REPUBLIC OF BULGARIA

MINISTRY OF ENVIRONMENT AND WATER

SIXTH NATIONAL REPORT

2014 – 2018

TO THE

CONVENTION ON BIOLOGICAL DIVERSITY

Convention on Biological Diversity

United Nations Decade on Biodiversity

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ABBREVIATIONS AND ACRONYMS

UNSDSTRB 2014-2030	Updated National Strategy for Development of Sustainable Tourism in the Republic of Bulgaria 2014 – 2030
RBD	River Basin Directorate
DRBD	Danube River Basin Directorate
WARBD	West Aegean River Basin Directorate
EARBD	East Aegean River Basin Directorate
BSRBD	Black Sea River Basin Directorate
BBPPS	Bulgarian Birds of Prey Protection Society
BD	Biodiversity
BBF	Bulgarian Biodiversity Foundation
GR	Genetic resources
GSPC	Global Strategy for Plants Conservation 2020
DAI	Dobrudzha Agricultural Institute
NNCSD - MOEW	National Nature Conservation Service Directorate - MOEW

NPD	National Parks Directorate
ESS	Ecosystem services
PAs	Protected areas
PTs	Protected territories
EFA	Executive Forests Agency
ExEA	Executive Environment Agency
EFAA	Executive Agency "Fisheries and Aquacultures"
EASRAB	Executive Agency "Selection and Reproduction in Animal Breeding"
IBER - BAS	Institute of Biodiversity and Ecosystem Research - Bulgarian Academy of Sciences
EEZ	Exclusive economic zone (Part V of the United Nations Convention on the Law of the Sea)
EASRL	Executive agency for selection and reproduction in livestock
IO-BAS	Institute of Oceanology - Bulgarian Academy of Sciences
IPA	Instrument for Pre-Accession Assistance
IPGR - Sadovo	Institute for Plant Genetic Resources - Sadovo
IREMC - Kazanlak	Institute of Roses, Essential and Medical Cultures – Kazanlak
CBD	Convention on Biological Diversity
IAS	Invasive alien species
MAFF	Ministry of Agriculture, Food and Forestry
MES	Ministry of Education and Science
MOEW	Ministry of Environment and Water
MOE	Ministry of Environment
MRDPW	Ministry of Regional Development and Public Works
MT	Ministry of Tourism
NBIMCC	Institute "National Bank for Industrial Microorganisms and Cell Cultures"
NMNH-BAS	National Museum of Natural History
NAPCC 2013 – 2020	Third National Action Plan on Climate Change 2013 – 2020
NGO	Non-governmental organisation
NDP BG2020	National Development Programme: Bulgaria 2020
NPAF Natura 2000	National prioritised action framework for Natura 2000 for Bulgaria
NFEMP	National Forest Ecosystems Monitoring Programme
NSEM	National System for Environmental Monitoring
NBDSMS	National Biodiversity Monitoring System
NSBC1998	National Strategy on Biodiversity Conservation
NSDFSRB 2013 – 2020	National Strategy for the Development of the Forestry Sector in the Republic of Bulgaria 2013 – 2020
UN	United Nations Organisation
CAP	Common Agricultural Policy
GHGs	Greenhouse gases
RDP	Rural Development Programme
MP	Management plan
EMEPA	Enterprise for Management of Environmental Protection Activities
RBMPs	River Basin Management Plans
WFD, 2000/60/EC	Water Framework Directive 2000/60/EC
MSFD	Marine Strategy Framework Directive 2008/56/EC
RIEW	Regional Inspectorate for Environment and Water
UNFCCC	United Nations Framework Convention on Climate Change

WHO	World Health Organisation
SAP BSC	Strategic Action Plan for Black Sea Conservation
TBC	Transboundary cooperation
EQO	Ecosystem Quality Objectives
BS - TDA	Black Sea – Transboundary Diagnostic Analysis
UNESCO	United Nations Educational, Scientific and Cultural Organization
ACUS	Aeroterrestrial algae collection of the University of Sofia
AEGIS	European Genebank Integrated System
BSP	Biodiversity Support Programme
CETAF	Consortium of European Taxonomic Facilities
CICES	Common International Classification of Ecosystem Services
CITES	Convention on International Trade in Endangered Species
ECPGR	European Cooperative Programme for Plant Genetic Resources
ESENIAS	East and South European Network for Invasive Alien Species
EUFGIS	European Information System on Forest Genetic Resources
EUNIS	European Nature Information System
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
IBBIS	Bulgarian Biodiversity Information System
IMAMO	Improved Marine Waters Monitoring
IUCN	International Union for Conservation of Nature
MA	Millennium Ecosystem Assessment
MAB – ICC	International Co-ordinating Council of the Man and the Biosphere Programme - UNESCO
MAES, 2013	Mapping and Assessment of Ecosystems and their Services
TEEB	The Economics of Ecosystems and Biodiversity
USAID	US Agency for International Development
USAID/EUR	US Agency for International Development/Europe and Eurasia
WWF-Bulgaria	World Wildlife Fund – Bulgaria

INTRODUCTION

The present Sixth National Report summarises the measures that Bulgaria has undertaken for the implementation of the Convention on Biological Diversity objectives. The document includes measures implemented in the period 2014–2018. The Sixth National Report follows the format adopted with Decision XIII/27 at the Thirteenth meeting of the Conference of the Parties to the Convention. In line with the guidelines for its preparation, the report contains information about:

- Objectives implemented at national level (Chapter I)
- Implementation of measures, assessment of their efficiency, bottlenecks and scientific needs in relation to the achievement of the National Biodiversity Conservation targets (Chapter II)
- Assessment of the progress towards the achievement of the National Biodiversity Conservation targets (Chapter III)
- Description of the national contribution towards the achievement of each of the Aichi Biodiversity Targets under the Strategic Plan for Biodiversity 2011-2020 (Chapter IV)
- Description of the national contribution towards the achievement of the Global Strategy for Plant Conservation (Chapter V)
- Update of the national biodiversity profile (Chapter VII)

Despite being relatively small in size, Bulgaria is one of the countries with the richest biodiversity in Europe. Parts of three biogeographical regions are located on its territory - Alpine, Black Sea and Continental. The number of Balkan and Bulgarian endemics is relatively high. With the aim of preserving this rich biodiversity, a National Ecological Network (which includes the European Ecological Network Natura 2000 and protected areas) was established in Bulgaria, which covers about 34% of the country's territory and is one of the largest in Europe.

