THE REPUBLIC OF TURKEY
MINISTRY OF FORESTRY AND WATER AFFAIRS
HEAD OF THE INFORMATION AND TECHNOLOGY DEPARTMENT
THE BIODIVERSITY MONITORING UNIT

NATIONAL BIODIVERSITY MONITORING REPORT – 2011

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President of the Republic of Turkey Abdullah GÜL

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NATURE CONSERVATION CENTRE

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Photograph: Aykut İnce

Foreword

Prof. Dr. Veysel EROĞLU
Minister of the Republic of Turkey's
Ministry of Forestry and Water Affairs

For a variety of reasons, the biodiversity of Turkey on its own is considered comparable with the whole of continental Europe. However, some of this diversity has become extinct and some is threatened with extinction.

In recent years many developed countries have completed the identification of their plant and animal species and have developed national species databases using geographic information technologies. These countries have ensured the cross-sectoral use of data on natural values and developed their national decision support systems. Furthermore, they have achieved effective site management through identifying natural values, monitoring, protection, and developing national development strategies. By comparison, in Turkey, studies to identify and collect information on the flora and fauna are rather new. Today, the urgent need for establishing a system to monitor biodiversity in Turkey and using it to guide conservation action is widely accepted by all experts and organizations in this field.

In our country, flora and fauna identification studies have started in the past and the compilation of inventories are ongoing. On the other hand the work on the development of systems to record, store and analyse these data have started only recently. In this context the Biodiversity Monitoring Unit (BMU) was established in 2004, under the Ministry of Forestry and Water Affairs, within the framework of the GEF-II Project. BMU's purpose is to monitor biodiversity in Turkey and to develop and carry out a methodology to identify potential areas to be protected.

The Biodiversity Monitoring Unit manages the Noah's Ark National Biodiversity Database in cooperation with the General Directorate of Nature Protection and National Parks. This database brings together the data required for monitoring biodiversity in our country for the first time. An unlimited amount of biodiversity data can be entered into the database. The data can be queried by a site of interest, region, habitat type or by protected areas. Distribution maps of species can be produced and changes in the Red List status of species can be monitored over time. Furthermore, information about all protected areas is stored in the Geographic Information System environment of the database, so changes over time in sites as well as species can be monitored. In addition to this, the database can be used to produce population and Red List tables of species.

The Noah's Ark Database was activated at www.nuhungemisi.gov.tr website in 2007. Since then the database software has regularly been improved through the development of new modules and interfaces. Currently, the database is the biggest of its kind in Turkey with approximately 500.000 records. The database will also be an invaluable tool in securing the sustainability of Turkey's rich diversity of plant and animal resources by providing a major tool for the decision support mechanism for nature conservation and site management,. The Noah's Ark Database, with its spatial data on plant and animal species, will facilitate centralized management decisions on natural resources, in the right way and at the right time, and will make it possible to accelerate nature conservation and biodiversity monitoring activities.

I would like to express my sincere thanks to all those colleagues in nature conservation who have given their support to biodiversity projects carried out by our Ministry, and to wish good luck for the continuation of nature conservation projects in the future.

Foreword

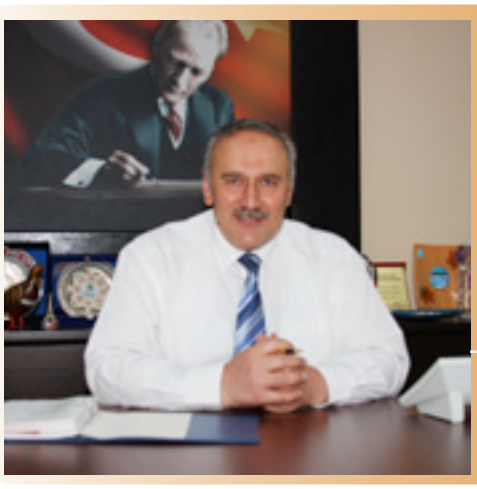
Prof. Dr. Lütfi AKÇA

Undersecretary

Turkey is a country hosting extraordinary biodiversity and natural resources due to the three biogeographic regions it is host to (the Irano-Turanian, Euro-Siberian and Mediterranean), the transition zones between them, and its location at the intersection of three continents. According to a global study carried out by Conservation International, there exist only three countries which include three hotspots: Turkey, South Africa and the People's Republic of China. According to Conservation International, in Turkey the ecosystems of the Caucasus forest, Mediterranean maquis and Irano-Anatolian steppe hotspots intersect. Furthermore in our country, the fauna includes endemic animal species together with a mix of arboreal species from Europe, steppe species from the Caucasus and Middle East desert species from the south.

To protect the rich biodiversity of our country and to hand it down to future generations is the responsibility of all of us. To establish an effective monitoring mechanism to serve the conservation of our country's biodiversity is a need and also a must. The Convention on Biological Diversity urges the member countries, including Turkey, to identify, monitor and store monitoring data of the biodiversity aspects important for the conservation and sustainable use of the member states' total national biodiversity. In this respect, the responsibilities of the General Directorate of Nature Protection and National Parks have been reformulated to act as the focal point at the national and international levels and to enhance the effectiveness of the national studies on biodiversity through the Delegated Legislation on the Governance and Duties of the Republic of Turkey Ministry of Forestry and Water Affairs, dating 29.06.2011 and numbered 645. In this delegated legislation, through the Ministerial Post's approval, the Regulation on the Republic of Turkey Ministry of Forestry and Water Affairs Central Organization's Duties and Working Procedure and Principles dating 29.02.2012 and numbered 64 are presented. In this legal framework, to effectively carry out all studies on biodiversity and to correspond to all these needs, the Head of the Biological Diversity Department has been established as a new entity. Within this department different sub-departments have been established aiming at monitoring biodiversity in a centralized manner, reporting the outcomes of the monitoring work to decision makers and ensuring coordination at national and international levels. These sub-departments are: Inventory, Research, Biotechnology, Monitoring and Evaluation, Information Systems sub-departments. Furthermore, development of a mechanism for determining existing biodiversity and monitoring it has been identified as an essential element of Turkey's negotiations for accession to the European Union.

Finally, I would like to thank the Biodiversity Monitoring Unit – established under the coordination of General Directorate of Nature Protection and National Parks and within the Head of Information and Technology Department through the Ministerial Post's approvals dating 10.02.2009 and numbered B.18.0.BİD.0.03–713.03–91/10 – and the experts in the General Directorate of Nature Protection and National Parks for their valuable work on biodiversity and for their support in establishing a more efficient system for biodiversity monitoring.



Foreword

Ahmet ÖZYANIK

Director of the General Directorate of
Nature Protection and National Parks

Turkey is among the luckiest countries in the world for biodiversity. Three biogeographical regions meet in our country and there is a wide variety of forms and compositions of forest, mountain, steppe, wetland, coastal and marine ecosystems. This extraordinary diversity of habitats has a correspondingly important diversity of species and genes.

In our country, there are known to be approximately 19.000 invertebrate species and among these almost 4000 species/subspecies are endemic to Turkey. According to the latest data on vertebrate species, there are 460 birds, 161 mammals, 141 reptiles and amphibians, 480 marine fish and 236 freshwater fish species in Turkey. Until today almost 1500 vertebrate species have been identified. Among the vertebrate species more than 100 are endemic; 70 are fish.

To comprehend the richness of Turkey for plant species (flora), a comparison with continental Europe will suffice: in the whole of continental Europe 12.500 gymnosperm and angiosperm plant species are known. This is close to the number of species present only in Anatolia (11.000), and approximately one third of these are endemic to Turkey. Turkey has a notably high endemism rate, is also rich in medicinal and aromatic plants.

Turkey's genetic diversity increases in importance when one considers plant genetic resources, because Turkey is located at the intersection of the Mediterranean and Near East gene centres. These two regions play an important role in the emergence of cereals and plants for horticulture. There are 5 micro-gene centres which host more than 100 species with a wide distribution and are the origin or diversity centres of numerous plants important economically, including plants cultivated for food and for medicines. These centres are very important sources of genes for the future sustainability of the global cultivation of numerous plant species. Many animal genetic resources also originated here, and it is accepted that numerous local animal breeds were first developed in Anatolia and spread to other regions of the world from here.

To ensure the conservation and sustainability of the rich biodiversity our country hosts, it is essential to assess its status and to monitor any change in that status. The National Biodiversity Strategy and Action Plan, prepared by our General Directorate in 2007, details the roadmap of the work to be carried out on biodiversity by 2018. One of the priority subjects of the plan is "developing a central information management system" where all data on biodiversity is kept, queried and where analysis reports can be prepared for the decision makers.

