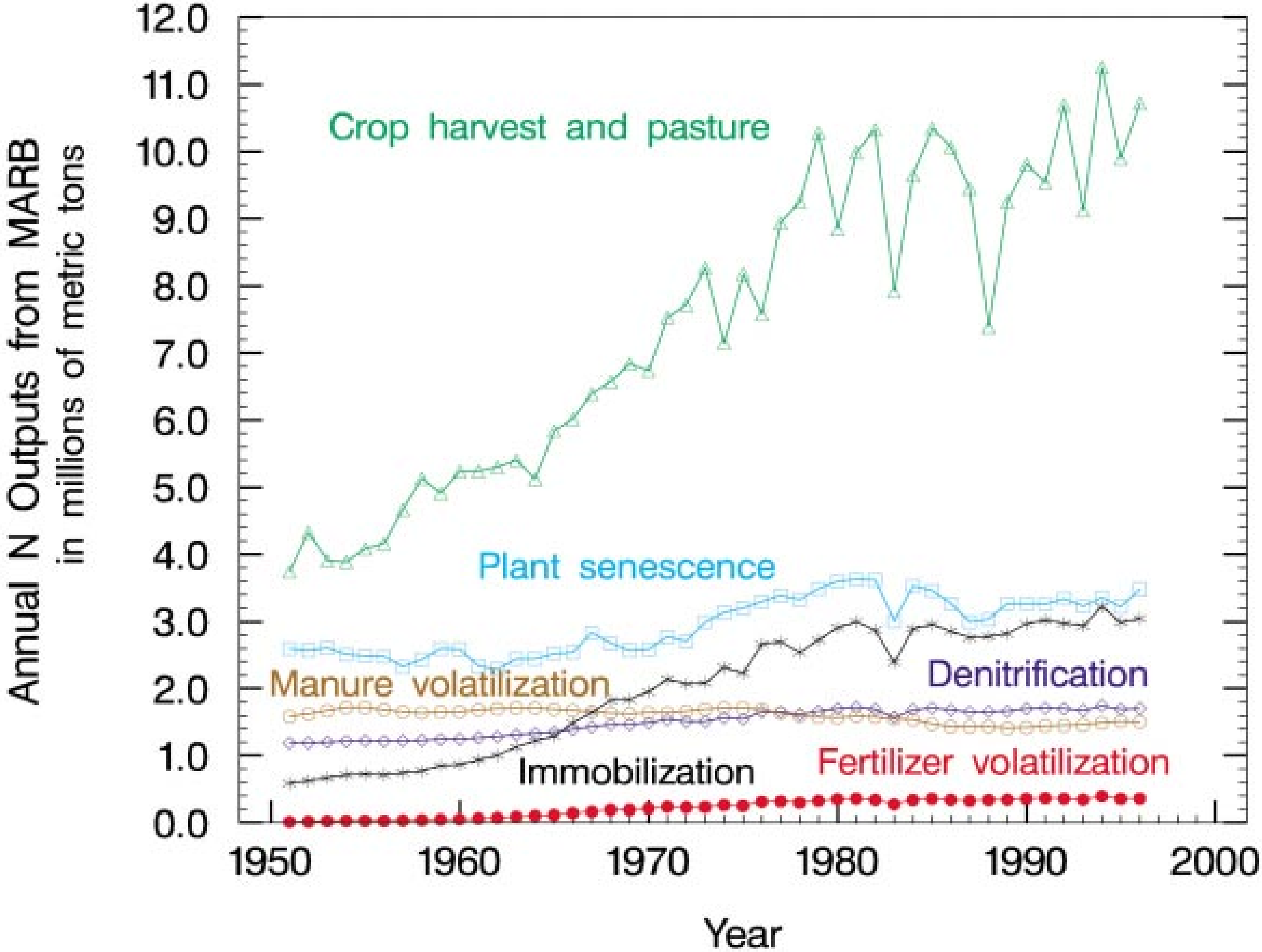

FIGURE 2.5B – Annual Nitrogen Outputs to the Mississippi/Atchafalaya River Basin

