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**INDICATORS OF INLAND AND SEA WATER NOT COVERED BY THE
GUIDELINES**

Revised informal note by the secretariat¹

¹ Prepared with the assistance of Mr. Vladislav Bizek and Mr. Alexander Shekhovtsov, consultants to the secretariat in the light of the discussions held at the 4th session of the Joint Task Force and written comments submitted thereafter.

I. Introduction

1. During the past decades various international and national organizations have been developing sets of indicators to measure and assess the water related issues from both quantitative and qualitative points of view with particular attention given to the environment and health.

2. The European Environment Agency (EEA) has developed, as a part of the Core Set of Indicators (CSI) a set of 7 indicators for water sector that are updated regularly. The indicators describe the development of the sector and implications for the environment and water policy actions. Annex I lists these indicators. The EEA's indicator fact sheets on water sector constitute the basis for its environment reporting. The fact sheets are available from the website of the EEA, www.eea.europa.eu/data-and-maps/indicators.

3. The Organisation for Economic Co-operation and Development (OECD) in cooperation with Eurostat has been developing a set of water sector related indicators to better integrate environmental concerns into water policy (see annex II). The indicators are divided into two groups, one dealing with Inland waters (11 indicators) and the other one with coastal waters (7 indicators). Specific attention is given to the industrial pollution of waters.

4. The United Nations Statistics Division (UNSD) and UNEP have developed a set of 10 water related indicators (see Annex III). Questionnaire distributed by these organizations is being filled in regularly by many UN member countries, including countries in Eastern Europe, Caucasus, Central Asia and South-Eastern Europe (EECCA). The reported data are collected in the database.

5. The analysis of water related indicators used by EEA, OECD/EUROSTAT and UNSD/UNEP has shown that some of these indicators have already been included in the Guidelines for the Application of Environmental Indicators in Eastern Europe, Caucasus and Central Asia² (EECCA) prepared by the United Nations Economic Commission for Europe (UNECE). However, to harmonize further reporting on inland and see water indicators across the pan-European region a proposal has been made in the present document to add six indicators to the Guidelines. Some of these indicators could be produced using basic data collected for indicators already included in the Guidelines. For the others, additional data collection and/calculations will be required.

6. On the basis of the above-mentioned sets water indicators, the following 14 indicators can be recommended for use in the countries of Eastern Europe, Caucasus, Central Asia and South-Eastern Europe (target countries):

(a) Total water use: new proposed indicator;

(b) Renewable freshwater resources: indicator 7 from the Guidelines;

² See United Nations publication, *Environmental Indicators and Indicators-based Assessment Reports: Eastern Europe, Caucasus and Central Asia*, Sales No. E 07.II.E.9. Available on-line at www.unece.org/env/documents/2007/ece/ece.belgrade.conf.2007.inf.6.e.pdf.

- (c) Freshwater abstraction: indicator 8 from the Guidelines;
- (d) Public water supply: new proposed indicator;
- (e) Connection of population to public water supply: new proposed indicator;
- (f) Water losses: indicator 10 from the Guidelines;
- (g) Household water use per capita: indicator 9 from the Guidelines;
- (h) Drinking water quality: indicator 12 from the Guidelines;
- (i) Population connected to wastewater treatment: new proposed indicator;³
- (j) Wastewater treatment facilities (Capacity of wastewater treatment facilities and efficiency of treatment): new proposed indicator;⁴
- (k) Polluted (non-treated) wastewaters: indicator 16 from the Guidelines;
- (l) Reuse and recycling of freshwater; indicator 11 from the Guidelines;
- (m) Biochemical oxygen demand and concentration of ammonium in rivers: indicator 13 from the Guidelines;
- (n) Nutrients in freshwater: indicator 14 from the Guidelines;
- (o) Concentration of pollutants in seawater and sediments (excepts nutrients): new proposed indicator;
- (p) Nutrients in coastal seawaters: indicator 15 from the Guidelines.