The National Strategy on Biodiversity Conservation (NSBS), adopted by Protocol No.15.3 of the Council of Ministers in 1998, was developed in line with the requirements for national strategic planning of nature conservation activities set out in the Convention on Biological Diversity from 1992, to which Bulgaria is a party.

The Strategy is valid for the reporting period 2014 - 2018 and a new strategy is planned to be developed in 2020.

CHAPTER I. INFORMATION ON THE OBJECTIVES AT NATIONAL LEVEL

☒ My country has adopted national targets for biological diversity or **equivalent commitments** in line with the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets.

The National Strategy for Biodiversity Conservation (NSBC) was developed in line with the requirements for national strategic planning of nature conservation activities set out in the ***Convention on Biological Diversity from 1992***, to which Bulgaria is a party.

It also reflects the recommendations of the 1992 World Bank's ***Environmental Strategy Research in Bulgaria***. **The NSBC is the first national strategic plan for biodiversity conservation developed in Central and Eastern Europe which is current at the time of reporting.**

The Strategy is the product of a three-year process of development and discussions; it was jointly drafted by the Government of the Republic of Bulgaria, Bulgarian specialists, the United States Agency for International Development (USAID) and coordinated through the Biodiversity Support Program (BSP) - a consortium of the World Wildlife Fund, The Nature Conservation Organization and the Centre for International Development and Environment to the World Resources Institute. The process was funded by the Bureau for Europe and Eurasia of the US Agency for International Development (USAID/EUR) and implemented as technical assistance to the Government of Bulgaria and the Ministry of Environment (MOE).

The objective of the Strategy is conservation, restoration and sustainable management of biodiversity in the country, and limiting biodiversity loss.

The main priorities/objectives in the National Strategy on Biodiversity Conservation are priorities identified as key elements of the Strategy which require urgent support from Bulgaria and from the international community.

The Strategy addresses areas in need of such support - **fundamental** to building the overall Biodiversity Conservation Strategy:

PRIORITY/OBJECTIVE A. Strengthening the scientific base of nature conservation activities:

The objective is to collect and assess the biodiversity information available, as a prerequisite to planning future conservation activities in Bulgaria.

National objective rationale

The need to focus efforts on enhancing the scientific knowledge in the field of biodiversity in Bulgaria has been identified, with a priority focus on the ***gaps identified in the Strategy, in particular the need for basic information and data on specific taxonomic groups, geographical areas, anthropogenic pressure and impact, as well as methods for mitigating negative effects and for recovery.***

Other high-priority areas include:

- *the need for equipment and materials*;
- *revising the Bulgarian Red Data Book;*
- *additional information at type- and community-level;*
- *promoting interdisciplinary research;*
- *broader access to existing scientific information;*
- *disseminating scientific information.*

Level of implementation:
☐ regional / multicountry
☒ national
☐ subnational

Relevance of national objectives to the Aichi biodiversity targets (Links between the national objectives and the Aichi targets):

Directly related – the Aichi Biodiversity Targets to which the national objective is completely or partially related: **1, 2, 4, 17 and 19.**

☒1 ☐6 ☐11 ☐16
☒2 ☐7 ☐12 ☒17
☐3 ☐8 ☐13 ☐18
☒4 ☐9 ☐14 ☒19
☐5 ☐10 ☐15 ☐20

Other national objectives indirectly related to the Aichi targets: 6, 7 and 9.
☐1 ☒ 6 ☐ 11 ☐ 16
☐2 ☒ 7 ☐ 12 ☐ 17
☐3 ☐ 8 ☐ 13 ☐ 18
☐4 ☒ 9 ☐ 14 ☐ 19
☐5 ☐10 ☐ 15 ☐ 20

Additional information:

Strategies and plans in which the national objective/target is included:

Supporting the implementation of **Priority/Objective A. Strengthening the scientific base of nature conservation activities** are the following strategic and planning documents:

- **National Development Programme: Bulgaria 2020**

The National Development Program: Bulgaria 2020 (NDP BG2020), adopted by Council of Ministers Decision No 1057 of 20.12.2012 is the leading strategic and programming document that specifies **the objectives of development policies until 2020.** In the Action plan, a related objective from the National Strategy is:

PRIORITY 5: Supporting innovation and investment activities to enhance economy's competitiveness

Priority 5.2 *„Enhancing quality and efficiency of scientific research and innovation“.*

This priority involves activation of R&D and innovation activities aimed at modernization of the production technologies applied in the economy, as well as implementation of innovative solutions in management practice.

Areas of impact related to the implementation of this sub-priority are:

- ✓ ***Better integration between elements of the "knowledge triangle".*** The area of impact aims to create a national interactive 'education-science-business' platform through the establishment of inter-institutional scientific research centres for the benefit of the economy; development of scientific applied programmes; doctoral and postdoctoral traineeships at high-tech centres; introduction of fixed-term assistant contracts in priority work areas in scientific organizations and subsequent practical work in the industry. The target group for this area is mainly PhD students and young scientists.