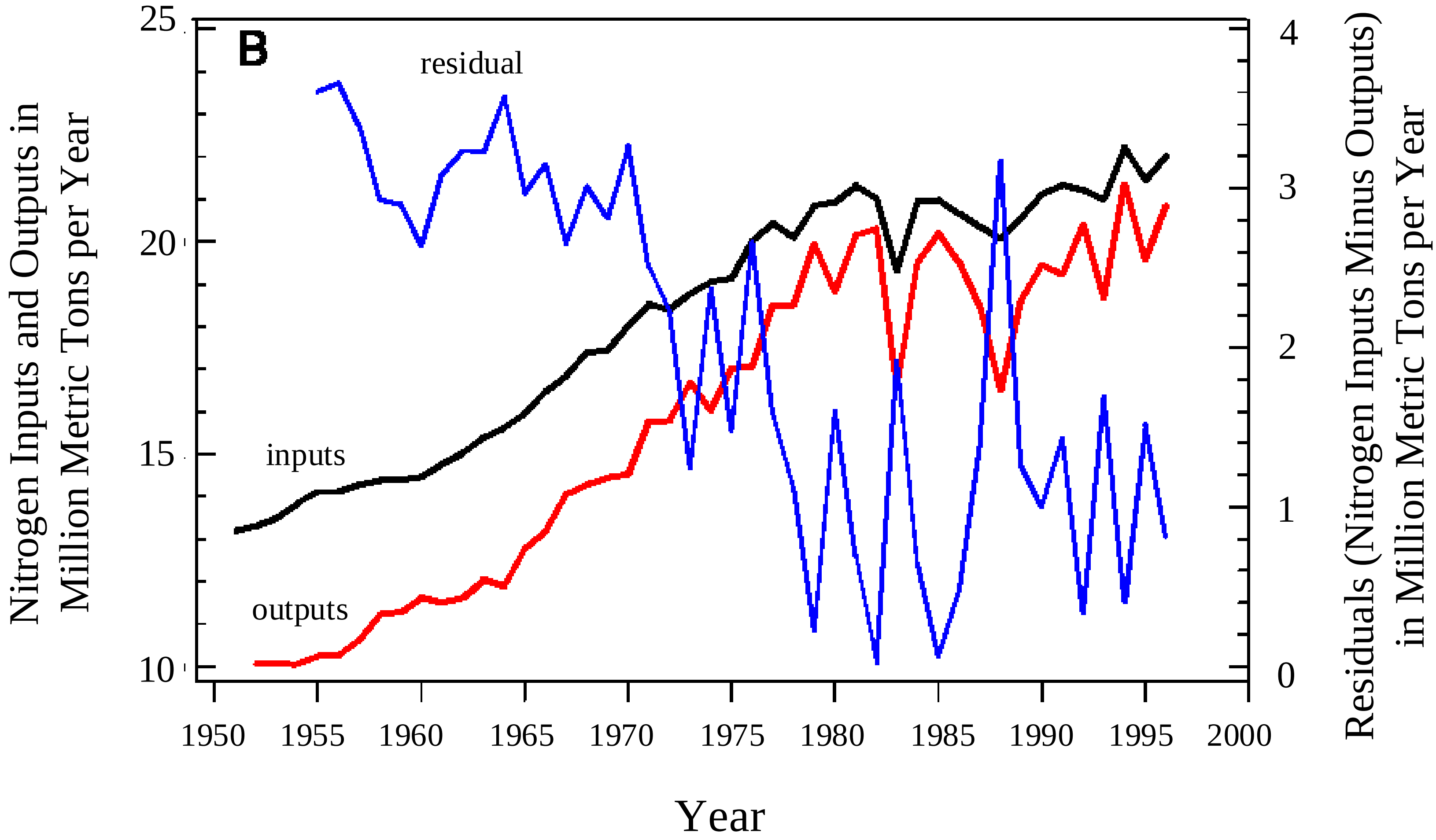

FIGURE 2.6 – Annual Nitrogen Inputs, Outputs and Residuals (inputs minus outputs) from Nitrogen Mass Balance for 1951-96