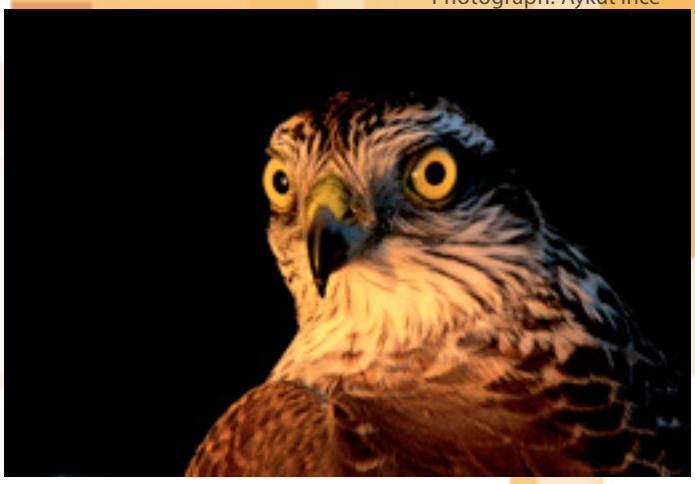
The Biodiversity Monitoring Unit's activities are of critical importance to the implementation of our National Biodiversity Strategy and Action Plan, to the conservation of our country's biodiversity and to its sustainable use.

In the name of our General Directorate, the focal point of Turkey's national and international work on biodiversity, I wish for the continued success of the Biodiversity Monitoring Unit, and thank all personnel involved in the Unit's activities.

I. THE BIODIVERSITY MONITORING UNIT

Photograph: Ahmet Karataş

Photograph: Aykut İnce



The Biodiversity Monitoring Unit (BMU) was established in 2004 within the framework of the "Biodiversity and Natural Resource Management Project (GEF-II)", and was placed under the aegis of the Directorate of Forestry's Mapping and Photogrammetry Department. The unit was comprised of experts from the General Directorate of Nature Protection and National Parks and the General Directorate of Forestry. In 2008, the BMU was moved to the Ministry of Forestry and Water Affairs, and started working under the Head of the Information and Technology Department. Following the Ministerial Post's approvals dated 10.02.2009 and numbered B.18.0.BİD.0.03–713.03–91/10 in the coordination of the General Directorate of Nature Protection and National Parks and under the Head of the Information Technology Department, the Biodiversity Monitoring Unit – BMU – was established with the following remit:

- To monitor the biodiversity of Turkey through the Noah's Ark National Biodiversity Database – initiated by His Honour Our Minister Prof. Dr. Veysel Eroğlu – and other information technologies,
- To finalize the Systematic Conservation Planning (Gap Analysis) work, which was started in 2004 under the "National Gap Analysis Programme", to cover the whole country.

Vision

To establish a knowledge-based conservation system, which, through close collaboration with related organizations, sufficient and sustainable financial, technical, logistical and human resources, can facilitate and support the effective delivery of biodiversity conservation and sustainable use of natural resources in Turkey.

Mission

The effective management and analysis of all biodiversity information, and the development of appropriate and effective policies, which achieve the conservation and sustainable use of biodiversity in Turkey.

Goals:

- To establish and operate an information management system to secure reliable biodiversity data,
- To establish an information system which permits carrying out analysis, queries and preparing reports for implementers and decision makers of data resulting from studies related to biodiversity,

- To ensure the validity of all data entered,
- To further advance the Noah's Ark National Biodiversity Database to correspond to the needs of a central information management system at the national level using software appropriate for all biodiversity data,
- To provide an information management system to support the biodiversity studies carried out under the coordination of the General Directorate of Nature Protection and National Parks,
- To establish the infrastructure and support mechanism for the analysis of the data collected in the database.

Under this structure of Vision, Mission and Goals, the Biodiversity Monitoring Unit is thus authorized to monitor Turkey's biodiversity. The work falls into two categories:

1. To manage the Noah's Ark National Biodiversity Database;
2. To act as national coordinators of Systematic Conservation Planning (SCP) studies.

1. Noah's Ark – the National Biodiversity Database:

Noah's Ark – the National Biodiversity Database – was developed within the framework of the "Biodiversity and Natural Resource Management Project (GEF-II)". The database collects and collates all observations on Turkey's biodiversity for the purpose of conservation. Noah's Ark became active in 2007 under the Ministry of Forestry and Water Affairs at **www.nuhungemisi.gov.tr.** The Biodiversity Monitoring Unit's work involves facilitating or undertaking active data entry to Noah's Ark, coordinating the validation of data by experts and developing database interfaces, which support the processes of biodiversity conservation. The database is open to experts and the public.

2. Systematic Conservation Planning:

Systematic Conservation Planning (SCP) is an approach which has been used in academic studies and conservation planning processes by non-governmental organizations, the private sector and the Ministry of Forestry and Water Affairs since 2000 (Zeydanlı et al. 2005; Turak et al. 2011).

SCP is a process of establishing a conservation management system, which explicitly identifies conservation targets and within which entire biodiversity is represented in a consistent manner. Through this process "Sites of Conservation Priority" are identified. The Ministry of Forestry and Water Affairs has declared that SCP will be used to identify Natura 2000 sites in Turkey.

The coordination of Systematic Conservation Planning studies throughout Turkey is one of the main responsibilities of the Biodiversity Monitoring Unit. The Coastal Aegean Region Gap Analysis study was initiated by the Ministry of Forestry and Water Affairs and finalized in 2007. The Biodiversity Monitoring Unit has also supported and coordinated the following Systematic Conservation Planning studies: Lesser Caucasus (2004-2006), Anatolian Diagonal (2007-2010) and Black Sea (2010-2011).

The Importance of Monitoring Biodiversity

As a direct result of human activities, wildlife and habitats throughout the world are rapidly going extinct. In Turkey too, there are intense threats to species and habitats and, since Turkey hosts one of the highest diversities of species of any country in the Earth's temperate zone, this is of particular concern. Nonetheless, many organizations are working at local and national scales for the conservation of Turkey's species and habitats, and the sustainable use of natural resources. In order to both understand what influence this work is having on biodiversity and to direct new studies, monitoring systems are needed. This is further confirmed by the Convention on Biological Diversity, which encourages member states (which include Turkey) and conservation organizations to take appropriate steps for monitoring biodiversity.

Several organizations in Turkey have already initiated their own databases and monitoring programmes on specific issues of biodiversity. However, there is a need to establish a national monitoring system in Turkey which can monitor the trends of changes in biodiversity at the national scale. Studies have been started to address this need under the coordination of General Directorate of Nature Protection and National Parks and are expected to be taken to a more advanced level through the support and collaboration of the BMU working under the Head of Information Technology Department. Such a national monitoring system would make it possible to identify the priority actions needed for the conservation and sustainable use of biodiversity. All biodiversity related studies carried out at the national scale are expected to be carried to more advanced levels through the existence of the Biodiversity Monitoring Unit and its support through the information system infrastructure.

To conclude, the Biodiversity Monitoring Unit (BMU) will support the biodiversity studies carried out under the coordination of and within the General Directorate of Nature Protection and National Parks by supporting the entry of all biodiversity inventory data to the database, data storage, the analysis of biodiversity data for monitoring biodiversity trends at the national scale and, when requested, supporting the reporting processes through its information systems infrastructure.

Photograph: Aykut İnce

II. NOAH'S ARK

THE NATIONAL BIODIVERSITY DATABASE

Photograph: Ahmet Karataş

Photograph: Sühendan Karauz

Noah's Ark is a web-based database where biodiversity data from Turkey is gathered, monitored, managed and reviewed.

By entering their observations into the database, users share their observations with others and make the data available both for their own studies and for the national conservation of species and sites. All relevant government bodies, scientists and academic research units, amateur researchers, non-governmental and other organizations collecting and/or holding biodiversity data can support the system.

Currently the Noah's Ark database comprises:

- Approximately **500.000** records;
- **3582** registered users.

With the Noah's Ark database:

- The conservation of one of the nation's largest resources – Turkey's biodiversity – is secured;
- The information infrastructure required to fulfill Turkey's obligations under international agreements, such as the United Nations Convention on Biological Diversity, and negotiations for accession to the European Union is established.

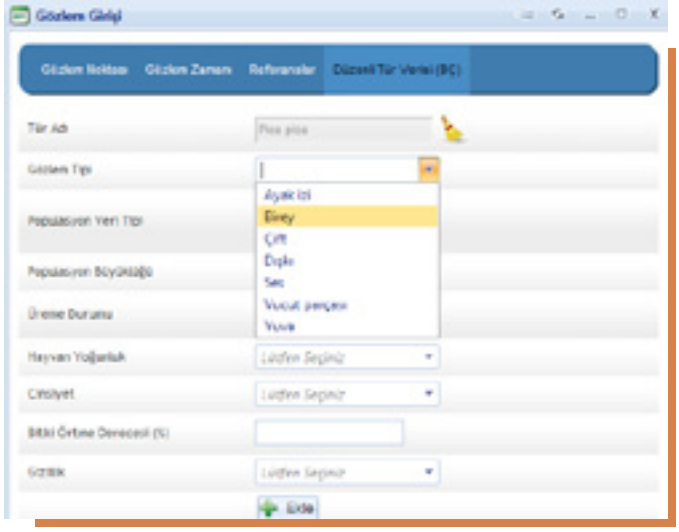
In order to facilitate data entry and queries by all users, a variety of interfaces have been developed in the Noah's Ark database by the BMU.