- ✓ ***Building scientific and innovation infrastructure.*** The state will encourage the establishment and development of high-tech incubators for start-ups, technology centres, technology transfer centres, innovation clusters, technology parks, as well as **the modernisation of scientific research infrastructure.**

- **Updated National Strategy for Scientific Research Development in the Republic of Bulgaria 2017 – 2030**

The National Strategy for Scientific Research Development in the Republic of Bulgaria, adopted with Council of Ministers Decision No. 282 of 19.05.2017, sets out the objectives and the corresponding measures and activities on the part of the state for the development of scientific research in the period 2017-2030. The Strategy is one of the prerequisites for achieving the goals set out in the *Partnership Agreement between the Republic of Bulgaria and the European Commission during the 2014-2020 programming period and is linked to the Innovation Strategy for Smart Specialization 2014-2020.*

The vision that underpins the Strategy outlines the main goals that the State sets for the development of scientific research in Bulgaria.

Based on these goals, specific policies were defined, as well as specific measures and tools for their implementation. Some of the components of these policies are directly related to the recommendations of the international panel assessing the state of science and innovation system in Bulgaria and are aimed at supporting the implementation of the priorities of the Smart Specialization Strategy and the National Higher Education Strategy, as well as the implementation of OP „Science and Education for Smart Growth“ and the EU Framework Programme for Research and Innovation.

Specific objective 1. Provide highest qualification and effective career development of scientists based on a high level of scientific research.

Specific objective 2. Improve the quality of life and the social status of scientists and research professionals by ensuring that remuneration is adequate and results-driven, and provide good working conditions.

Specific objective 3. Increase the number of scientists to reach the corresponding EU levels and ensure their balanced distribution by age, gender, scientific field and region.

Relevant websites, web links and files:

Partnership Agreement between the Republic of Bulgaria and the European Commission during the 2014-2020 programming period to the updated National Strategy for Scientific Research Development in the Republic of Bulgaria 2017-2030:

http://www.government.bg/cgi-bin/e-cms/vis/vis.pl?s=001&p=0212&n=3099&g=

Innovation Strategy for Smart Specialisation 2014–2020

http://www.mi.government.bg>themes>inovacionna-strategiya-za-inteligentno-razvitie;

National Action Plan for Conservation of Wetlands of High Significance in Bulgaria 2013 – 2022:

https://www.google.com/search?client=firefox-bd&q=Национален+план+за+опазване+на+най-значимите+влажни+зони

Stakeholders: see Appendix 3

PRIORITY/OBJECTIVE - B. Supporting legislative initiatives

The aim of this Priority is to clarify the legal and social basis for the conservation of biological resources, as well as the possibilities for setting up targeted funds earmarked for financing nature conservation activities.

National objective rationale:

Laws supporting the National Biodiversity Conservation Strategy should be informed by the most comprehensive and complete scientific data and should broadly reflect public opinion and the participation of non-governmental organizations. This participation ensures the basic principles of democracy and justice, thus being valuable in itself, with the establishment in Bulgaria of legal procedures, regulations and institutions vital to the democratic governance of the country. ***All changes are aimed at bringing the national legislation in compliance with the European and international environmental agreements.***

Level of implementation:

☐ regional / multicountry

☒ national

☐ subnational

Relevance of national objectives to the Aichi biodiversity targets (Links between the national objectives and the Aichi targets):

Directly related – the Aichi Biodiversity Targets to which the national objective is completely or partially related: target **2, 3, 4, 5, 6, 7, 8, 9, 16 and 17.**

☐1 ☒6 ☐11 ☒16

☒2 ☒7 ☐12 ☒17
☒3 ☒8 ☐13 ☐18
☒4 ☒9 ☐14 ☐19
☒5 ☐10 ☐15 ☐20

Other national objectives indirectly related to the Aichi targets: 13, 20.

☒1 ☐6 ☐11 ☐16
☐2 ☐7 ☒12 ☐17
☐3 ☐8 ☒13 ☐18
☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☒20

Other relevant information:

Two teams were involved in the process of developing and adopting the national objective to the National Strategy on Biodiversity Conservation - a *Social Sciences team* of foreign and Bulgarian experts, which drafted expert information on the legal and regulatory aspects of biodiversity conservation, organisation and management of protected areas, natural resources economy and regional planning, and spatial planning and development. The other team was the *Non-governmental Organisations team*, which identified and presented key social, economic and political issues related to the environment and nature conservation and biodiversity in Bulgaria.

In the period 2014-2018, the BDA was amended and supplemented to grant more efficient protection of biodiversity, better management and conservation of protected areas, protection of wild flora and fauna species by regulating their trade, etc.

Public participation in drafting legislation related to biodiversity conservation is expected to produce favourable results that ***go beyond the context of biodiversity conservation.***

Strategies and plans in which the national priority/objective is included:

- **National Development Programme: Bulgaria 2020**

The National Development Programme: Bulgaria 2020 (NDP BG2020), adopted by Council of Ministers Decision No 1057 of 20.12.2012, is the leading strategic and programming document that ensures coherence and specifies the **objectives of the country's development policies until 2020.** The Programme also sets out the main environmental policies. **In the action plan, related objectives of the NBDCS are:**

PRIORITY 3. „Achieving sustainable integrated regional development and putting local potential to use":

Sub-priority 3.5 *"Creating suitable conditions for environmental protection and improvement in the regions, climate change adaptation and achieving sustainable and efficient use of natural resources."*

- ✓ Area of impact: „*Conservation, support and restoration of biological diversity as part of the natural potential for sustainable development of the regions",* which envisages measures directly related to the NBDCS.

PRIORITY 4. Agricultural sector development to ensure food security and production of high value-added products under sustainable management of natural resources

- ✓ ***Sub-priority 4.5*** *„Sustainable use and management of natural resources“:* With the aim of stimulating the application of climate- and environmentally friendly agricultural practices, support is provided under the two pillars of the *Common Agricultural Policy*.

PRIORITY 7. *Energy security and enhancing resource efficiency*

- ✓ ***Sub-priority 7.5*** *„Improving resource efficiency.”* This sub-priority has the following area of impact: "Introducing low-carbon, energy-efficient and zero-waste technologies", which sets out the measure *"Developing systems to assess and evaluate ecosystems and ecosystem services in the process of sectorial policy-making"* .