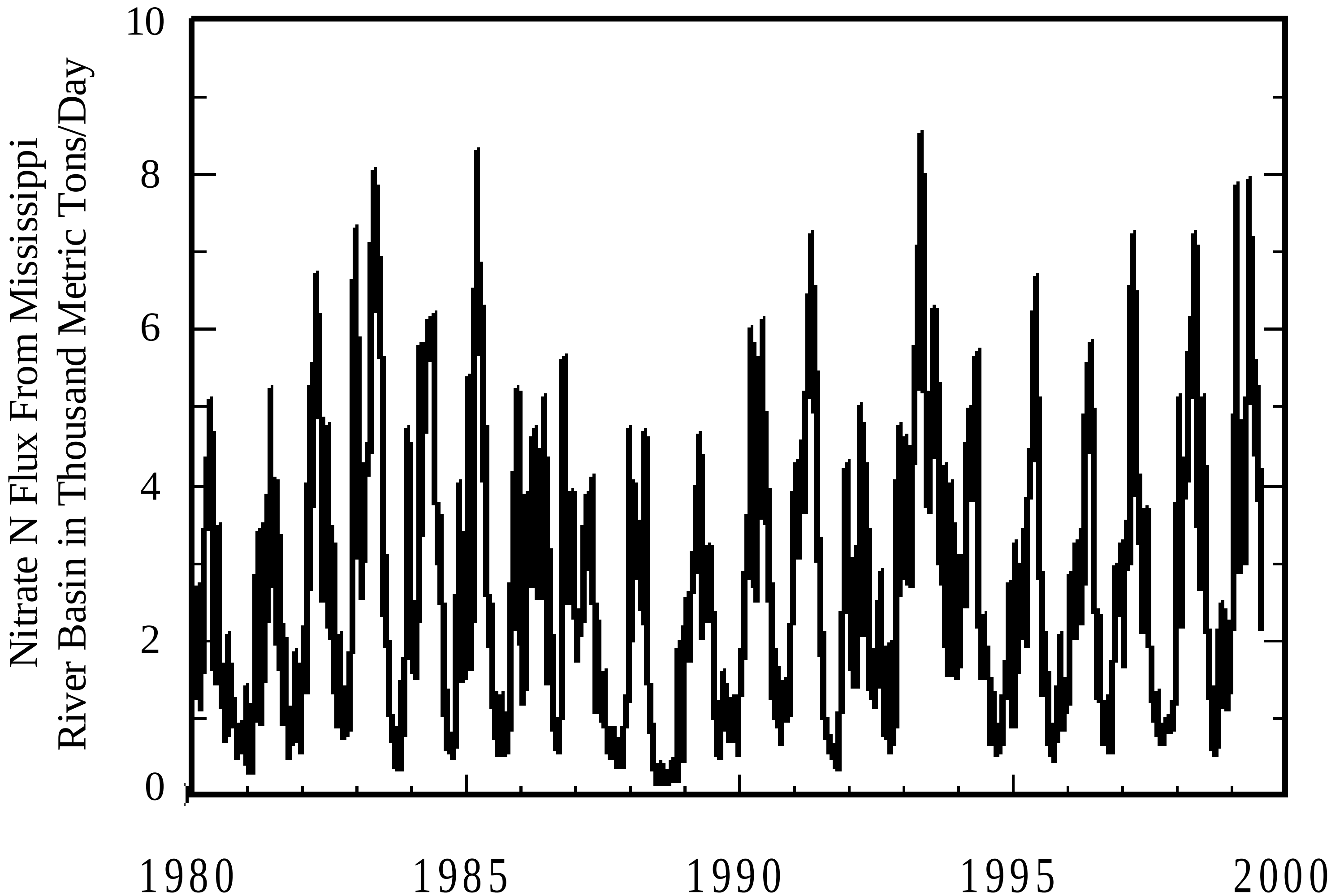

FIGURE 2.7 – Flux of Nitrate from the Mississippi River Basin to the Gulf of Mexico 1980 to August-1999

