working draft

EEA Core Set of Indicators - CSI 023

Chlorophyll in transitional, coastal and marine waters

May 2005 assessment

About this document
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If you would like to see further background information about this indicator, you can see the published specification at:
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European Environment Agency

Key policy question: Is eutrophication in European surface waters decreasing?

Key message: There has in general been no reduction in eutrophication (as measured by chlorophyll a concentrations) in the Baltic Sea, the Greater North Sea or the coastal waters of Italy and Greece, though in some coastal areas chlorophyll a concentrations have increased, and in others they have decreased.

No overall trend has been observed in summer surface chlorophyll a concentrations, either in the open sea areas of the Baltic Sea area and of the Greater North Sea, or the coastal waters of Italy and Greece in the Mediterranean Sea(Fig. 1). The majority of the coastal stations in the three seas show no trend, however there are some stations showing increasing and decreasing trends. For example, in the Baltic Sea, 11 % of the coastal stations show an increase in chlorophyll a concentrations, while 3 % show a decrease. This lack of a clear general trend indicates that measures to reduce loads of nutrients have not yet succeeded in significantly reducing eutrophication.

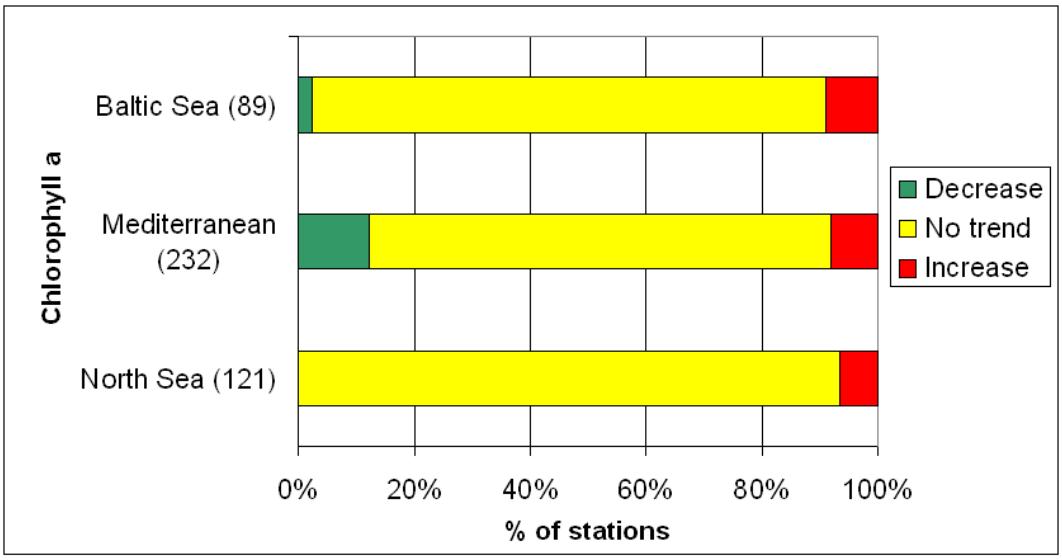
In the Baltic Proper and Gulf of Finland, high mean summer surface chlorophyll a concentrations (>2.8ug/l) are found in open waters, probably due to summer blooms of cyano-bacteria, specific to the Baltic Sea(Fig. 2). Concentrations >4ug/l are observed in estuaries and coastal waters influenced by rivers or cities in some Swedish, Estonian, Lithuanian, Polish and German coastal waters.

In the North Sea, high chlorophyll a concentrations (>5.8 ug/l) are observed in the Elbe estuary and Belgian, Dutch and Danish coastal waters influenced by river discharges (Fig. 5).High concentrations are also observed in Liverpool Bay in the Irish Sea. In the open North Sea and Skaggerak, chlorophyll a concentrations are generally low (<1.4 ug/l).