- **National Strategy for Sustainable Development of Agriculture in Bulgaria for the period 2014-2020.**

Main objective of the Strategy*: to serve as a policy document that outlines the principles and tools for sustainable development of Bulgarian agriculture in the next programming period 2014 - 2020.*

- **National Strategy for the Development of the Forestry Sector in the Republic of Bulgaria 2013 – 2020 and monitoring 2013-2016.**

Prerequisite for the sustainable development of forest territories are the three levels of forest planning regulated by the Forest Act - national, regional and local. A **Final interim evaluation report on the outcomes of the implementation of NSDFSRB** (2013-2020) for the period 2013-2016 and its impact on the state of the forest sector has been developed, in line with Order No. РД 09-155 of 29.03.2016.

- **Strategy for the development of hunting in Bulgaria for the period 2012 -2027**

The strategy was developed on the basis of an in-depth analysis of the state of game resources over a period of more than 100 years. Legislation has been reviewed from the first Hunting Act of 1880 to the most current one - the seventh Hunting and Game Conservation Act of 2000.

The strategy defines the objectives of the hunting activity in our country, aimed primarily at protecting the biodiversity and gene pool of our country and the local wild game species, while taking into consideration both the interests of the state and the owners of land and forests and those of the managers responsible for the game.

- **River Basin Management Plans for the period 2010 – 2015**

Transposing the Water Framework Directive (WFD, 2000/60/EU) into the **Water Act** led to significant changes in the approach to water management: the introduction of the basin principle, the ecosystem approach, recognising biological parameters as leading in determining the ecological status of water bodies and the introduction of integrated river basin management plans.

- **Update of the river basin management plans (development of the second cycle RBMPs for the period 2016-2021)**

Pursuant to the requirements of the Water Framework Directive (2000/60/EU) and Art. 159 (1) of the Water Act, the River Basin Management Plans (RBMPs) are to be reviewed and updated every six years following their initial publication.

In 2017, Bulgaria reported to the European Commission the fulfilment of the Republic of Bulgaria's obligations under the WFD in relation to the adopted second cycle RBMPs (2016 - 2021) for DRBD, BSRBD, EARBD and WARBD, including national programmes for their implementation with Council of Ministers Decisions No. 1110, 1107, 1106 and 1108 of 29.12.2016.

- **Flood Risk management Plans 2016-2021**

The Flood Risk Management Plans are developed in line with the requirements of Directive 2007/60/EU for the assessment and management of flood risk. Flood risk assessment and management in the Republic of Bulgaria is subject to the European Floods Directive (FD), which is in force since 26.11.2007 and which is transposed into national legislation with amendment of the Water Act in August 2010. **The Directive requires Member States to implement a long-term planning approach to reduce the risk of floods.**

Stakeholders: see Appendix 3

Relevant websites, web links and files:
Ministry of Environment and Water: http://www.moew.government.bg;
https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/obsta-informaciya-za-biologichnoto-raznoobrazie
Ministry of Agriculture, Food and Forests: http://www.mzh.government.bg;
Ministry of Justice (MJ); http://www.justice.government.bg;
Energy Strategy of Bulgaria up to 2020:
https://www.me.government.bg/bg/themes/energiina-strategiya-na-republika-balgariya-do-2020-g-147-295.html;
Republic of Bulgaria Transport System Development Strategy up to 2020:
https://www.mtitc.government.bg/bg/category/42/strategiya-za-razvitie-na-transportnata-sistema-na-republika-bulgariya-do-2020-g;
Third National Action Plan on Climate Change for the period 2013 - 2020
https://www.google.com/search?client=firefox-bd&q=Трети+Национален+план+за+действие+по+изменение+на+климата

PRIORITY/OBJECTIVE - C. Expanding and strengthening the network of protected territories:

The aim of the Priority is to set the targets for biological resources and biodiversity conservation in Bulgaria, as well as to identify biologically significant areas and priorities for nature preservation (conservation) actions. Related to this is the identification of priorities and mechanisms to achieve the conservation objectives.

National objective rationale:

The following priority actions for expanding and strengthening the network of protected territories are identified in the NBDCS:

- Clarifying legislative and institutional issues related to protected territories and granting full powers to the supervisory authority in order to ensure effective protection and management of these territories;
- Appointing a working group comprising of scientists, representatives of government institutions, non-governmental organizations, etc. with the aim of ***determining the percentage of base area*** which is required in order to achieve the objectives of the network of protected territories and to ***identify the methods to improve the operation of the network;***
- Review of the existing protected territories and identifying areas of particular importance due to their high biodiversity (including corridors and buffer zones) ***that are outside the network of protected territories*** using geographical information systems.
- ***Determining the management needs of the protected territories network;*** drafting educational, information and awareness programs for the public; strengthening the capacity for rigorous law enforcement; staff need assessment; developing effective management plans and sustainable land use programmes; expanding vocational training opportunities.
- ***Regional meetings*** to engage the society, which will lead to a ***national meeting*** to review the status of the existing network and to develop comprehensive ***plans to expand and further develop the network***.
- ***Outlining scientific research needs*** (including inventarisation, monitoring and long-term environmental studies) of the individual protected territories and of the network as a whole;
- ***Review of the status of the 17 biosphere reserves*** in Bulgaria and assessment of their management needs.

Level of implementation:
☐ regional / multicountry
☒ national
☐ subnational

Relevance of national objectives to the Aichi biodiversity targets (Links between the national objectives and the Aichi targets):

Directly related – the Aichi Biodiversity Targets to which the national objective is completely or partially related: **11.**

☐1 ☐6 ☒11 ☐16
☐2 ☐7 ☐12 ☐17
☐3 ☐8 ☐13 ☐18

☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☐20

Other national objectives indirectly related to the Aichi targets: 12, 13.
☐1 ☐6 ☐11 ☐16
☐2 ☐7 ☒12 ☐17
☐3 ☐8 ☒13 ☐18
☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☐20

Strategies and plans in which the national priority/objective is included:

- **European Biodiversity Strategy** covering the period up to 2020, December 2011, European Commission.