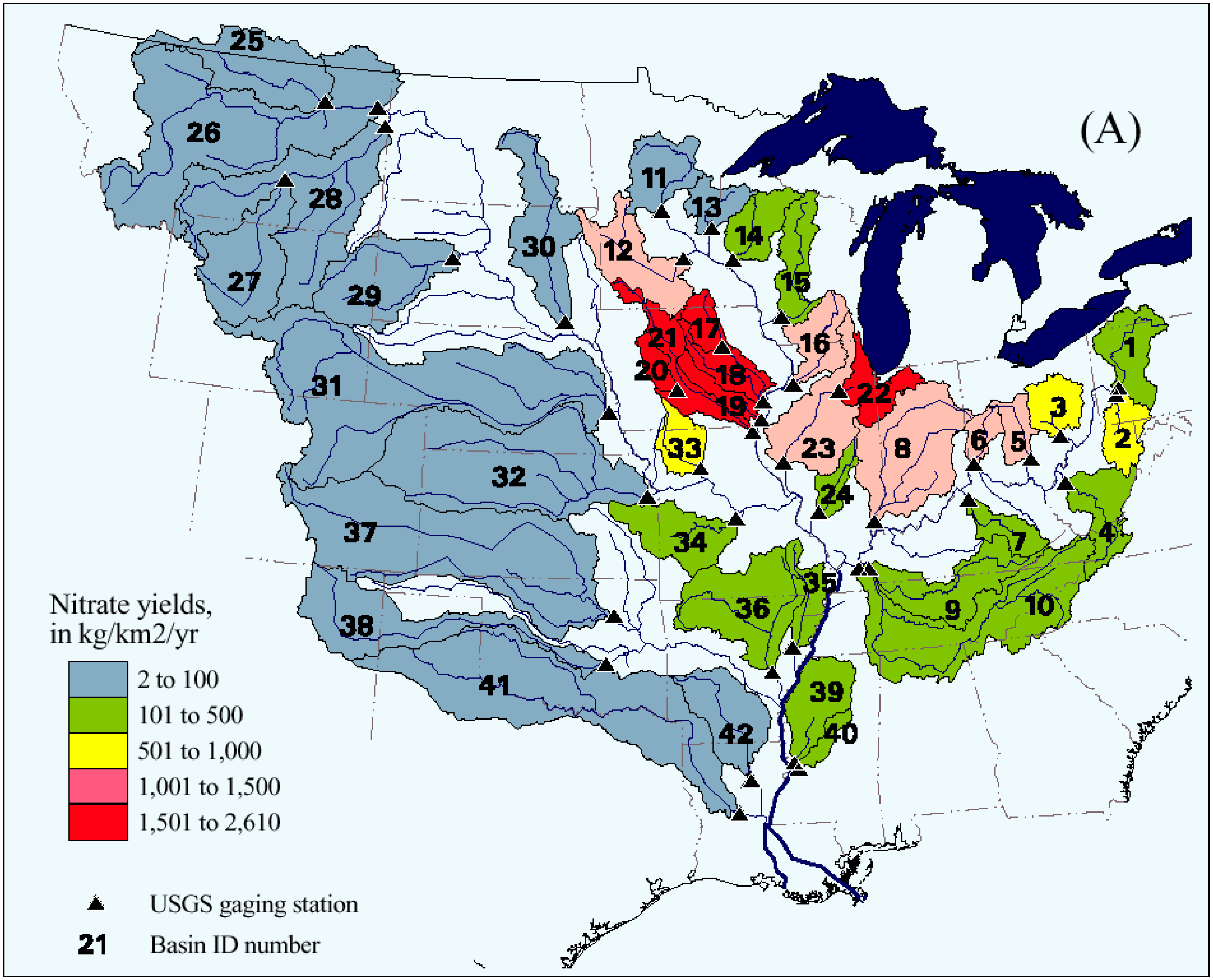

FIGURE 2.8 -- Average annual nitrate yields (1980-96) for 42 basins within the Mississippi-Atchafalaya River Basin