7. The Russian Federation proposes to add a new indicator “Concentration of pollutants in freshwater (except nutrients)”.

8. A detailed description of the six new proposed indicators mentioned in para.6 is given below.

³ The Russian Federation considers this indicator pointless.

⁴ The Russian Federation proposes the title of this indicator as “Capacity of treatment facilities at the discharge into water bodies”.

II. PROPOSED ADDITIONAL INDICATORS⁵

A. Total water use

General description

- a) **Brief definition:** The use of water from various sources (including sea water) to meet the needs of households, industrial use, irrigation, agricultural water supply, etc. Evaluation of this indicator is carried out for the whole country and by economic activity according to ISIC.
- b) **Unit of measurement:** Million m³/year (total, broken down by economic in accordance with ISIC); cubic meters per unit of GDP.

Context – Relation to other indicators from the Guidelines

This indicator relates to indicators 7 – Renewable freshwater resources, 8 - Freshwater abstraction, 10 - Water losses and 11 - Reuse and recycling of freshwater.

Relevance for environmental policy

- a) **Purpose:** The indicator provides a measure of the pressure on the environment in terms of water abstraction from different sources (including recycling and re-use of water, and water losses).
- b) **Issue:** Rational quantities of water for meeting basic human needs are a prerequisite for life, health and economic development. The indicator is one of major ones defining the level of development of water economy services and the degree of water accessibility to cover the needs of population and society. This indicator helps to identify trends in rational water use in a particular country. Finally, this indicator differs from country to country depending not only on the size of population but also on the structure of national economy.
- c) **International agreements and targets:**
Regional level: The UNECE Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes obliges the Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management.

Subregional level: The Environmental Strategy for countries of Eastern Europe, Caucasus and Central Asia, adopted by the 2003 Ministerial Conference “Environment for Europe”, requires the preparation and implementation of programs for integrated water management.

In the European Union, the Water Framework Directive (Directive 2000/60/EC) obliges the Member States to promote sustainable use based on long-term protection of available water resources and to ensure a balance between abstraction and recharge of water with the aim of achieving “good water status” by 2015.

⁵ Useful comments have been sent by Armenia and the Russian Federation. However, country specific examples were not included.

Methodology and guidelines

- a) **Data collection and calculations:** The data on water use are collected from operators of water bodies and the recipients of water from water supply systems. The indicator is calculated by summarizing the data on the use of water through a centralized water supply system and through self-supply for drinking and service needs and for production purposes, as well as data on the use of water for irrigation and on agricultural water supply (including drinking and service needs of the rural population) for the country as a whole and by economic activity. Use of water for hydro power generation is excluded. Losses of water during the transport of water by water supply infrastructure should be taken into account where appropriate.
- b) **Internationally agreed methodologies and standards:** The UNSD/UNEP Questionnaire on Environmental Statistics (Table W3). The Joint OECD/Eurostat Questionnaire on the State of the Environment (Inland Waters, Table 3.1). **International Recommendations for Water Statistics (IRWS), UNSD 2010.**

Data sources and reporting

Countries have databases that contain fairly comprehensive time series of data on water use, collected by national environmental authorities from enterprises using statistical reporting forms. These data are collected in water cadasters. Information on water use (consumption) is published in statistical yearbooks and/or national state-of-the-environment reports. National environmental authorities provide data to the UNSD Environment Statistics Database.

References at the international level

- Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes (1992)
- International Standard Industrial Classification of all Economic Activities, United Nations, Series M, No 4, rev.3
- Europe's Environment, The 4th Assessment, EEA 2007
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive)
- Indicators of Sustainable Development: Guidelines and Methodologies, 3rd edition, United Nations 2007
- IRWS: <http://unstats.un.org/unsd/envaccounting/irws/irwswebversion.pdf>
- <http://www.unece.org/env/water/pdf/waterconr.pdf>
- <http://www.unece.org/env/documents/2000/wat/mp.wat.2000.1.r.pdf>
- www.wmo.ch
- <http://stats.oecd.org>
- <http://unstats.un.org/unsd/environment/>
- http://www.fao.org/ag/agl/aglw/aquastat/water_res/waterres_tab.htm
- <http://www.euro.who.int/ehindicators/>