EU 2020 flagship target: *Halting the loss of biodiversity and degradation of ecosystem benefits in the EU by 2020, and, as appropriate, restoring their contribution to halting biodiversity loss worldwide.*

The strategy includes specific measures to improve monitoring and reporting. Integrating biodiversity monitoring and reporting into European legislation on nature protection, the Common Agricultural Policy (CAP), the Common Fisheries Policy (CFP) and the regional policy will support the assessment of impact of these policies on biodiversity.

- **EU Strategy for Sustainable Plant Protection and International Plant Protection Convention, 2020**

The European Strategy for Sustainable Plant Protection is a joint initiative of the Council of Europe www.coe.int and Planta Europa; www.plantaeuropa.org. Its contribution to the Global Strategy for Plant Conservation adopted by the Convention on Biological Diversity (CBD) (Decision VI/9) is widely recognised.

The Global Strategy for Plant Conservation is developed as a framework for action at regional and at national level, as well as at global level.

The objectives of both the Global and the European Strategy are focused on five key tasks:

- ✓ *understanding and documenting plant diversity;*
- ✓ *conservation of plant diversity;*
- ✓ *sustainable use of plant diversity;*
- ✓ *raising knowledge and awareness of plant diversity; capacity building for the protection of plant diversity.*

- **National Priority Action Framework (NPAF) for NATURA 2000 Bulgaria** – for the EU multiannual financial framework 2014-2020 (**updated version**, August 2019)

Developed in line with Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora and Directive 2009/147/ EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds;

In the period 2014-2020, the Commission adopted a new financial resources planning approach, and in particular regarding financial resources for the implementation of biodiversity policy. It is first and foremost about integrating biodiversity investment needs into the main EU funding instruments, as well as about achieving synergies with climate change funding (implementing ecosystem mitigation and adaptation approaches).

The update of the NPAF covers the period from 2015 to 2018 - implemented in 2019. The changes that were reflected are summarised in the separate parts of the NPAF.

The updated information on the NPAF for NATURA 2000 Bulgaria is included in the **National Summary for Bulgaria to the Article 17 of the Habitats Directive reporting for the period 2013 - 2018.**

Stakeholders: see Appendix 3

Relevant websites, web links and files:

Ministry of Environment and Water: http://www.moew.government.bg;

Ministry of Agriculture, Food and Forests: http://www.mzh.government.bg;

Executive Forests Agency: http://www.iag.bg

Ministry of Culture (MC); http://www.mc.government.bg;

Practical Manual on "Management Planning of NATURA 2000 sites in Bulgaria": http://www.greenbalkans.org/article_files/124202945178.pdf;

NATURA 2000 objectives document: https://www.moew.government.bg/bg/proekt-na-dokument-za-celite-na-natura-2000-8680/

Bulgaria National Summary: reporting under Article 17 of the Habitats Directive for the period 2013 - 2018:

https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-national-summary-dashboards/general-information-on-habitats-and-species

PRIORITY/OBJECTIVE - D. Environmental education and training:

In the long term, conservation of biodiversity in Bulgaria depends on the general public's awareness and appreciation of its importance, as well as on the necessary environmental protection actions related to environmental education at all levels.

National objective rationale:

The National Biodiversity Conservation Strategy defines immediate steps to launch the process:

- Drafting national strategy for environmental education and training, involving the respective ministries, Bulgarian Academy of Sciences, non-governmental organizations, teachers and university lecturers;
- Setting up an advisory group of scientists, education and environmental experts to develop guidelines and recommendations for curricula on Biodiversity and Conservation;
- Developing qualification programs for teacher training on biodiversity issues;
- Supporting opportunities for partnership and cooperation between Bulgarian and international environmental education specialists in order to acquire useful knowledge of successful environmental education programmes in other countries. The Strategy recognises the need to establish a national network for advisory services.

Level of implementation:

☐ regional / multicountry

☒ national

☐ subnational

Relevance of national objectives to the Aichi biodiversity targets (Links between the national objectives and the Aichi targets):

Directly related – the Aichi Biodiversity Targets to which the national objective is completely or partially related: **1, 19.**

☒1 ☐6 ☐11 ☐16
☐2 ☐7 ☐12 ☐17
☐3 ☐8 ☐13 ☐18
☐4 ☐9 ☐14 ☒19
☐5 ☐10 ☐15 ☐20

Other national objectives indirectly related to the Aichi targets: 2, 20.

☐1 ☐6 ☐11 ☐16
☒2 ☐7 ☐12 ☐17
☐3 ☐8 ☐13 ☐18
☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☒20

Other relevant information:

A *Biodiversity team, an Applied Biology team and an Information team* participate in the preparation of PRIORITY/OBJECTIVE - D. Environmental education and training to the NBDCS. The Information team is composed of GIS and mapping specialists from various Bulgarian institutes and the American Environmental Systems Research Institute (ESRI), which prepares maps for the seminar and the National Strategy papers.

Strategies and plans in which the national priority/objective is included:

- **National Development Programme: Bulgaria 2020**

The National Development Programme: Bulgaria 2020 (NDP BG2020) is the leading strategic and programming document that specifies the **objectives of the country's development policies until 2020.**

The first priority of NDP BG 2020 is formulated as follows:

Priority 1. Improving access and enhancing the quality of education and training, and the workforce quality characteristics.