In the Mediterranean Sea, 12 % of the stations in Italian coastal waters show a decrease in concentrations of chlorophyll a, while 8 % show an increase (Fig. 1). The lowest concentrations (<0.35 ug/l) are observed around the Sardinian Island and in southern Italian and Greek coastal waters. Higher concentrations (>0/6 ug/l) are observed along the Italian east and west coasts and in the Greek Saronikos Bay(Fig. 3).High concentrations (>1.95 ug/l) are found in the northern Adriatic and along the Italian west coast from Napoli to the north of Rome.

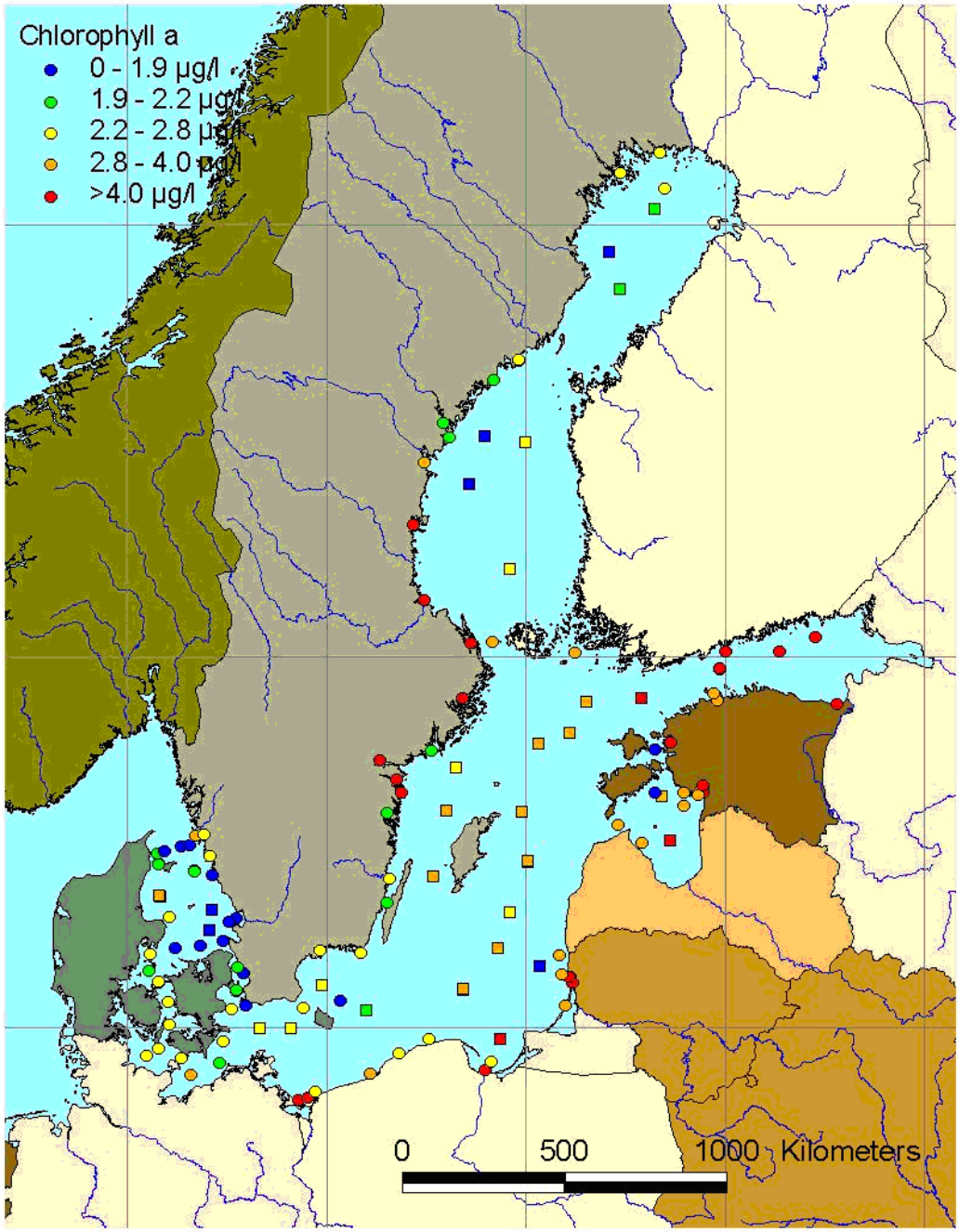
Very few chlorophyll a data are available for the Black Sea. The available data show the highest level (>1.7 ug/l) found in the Ukrainian waters of the north-western Black Sea (Fig. 6).

