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**INDICATORS OF BIOLOGICAL DIVERSITY NOT COVERED BY THE  
GUIDELINES**

Informal note by the secretariat<sup>1</sup>

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## I. Introduction

1. During the past decades various international and national organizations have been developing sets of indicators to measure and assess the status of “biological resources”<sup>2</sup> from both quantitative and qualitative points of view with particular attention given to biological diversity (biodiversity)<sup>3</sup>.

2. The European Environment Agency (EEA) has developed a set of 26 indicators SEBI (Streamlining European 2010 Biodiversity Indicators)<sup>4</sup>. In parallel, three indicators for biodiversity are being updated regularly as a part of the Core Set of Indicators (CSI). Annex I lists these indicators. The EEA’s indicator fact sheets on biodiversity constitute the basis for its environment reporting. The fact sheets are available from the website of the EEA<sup>5</sup>.

3. The Organisation for Economic Co-operation and Development (OECD) has developed a set of 7 indicators related to “Wildlife”. The indicators are divided into three groups, one dealing with the state of wildlife, (3 indicators), one with fishery (2 indicators) and one with biosphere reserves and wetlands (2 indicators). In addition, OECD has 2 biodiversity-related indicators on “Water”, 2 on “Forest” and 2 on “Land”. Annex II lists all these 13 biodiversity-related indicators. Data on OECD environmental indicators are available on the OECD website<sup>6</sup>

4. The analysis of biodiversity related indicators used by EEA and OECD 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 Asia<sup>7</sup> (EECCA) prepared by the United Nations Economic Commission for Europe (UNECE). However, to harmonize further reporting on biodiversity related indicators across the pan-European region a proposal has been made in the present document to add three indicators to the Guidelines.

5. Two of these indicators could be produced partially using basic data collected for indicators already included in the Guidelines, however additional data collection will be necessary. For the third one, additional data collection and/or calculations will be required.

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<sup>2</sup> "Biological resources" includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity (UN Convention on Biological Diversity, Art 2).

<sup>3</sup> "Biological diversity" means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (UN Convention on Biological Diversity, Art 2).

<sup>4</sup> Halting the Loss of Biodiversity by 2010: Proposal for a first set of indicators to monitor progress in Europe, Technical Report No17/2007, EEA Copenhagen 2007.

<sup>5</sup> [www.eea.europa.eu/data-and-maps/indicators](http://www.eea.europa.eu/data-and-maps/indicators).

<sup>6</sup> [http://www.oecd.org/document/49/0,3746,en\\_2649\\_34283\\_39011377\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/49/0,3746,en_2649_34283_39011377_1_1_1_1,00.html).

<sup>7</sup> 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](http://www.unece.org/env/documents/2007/ece/ece.belgrade.conf.2007.inf.6.e.pdf).

6. On the basis of the above-mentioned sets of biodiversity related indicators, the following 11 indicators can be recommended for use in the countries of Eastern Europe, Caucasus, Central Asia and South-Eastern Europe (target countries):

- (a) Protected areas: indicator 17 from the Guidelines;
- (b) Forest and other wooded land: indicator 18 from the Guidelines;
- (c) Threatened and protected species: indicator 19 from the Guidelines;
- (d) Trends in the number and distribution of protected species: indicator 20 from the Guidelines;
- (e) Land uptake: indicator 21 from the Guidelines;
- (f) BOD and concentration of nutrients in rivers: indicator 13 from the Guidelines;
- (g) Nutrients in freshwater: indicator 14 from the Guidelines;
- (h) Nutrients in coastal seawaters: indicator 15 from the Guidelines;
- (i) Biosphere reserves and wetlands of international importance: new proposed indicator;
- (j) Invasive alien species: new proposed indicator.
- (k) Catches of fish and other aquatic animals and products: new proposed indicator.

7. A detailed description of the three new proposed indicators is given below.

## II. PROPOSED ADDITIONAL INDICATORS

### A. Biosphere reserves and wetlands of international importance

#### *General description*

- a) **Brief definition:** This indicator presents numbers and areas of biosphere reserves (which are internationally recognized within the framework of UNESCO's Man and the Biosphere (MAB) Programme) and of wetlands of international importance (designated by the Parties to the 1971 Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat).
  
