Streams and rivers themselves are not always much affected by nutrient loading. However, in most cases these nutrient-enriched waterways flow to the sea, with eutrophication of coastal waters the unfortunate result. This problem now occurs regularly throughout the world, in locations such as the Gulf of Mexico (Rabalais et al. 1999), the Baltic Sea (Larson et al. 1985), the Adriatic Sea (Faganeli et al. 1985), and the Black Sea (Tolmazin 1985). But we have moved beyond being concerned about nutrients only in the regions where they are discharged to being concerned about their movement through large watersheds (thousands and even millions of square kilometers in extent) and over long distances (hundreds to thousands of kilometers), and their effects on large areas of coastal water.

In this article we describe a suite of practices that, if effected collectively, could help reduce nitrogen loadings to the Gulf of Mexico. These practices, in turn, could help limit hypoxia (the presence of low levels of dissolved oxygen in bottom waters, generally less than 2 mg per L) on the continental shelf of the northern Gulf of Mexico, a seasonally severe problem that has persisted there for the past decade. Between 1993 and 1999 the hypoxia zone ranged in extent from 13,000 to 20,000 km² (Rabalais et al. 1996, 1998, 1999, Rabalais and Turner 2001). The hypoxia is most widespread, persistent, and severe in June, July, and August, although its extent and timing can vary, in part because of the amplitude and timing of flow and subsequent nutrient loading from the Mississippi River Basin.

The waters that discharge to the Gulf of Mexico originate in the watersheds of the Mississippi, Ohio, and Missouri Rivers (collectively described here as the Mississippi River Basin). With a total watershed of 3 million km², this basin encompasses about 40% of the territory of the lower 48 states (Figure 1) and accounts for 90% of the freshwater inflow to the Gulf of Mexico.