Fig. 1: Trends in mean summer chlorophyll a concentrations in coastal waters of the Baltic Sea, the Mediterranean (mainly Italian waters) and the Greater North Sea (mainly the eastern North Sea and the Skagerrak).



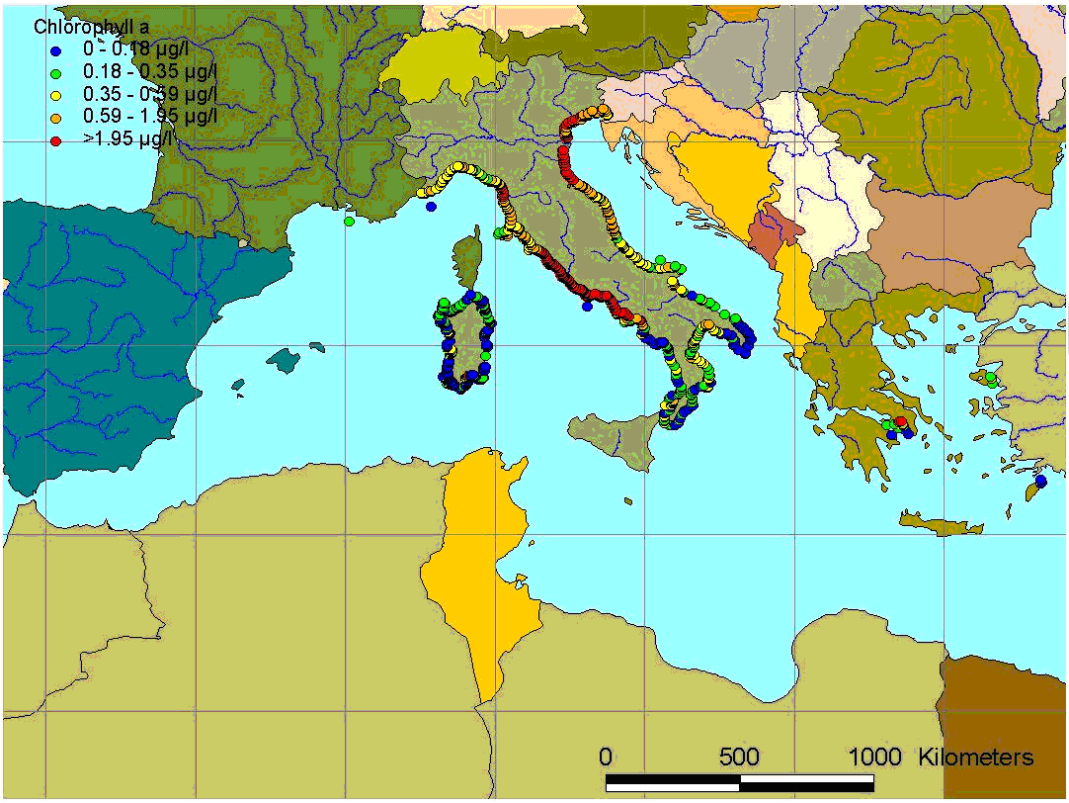
Data source: Waterbase (data from OSPAR, HELCOM, ICES and EEA member countries compiled by ETC Water).
Note: Trend analyses are based on time series 1985-2003 from each monitoring station having at least 3 years of data in the period 1995-2003 and at least 5 years of data in all. Number of stations in brakets.
Baltic Sea (incl. the Belt Sea and the Kattegat) data from: Denmark, Finland, Lithuania, Sweden and ICES.
Mediterranean data from: Greece and Italy.
North Sea (incl. the Skagerrak) data from: Belgium, Denmark, Norway, Sweden, UK and ICES.