- http://europa.eu.int/comm/environment/water/water-framework/index_en.html
- <http://europa.eu.int/comm/eurostat>
- <http://themes.eea.eu.int/IMS/CSI/>

B. Public water supply

General description

a) **Brief definition:** Total water supplied by the public water supply industry. The public water supply industry includes a set of activities and facilities ensuring the abstraction, treatment, storage, supply and distribution of water for the population and economic activities⁶.

b) **Unit of measurement:** Supply in million m³/year.

Context – Relation to other indicators from the Guidelines

This indicator relates to indicators 8 - Freshwater abstraction, 9 - Household water use per capita, 10 - Water losses.

Relevance for environmental policy

a) **Purpose:** The indicator provides measure of pressure on the environment and a measure of response. In addition, this indicator provides a measure of impact on human health and in a broader sense a measure of quality of life.

b) **Issue:** Rational quantities of water for meeting basic human needs are a prerequisite for life, health and economic development. The indicator is one of major ones defining the level of development of water economy services and the degree of water accessibility to cover the needs of population and society. This indicator helps to identify trends in rational water use in a particular country. Finally, this indicator differs from country to country depending not only on the size of population but also on the structure of national economy. Appropriate quality of drinking water in water supply systems represents one of the basic preconditions for environmental health and prevention of water related diseases.

c) **International agreements and targets:**

Regional level: The Protocol on Water and Health to the UNECE Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes requires that the Parties take all appropriate measures to ensure adequate supply of healthy drinking water.

Sub-regional level: The Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia, adopted by the 2003 Ministerial Conference “Environment for Europe”, requires the preparation and implementation of programmes for integrated water management.

⁶ The Russian Federation proposes to omit „economic activities“.

In the European Union, the Water Framework Directive (Directive 2000/60/EC obliges the Member States to promote sustainable use based on long-term protection of available water resources and to ensure a balance between abstraction and recharge of water with the aim of achieving “good water status” by 2015.

Methodology and guidelines

- a) **Data collection and calculations:** Data can be obtained from the subjects operating public water supply systems. Indicator is calculated by summarizing annual capacities of particular water supply systems. In addition, water losses during the distribution should be taken into account.
- b) **Internationally agreed methodologies and standards:** The UNSD/UNEP Questionnaire on Environmental Statistics (Table W3). The UNCSD Methodology Sheets for Indicators of Sustainable Development (Proportion of population using improved water sources). The UNECE/WHO Guidelines on the Setting Targets, Evaluation of Progress and Reporting under the Protocol on Water and Health. International Recommendations for Water Statistics (IRWS), UNSD 2010.

Data sources and reporting

Data are collected based on statistical reporting by countries. In many countries databases and fairly comprehensive time series exist at the water cadastre level. Countries provide data to the UNSD Environment Statistics Database.

References at the international level

- The Protocol on Water and Health (1999)
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive)
- Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption
- The Protocol on Water and Health: Guidelines on the Setting Targets, Evaluation of Progress and Reporting, UNECE/WHO 2010
- Indicators of Sustainable Development: Guidelines and Methodologies – Methodology Sheets, United Nations 2007
- IRWS: <http://unstats.un.org/unsd/envaccounting/irws/irwswebversion.pdf>
- <http://www.unece.org/env/water/pdf/waterconr.pdf>
- <http://www.unece.org/env/documents/2000/wat/mp.wat.2000.1.r.pdf>
- www.wmo.ch
- <http://unstats.un.org/unsd/environment/>
- http://www.unece.org/env/water/publications/documents/guidelines_target_setting.pdf
- http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets.pdf
- http://www.fao.org/ag/agl/aglw/aquastat/water_res/waterres_tab.htm
- <http://www.euro.who.int/ehindicators/>

- http://europa.eu.int/comm/environment/water/water-framework/index_en.html
- <http://europa.eu.int/comm/eurostat>
- <http://themes.eea.eu.int/IMS/CSI/>

C. Connection of population to public water supply

General description

- a) **Brief definition:** Percentage of population connected to public water supply.
- b) **Unit of measurement:** Percentage.

