

Eutrophic conditions

- Eutrophication was a widespread problem throughout most of the Nation.
- Majority of systems for which data were available were moderately to highly eutrophic.
- There were no regional or national spatial patterns of symptoms.
- The mid-Atlantic region was the most impacted.

The assessment of overall eutrophic condition (OEC) is based on five symptoms: chlorophyll *a*, macroalgae, dissolved oxygen, nuisance/toxic blooms, and submerged aquatic vegetation. The expression level of each is determined by the concentration or problem occurrence, spatial coverage, frequency of occurrence, and for nuisance/toxic algal blooms, the duration of the bloom (see *Chapter 2*, Figure 2.3).

Eutrophication is a widespread problem throughout most of the regions (Figure 3.9). Overall, 29 estuaries had a moderate high or high OEC rating, representing 39% of the total assessed estuarine surface area. An additional 35 estuaries exhibited moderate eutrophic conditions. When considered together, estuaries with moderate to high conditions represent 78% of the assessed estuarine surface area. Estuaries with high OEC ratings were mainly located in the mid-Atlantic region. The largest concentration of highly eutrophic estuaries occurred around Chesapeake Bay, an area that also had high influencing factor ratings.

There were 35 systems (21% of assessed surface area) which exhibited low to moderate low overall eutrophic conditions. More than half of these estuaries were located in the Gulf of Mexico and Pacific Coast regions. Low to moderate low overall eutrophic conditions in the Pacific Coast region are a result of moderate chlorophyll *a* and low dissolved oxygen symptom expressions. While nitrogen load data were only available for four systems in this region, these systems have a moderate or low susceptibility to nutrients. Although the North Atlantic region had a predominance of estuaries with low influencing factors ratings, the OEC ratings in the region varied from low to moderate high, with most systems having a low or moderate OEC condition.

Data confidence and reliability (DCR) varied among systems. The general trend showed moderate DCR ratings in systems with high overall eutrophic conditions but low DCR ratings in systems with moderate or low OEC ratings. Most of the systems with high confidence are located in the North

and mid-Atlantic regions, while those with low confidence are located in the Gulf of Mexico and Pacific Coast regions.

Changes in eutrophic condition since the 1990s

Changes in overall eutrophic condition since the 1999 assessment revealed that equal numbers of systems had worsened and improved. Among the systems where data were available for comparison (58), 13 had improved (9% of assessed surface area), 13 had worsened (14% assessed surface area), and 32 had remained the same (77% assessed surface area). There were fewer systems with high overall eutrophic conditions in 2004 (15) than a decade ago (17). The assessed estuarine surface area with moderate to high overall eutrophic conditions has remained about the same from 72% in the early 1990s to 78% in this assessment. It is evident from these results that changes have occurred predominantly in the smaller systems. However, these results must be viewed with caution, because the total number of systems for which conditions are unknown has increased from 17 in the 1999 assessment to 42 in this assessment. Similar to the 1999 survey, the Pacific Coast region had the least robust data and the lowest assessment confidence.

The data gaps and low confidence in some of the results highlight the need for systematic monitoring. The same is true for trend analysis of the individual symptom results. While it is possible to say that there were 48 systems exhibiting high chlorophyll *a* levels compared to only 39 systems a decade ago, there were many more systems in 2004 for which data were unknown. Likewise, there were 42 systems with high and moderate levels of dissolved oxygen problems a decade ago; in 2004 only 24 systems exhibited high or moderate problems. It is tempting to evaluate and make conclusions about management success during the past decade based upon these numbers. However, more systems need to be characterized before any conclusions can be made.



Wetlands help filter nutrients out of water bodies.

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Figure 3-9. Overall eutrophic condition on a national scale.