- b) **Unit of measurement:** Number and area (km<sup>2</sup>) of biosphere reserves and of wetlands of international importance.

#### *Context – Relation to other indicators from the Guidelines*

This indicator relates to indicator 17-Protected areas.

#### *Relevance for environmental policy*

- a) **Purpose:** The indicator provides a measure of the state of biodiversity in terms of the number and area of internationally recognized biosphere reserves and wetlands and the relative effectiveness of national response measures to maintain national level and global biodiversity.
  
- b) **Issue:** Biodiversity has intrinsic value, and biodiversity maintenance is essential for human life and sustainable development.

**Biosphere Reserves** are internationally recognized within the framework of UNESCO's Man and the Biosphere (MAB) Programme. They are areas of terrestrial and coastal/marine ecosystems, where, through appropriate zoning patterns and management mechanisms, the conservation of ecosystems and their biodiversity is combined with the sustainable use of natural resources for the benefit of local communities, including relevant research, monitoring, education and training activities. Biosphere Reserves consist of a core area, a buffer zone and a transition area and only the core area requires legal protection. A number of Biosphere Reserves simultaneously encompass areas protected under other systems (such as national parks or nature reserves) and other internationally recognized sites (such as World Heritage or Ramsar wetland sites). The core areas of Biosphere Reserves are mostly public land, but may also be privately owned or belong to non-governmental organizations.

**Wetlands** are designated by the Parties to the 1971 Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat. Wetlands are defined as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres". Such areas are of particular importance because of their ecological richness and diversity as well as that of the wildlife they support.

c) **International agreements and targets:**

Global and regional levels: This indicator is relevant to the UN Convention on Biological Diversity (UN CBD), the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) and the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The UN CBD aims to establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity. The Bern Convention aims to conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States. The Ramsar Convention requires each Party to designate at least one wetland of international importance and to formulate and implement their planning so as to promote the conservation of the wetlands and as far as possible the wise use of wetlands in their territory.

Under the framework of UNECSO's Man and Biosphere Programme (MAB), the World Network of Biosphere Reserves has been established. The Madrid Action Plan for Biosphere Reserves for 2008 – 2013 has been adopted in 2008.

Sub-regional level: In 2011, the Council has endorsed the EU Biodiversity Strategy until 2020, which is the EU's key instrument for reaching the new EU target for the protection of biodiversity in 2020: the EU intends to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss. Deeper collaboration within the framework of the Ramsar Convention is required explicitly.

*Methodology and guidelines*

a) **Data collection and calculations**

Information on national Ramsar wetlands can be provided by the National Focal Points, whose list and contact data as well as all relevant guidelines can be found at the Ramsar Convention website.

Information on the Biosphere Reserves can be obtained from the MAB National Committees whose list and contact data as well as all relevant guidelines are available at the MAB.

b) **Internationally agreed methodologies and standards:** The Ramsar Convention Manual, 4th edition (2006), The Ramsar Convention Handbooks for the wise use of wetlands, 4th ed. (2010), Guiding Principles for Projects on Biosphere Reserves, Biosphere Reserves Nomination Form.

*Data sources and reporting*

All EECCA and SEE countries (with the exception of Turkmenistan) are Parties to the Ramsar Convention, have established national focal points and report to the Secretariat on the current status of wetlands. Lists of all Ramsar wetlands and their area can be found at the website of the Ramsar Convention.

Many EECCA and SEE countries are participating in the MAB Programme and have established National Committees. The list of Biosphere Reserves, contacts to National Committees and all other relevant information can be found on the MAB website.

### *References at the international level*

- UN Convention on Biological Diversity (<http://www.cbd.int>),
- Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (<http://www.ramsar.org>),
- The Ramsar Convention Manual, 4th edition (2006) (<http://www.ramsar.org>),
- The Ramsar Convention Handbooks for the wise use of wetlands, 4th ed. (2010), (<http://www.ramsar.org>),
- MAB: <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/man-and-biosphere-programme/>,
- MAB: The Seville Strategy for Biosphere Reserves and Statutory Framework of the World Network of Biosphere Reserves,
- MAB: Seville +5 Recommendations for the Establishment and Functioning of Transboundary Biosphere Reserves,
- MAB: Seville +5 Recommendations: Checklist for Action,
- Madrid Action Plan for Biosphere Reserves (2008 – 2013) (<http://unesdoc.unesco.org/images/0016/001633/163301e.pdf>),
- MAB: Guiding Principles for Projects on Biosphere Reserves ([http://www.unesco.org/mab/doc/brs/Guid\\_princip.pdf](http://www.unesco.org/mab/doc/brs/Guid_princip.pdf)),
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora,
- Our life insurance, our natural capital: an EU biodiversity strategy to 2020; SEC(2011) 541 final (<http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm>).