Context – Relation to other indicators from the Guidelines

This indicator relates to indicators 8 - Freshwater abstraction, 9 - Household water use per capita and 12 – Drinking water quality.

Relevance for environmental policy

- d) **Purpose:** This indicator provides a measure of impact on human health and in a broader sense a measure of quality of life.
- e) **Issue:** Rational quantities of water for meeting basic human needs are a prerequisite for life and health. The indicator is one of major ones defining the level of development of water economy services and the degree of water accessibility to cover all needs of population. This indicator helps to identify trends in rational water use in a particular country. Finally, this indicator differs from country to country depending not only on the size of population but also on the connection to public water supply. Appropriate quality of drinking water in water supply systems represents one of the basic preconditions for environmental health and prevention of water related diseases.
- f) **International agreements and targets:**
Regional level: The Protocol on Water and Health to the UNECE Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes requires that the Parties take all appropriate measures to ensure adequate supply of healthy drinking water.

Sub-regional level: The Environmental Strategy of countries of Eastern Europe, Caucasus and Central Asia, adopted by the 2003 Ministerial Conference “Environment for Europe”, requires the preparation and implementation of programmes for integrated water management.

In the European Union, the Water Framework Directive (Directive 2000/60/EC obliges the Member States to promote sustainable use based on long-term protection of available water resources and to ensure a balance between abstraction and recharge of water with the aim of achieving “good water status” by 2015. Council Directive 98/83/EC on the quality of water intended for human consumption sets drinking water quality standards and obliges the

Member States take the measures necessary to ensure that water intended for human consumption is healthy and clean.

Methodology and guidelines

- c) **Data collection and calculations:** Data on percentage of population connected to public water supply can be obtained from subjects operating water supply facilities, and/or from census and other targeted surveys, e.g. households' surveys. In addition, water losses during the distribution should be taken into account.

- g) **Internationally agreed methodologies and standards:** The UNSD/UNEP Questionnaire on Environmental Statistics (Table W3). The UNCSD Methodology Sheets for Indicators of Sustainable Development (Proportion of population using improved water sources). The UNECE/WHO Guidelines on the Setting Targets, Evaluation of Progress and Reporting under the Protocol on Water and Health. International Recommendations for Water Statistics (IRWS), UNSD 2010.

Data sources and reporting

Data are collected based on statistical reporting by countries. In many countries databases and fairly comprehensive time series exist at the water cadastre level. countries provide data to the UNSD Environment Statistics Database.

References at the international level

- The Protocol on Water and Health (1999)
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive)
- Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption
- The Protocol on Water and Health: Guidelines on the Setting Targets, Evaluation of Progress and Reporting, UNECE/WHO 2010
- Indicators of Sustainable Development: Guidelines and Methodologies – Methodology Sheets, United Nations 2007
- IRWS: <http://unstats.un.org/unsd/envaccounting/irws/irwswebversion.pdf>
- <http://www.unece.org/env/water/pdf/waterconr.pdf>
- <http://www.unece.org/env/documents/2000/wat/mp.wat.2000.1.r.pdf>
- www.wmo.ch
- <http://unstats.un.org/unsd/environment/>
- http://www.unece.org/env/water/publications/documents/guidelines_target_setting.pdf
- http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets.pdf
- http://www.fao.org/ag/agl/aglw/aquastat/water_res/waterres_tab.htm
- <http://www.euro.who.int/ehindicators/>
- http://europa.eu.int/comm/environment/water/water-framework/index_en.html
- <http://europa.eu.int/comm/eurostat>

- <http://themes.eea.eu.int/IMS/CSI/>

D Population connected to wastewater treatment⁷

General description

a) **Brief definition:** The percentage of population connected to wastewater treatment facilities (total and broken down by the level of treatment: mechanical (primary) treatment, biological (secondary) treatment, and advanced (tertiary) treatment).

b) **Unit of measurement:** Percentage.