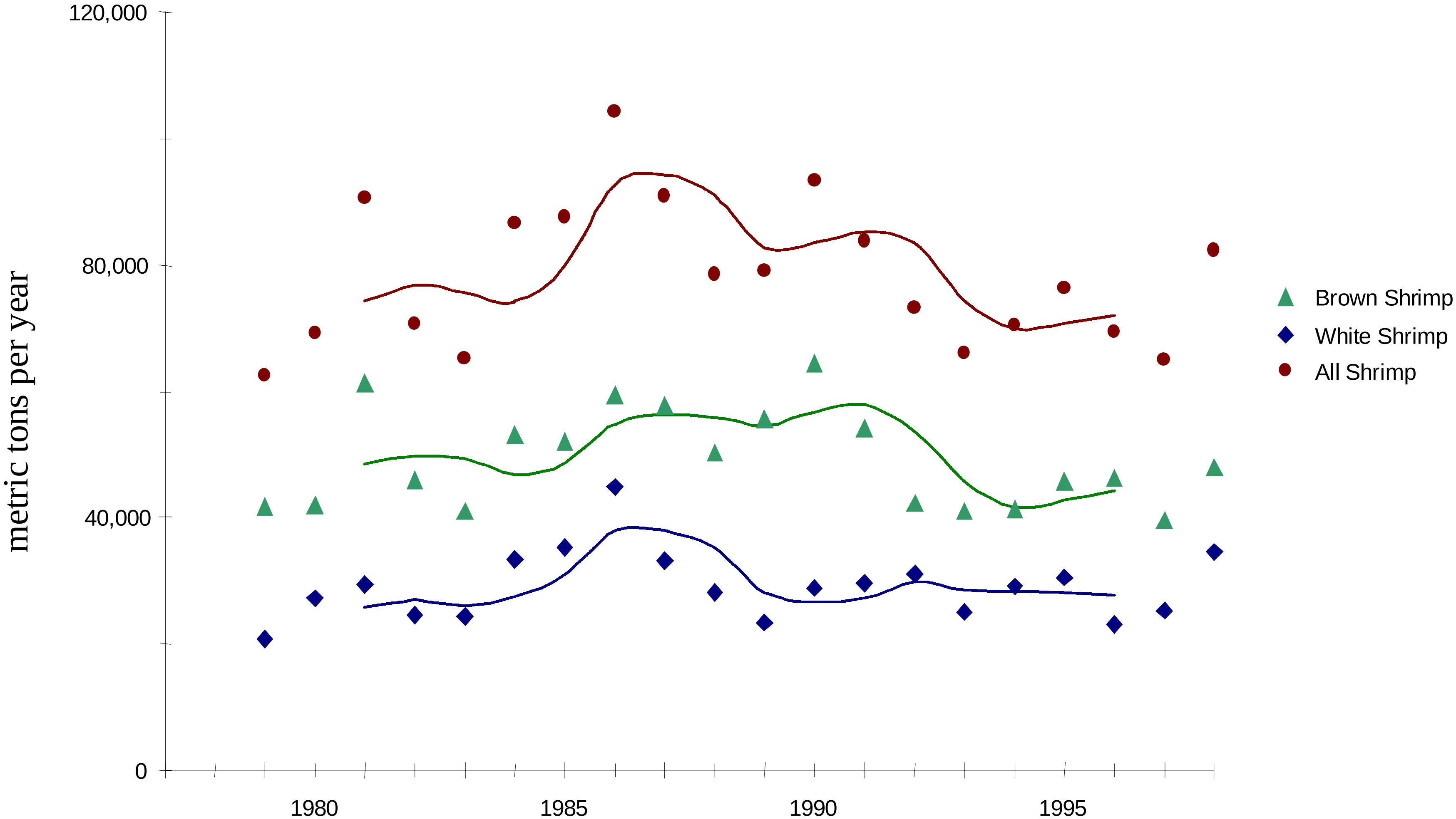

FIGURE 3.1 -- Trends in annual shrimp yield recorded by the National Marine Fisheries Service for Louisiana and Texas, 1979 - 1998 -- The lines include 3-year moving averages. The data are available at www.sf.nmfs.gov/st1/commercial/landings/index.html)