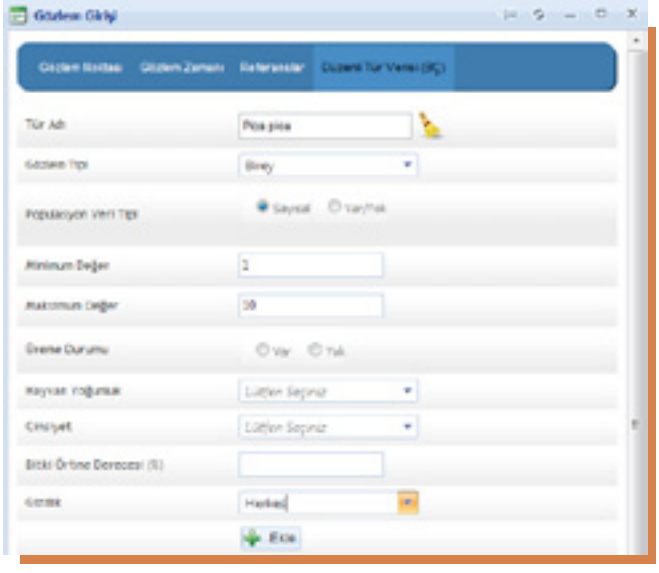
II.1. Data entry and query

II.1.1. Data entry:

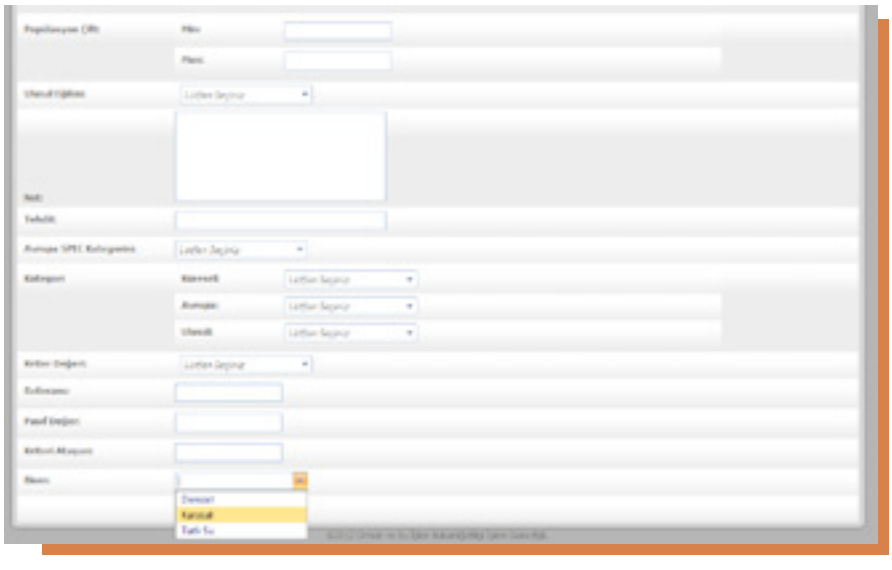
Photograph: Michel Gunther Photograph: Cem Kıraç

- One of the principle functions of the database is to ensure the effective and easy entry of all data into the system. Thus users can enter data on species with regular monitoring information, such as Mediterranean monk seal (*Monachus monachus*) and loggerhead turtle (*Caretta caretta*), or the outcomes of other regular studies, such as MidWinter Waterfowl Counts, under the "Regularly Collected Biodiversity Data" module developed by the unit. Data collected irregularly can also be integrated into the system. Other details associated with each observation, such as the data type (e.g. nest counts, tracks, signs) or qualitative information (e.g. population size, sex, density of individuals) can also be entered.



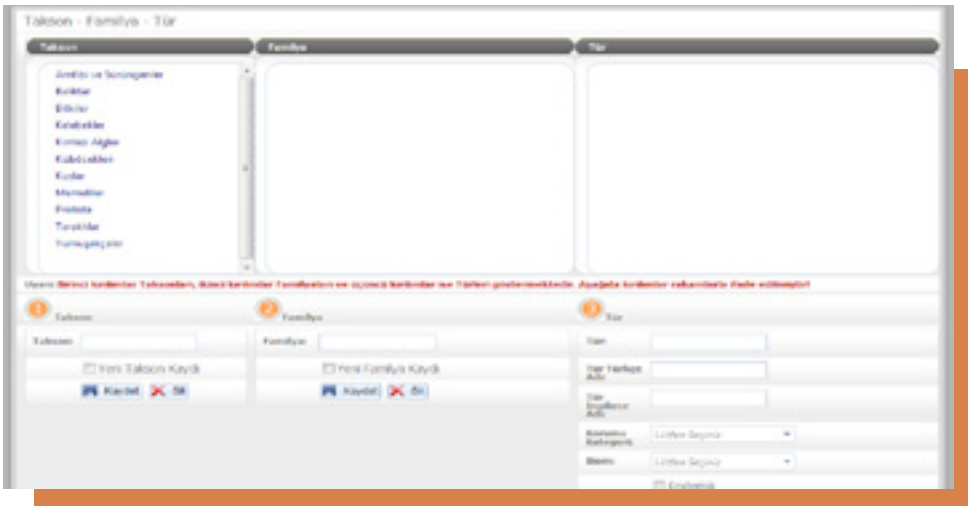


- A module has been developed to incorporate Red List assessments A Red List assessment is usually carried out at the species level and determines to what degree a species is threatened with extinction. A species' Red List status and its supporting assessment are thus important qualifying characteristics to include in the system. In this module the details, which can be entered, include a species' Red List status, population trends, the threats it faces and the criteria the species has fulfilled to justify its Red List status. Red List assessments can also be carried out at the level of biomes (terrestrial, marine, freshwater).



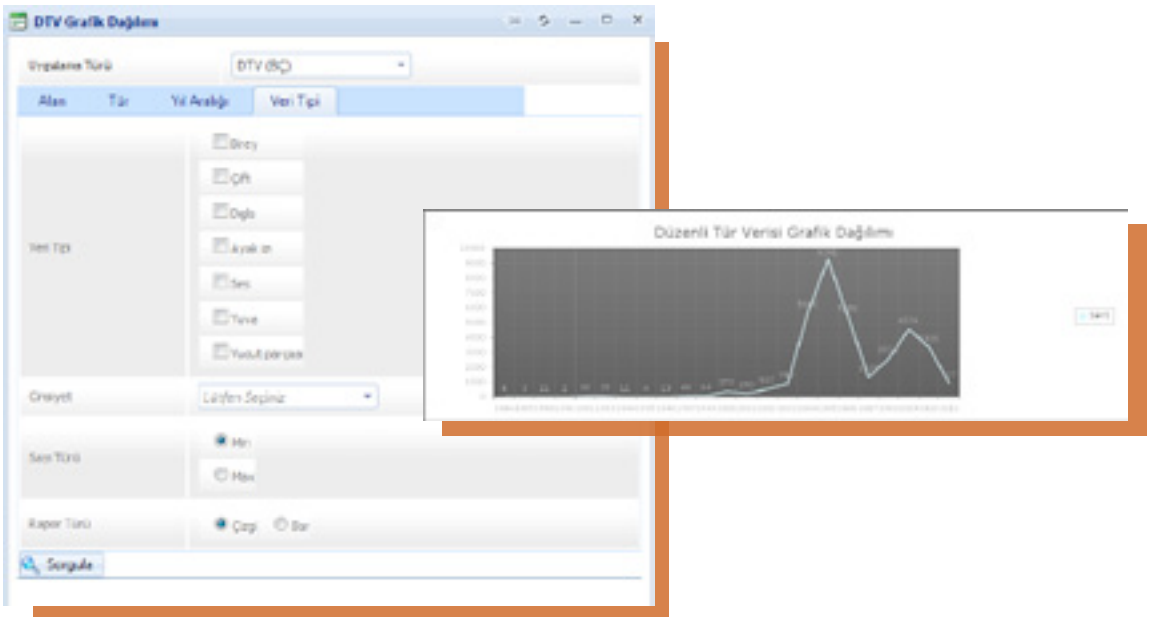
- Species and habitat data, which meets the criteria set for Systematic Conservation Planning (SCP), can also be entered to the system. This module thus accepts data on species and habitats at the scale of 10x10 km squares, following the UTM grid system adopted by SCP.

- In the database, taxonomic changes carried out by scientists can be incorporated and the data on the affected species rearranged as necessary.

