1) General description

1.1) Brief definition

This indicator specifies trends in the population size of various selected species in a defined area (country, region or designated area).

1.2) Units of measurement

The occurrence of species (population size) is expressed as the number of mature individuals in a defined area (thousands of individuals).

1.3) Context

Relation to other indicators from the Guidelines - This indicator relates to indicator "D-4: Threatened and protected species".

2) Relevance for environmental policy

2.1) Purpose

The indicator provides a measure of the state of populations of selected animal species of significance and of the effectiveness of national responses, i.e. actions taken to conserve national and global biodiversity.

2.2) Issue

A number of multilateral environmental agreements recognize that biodiversity has an intrinsic value and that biodiversity maintenance is essential for human life and sustainable development. Many species are currently decreasing in population size and are at risk of extinction. This indicator shows the situation for populations of fauna that belong to groups of species that are of major resource relevance and are important from the point of view of biodiversity conservation ("selected species"). The indicator will help decision makers to balance economic interests with biodiversity protection (especially when issuing hunting and forest harvest licenses), and to maintain a balance in ecosystems.

2.3) International agreements and targets

a) Global and regional level:

This indicator is relevant to the United Nations Convention on Biodiversity (CBD), the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Conservation of European Wildlife and Natural Habitats (Bern Convention). Under the CBD, a Strategic Plan for Biodiversity 2011-2020 was adopted which requires that by 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained (Target 12). The ministers of environment of the European States participating in the process of the Pan-European Biological and Landscape Diversity Strategy in 2003 reinforced their objective to halt the loss of biological diversity at all levels by the year 2010.

b) Subregional level:

The Environmental Strategy of countries of South-Eastern and Eastern Europe, Caucasus and Central Asia calls for the preparation and implementation of national strategies and action plans in the field of biodiversity protection.

In the European Union (EU), Directives on the conservation of wild birds and on the conservation of natural habitats and wild fauna and flora are also relevant. In a broader sense, the EU Council has endorsed in 2011 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.

3) Methodology and guidelines

3.1) Data collection and calculations

The following categories of species might be considered "selected species" when developing a monitoring programme:

  (a) *Keystone species*: Species that play an essential role in the structure, functioning or productivity of a habitat or ecosystem at a defined level (habitat, soil, seed dispersal, etc.).   The loss of these species will

significantly affect the population sizes of other species in the ecosystem, potentially leading to further species loss ("cascade effect"). Examples include the bats and insects role in maintaining pollination.

(b) *Flagship species:* These are species of particular intrinsic (cultural and historical) appeal to the citizens of the country as a whole or its regions, which are selected to act as an ambassador, icon or symbol for a defined habitat, issue, campaign or environmental cause. As there might be overlaps between "flagship" and "keystone" species, these should be specified when providing the data.

(c) *Endemic species:* Any area contributes to global biodiversity by the overall number of different species within it and by the proportion of species that are unique to a defined geographical area, i.e. are endemic to the area. Conservation of endemic species, particularly those sharing a discrete geographic area, can be an effective way to maintain global biodiversity.

Information on the population of species should be collected through the consistent long-term application of an appropriate survey technique that is widely accepted by the scientific community. Retrospective data on population sizes can be obtained through a review of published literature, including previous field study reports, to find material that is appropriate for comparison with the methodologies currently in use. While it is usually impossible to count every individual within a population or area, knowledge of habitat requirements and species population density in sample areas, coupled with data on climate, altitude, soil type and/or vegetation cover, can be used to estimate the population size in the area of interest. In many countries, geographic information systems (GIS) are commonly used to analyse the spatial data. It is important to verify population size predictions through fieldwork. Trends in population seizes are determined on the basis of total cyclic oscillations which reflect all conditions relating to the existence, protection and use of biological resources.

This indicator is determined separately for each species. For species for which there are only assessments of population seizes in particular areas for observation (in administrative territorial units, particular Protected Areas or National Parks), the reference point for each observation area is the assessment of the quantity in the year in which the monitoring was introduced.