Sub-priority 1.1 *Granting accessible and quality education for personal development of the individual by updating the education system and ensuring its adaptability to the needs of the labour market. Modernisation of the education system at all levels.*

Stakeholders: see Appendix 3

Relevant websites, web links and files:

Ministry of Environment and Water (MOEW): http://www.moew.government.bg

Ministry of Education and Science (MES): http://www.mon.bg;

National Development Programme: Bulgaria 2020: https://www.eufunds.bg/archive2018/archive/documents/1357662496.pdf;

Chemistry and environmental protection textbook, grade 11, specialised training: https://www.prosveta.bg/ceni-na-uchebnici/himiya-i-opazvane-na-okolnata-sreda-za-11-klas-profilirana-podgotovka-i-chast;

PRIORITY/OBJECTIVE - E. Developing and implementing an eco-tourism policy:

The Strategy for Development of Tourism in Bulgaria (drafted in 1992) lays the foundations of a comprehensive national eco-tourism policy.

National objective rationale:

The National Strategy on Biodiversity Conservation identifies eco-tourism as an important source of funding for nature preservation projects aimed at conservation and showcasing biological diversity along the following lines:

- Eco-tourism opportunities should be reflected in the process of preparation of regional plans and of specialised plans for specific locations or sites.
- The relevant ministries and committees should develop a clear and effective national eco-tourism policy.
- Urgent assistance in the development of eco-tourism policy and in fulfilling the key prerequisites for eco-tourism as a component of the National Strategy.

Level of implementation:

☐ regional / multicountry

☒ national

☐ subnational

Relevance of national objectives to the Aichi biodiversity targets (Links between the national objectives and the Aichi targets):

Directly related – the Aichi Biodiversity Targets to which the national objective is completely or partially related: **20.**

☐1 ☐6 ☐11 ☐16
☐2 ☐7 ☐12 ☐17
☐3 ☐8 ☐13 ☐18
☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☒20

Other national objectives indirectly related to the Aichi targets: 18.

☐1 ☐6 ☐11 ☐16
☐2 ☐7 ☐12 ☐17
☐3 ☐8 ☐13 ☒18
☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☐20

Other relevant information:

The priority/objective that was formulated in the NBDCS is further developed in the Updated National Strategy for Development of Sustainable Tourism in the Republic of Bulgaria 2014 – 2030 (UNSDSTRB).

Eco-tourism is included in the Marketing mix section of the updated NSDSTRB 2014-2030 as a ***„Product with good potential“.*** Ecotourism is defined as a relatively new but rapidly developing sector of the tourism industry. In the context of global climate change and the increasing negative impact of anthropogenic activity on the environment, ecotourism is a product with very high development potential. It is, in essence, *"a responsible journey to natural sites (territories, areas, zones) that preserves the environment and maintains the well-being of the local population"* and is at the heart of the development of **sustainable tourism** as a whole.

Strategies and plans in which the national priority/objective is included:

- **Updated National Strategy for Development of Sustainable Tourism in the Republic of Bulgaria 2014 – 2030 (UNSDSTRB)**

The strategic framework of UNSDSTRB 2014-2030 is developed on the basis of a comprehensive SWOT-analysis and the vision the stakeholders have about the development of tourism in Bulgaria.

The strategic framewok strives to strike a balance between the economic, environmental and socio-cultural aspects of the tourist development, taking into account the basic principles of sustainability.

The Action plan to the Updated National Strategy for Development of Sustainable Tourism in the Republic of Bulgaria is developed for the period 2017 - 2020 (4 years). For each of the following periods (2021 - 2025 and 2026 - 2030), new common action plans will need to be developed, based on the results of the annual monitoring reports and the interim evaluations. A detailed Annual Action Plan should be developed at the beginning of each year that should take into account the work programmes of the National Tourism Council, the Interministerial Council for Tourism Personnel and the Annual National Tourism Advertising Program.

- **National Development Programme: Bulgaria 2020**

The National Development Programme: Bulgaria 2020 (NDP BG2020), adopted by Council of Ministers Decision No. 1057 of 20.12.2012 is the leading strategic and programming document that specifies the **objectives of the country's development policies until 2020.**

In the Action plan related NBDCS objectives are:

PRIORITY 5: Support for innovation and investment activities to boost economy's competitiveness

- ✓ ***Sub-priority 5.4*** *„Support for the tourism sector"*– Area of impact: „Improving tourist services quality" under measure *"Promoting the development of high-quality, environmentally friendly and sustainable tourism";*

Stakeholders: see Appendix 3

Relevant websites, web links and files:

Updated National Strategy for Development of Sustainable Tourism in the Republic of Bulgaria – 2014-2030: http://www.tourism.government.bg/bg/kategorii/strategicheski-dokumenti/aktualizirana-nacionalna-strategiya-za-ustoychivo-razvitie-na;

Action plan: http://www.tourism.government.bg/bg/kategorii/strategicheski-dokumenti;

National Development Programme: Bulgaria 2020
https://www.eufunds.bg/archive2018/archive/documents/1357662496.pdf;

PRIORITY/OBJECTIVE - F. Promoting the conservation of the Black Sea basin:

Both national and international measures are needed to restore and conserve the Black Sea's biodiversity and economic resources. The Bulgarian Black Sea coast is an area of critical importance in terms of biodiversity conservation.

National objective rationale:

The Bulgarian Black Sea coast ranks among the areas with the richest diversity in terms of species, home to unique communities, wetlands and important migratory bird habitats. At the same time, the sea coast is subject to severe negative anthropogenic impacts caused by pollution, industrial construction and recreational facilities development, as well as the overuse of biological resources.

According to the NBDCS, the following activities should be supported at national level:

- Identifying the biologically important areas that not yet included in the protected territories network;
- Integrated planning of the development and conservation of the coastal area;
- Increasing investment for project funding for recovery and pollution mitigation projects;
- More stringent enforcement of regulations and prohibitions on pollution, trawling and overuse of fish resources.

Level of implementation:

☒ regional / multicountry

☐ national

☐ subnational

Relevance of national objectives to the Aichi biodiversity targets (Links between the national objectives and the Aichi targets):

Directly related – the Aichi Biodiversity Targets to which the national objective is completely or partially related: **11.**

☐1 ☐6 ☒11 ☐16
☐2 ☐7 ☐12 ☐17
☐3 ☐8 ☐13 ☐18
☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☐20

Other national objectives indirectly related to the Aichi targets: 12, 13.