Context – Relation to other indicators from the Guidelines

This indicator relates to indicator 16 - Polluted (non-treated) waste waters.

Relevance for environmental policy

a) **Purpose:** The indicator provides a measure of pressure on the environment, especially water bodies, and a measure of response. In addition, this indicator provides a measure of impact on human health and in a broader sense of a measure of quality of life.

b) **Issue:** Wastewater treatment is a basic prerequisite for minimizing pressure on both surface and ground waters in terms of water pollution. As both ground waters and surface waters are abstracted for the production of drinking water, or even for direct use (self-supply), reduction of water pollution represents one of the basic preconditions for environmental health and prevention of water related diseases. Wastewater treatment should follow the water quality standards laid down by national legislation.

c) **International agreements and targets:**

Regional level: The UNECE Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes obliges the Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management. The Protocol on Water and Health requires that the Parties take all appropriate measures to ensure adequate sanitation.

Sub-regional level: The Environmental Strategy of EECCA countries, adopted by the 2003 Ministerial Conference “Environment for Europe”, requires the preparation and implementation of programmes for integrated water management.

In the European Union, the Water Framework Directive (Directive 2000/60/EC) obliges the Member States to promote sustainable use based on long-term protection of available water resources and to ensure a balance between abstraction and recharge of water with the aim of achieving “good water status” by 2015. Directive 91/271/EEC concerning urban wastewater treatment obliges the Member States to ensure that all agglomerations above 2000

⁷ The Russian Federation considers this indicator pointless.

population equivalents are provided with collecting systems for urban waste water and that discharge is subject to secondary treatment or an equivalent treatment.

Methodology and guidelines

- a) Data collection and calculations:** Data can be obtained from subjects operating waste water treatment facilities, and/or from census and other targeted surveys, e.g. households' surveys. The indicator is calculated dividing the number of population connected to sewers, which are in turn connected to wastewater treatment facilities, by the total number of population. To avoid double-counting, water subjected to more than one treatment should be reported under the highest level of treatment.
- b) Internationally agreed methodologies and standards:** The UNSD/UNEP Questionnaire on Environmental Statistics (Table W4B). The Joint OECD/Eurostat Questionnaire on the State of the Environment (Inland Waters, Table 4). The UNCSA Methodology Sheets for Indicators of Sustainable Development (Proportion of Population using improved sanitation facilities). The UNECE/WHO Guidelines on the Setting Targets, Evaluation of Progress and Reporting under the Protocol on Water and Health. International Recommendations for Water Statistics (IRWS), UNSD 2010.

Data sources and reporting

Data are collected based on statistical reporting by countries. In many countries databases and fairly comprehensive time series exist at the water cadastre level. Countries provide data to the UNSD Environment Statistics Database.

References at the international level

- Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes (1992)
- Protocol on Water and Health (1999)
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive)
- Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment,
- Indicators of Sustainable Development: Guidelines and Methodologies – Methodology Sheets, United Nations 2007
- Protocol on Water and Health: Guidelines on the Setting Targets, Evaluation of Progress and Reporting, UNECE/WHO 2010
- IRWS: <http://unstats.un.org/unsd/envaccounting/irws/irwswebversion.pdf>
- <http://www.unece.org/env/water/pdf/waterconr.pdf>
- <http://www.unece.org/env/documents/2000/wat/mp.wat.2000.1.r.pdf>
- http://www.unece.org/env/water/publications/documents/guidelines_target_setting.pdf
- <http://unstats.un.org/unsd/environment/>
- http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets.pdf
- http://www.fao.org/ag/agl/aglw/aquastat/water_res/waterres_tab.htm