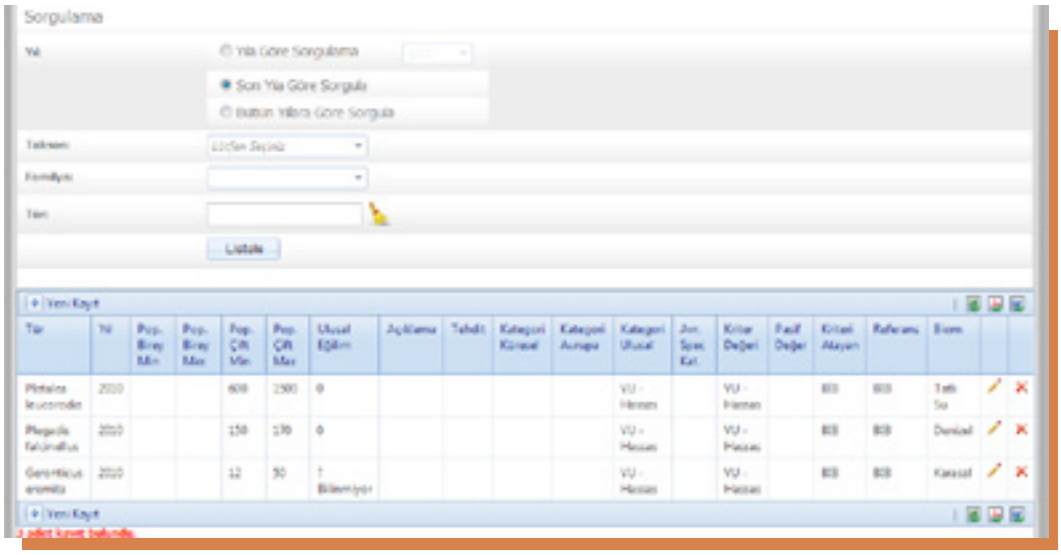


II.1.2. Data query:

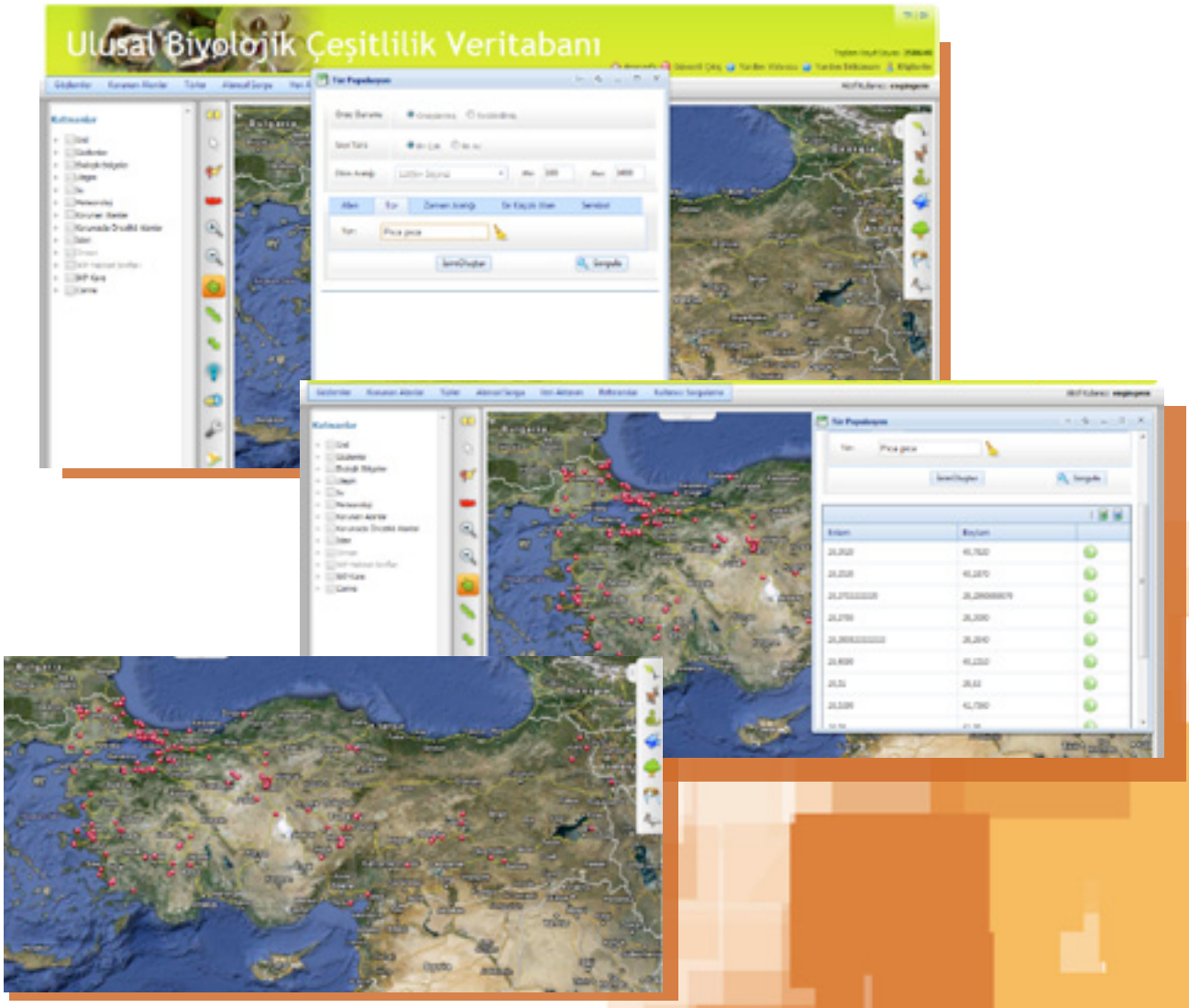
- Queries can be built from data in different formats using separate modules of the database. Users can thus search for species by name, and at the same time incorporate observation details to the query (such as sex, observation type, etc.); and graphic outputs can be produced.



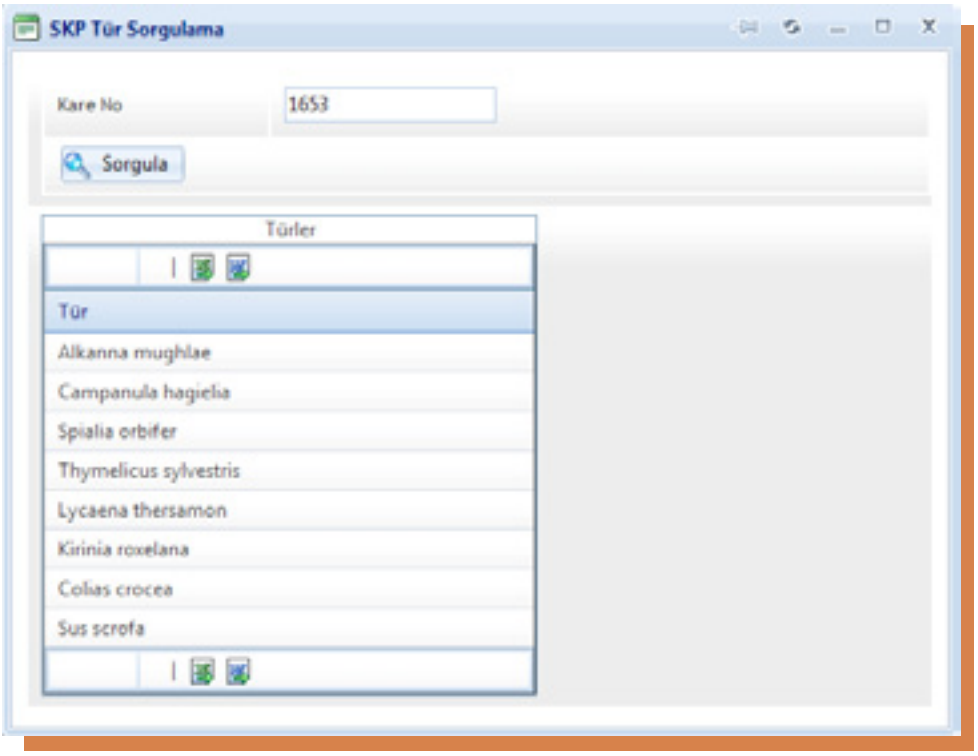
- The Red List status entered into the database can be queried at taxon, family and species level and also by biome.



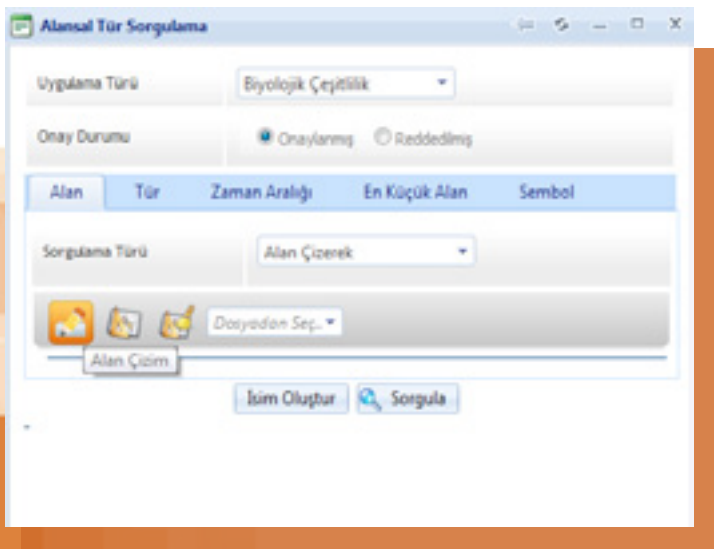
- Species distribution maps can be produced at the national scale.