☐1 ☐6 ☐11 ☐16
☐2 ☐7 ☒12 ☐17
☐3 ☐8 ☒13 ☐18
☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☐20

Other relevant information:

In the NBDCS, assessment of the ecological status of the Black Sea result from the impact of internal activity in all Black Sea countries and the activities in the coastal waters and the open water area of the countries located around the Black Sea. International support and cooperation is needed to provide accurate and reliable information on the Black Sea ecosystems to help ***address pollution, sedimentation and eutrophication, over-exploitation of fish resources, gas and oil prospecting, and other inappropriate activities.***

Specific activities should include:

- ✓ *Support for the implementation of the Convention on the Protection of the Black Sea against Pollution;*
- ✓ *Assistance in monitoring biodiversity, research and conservation activities as part of the Strategic Action Plan for environment protection and Black Sea rehabilitation, a regional environmental management and protection programme developed with the support of the World Bank's Global Environment Facility, the United Nations Development Programme and the United Nations Environment Programme;*
- ✓ *Increase in investment from all Black Sea coastal countries to restore marine biodiversity;*
- ✓ *Support for joint research activities at the ecosystem level for the Black Sea and its biodiversity.*

Strategies and plans in which the national priority/objective is included:

- **Strategic Action Plan for environment protection and Black Sea rehabilitation**

The plan is an agreement between the six countries bordering on the Black Sea (Bulgaria, Georgia, Romania, the Russian Federation, Turkey and Ukraine) to act in unison to support the ongoing rehabilitation of the Black Sea.

The Black Sea vision includes preservation of the Black Sea ecosystem as a valuable natural endowment of the region whilst ensuring the protection of its marine and coastal living resources as a condition for the sustainable development of the Black Sea coastal states, their well-being, health and protection of the population.

Long-term Ecosystem Quality Objectives (LEQO) are an expression of the Vision and reflect what stakeholders would like the Black Sea status to be for a longer future period, based on resolution of priority issues identified by the Transboundary Diagnostic Analysis.

The four LEQO and the related sub-objectives of the Strategic Action Plan for environment protection and Black Sea rehabilitation (2009) are as follows:

LEQO 1: Conservation of living commercial marine resources;

LEQO 1a: Sustainable use of available fish and other living marine resources for commercial use;

LEQO 1b: Recovery/rehabilitation of living commercial marine resources;

LEQO 2: Conservation of Black Sea diversity and habitats;

LEQO 2a: Reducing the risk of extinction of endangered species;

LEQO 2b: Conservation of coastal and marine habitats and nature;

LEQO 2c: Reducing and managing anthropologic intervention;

LEQO 3: Reducing eutrophication;

LEQO 4: Ensuring good water quality for human health, recreational activities and aqua biota;

LEQO 4a: Reducing land-based pollutants, including atmospheric emissions;

LEQO 4b: Reducing pollutants from ships and land facilities.

Stakeholders: see Appendix 3

Relevant websites, web links and files:

Convention on the Protection of the Black Sea against Pollution: https://www.moew.government.bg/bg/vodi/morski-vodi/konvenciya-za-opazvane-na-cherno-more-ot-zamursyavane/;
Strategic Action Plan for environment protection and Black Sea rehabilitation: https://www.moew.government.bg/bg/vodi/strategicheski-dokumenti/strategicheski-plan-za-dejstvie-za-opazvane-na-okolnata-sreda-i-vuzstanovyavane-na-cherno-more/;

PRIORITY/TARGET G. Promoting biodiversity conservation in the Balkans:

National objective rationale: Biodiversity conservation in Bulgaria requires partnership and coordination with the neighbouring countries. The National Strategy identifies immediate measures to explore common interests and concerns, exchange information and coordinate biodiversity conservation plans with the other Balkan Peninsula countries:

Level of implementation:
☒ regional / multicountry
☐ national
☐ subnational

Relevance of national objectives to the Aichi biodiversity targets (Links between the national objectives and the Aichi targets):

Directly related – the Aichi Biodiversity Targets to which the national objective is completely or partially related: **1, 3, 4.**
☒1 ☐6 ☐11 ☐16
☐2 ☐7 ☐12 ☐17
☒3 ☐8 ☐13 ☐18
☒4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☐20

Other national objectives indirectly related to the Aichi targets: 2.
☐1 ☐6 ☐11 ☐16
☒2 ☐7 ☐12 ☐17
☐3 ☐8 ☐13 ☐18
☐4 ☐9 ☐14 ☐19
☐5 ☐10 ☐15 ☐20

Other relevant information:

The summarised guidelines developed and adopted by the NBDCS to this priority/objective include:

- Regional conference to explore and discuss transboundary threats to biodiversity and opportunities for joint nature conservation projects;
- Establishing advisory councils, in Bulgaria and in other countries, to provide advice and guidance on the implementation of joint projects and programmes related to transboundary threats and issues;
- Joint research on the Balkan Peninsula biogeography and biodiversity, the abundance and the distribution of rare and endemic species, threats to biodiversity, sustainable management strategies and other issues of international scale and importance;
- Compilation of common Balkan Red Data Books;
- Planning landscape conservation in border areas, particularly in areas where adjacent protected territories, buffer zones or connecting habitats (corridors) currently exist or may be established.

Strategies and plans in which the national priority/objective is included:

There are no strategies or plans developed at national or European level that include PRIORITY/OBJECTIVE - G. Promoting biodiversity conservation in the Balkans.