- <http://www.euro.who.int/ehindicators/>
- http://europa.eu.int/comm/environment/water/water-framework/index_en.html
- <http://europa.eu.int/comm/eurostat>
- <http://themes.eea.eu.int/IMS/CSI/>

E. Wastewater treatment facilities (Capacity of wastewater treatment facilities and efficiency of treatment)⁸

General description

- a) Brief definition:** a) Number of wastewater treatment facilities: total and broken down by the level of treatment; b) designed⁹ (nominal) capacity and volumes of treated wastewater: total and broken down by the level of treatment (mechanical/primary, biological/secondary, and advanced/tertiary), and/or by the type of operator (public, other operators, independent/septic tanks), and c) total national waterborne emissions and emissions removed by waste water treatment facilities. If available, the data on designed (nominal) capacity should be replaced by data on real (actual) capacity in order to measure real efficiency of treatment facilities.
- b) Unit of measurement:** a) Number of wastewater treatment facilities, b) designed capacity and volumes of treated wastewater in million cubic meters per year or in thousands of cubic meters per day, and c) waterborne emissions and emissions removed by wastewater treatment in thousand tons of BOD₅ per year.

Context – Relation to other indicators from the Guidelines

This indicator relates to indicators 13 - BOD and concentration of ammonium in rivers, 14 – Nutrients in freshwater, 15 – Nutrients in coastal seawaters and 16 – Polluted wastewaters.

Relevance for environmental policy

- a) Purpose:** The indicator provides a measure of pressure on the environment and a measure of response.
- b) Issue:** Wastewater treatment is a basic prerequisite for minimizing pressure on both surface and ground waters in terms of water pollution. As both ground waters and surface waters are abstracted for the production of drinking water or even for direct use, (self-supply) reduction of water pollution represents one of the basic preconditions for environmental health and prevention of water related diseases.

⁸ The Russian Federation proposes the title of this indicator as „Capacity of treatment facilities at the discharge into water bodies“.

⁹ There can be considerable difference between designed (nominal) and real (actual) capacity of facilities in some cases. In addition, certain parts of treatment facilities does not match the quality of treatment required by standards.

c) **International agreements and targets:**

Regional level: The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (and its protocols) obliges the Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management. The Protocol on Water and Health requires that the Parties take all appropriate measures to ensure adequate sanitation.

Subregional level: The Environmental Strategy of EECCA countries, adopted by the 2003 Ministerial Conference “Environment for Europe”, requires the preparation and implementation of programmes for integrated water management.

In the European Union, the Water Framework Directive (Directive 2000/60/EC) obliges the Member States to promote sustainable use based on long-term protection of available water resources and to ensure a balance between abstraction and recharge of water with the aim of achieving “good water status” by 2015. Directive 91/271/EEC concerning urban wastewater treatment obliges the Member States to ensure that all agglomerations above 2000 population equivalents are provided with collecting systems for urban waste water and that discharge is subject to secondary treatment or an equivalent treatment.

Relevant requirements are included in sub-regional multilateral environmental agreements - MEAs (mainly the Baltic Sea, the Black Sea, the Caspian Sea, the Mediterranean Sea and the Danube River).

Methodology and guidelines

a) **Data collection and calculations:** Data can be obtained from the companies operating waste water treatment facilities. The indicator is calculated by summarizing annual capacities of treatment facilities, volumes of treated wastewater and amounts of waterborne and removed emissions in total and by categories (level of treatment, type of operator). Volume of water treated in independent treatment facilities and amounts of waterborne and removed emissions should be estimated.

b) **Internationally agreed methodologies and standards:** The UNSD/UNEP Questionnaire on Environmental Statistics (Table W4C). The Joint OECD/Eurostat Questionnaire on the State of the Environment (Inland Waters, Table IV-5). The UNCSD Methodology Sheets for Indicators of Sustainable Development (Waste water treatment). The UNECE/WHO Guidelines on the Setting Targets, Evaluation of Progress and Reporting under the Protocol on Water and Health. International Recommendations for Water Statistics (IRWS), UNSD 2010.