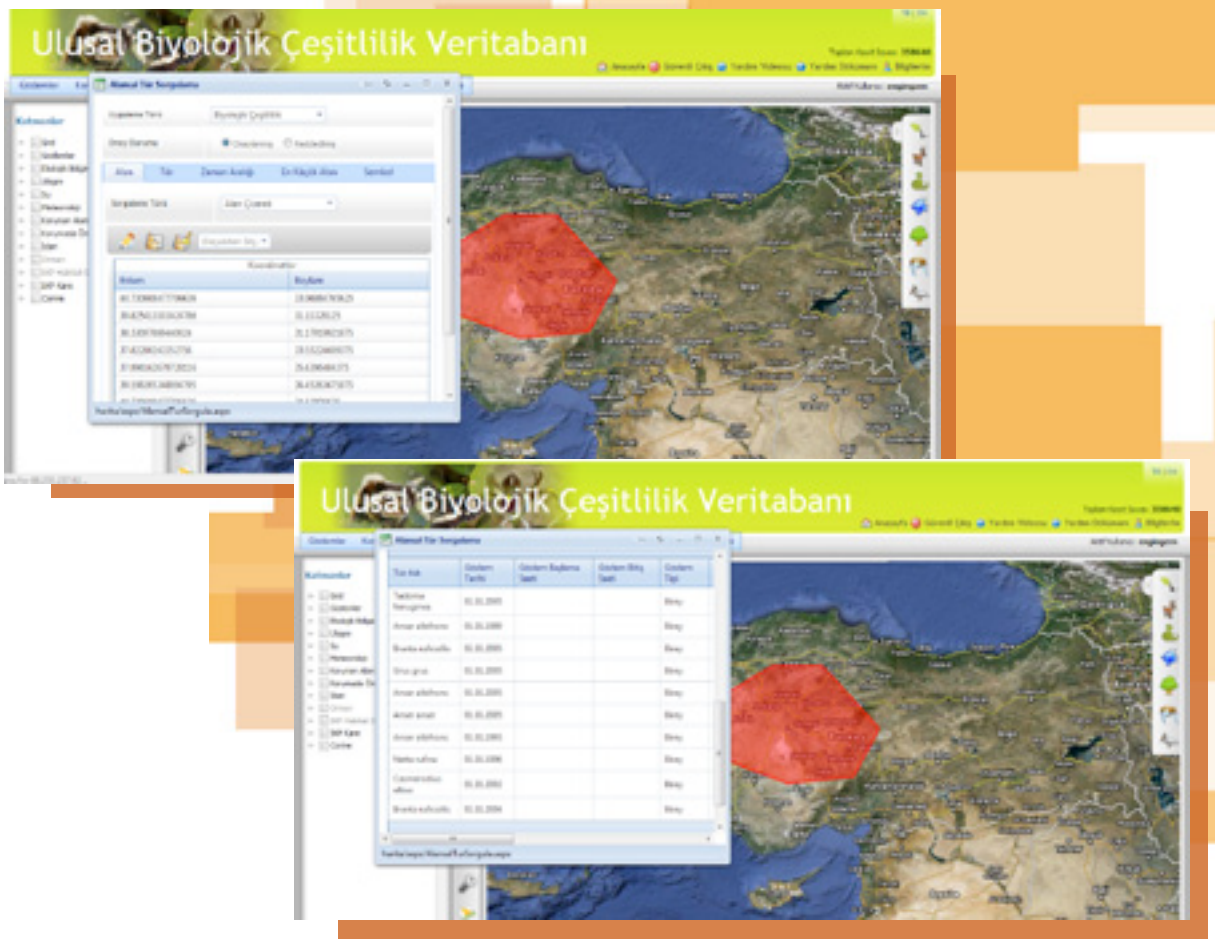


- Queries for species and habitats can be made for all of the Sites of Conservation Priority in Turkey identified through SCP studies, and results are provided at the scale of 10x10 km squares following the UTM grid system.



- Spatial species queries can be carried out in areas where users can define the boundaries. Users can work with the existing geographical layers in the system to identify the area where they want to make the query, doing this either by uploading the coordinates of the area's boundaries or by uploading data as vector. Alternatively, users can directly draw a polygon in the database to identify the query area.





- Species queries can also be made in areas with legal protection status, geographical regions, river basins, administrative jurisdictions and lakes.
- Species queries can be made by Corine Land-use Classes and forest stand types (as categorized by the General Directorate of Forestry), which are present in the system. In the future it will also be possible to search for species data using Eunis habitat classes (the classification approach adopted by the European Union to identify habitats of conservation priority).

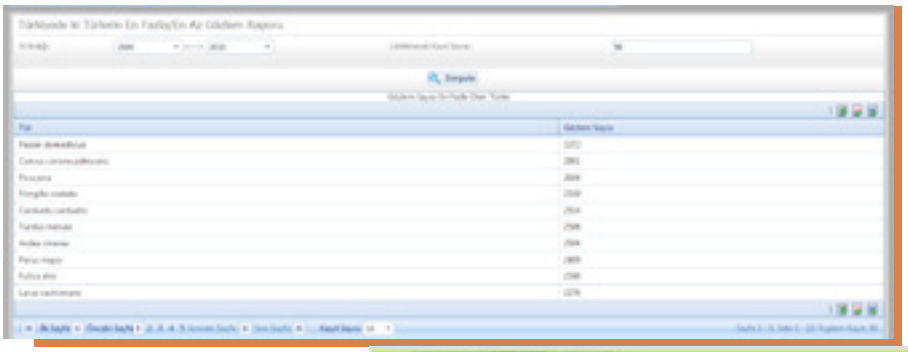
II.2. Indicators

- The Red List Index is one of the official indicators of the Convention on Biological Diversity and is fully integrated into the Noah's Ark database. Through regular Red List updates, the changes in the Red List status of species groups can be monitored. Through this indicator, information about the threats acting on species and their influence can be followed. Even though this indicator provides only general information – it does not provide information about what is happening at specific locations – it evaluates the outcomes of existing studies to reflect the situation of a species at the national or regional level at low cost.

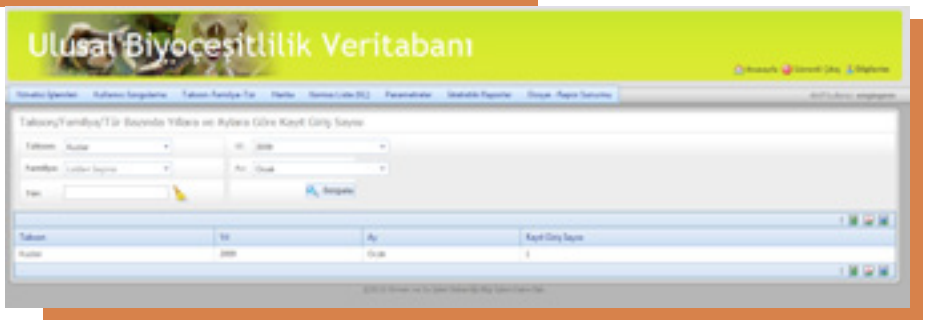
- Modules for recording information on wetlands, wildlife, exotic and invasive exotic species are also present in the Noah's Ark database. The data in these modules come from studies carried out by the relevant departments of the Ministry of Forestry and Water Affairs.