Fig. 2: Mean summer surface concentrations of chlorophyll a in the Baltic Sea Area



Data source: Waterbase (data from HELCOM, OSPAR and EEA member countries compiled by ETC Water).
Note: Coastal stations are marked by circles and ICES open-water stations by squares. Level of classification is based on the 20 %, 40 %, 60 % and 80 % percentiles of the chlorophyll a distribution at coastal stations.

Fig. 3: Mean summer surface concentrations of chlorophyll a in the Mediterranean Sea



Data source: Waterbase (data from EEA member countries compiled by ETC Water).
Note: Coastal stations are marked by circles. Level of classification is based on the 20 %, 40 %, 60 % and 80 % percentiles of the chlorophyll a distribution at coastal stations.

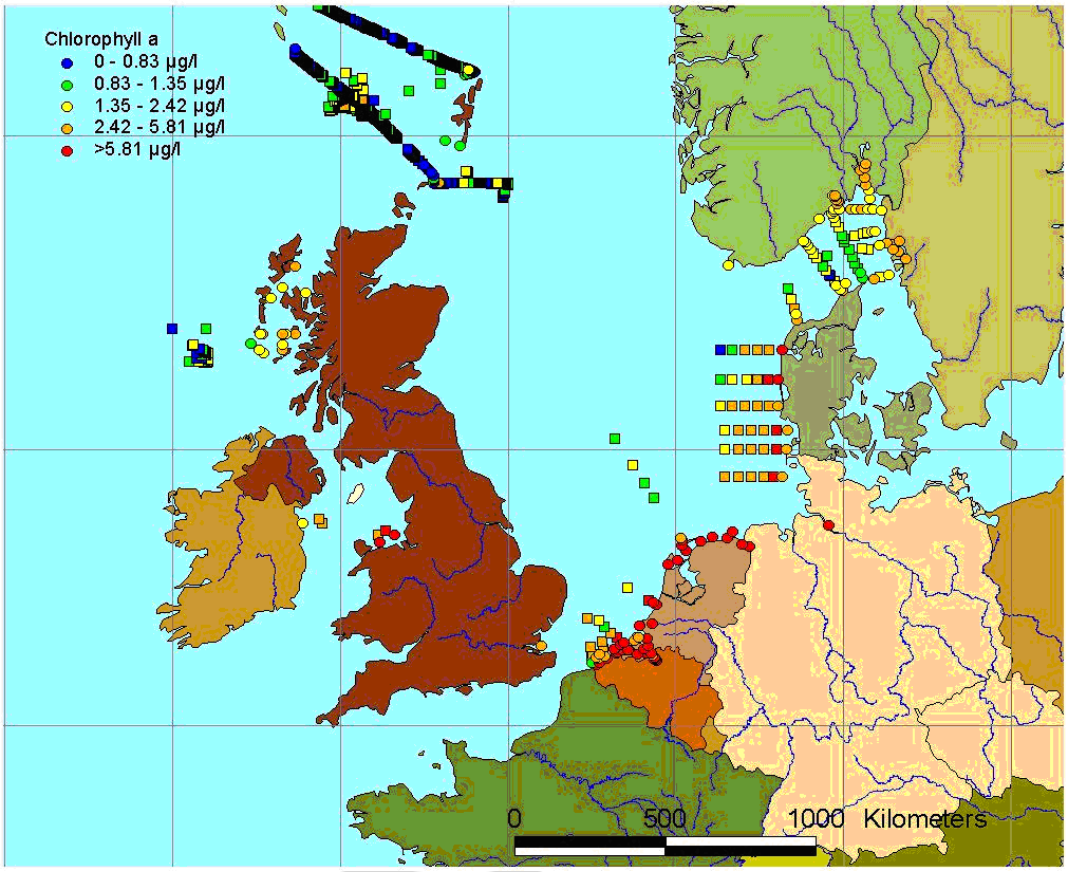
Fig. 4: Number of stations per country showing no trend, decreasing or increasing trend in summer surface concentrations of chlorophyll

Baltic Sea Area				
Country	Chlorophyll			Number of stations
	Decrease	No trend	Increase	Total
Denmark	1	31	1	33
Finland	0	2	1	3
Lithuania	0	3	3	6
Open waters	0	23	1	24
Sweden	1	20	2	23