Data sources and reporting

Data are collected based on statistical reporting by countries. In many countries databases and fairly comprehensive time series exist at the water cadastre level. Countries report data in their inputs to the UNSD Environment Statistics Database.

References at the international level

- Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992)
- Protocol on Water and Health (1999)
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive)
- Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment
- Indicators of Sustainable Development: Guidelines and Methodologies – Methodology Sheets, United Nations 2007
- Protocol on Water and Health: Guidelines on the Setting Targets, Evaluation of Progress and Reporting, UNECE/WHO 2010
- IRWS: <http://unstats.un.org/unsd/envaccounting/irws/irwswebversion.pdf>
- <http://www.unece.org/env/water/pdf/waterconr.pdf>
- <http://www.unece.org/env/documents/2000/wat/mp.wat.2000.1.r.pdf>
- <http://unstats.un.org/unsd/environment/>
- http://www.unece.org/env/water/publications/documents/guidelines_target_setting.pdf
- http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets.pdf
- http://www.fao.org/ag/agl/aglw/aquastat/water_res/waterres_tab.htm
- <http://www.euro.who.int/ehindicators/>
- http://europa.eu.int/comm/environment/water/water-framework/index_en.html
- <http://europa.eu.int/comm/eurostat>
- <http://themes.eea.eu.int/IMS/CSI/>

F. Concentration of pollutants in coastal seawater and sediments (except nutrients)

General description

- a) **Brief definition:** The concentration of pollutants in coastal seawaters: easily oxidizable organic pollutants as BOD₅, uneasily oxidizable organic pollutants as COD, ammoniac nitrogen, dissolved oxygen, petroleum products, phenols, synthetic surface-active compounds, heavy metals (Cd, Co, Cu, Cr, Fe, Hg, Mn, Ni, Pb and Zn), chlorinated pesticides and faecal coliform, and in sediments (heavy metals, chlorinated pesticides and oil hydrocarbons) represent serious risk for the ecological condition of coastal waters, and indirectly for human health (via food chain).
- b) **Unit of measurement: Values** of BOD₅, COD and concentrations of dissolved oxygen are expressed in milligrams O₂ /litre; ammoniac nitrogen in milligrams/litre; petroleum products, phenols, surface-active compounds, heavy metals and pesticides in micrograms /litre; and those of faecal coliform in MPN (Most Probable Number) per 100 ml. Concentrations of heavy metals, chlorinated pesticides and oil hydrocarbons in sediments are expressed in micrograms/g of dry weight.

Context – Relation to other indicators from the Guidelines

This indicator relates to indicator 15 - Nutrients in coastal seawaters.

Relevance for environmental policy

- a) **Purpose:** The indicator provides a measure of the state of coastal seawaters and sediments in terms of pollutant concentration.
- b) **Issue:** The presence of pollutants in coastal seawaters and sediments represents serious risk for the ecological of coastal waters and indirectly for human health (via food chain). Large quantities of organic matter (microbes and decaying organic waste) can reduce the chemical and biological quality of water and result in impaired biodiversity of aquatic communities and microbiological contamination that can affect the quality of water. Sources of organic matter include discharges from wastewater treatment plants, industrial effluents and agricultural run-off. Organic pollution leads to higher rates of metabolic processes that demand high amounts of oxygen. This could result in a lack of oxygen (anaerobic conditions). Seawater and sediment pollution represents a direct risk for human health in coastal zones used for recreation.
- c) **International agreements and targets:** The Convention on the Protection of the Marine Environment of the Baltic Sea (Helsinki, 1974); the Convention on the Protection of the Mediterranean Sea against Pollution (Barcelona, 1976); the Convention on the Protection of the Black Sea against Pollution (Bucharest, 1992); the Framework Convention on the Protection of the Marine Environment of the Caspian Sea (Tehran, 2003).
The European Union has adopted the Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive). The Directive provides that Member States shall take the necessary measures to achieve or maintain good environmental status in the marine environment by the year 2020 at the latest.