## **B. Invasive alien species.**

### *General description*

- a) Brief definition:** The indicator 'Invasive alien species' comprises two elements: 'Cumulative number of alien species', which shows trends in species that can potentially become invasive alien species, and 'Worst invasive alien species threatening biodiversity', a list of invasive species with demonstrated negative impacts.
- b) Unit of measurement:** Number of the Invasive alien species and of the Worst invasive alien species in total and broken down by major ecosystems (terrestrial, freshwater and marine) and selected 'taxonomic' groups: vertebrates, invertebrates, primary producers (vascular plants, bryophytes and algae) and fungi.

### *Context – Relation to other indicators from the Guidelines*

This indicator does not relate to any indicator.

### *Relevance for environmental policy*

- a) Purpose:** The indicator provides a measure of pressure on biodiversity in terms of the number of the Invasive alien species and of the Worst invasive alien species.
- b) Issue:** The UN Convention on Biological Diversity (COP Decision VI/23) defines an alien species to be 'a species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species

that might survive and subsequently reproduce' while an invasive alien species is 'an alien species whose introduction and/or spread threaten biological diversity'. The potential threat that alien species pose to biological diversity can be illustrated in the cumulative number of alien species. Although not all alien species become invasive, the number of alien species introduced to an environment has a direct correlation with the number of species which may become invasive at a later date. Invasive alien species may affect and reduce native biodiversity in various ways, such as through competition for food and space, predation, disease transfer, and changing habitat structure and functions. Many invasive alien species are weeds and animal pests in agriculture/aquaculture and forestry. Invasive alien micro-organisms may create severe problems to human health and to production crops. Intentionally introduced alien species for production in agriculture, forestry and fisheries/aquaculture, horticulture or for biological control, can also become invasive, causing negative impact on native biodiversity. There is a growing concern that with climate change and further deterioration in the environment, invasive alien species may benefit and increasingly compete with native species to the latter's disadvantage. Increase in trade and tourism and transport on land and in particular at sea, as well as developments in agriculture, plantation forestry, aquaculture, fisheries, game management and the pet trade, have provided new and enhanced pathways for the spread of invasive alien species. Although many countries have a regulatory framework to protect economic interests against diseases and pests, these are often inadequate to safeguard against species that threaten native biodiversity. The genuinely problematic ones are more easily identifiable and there are several reasons to consider those worst invasive alien species to prioritize actions and to be able to communicate the issue to a wider public.

**c) International agreements and targets:**

Global and regional levels: This indicator is relevant to the UN Convention on Biological Diversity (UN CBD) which aims to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species. Under the UN CBD, the Strategic Plan for Biodiversity 2011-2020 was adopted which requires that, by 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment. In 1997, the Global Invasive Species Program had been started followed by the 2007 Global Invasive Species Initiative which is operated by IUCN.

Sub-regional level: In 2011, the EU Council has endorsed the EU Biodiversity Strategy until 2020, which is the EU's key instrument for reaching the new EU target for the protection of biodiversity in 2020. One of the main targets of this strategy is combating invasive alien species.

*Methodology and guidelines*

**a) Data collection and calculations:** The actual estimate of the number of Invasive Alien Species and especially of the Worst Invasive Alien Species should be carried out by experts based on available information. Criteria for the specification of the Worst Invasive Alien Species include:

- severe impacts on ecosystem structure and function;
- replacement of a native species throughout a significant proportion of its range;
- hybridisation with native species;
- threats to unique biodiversity (e.g. endemic species);
- negative consequences for human activities, health and/or economic interests.

- b) Internationally agreed methodologies and standards:** At the EU level, the European Environment Agency (EEA) has developed methodology on this indicator (see EEA website). Recently, joint EEA and OECD methodology is being prepared.