II.3. Actual data

Using the database, statistical reports can be prepared on a variety of subjects. These include:

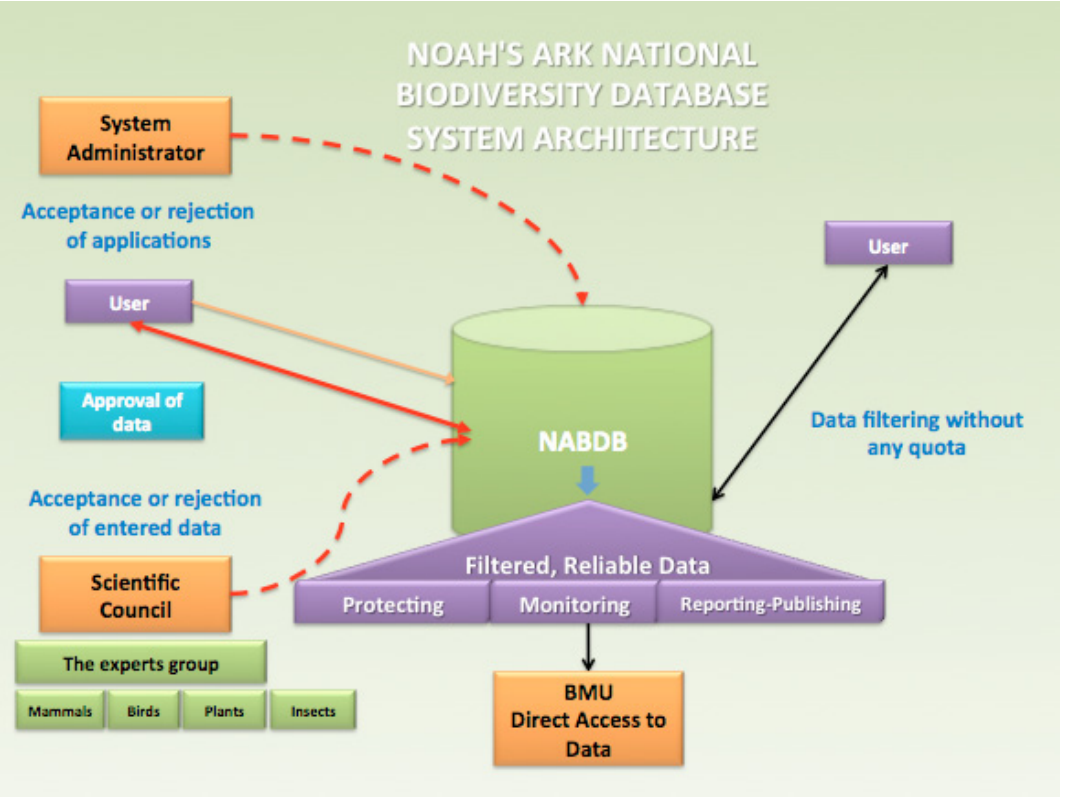


- Species with the highest number of observations,
- Queries at Taxon/ Family/Species level and according to Date (Year/ Month) and Province.



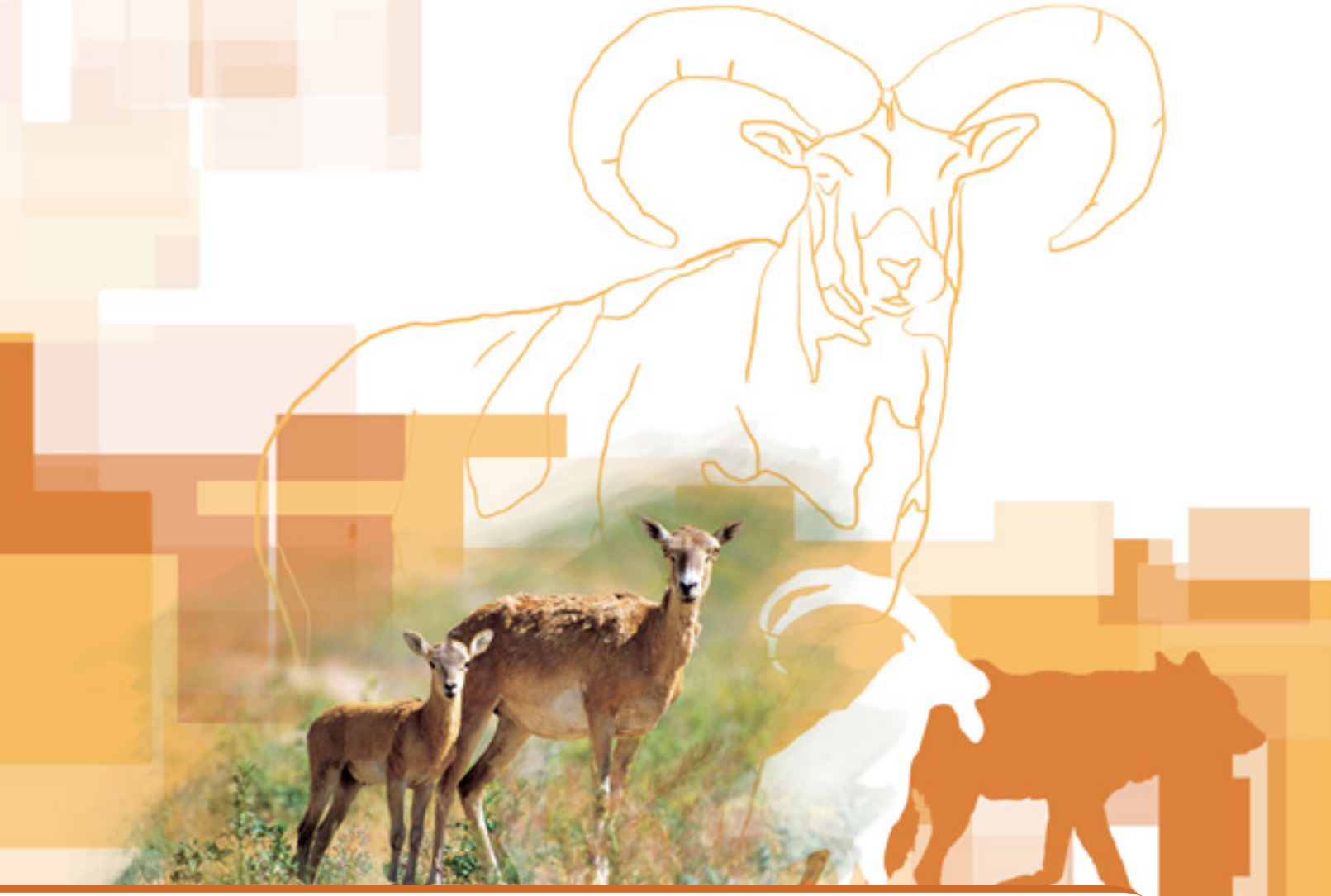
II.4. Administrative processes

- Data entered into the Noah's Ark database are controlled and approved through the support of voluntary experts.



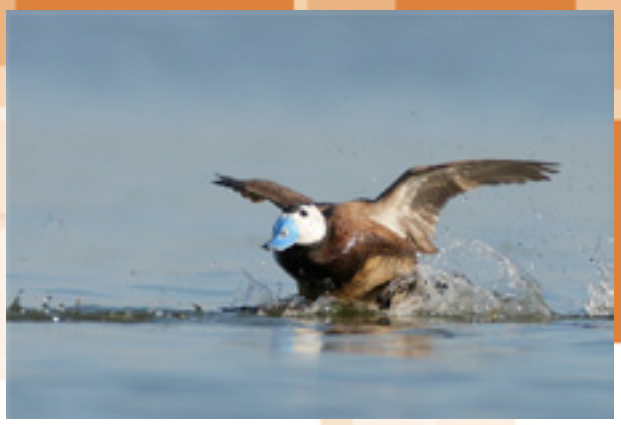
- There are different types of users with varying privileges using the Noah's Ark database. According to their privileges, users can download different quantities of data. Users can increase their privileges according to the volume of data they submit and the percentage of that data which is approved as reliable. However, for the acquisition of specific sensitive biodiversity data threatening the bio-security of Turkey, all users will sign a protocol with the Ministry of Forestry and Water Affairs and a commitment from the owner of request will be obtained.
- 4 different types of users are defined in the system:
  - **Basic User:** Those entering their first data to the database. They can enter data and can view 5 lines of data including their own.
  - **Bronze User:** Can enter data, and view and download 10 lines of data. However they cannot download confidential data about sensitive species without first signing a protocol with the Ministry of Forestry and Water Affairs (see above).
  - **Silver User:** Can enter data, and view and download 25 lines of data. However they cannot download confidential data about sensitive species without first signing a protocol with the Ministry of Forestry and Water Affairs (see above).
  - **Gold User:** Can enter data, and view and download 2000 lines of data. However they cannot download confidential data about sensitive species without first signing a protocol with the Ministry of Forestry and Water Affairs (see above).
- Without registering to the system, it is possible to view only a limited amount of species data, to query protected area data and to use certain interfaces, as a visitor.
- Up to date technological tools are used to manage the Noah's Ark database:
  - Web-based application
  - Multilayer architecture
  - Microsoft .NET platform (ASP.NET 3.5)
  - Oracle Database, Oracle Spatial
  - C# programming language
  - Reports in Microsoft Office
  - Esri GIS: ArcGIS Server, ArcSDE , WMS
  - Base Maps: Google Maps, Virtual Earth.

Photograph: Aykut İnce



III. GLOBAL ASSESSMENTS

Photograph: Aykut İnce



Photograph: Ahmet Karataş

The United Nations Convention on Biological Diversity (CBD) is one of the three Rio Agreements, opened to signature during the United Nations Conference on Environment and Development in Brazil in 1992. The aim of the CBD is the conservation of biodiversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising from the use of genetic resources. There are 193 parties to the convention (192 countries plus the European Union). Turkey became a signatory to the convention in 1996. The convention was brought into force on 14 May 1997 and throughout the national focal point for the convention has been the General Directorate of Nature Protection and National Parks.