Mediterranean				
Country	Chlorophyll			Number of stations
	Decrease	No trend	Increase	Total
Greece	0	6	0	6
Italy	28	178	19	225
Open waters	0	1	0	1

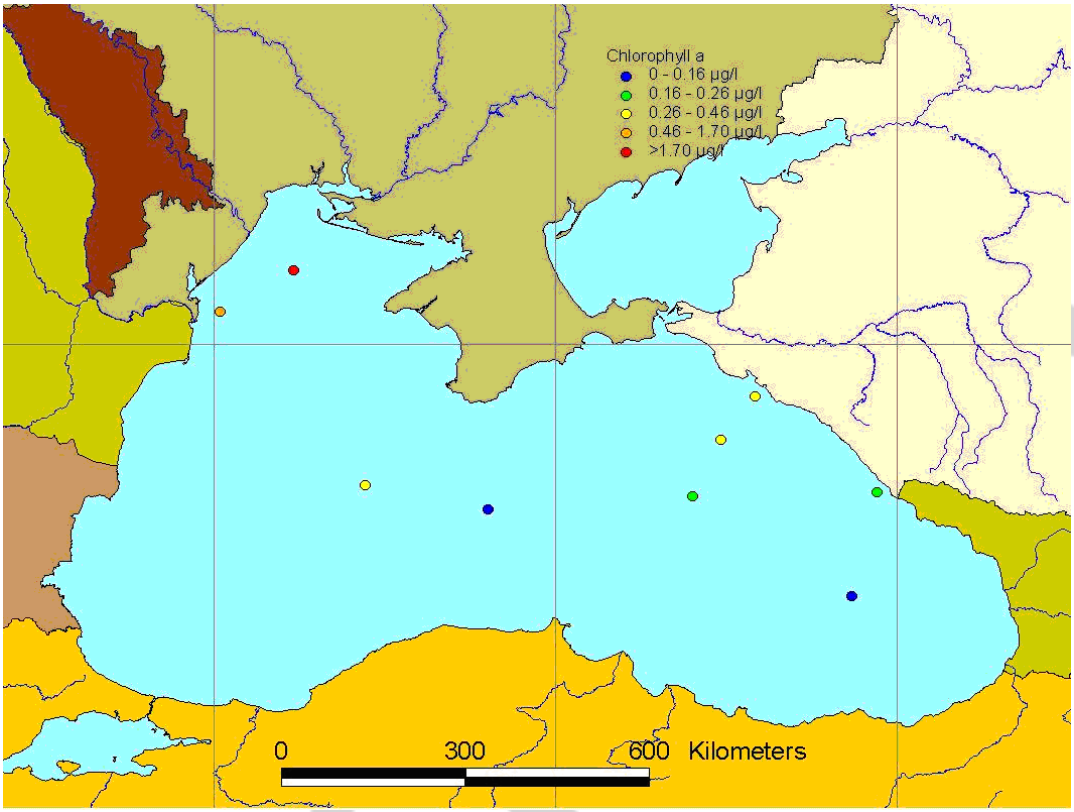
North Sea Area				
Country	Chlorophyll			Number of stations
	Decrease	No trend	Increase	Total
Belgium	0	12	3	15
Denmark	0	9	0	9
UK	0	3	0	3
Norway	0	20	0	20
Open waters	0	64	2	66
Sweden	0	5	3	8

Fig. 5: Mean summer surface concentrations of chlorophyll a in the Greater North Sea, the Irish Sea and the north-east Atlantic



Data source: Data from EEA member countries
Note: Level classification is based on the 20%, 40%, 60% and 80% percentiles of the chlorophylladistribution.

Fig. 6: Mean summer surface concentrations of chlorophyll a in the Black Sea



Data source: : The data used here originate from the database prepared in the framework of the NATO SfP-971818 ODBMS Black Sea Project
Note: Level classification is based on the 20%, 40%, 60% and 80% percentiles of the chlorophylladistribution.