#### *Data sources and reporting*

National Focal Points for the UN Convention of Biological Diversity can provide detailed information. Information on alien invasive species is also included in national reports to the UN CBD Secretariat. Certain EECCA and CEE countries operate their national websites on biodiversity. As an additional information source, the lists of invasive alien species with their description can be found in the Global Invasive Species Database managed by IUCN for each EECCA and SEE country.

#### *References at the international level*

- UN Convention on Biological Diversity: <http://www.cbd.int>.
- UN CBD Strategic Plan for Biodiversity 2011-2020: <http://www.cbd.int/decision/cop/?id=12268>
- National Reports to UN CBD: <http://www.cbd.int/reports>
- Halting the loss of biodiversity by 2010: proposal for a first set of indicators to monitor progress in Europe, EEA Technical Report No 11/2007, EEA Copenhagen 2007.
- Global Invasive Species Database: <http://www.issg.org/database>
- IUCN: <http://www.iucn.org>
- EEA: <http://www.eea.europa.eu/data-and-maps/indicators/invasive-alien-species-in-europe/invasive-alien-species-in-europe>
- Our life insurance, our natural capital: an EU biodiversity strategy to 2020; SEC(2011) 541 final (<http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm>).

### **C. Catches of fish and other aquatic animals and products**

#### *General description*

- a) Brief definition:** Amount of caught fish, crustaceans, molluscs, whales and seals and amount of aquatic animal products and aquatic plants.
- b) Unit of measurement:** Tons per year (fish, crustaceans, molluscs, aquatic animal products and aquatic plants) or number per year (whales, seals).

#### *Context – Relation to other indicators from the Guidelines*

This indicator does not relate to any indicator.

#### *Relevance for environmental policy*

- a) Purpose:** The indicator provides a measure of pressure on the aquatic environment and indirectly a measure of its state.
- b) Issue:** Fish and other aquatic products provide an important resource for humans and for human activities. The question of sustainable use of this natural resource has become



important after several cases of overfishing. Fish represent one of the most important parts of global biodiversity. From the total of 63,645 known species of vertebrates, the number of fish species is estimated at the level of 32,000 (50.3 %). The impacts on Europe's seas and coasts are driven by human activities such as fishing and aquaculture. As a result, the ecosystem services provided by Europe's seas and coasts are deteriorating, including a decline in goods such as fish and other aquatic animals and plants. Fishing pressures in most of Europe's seas exceed sustainable levels and safe biological limits (SBL), and since 1985, there has been a general decline in fish catches. The capacity of European fishing fleets has also not been sufficiently reduced to be in balance with available fish resources. As a result, 30 % of Europe's commercial fish stocks are now fished beyond SBL, and in 2010, 70 % of commercial stocks were fished above maximum sustainable yield. Other pressures include: by-catch; the destruction of sea-floor habitats; and illegal, unreported and unregulated fishing. European aquaculture production has increased over the past 15 years, driven by the combined effects of decreased wild catches and increased demand for fish.

**c) International agreements and targets:**

Global and regional level:

This indicator relates to the 1982 UN Convention on the Law of the Sea, the UN Convention on Biological Diversity (UN CBD), the Bonn Convention on the Conservation of Migratory Species of Wild Animals, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention).

Under the UN CBD, the Strategic Plan for Biodiversity 2011-2020 was adopted which requires that by 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Following the 2002 Johannesburg Plan of Action, the 2005 Johannesburg Plan for Implementation, as developed under the UN Commission for Sustainable Development, aims to tend towards sustainable fisheries (article 31) and proposes several concrete activities.

Subregional level:

Under the framework of its Common Fisheries Policy, the EU has adopted and implemented high number of legal acts regulating fishery. In 2011, the EU Council has endorsed the EU Biodiversity Strategy until 2020, which is the EU's key instrument for reaching the new EU target for the protection of biodiversity in 2020. One of the main targets of this strategy is sustainable use of fisheries resources.

The 1995 Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean to the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean provides for ban of catching in protected zones.

*Methodology and guidelines*

- a) **Data collection and calculations:** Data can be obtained from the companies dealing with catch of fish and other aquatic animals, by exploitation of aquatic products or by production

aquatic animal/plants products. Fishing and other activities by private persons should be estimated.