Signatories to the Convention on Biological Diversity agree to certain obligations for the conservation of biodiversity in their country:

- Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned;
- Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

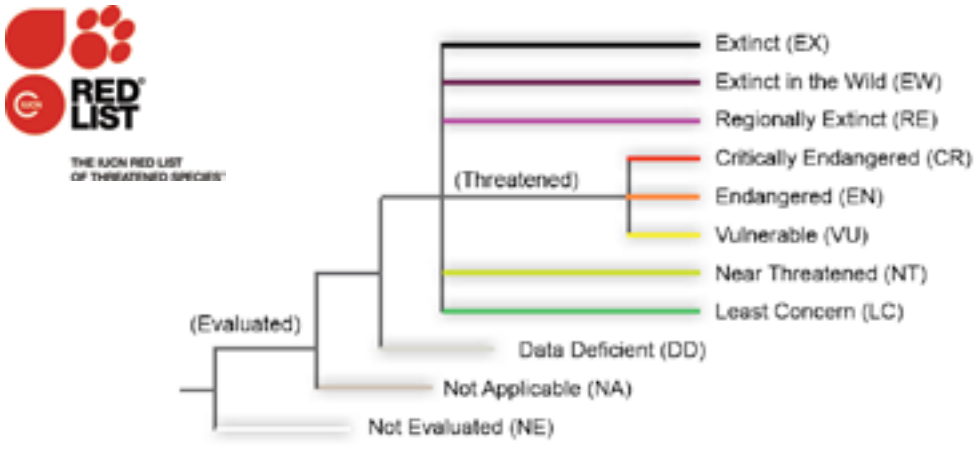
According to its responsibilities under the Convention, in 2001 Turkey prepared a "National Biodiversity Strategy and Action Plan". This document was updated in 2007 under the coordination of the General Directorate of Nature Protection and National Parks.

2010 was declared "International Year of Biodiversity" by the United Nations. The 10th and most recent Conference of Parties (which takes place every two years) was held on 18-29 October 2010 in Nagoya, Japan. The conference agreed that the period 2011-2020 be declared as "United Nations Decade on Biodiversity" and the strategy for biodiversity was updated with "Aichi Biodiversity Targets" adopted for the period 2011-2020 (http://www.cbd.int/sp/targets/). Indicators will be used to monitor whether the 5 strategic goals and 20 targets of the Aichi Biodiversity Targets were met (http://www.cbd.int/sp/indicators/). These indicators, which include the Living Planet Index and Red List Index, will be used to measure countries' performance in reaching targets to conserve and sustainably use their biodiversity.

III.1. The Red List Index

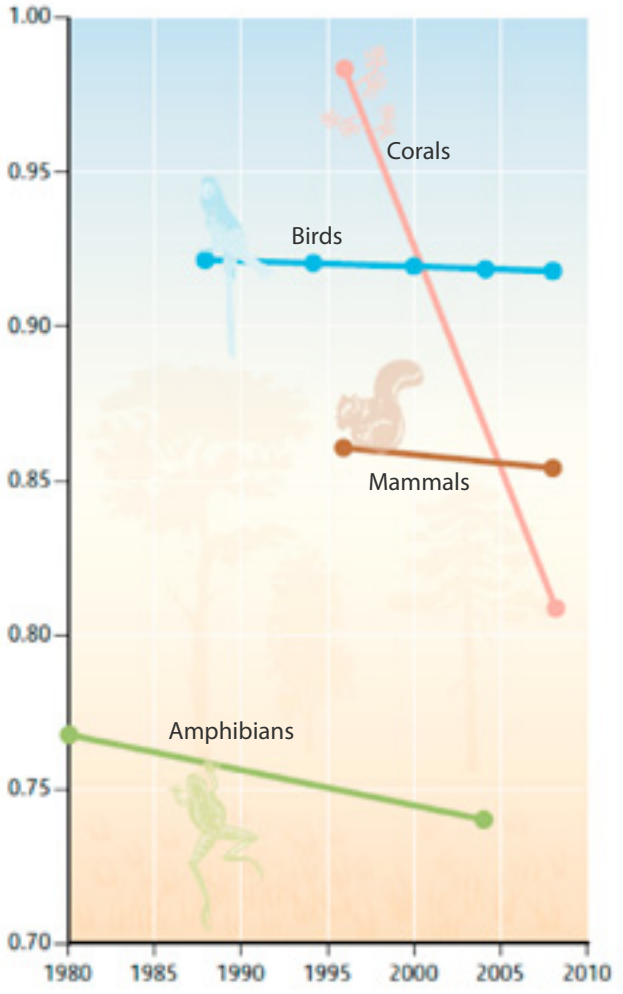
Extinction of species is a direct indicator of the loss of biodiversity, influencing ecological processes and ecosystem functions. The Red List Index is derived from changes in the extinction trends of living things and is used to detect changes in biodiversity (Baillie et al. 2008; Bubb et al. 2009). The Red List Index is based on the Red Lists developed by International Union for the Conservation of Nature (IUCN) as these are accepted as the most objective methodology for identifying extinction risk of living things (www.iucnredlist.org). The Index is used or planned to be used as an official indicator in numerous conventions where the objective is the conservation of biodiversity (e.g. the Ramsar Convention, the Convention on the Conservation of Migratory Species of Wild Animals [aka Bonn Convention]). It is also one of the official indicators of the Convention on Biological Diversity. The Red List Index is also used in reporting the indicator "proportion of species threatened with extinction" included under the 7th goal of the Millennium Development Goals ("Ensure Environmental Sustainability").

Red List assessments are carried out using standard criteria developed to determine how likely a species is to become extinct. During the Red List assessment process – a process which has achieved worldwide acceptance for its objectivity – the probability of species extinction is evaluated against quantitative criteria which consider aspects of both the species and the habitat(s) it uses. For an assessment to be possible there need to be sufficient data and knowledge available about the species' distribution, ecology, population size and trends. Through such an assessment, every species is assigned a conservation status according to one of the categories presented below. The Red List Index is derived from changes in status of species from one category to another.



The aim of the indicator is to understand how the extinction risks of living things are increasing (or decreasing) over time. The genuine changes in the extinction risks of living things detected during the assessments make it possible to identify the direction in which the biodiversity is changing. For the indicator, Red List assessments and updates carried out at global, regional and national scales are used.

The first Red List Index was developed for birds and covered all globally threatened species in the period 1988-2004. Later, amphibians, mammals and coral species were added. The last index, covering the 20 years between 1988 and 2008, showed an increase in the global extinction trend of birds (Butchart et al. 2010), with amphibians and mammals showing a faster increase in the extinction trend than birds. However, corals were shown to be under the greatest threat. The Red List Index is of great importance in identifying those taxa of high conservation priority.



Red List Index of different taxa (Secretariat of the Convention on Biological Diversity, 2010). When the Red List Index is equal to 1, it represents the "best case" where all species are Least Concern (LC). At the other extreme, when the RLI is equal to 0, it represents the "worst case" where all species are extinct.

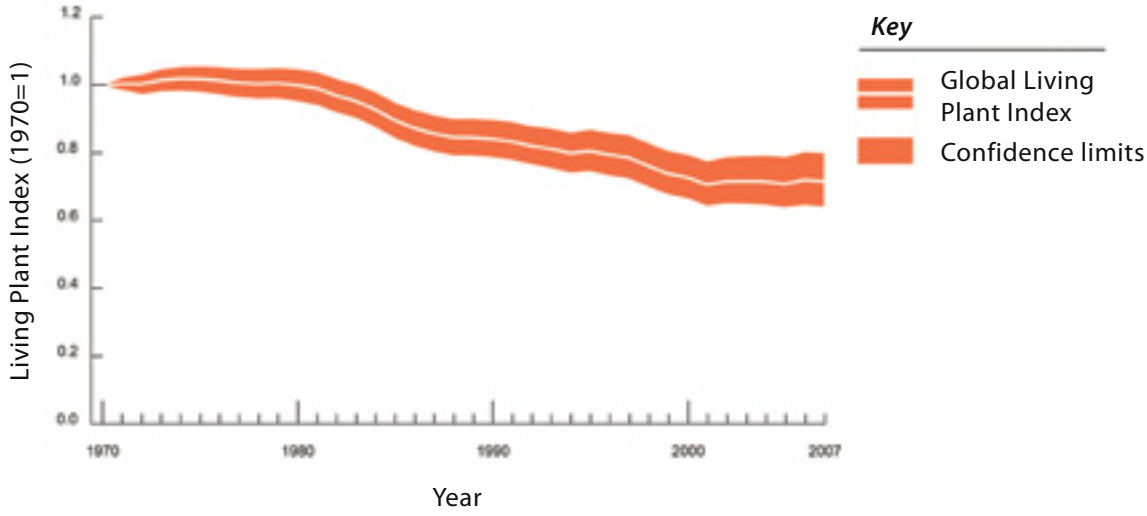
National Red List assessments make a major contribution to the Red List Index due to the finer scale at which they are made. Widespread application of national assessments will thus increase the strength of the Index in representing worldwide changes. National Red List assessments and updates also enable countries to monitor their own biodiversity using the Red List Index.

