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Documented Hypoxia and Associated Risk Factors in Estuaries, Coastal Waters, and the Great Lakes Ecosystems



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SPECIFIC INDICATORS

DOCUMENTED NUTRIENT POLLUTION

- [Nutrient loads and yields](#)
- [Fertilizer](#)
- [Manure](#)

DOCUMENTED IMPACTS

- [Hypoxia](#)
- [Harmful algal toxins](#)
- [Groundwater nitrate](#)
- [Assessed and impaired waters](#)

STATE ACTIONS UNDERWAY

- [Limiting loads \(Status of Nutrient Requirements for NPDES-Permitted Facilities\)](#)
- [Adoption of standards](#)

[Nutrient Indicators Dataset Home](#)

About this indicator

Hypoxia exists when water has dissolved oxygen concentrations too low to support fish and other important animal species. Hypoxia is strongly linked to eutrophication in aquatic systems as the decomposition of large amounts of organic matter (i.e., from algal blooms) leads to oxygen depletion. This indicator presents the number of coastal and Great Lakes ecosystems per state with ‘documented’ or ‘concern for’ hypoxia as detailed in the 2010 *Scientific Assessment of Hypoxia in U.S. Coastal Waters* report, as well as the total number of systems evaluated in each state. Ecosystems with ‘documented’ hypoxia experience low dissolved oxygen concentrations leading to hypoxia (i.e., dissolved oxygen concentrations < 2 mg/L) and show evidence that the hypoxia was caused, at least in part, by anthropogenic activity, mostly related to eutrophication. Systems with ‘concern for’ hypoxia demonstrate risks for and/or signs of eutrophication, including elevated nutrient and chlorophyll a concentrations or harmful algal blooms. These ecosystems are considered at risk of becoming hypoxic.

Number of state estuarine, coastal, and Great Lakes ecosystems with documented hypoxia or concern for hypoxia (i.e., presence of elevated nutrient concentrations, chlorophyll a levels, or harmful algal blooms). Also shown is the total number of ecosystems evaluated in each state.

State	# of hypoxic ecosystems	Total # of ecosystems reviewed
Alabama	10	10
Alaska	1	1
California	19	28
Connecticut	8	12
Delaware	9	10
Florida	108	132
Georgia	17	24
Hawaii	1	1
Illinois	No data	No data

State	# of hypoxic ecosystems	Total # of ecosystems reviewed
Indiana	No data	No data
Louisiana	21	32
Maine	4	24
Maryland	30	59
Massachusetts	11	17
Michigan	0	3
Minnesota	No data	No data
Mississippi	13	17
New Hampshire	1	3
New Jersey	11	15
New York	27	29
North Carolina	26	36
Ohio	2	3
Oregon	5	15
Pennsylvania	No data	No data
Rhode Island	6	6
South Carolina	26	37
Texas	39	53

State	# of hypoxic ecosystems	Total # of ecosystems reviewed
Virginia	13	46
Washington	25	35
Wisconsin	No data	No data

Note - Data are based on an extensive review of literature and national assessments which evaluated 647 U.S. coastal, estuarine, and Great Lakes ecosystems, and are current through December 2008. The total number of ecosystems in each state and nationwide is not determined, therefore these numbers may not fully represent the extent of hypoxia in each state.

Source: Scientific Assessment of Hypoxia in U.S. Coastal Waters report (Interagency Working Group 2010)

Download the [Hypoxia data table \(excel\)](#) (2 pp, 13 K)

Source of data

1. Committee on Environment and Natural Resources. 2010. Scientific Assessment of Hypoxia in U.S. Coastal Waters. Interagency Working Group on Harmful Algal Blooms, Hypoxia, and Human Health of the Joint Subcommittee on Ocean Science and Technology. Washington, DC.

Data source information

Data are from the 2010 Scientific Assessment of Hypoxia in U.S. Coastal Waters report developed by the Interagency Working Group on Harmful Algal Blooms, Hypoxia, and Human Health, which was chartered through the Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council and the Interagency Committee on Ocean Science and Resource Management Integration. In developing this report, the Working Group conducted an extensive review of literature and national assessments, obtaining hypoxia and risk information from 647 U.S. coastal and Great Lakes systems. Data are current through December 2008.

What to consider when using these data

Thirty states (not including territories) have coastal and Great Lakes segments, however no data were available for Illinois, Indiana, Minnesota, Pennsylvania, or Wisconsin. Because the universe of waterbody ecosystems (i.e., total number of U.S. coastal and Great Lakes ecosystems) is not provided in the Working Group's report, it is unknown to what extent these data may understate the levels of hypoxia and associated risk factors in U.S. coastal and Great Lakes systems.

References and links to other data sources

1. Diaz, R. J., R. Rosenberg. 2008. Spreading dead zones and consequences for marine ecosystems. *Science*. Vol. 321, pp. 926-929.
2. Bricker, S., B. Longstaff, W. Dennison, A. Jones, K. Boicourt, C. Wicks, and J. Woerner. 2007. [Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change](#). NOAA Coastal Ocean Program Decision Analysis Series No. 26. National Centers for Coastal Ocean Science, Silver Spring, MD.
3. U.S. Geological Survey. Toxic Substances Hydrology Program: [Hypoxia definition webpage](#), including links to other hypoxia studies.
4. National Oceanic and Atmospheric Administration. [National Coastal Data Development Center](#) and [Gulf of Mexico Hypoxia Watch](#).

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