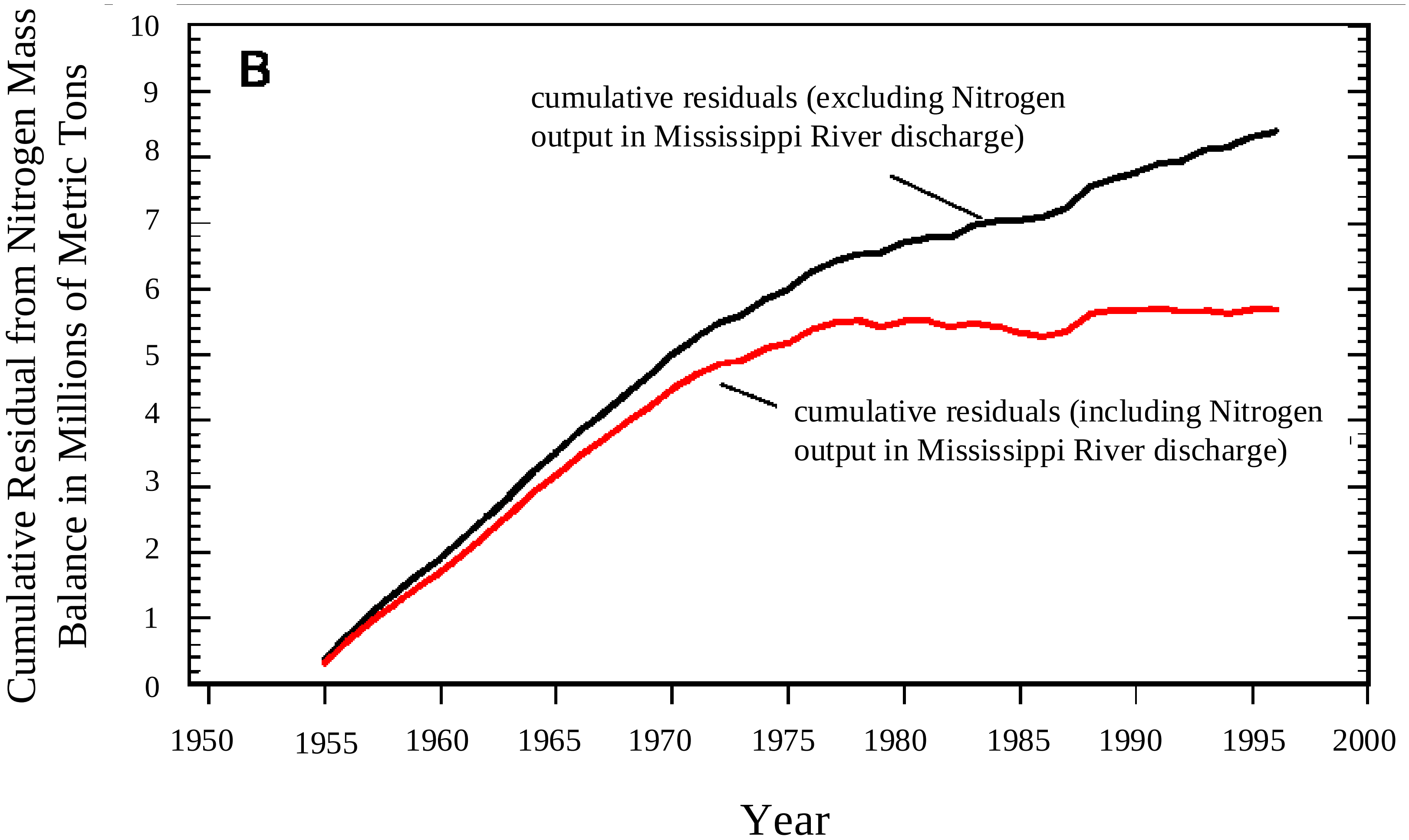

FIGURE 4.1 - Cumulative residual (nitrogen inputs minus outputs) from nitrogen mass balance for the MARB (from #3, Figure 6.4B)