3.2) Internationally agreed methodologies and standards

The United Nations Environment Programme's (UNEP) World Conservation Monitoring Centre (UNEP-WCMC) and the World Wide Fund for Nature (WWF) have designed and implemented a system (the Living Planet Index) to produce indicators on biodiversity change over time, principally at the global and continental levels. The European Environment Agency (EEA) is currently considering abundance variation trends in the number of species over years for farmland, woodland, park and garden birds as well as distribution variation trends over 20–25 years for butterflies.

4) Data sources and reporting

Completeness of the basic data on species varies between countries of South-Eastern and Eastern Europe, Caucasus and Central Asia depending on their conditions and national priorities. Some data that may be suitable as a basis for this indicator are collected by central environmental institutions, State Statistics bodies, academic institutions and nature conservation associations. To cite two international-level examples: BirdLife International maintains a database on farmland birds and on trends involving woodland, park and garden birds, and the Dutch Butterfly Conservation maintains a database on trends involving butterflies.

5) References at the international level

- United Nations Convention on Biological Diversity: http://www.cbd.int/;

- United Nations Convention on Biological Diversity Strategic Plan for Biodiversity 2011-2020: http://www.cbd.int/decision/cop/?id=12268 ;

- The IUCN list of threatened species: http://www.redlist.org/;

- A User´s Guide to the IUCN Red List website (March 2009): http://www.iucnredlist.org/documents/redlist_website_users_guide.pdf;

- Guidelines for Application of the IUCN Red List Criteria at Regional Levels (Version 4), IUCN 2012: http://www.iucnredlist.org/documents/reg_guidelines_en.pdf ;

- 2004 IUCN Red List of Threatened Species: A Global Species Assessment. Edited by Jonathan E.M. Baillie, Craig Hilton-Taylor and Simon N. Stuart. ISBN: 2-8317-0826-5;

- Categories and criteria of the World Red Book of the International Union for Conservation of Nature (IUCN);

- Global Biodiversity: Status of Earth's Living Resources. Compiled by World Conservation Monitoring Centre in collaboration with The Natural History Museum, London, and in association with IUCN, UNEP, WWF, and WRI. Chapman & Hall, London, 1992 - 585 p;

- World Atlas of Biodiversity. UNEPWCMC; Publisher University of California Press, 2002. - 340 p. ISBN: 0-520-23668-8;

- European Red List of Globally Threatened Animals and Plants, 1991 (E/ECE/1249 - ECE/ENVWA/20) (Sales No. 91.II.E.34);

- Code of Practice for the Conservation of Threatened Animals and Plants and Other Species of International Significance, 1992 (ECE/ENVWA/25-Sales No.92.II.E.16);

- Birds in Europe: Population Estimates, Trends and Conservation Status. BirdLife.

- International. BirdLife Conservation Series No 12. (London, 2004).

- EBCC Atlas of European Breeding Birds: Their Distribution and Abundance. Hagemeijer, EJM and Blair MJ (eds). (London: T and AD Poyser, 1997).

- Biotope use and trends of European butterflies. van Swaay, C., Warren, M. & Loïs G. Journal of Insect Conservation (2006) 10:189-209.

- Delbaere, B. An inventory of biodiversity indicators in Europe 2002. EEA Technical Report. (2003).

- Streamlining European biodiversity indicators 2020: Building a future on lessons learnt from the SEBI 2010 process, EEA Technical report No 11/2012: http://www.eea.europa.eu/publications/streamlining-european-biodiversity-indicators-2020;

- 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;

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora;

- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds;

- World Conservation Monitoring Centre: http://www.unep-wcmc.org/;

- EEA: http://www.eea.europa.eu/themes/biodiversity;

- EUNIS (European Nature Information System): http://eunis.eea.europa.eu/;

- EIONET: http://www.eionet.europa.eu/;

- Convention on Migratory Species: http://www.cms.int/;

- CITES: http://www.cites.org/;

- European Commission: Nature and Biodiversity: http://ec.europa.eu/environment/nature/index_en.htm;

- IUCN: http://www.iucn.org/;

- BirdLife International (Europe): http://www.birdlife.org/regional/europe/index.html;

- European Bird Census Council: http://www.ebcc.info/

- Dutch Butterfly Conservation: http://www.vlinderstichting.nl/.