III.2. Living Planet Index (LPI)

One of the longest running studies to determine global changes in biodiversity, the Living Planet Index (LPI) was developed by WWF-World Wide Fund for Nature together with the Zoological Society of London (World Wide Fund for Nature, 2010). This regularly published index is one of the official indicators of the Convention on Biological Diversity.

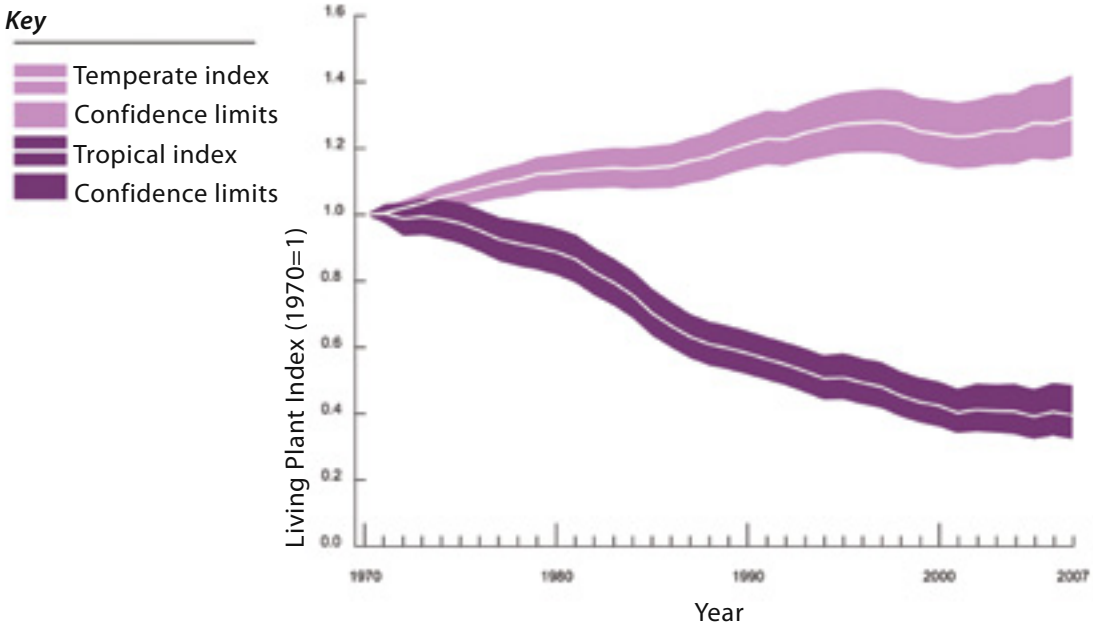
For this index, all population data collected on vertebrates – from reptiles to mammals, amphibians to fish – can be used in the calculation. First the population size change of a species from one year to another is calculated. Then, to calculate the Index, the average change in all species included in the Index is calculated, using data for all years since the first year of data collection (Collen et al. 2009). The first LPI was calculated in 1998 and presented changes in global wildlife populations starting from 1970. In 2010, the 8th and most recent global assessment was published, calculated using 7.953 population trends for 2.544 mammal, bird, reptile, amphibian and fish species. This assessment used more data than were used in any previous assessment.

A consistent trend can be seen in the LPI since it was first published in 1998; the most recent LPI showed a decrease of 30% between 1970 and 2007 at the global scale. In other words, over a period of 40 years, one third of the Earth's wildlife populations have been lost.



Global Living Planet Index. The index value of year 1970 was set to 1 (graphic taken from the World Wide Fund for Nature, 2010).

At the biome level, the freshwater biome has undergone the greatest change with a 35% decrease. However, there have also been large decreases of biodiversity in the terrestrial (25%) and marine biomes (24%). These decreases were especially pronounced in tropical systems (60%). Conversely, temperate species showed an increase of 29%. However, this is misleading and does not mean that temperate ecosystems are in a more intact state than those in the tropics. Rather it is a result of absence of data to represent the earlier dates when major changes occurred in the temperate systems.



LPI in the temperate and tropical systems (World Wide Fund for Nature, 2010).

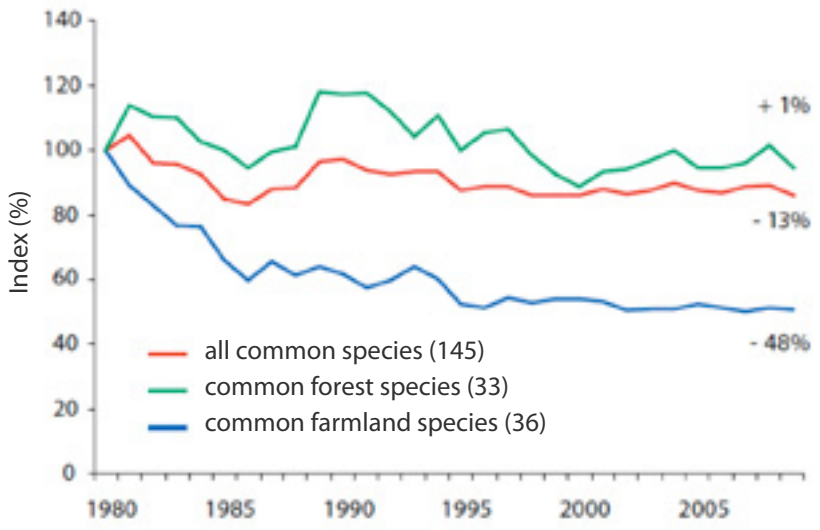
Among biogeographic regions, the highest decrease was observed in the tropical regions, namely Indo-Pacific (66%), Afrotropical (18%) and Neotropical (55%) regions. The populations of species in the Palearctic region, which includes Turkey, have seen an increase of 43%. This increase in species populations can be linked to the effectiveness of nature conservation in certain countries since the 1970s. However, the majority of the data used in the analysis are from Europe and it is likely that the trend will change when data from Asian countries are added. For example, the data for Turkey used in this study is inadequate for representing the changes that have taken place since the 1970s. For this reason the study cannot be said to present a healthy picture of biodiversity in Turkey.

III.3. European Farmland Birds Index

European Farmland Birds Index is an indicator developed to monitor the changes in populations of common birds throughout Europe. This index is used by the European Union and the Convention on Biological Diversity. The EU uses the index in relation to the development of agricultural policies.

Generally, monitoring efforts are focused on rare species, but the Pan-European Common Bird Monitoring Scheme, started in 2002, demonstrates that to understand the effect of widespread changes, common birds are important. The scheme aims to collect information on the changes in the breeding populations of common European bird species, which serves as indicators of changes in the natural environment.

The last update of the Pan-European Common Bird Monitoring Scheme was published in 2011 (www.ebcc.info). For this, breeding population data collected for 145 common bird species in 25 countries from 1980-2009 was used. The assessment shows common farmland species to be the most threatened group with a decrease of 48% in the last 30 years.



The population change indexes of 145 European common bird species between 1980 and 2009. The numbers given in parenthesis are the number of species in the group (www.ebcc.info).

Of the 145 species surveyed, 36 species are classified as farmland birds; of these, 20 species declined, 6 increased, 6 remained stable and the trends of 4 species were uncertain. Of the 33 species classified as forest birds, 11 species declined, 10 increased, 9 remained stable and the trends of 3 species were uncertain. The remaining 76 species include generalists and specialists of other habitats. Of these almost one third (24/76) declined.

The results show that the overall populations of common farmland birds have almost halved. The results also provided solid evidence of the extent of detrimental effects to which conventional agricultural practices adopted in European countries have on wildlife. For this reason great importance is placed on changing the Common Agricultural Policy (CAP) and on supporting farmers who are prepared to include measures, which benefit wildlife, as part of their daily farming practice.

Photograph: Ahmet Karataş

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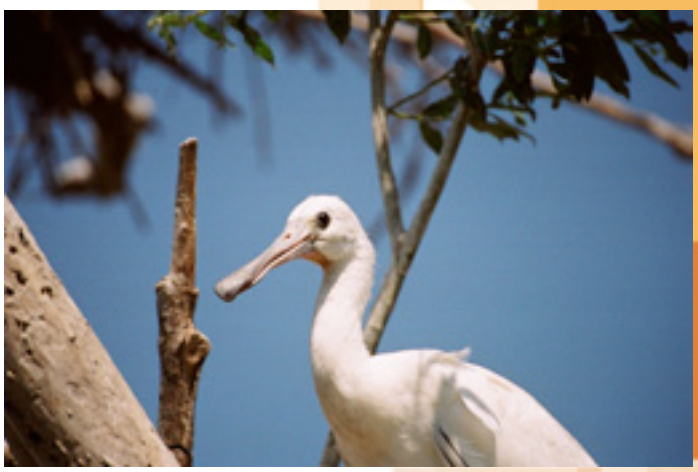

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