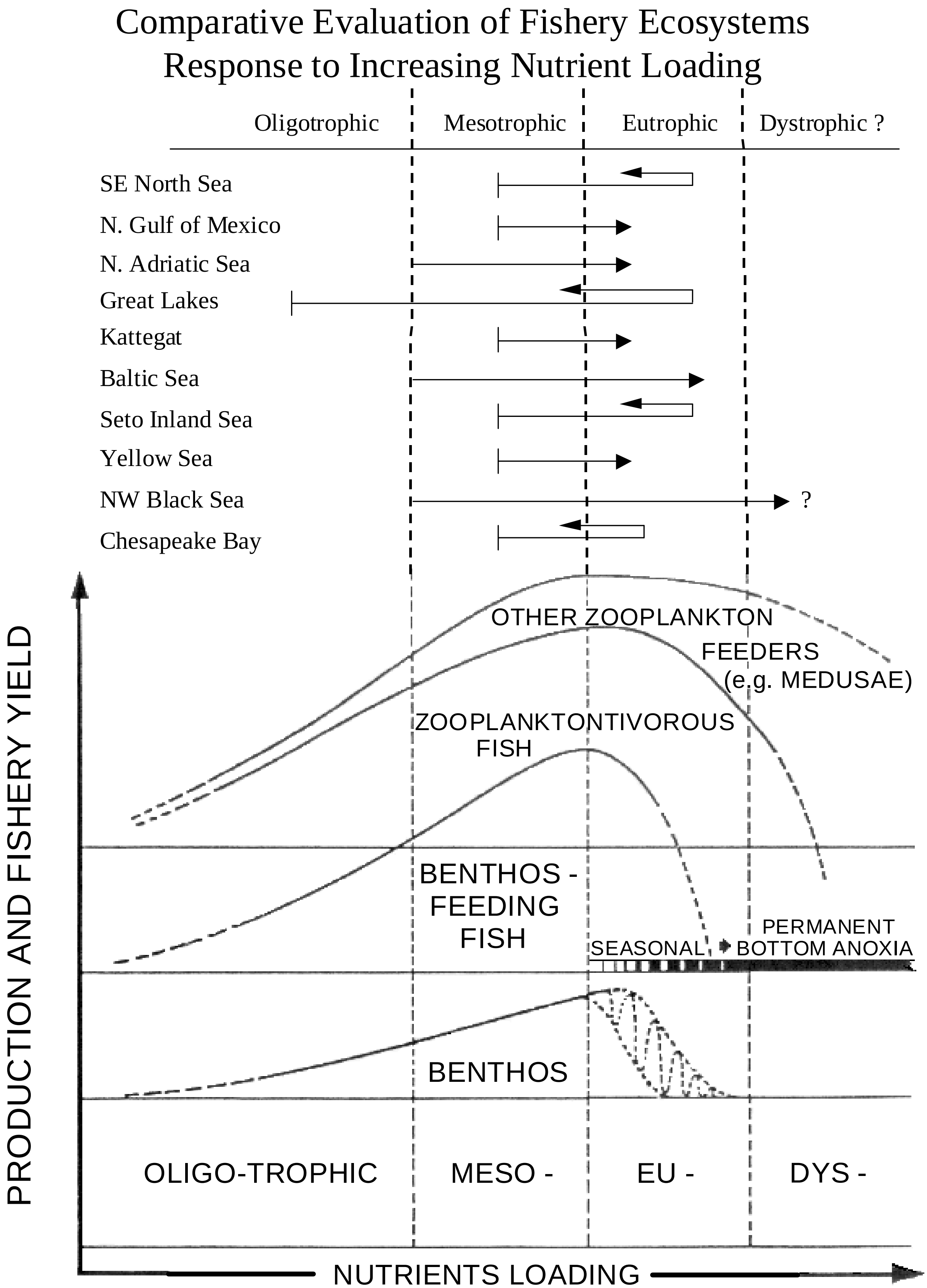

Figure 4.2 - Comparative evaluation of fishery response to nutrients (redrawn from Caddy, 1993) -- Each curve represents a species guild and their reaction to increasing nutrient supplies. The figure's top half list recent trends for systems world-wide. Vertical dashed lines separate categories of organic production which result from different nutrient levels.

FIGURE 5.1 - Role of forested riparian buffers in trapping nutrients before entering stream

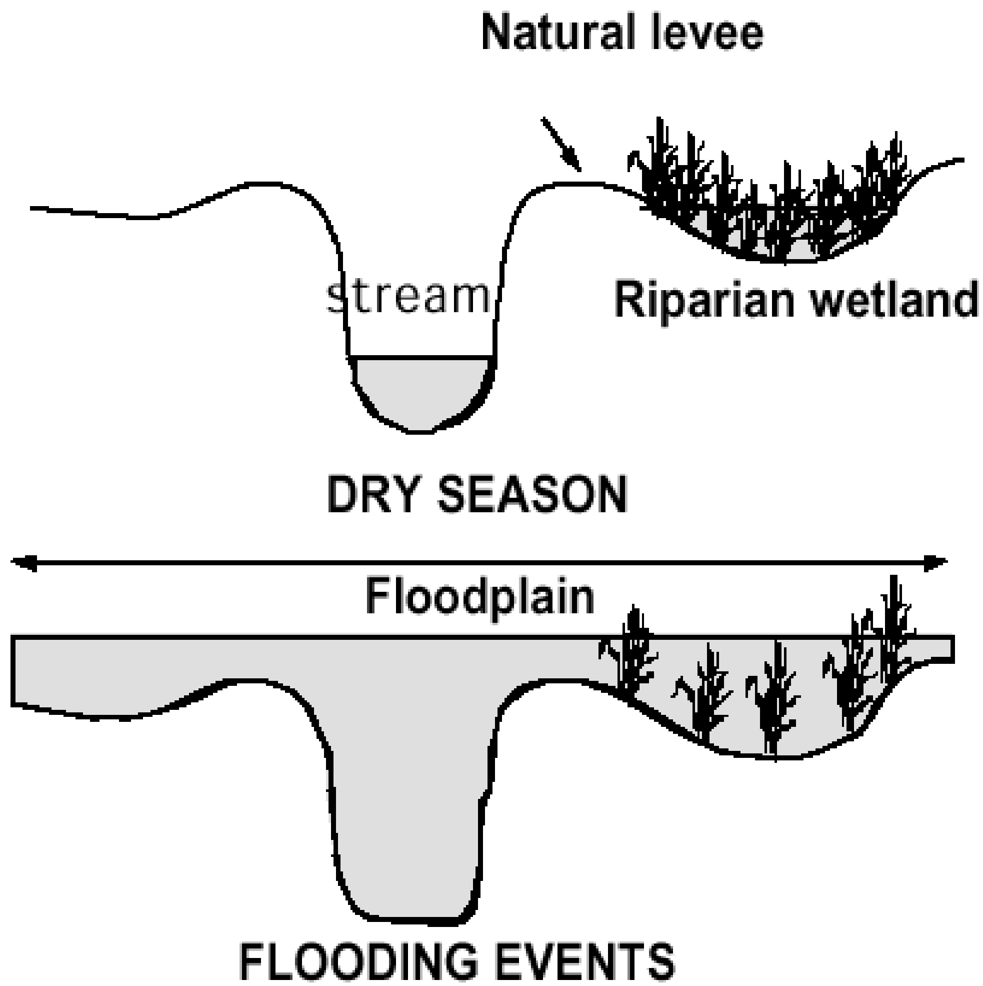

FIGURE 5.2 - The role of riparian wetlands in capturing nutrients during flood events