Methodology and guidelines

- a) **Data collection and calculations:** A basic monitoring programme should specify pollutants and a core list of measured indicators. The number of sampling points and their spatial location should enable the collection of information on the content of pollutants throughout the gradient of loads – from background water landing sea areas to coastal seawater areas exposed to substantive anthropogenic loads. Time parameters should take into account the time mutability of the content of pollutants. Methodological and metrological uniformity of surveillance and data processing should be a goal; microbiological and chemical-analytical activities should be conducted by accredited laboratories with measurement quality control systems.
- b) **Internationally agreed methodologies and standards:** The UNSD/UNEP Questionnaire on Environmental Statistics (Table W8A). The method of determining BOD in compliance with ISO 5815-1:2003 and ISO 5815-2:2003. International Recommendations for Water Statistics (IRWS), UNSD 2010.

Data sources and reporting

Countries have departmental and, in some cases, national databases of the level of pollution of coastal seawaters and sediments. Several coastal countries publish data on concentration of pollutants in seawater, including coastal waters and sediments, in annual reports on marine environment quality.

References at the international level

- GEMS/WATER Operational Guide, 3rd ed.(WHO, 1992)
- ISO Water Quality – determination of BOD after five days. ISO 5815. (1989)
- Standard Methods for the Examination of Water and Wastewater, 19th ed. (American Public Health Association, 1992)
- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)
- IRWS: <http://unstats.un.org/unsd/envaccounting/irws/irwswebversion.pdf>
- <http://www.unep.org>
- <http://www.iso.org>
- <http://www.helcom.fi>
- <http://www.blacksea-commission.net>
- <http://www.grida.no/caspian>
- <http://themes.eea.eu.int/IMS/CSI>
- Sanitary norms and rules for the protection of coastal zones
<http://www.stroyplan.ru/docs.php?showitem=2846>

III. Annexes

Annex I: EEA Indicators

- CSI 18: Use of Fresh Water Resources
- CSI 19: Oxygen Consuming Substances in Rivers
- CSI 20: Nutrients in Fresh Water
- CSI 21: Nutrients in Transitional, Coastal and Marine Waters
- CSI 22: Bathing Water Quality
- CSI 23: Chlorophyll in Transitional, Coastal and Marine Waters
- CSI 24: Urban Waste Water Treatment

Annex II: OECD/Eurostat Indicators

Inland Water

- IW-1: Freshwater resources
- IW-2.1: Annual Freshwater Abstraction by Source and by Sector
- IW-2.2: Other Sources of Water
- IW-3.1: Water Use by Supply Category
- IW-3.2: Water Use by Industrial Activities
- IW-4: National Population Connected to Wastewater Treatment Plants
- IW-5: Treatment Capacity of Wastewater Treatment Plants in terms of BOD5
- IW-6: Sewage Sludge Production and Disposal
- IW-7: Generation and Discharge of Wastewaters (in terms of volume, BOD, population equivalents, Ntot, Ptot)
- IW-8: Water Quality of Selected Rivers at Mouth or Downstream Frontier
- IW-9: Water Quality of Selected Lakes

Coastal Waters

- 1: Pollution Originating from the Coast
- 2: Pollution Originating from Coastal Industries

- 3: Pollution from Rivers
- 4: Description of the Coastal Zones
- 5: Bacteriological Quality of Marine Waters
- 6: Concentration of Pollutants in Seawaters and Sediments
- 7: Concentration of pollutants in Living Matter

Annex III: UNSD/UNEP Indicators

- W1: Renewable Fresh Water Resources
- W2: Water Abstraction by Source
- W3: Water Use by Supply Category and Activities
- W4A: Waste Water Generation
- W4B: Waste Water Treatment
- W5: Selected Variables at City Level
- W6: Water Quality of Selected Rivers
- W7: Water Quality of Selected Lakes
- W8: Water Quality in Coastal Areas