- b) **Internationally agreed methodologies and standards:** The OECD Questionnaire on the State of the Environment (Wildlife, Table 2A). Coordinating Working Party on Fishery Statistics (CWP) under FAO has developed CWP Handbook on Fishery Statistical Standards (with 22 factsheets).

#### *Data sources and reporting*

Data are collected based on reporting by the companies dealing with catch of fish and other aquatic animals, by exploitation of aquatic products or by production aquatic animal/plants products. In many EECCA and SEE countries, especially in those with access to sea, databases and data of fairly comprehensive time series exist and can be found in national statistical yearbooks.

#### *References at the international level*

- UN Convention on the Law of the Sea (<http://www.un.org/Depts/los/index.htm>)
- UN CBD Strategic Plan for Biodiversity 2011-2020:  
<http://www.cbd.int/decision/cop/?id=12268>
- CWP Handbook of Fishery Statistical Standards (<http://www.fao.org/fishery/cwp/search/en>)
- The Johannesburg Plan of Implementation:  
[http://www.un.org/esa/sustdev/documents/WSSD\\_POI\\_PD/English/POIToc.htm](http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POIToc.htm)
- Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy
- 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)
- Council Directive 83/129/EEC of 28 March 1983 concerning the importation into Member States of skins of certain seal pups and products derived therefrom
- Our life insurance, our natural capital: an EU biodiversity strategy to 2020; SEC(2011) 541 final (<http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm>).

### **III. Annexes**

#### **Annex I: EEA Biodiversity Indicators**

- CSI 007: Threatened and Protected Species
- CSI 008: Designated Areas
- CSI 009: Species Diversity
- SEBI 001: Abundance and Distribution of Selected Species
- SEBI 002: Red List Index for European Species
- SEBI 003: Species of European Interest
- SEBI 004: Ecosystem Coverage
- SEBI 005: Habitats of European Interest
- SEBI 006: Livestock Genetic Diversity
- SEBI 007: National Designated Protected Areas
- SEBI 008: Sites Designated under the EU Habitats and Bird Directive

- SEBI 009: Critical Load Exceedance of Nitrogen
- SEBI 010: Invasive Alien Species in Europe
- SEBI 011: Impact of Climate Change on Bird Population
- SEBI 012: Marine Trophic Index of European Seas
- SEBI 013: Fragmentation of Natural and Semi-natural Areas
- SEBI 014: Fragmentation of River Systems
- SEBI 015: Nutrients in Transitional, Coastal and Marine Waters
- SEBI 016: Freshwater quality
- SEBI 017: Forest: Growing stock, increment and fellings
- SEBI 018: Forest: Deadwood
- SEBI 019: Agriculture: Nitrogen Balance
- SEBI 020: Agriculture: Area under management practices potentially supporting biodiversity
- SEBI 021: Fisheries: European Commercial Fish Stocks
- SEBI 022: Aquaculture: Effluent water quality from finfish farms
- SEBI 023: Ecological footprint of European Countries
- SEBI 024: Patent Applications Based on Genetic Resources
- SEBI 025: Financing Biodiversity Management
- SEBI 026: Public Awareness

## **Annex II: OECD/Eurostat Indicators related to Biodiversity**

### Wildlife

- 1A: State of Mammals, Birds and Fish
- 1B: State of Reptiles, Amphibians, and Invertebrates
- 1C: State of Vascular Plants, Mosses, Lichens, Fungi and Algae
- 2A: Catches of Fish and other Aquatic Animals and Products
- 2B: Fishery Production
- 3A: Biosphere Reserves and Wetlands of International Importance
- 3B: Major Protected Areas

### Water

- 6: Water quality of selected rivers
  - 6A Dissolved oxygen
  - 6B Biochemical oxygen demand
  - 6C Nitrates
  - 6D Phosphorus
  - 6E Ammonium
  - 6F Lead
  - 6G Cadmium
  - 6H Chromium
  - 6I Copper
- 7: Water quality of selected lakes
  - 7A Total phosphorus
  - 7B Total nitrogen

### Forest

- 1: Forest and other wooded land
- 4: Burned area of forest and other wooded land

### Land

- 1A: Land use
- 1B: Changes in land use