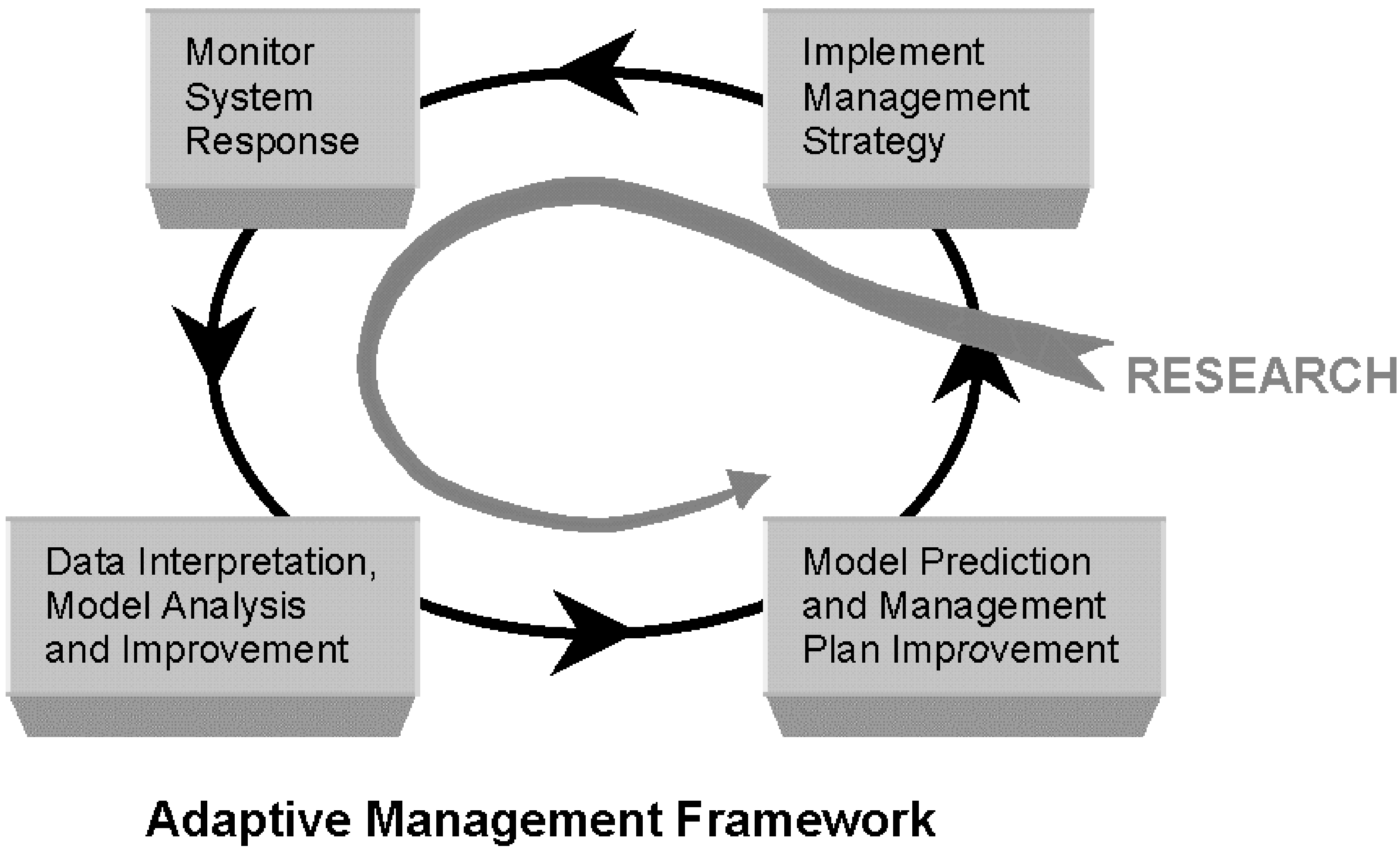

FIGURE 6.1 -- Adaptive Management Feedback Loop — connecting the following 4 steps in a circular process:

1. Monitor System Response;
2. Data Interpretation, Model Analysis and Improvement;
3. Model Prediction and Management Plan Improvement;
4. Implement Management Strategy