Stakeholders: see Appendix 3

Relevant websites, web links and files:

UN Convention on Biodiversity: https://www.cbd.int/;

Ministry of Environment and Water (MOEW): *https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/obsta-informaciya-za-biologichnoto-raznoobrazie*

Biodiversity Information System for Europe (BISE): www.biodiversity.europa.eu;

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

CHAPTER II. IMPLEMENTATION OF MEASURES, ASSESSMENT OF THEIR EFFICIENCY, OBSTACLES AND SCIENTIFIC AND TECHNICAL NEEDS TO ACHIEVE THE NATIONAL BIODIVERSITY CONSERVATION STRATEGY OBJECTIVES (1998)

Characteristics of the measures and their implementation

The present chapter reviews the implementation of activities/measures that are key elements of the National Biodiversity Conservation Strategy to the Convention on Biological Diversity, the Biodiversity Strategic Plan (2011–2020) and the Aichi Biodiversity Targets to the Convention, as well as the relevant European and national documents related to biodiversity and environmental policies.

Description of measures:

Activity / Measure 1.: A Red Data Book of the Republic of Bulgaria was published 2015 consisting of three volumes: Volume 1: Plants and fungi; Volume 2: Animals; Volume 3: Habitats; Author: Bulgarian Academy of Sciences. A number of atlases, guides, etc. related to biodiversity of species and their habitats were developed and published.

Compliance with national targets: A. Strengthening the scientific base of nature conservation activities.

Compliance with Aichi targets : 1, 19

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient
☐ the measures implemented are partially efficient
☐ the measures implemented are inefficient
☐ unknown

Rationale for selection:

The Red Data Book of Bulgaria (2015, BAS) contains accurate and up-to-date information on the status of biodiversity, complements the previous edition with more species, includes information at the level of species, community and habitat, assessment of the conservation status and conservation value of species and habitats, encourages interdisciplinary research, ensures full access to scientific information A number of atlases, guides, etc. related to biodiversity of species and their habitats were developed and published as a result of in-depth research or translations; the publications contribute to maintaining a national biodiversity database at species, ecosystem, genetic and landscape level, as well as to supporting a National Biodiversity Status Monitoring System (NBDMS) in Bulgaria.

Relevant websites, web links and files:
Institute of Biodiversity and Ecosystem Research to the Bulgarian Academy of Sciences (IBER-BAS): http://www.iber.bas.bg;

Red Data Book of the Republic of Bulgaria, 2015: http://e-ecodb.bas.bg/rdb/bg/;
Bulgarian Birds of Prey Protection Society (BBPPS); http://www.bpps.org
National Museum of Natural History (NMNH) - http://www.nmnhs.com/index_bg.php
Fund for Wild Flora and Fauna:
http://fwff.org/?fbclid=IwAR3XX_mWIcPrBgH6Trh1sNZGweXB-waDdrxAo7uC0asIQZp-vvIDoHgGQe4
Green Balkans Federation: https://greenbalkans.org/bg/
WWF Bulgaria: https://www.wwf.bg

Other relevant information:

A number of atlases, guides, etc. were developed and published, including:

- The Natural Resources of "Vitosha" Nature Park, edited by Alexi Popov, BAS, Sofia, 2014 [=Природното богатство на Природен парк „Витоша", под редакцията на Алекси Попов, ДПП „Витоша" – НПМ – БАН, София, 2014г.];

- Atlas of Invasive Alien Species of European Union concern (IBER-BAS), Southeast Europe Invasive Alien Species Network (ESENIAS), Sofia, Bulgaria, 2017 [=Атлас на инвазивните чужди видове от значение за Европейския съюз (ИБЕИ-БАН), Мрежата за инвазивни чужди видове в Югоизточна Европа (ESENIAS), София, България, 2017 г.];

- Key Species Catalogue, developed under the DEVOTES - IO-BAS project, is an overview of potentially significant species from different European marine habitats. A total of 41 species have been identified for the Black Sea ecosystem, some of which are invasive (Smith et.al, 2014). Another activity focus is the development of innovative approaches (molecular, acoustic, satellite) for biodiversity research and assessment of the good status of the marine environment (Danovaro et al, 2016);

- European Breeding Birds Atlas;

European Atlas with contribution by BBPPS, ExEA, NMNH-BAS, Green Balkans, Fund for Wild Flora and Fauna, Bulgarian Birds of Prey Protection Society, as well as many amateur and professional ornithologists from Bulgaria and abroad, 2019, etc.

Relevant websites, web links and files:

National Museum of Natural History (NMNH-BAS); http://www.nmnhs.com;

Institute of Biodiversity and Ecosystem Research to the Bulgarian Academy of Sciences (IBER-BAS): http://www.iber.bas.bg

European Breeding Birds Atlas: https://agro.bg/novini/okolna-sreda/gotovi-sa-parvite-karti-ot-atlasa-na-gnezdyashtite-ptitsi-v-evropa/;

European Atlas: http://mapviewer.ebba2.info/atlas/g8j5b86e25eb120;

Atlas of Invasive Alien Species of European Union concern:

http://esenias.org/files/ESENIAS_Atlas_WEB.pdf

Problems/obstacles and scientific and technical needs related to the measure: a key problem is the lack of sufficient funding.

Activity / Measure 2.: Establishing and maintaining gene banks for the purpose of sustainable protection and management of the plant gene pool, in IPGR - Sadovo and the EFA (forest seed control stations) – MAFF

Compliance with national targets: A. Strengthening the scientific base of nature conservation activities.

Compliance with Aichi targets : 6, 7, 12, 13, 16

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient
☐ the measures implemented are partially efficient
☐ the measures implemented are inefficient
☐ unknown

Rationale for selection:

For the purpose of sustainable conservation and management of the plant genetic fund, at the Institute of Plant Genetic Resources "Konstantin Malkov" – Sadovo (IPGR) a gene bank is maintained for short-, medium- and long-term storage of the PGRs, as well as a specialised database - *Phyto 2000* registry in *Microsoft* ACCESS format of specimens entered in the National Collection. IPGR in its capacity as national coordinator for PGRs and Biodiversity International. The PGRs programme is a member of the European programme (ECPGR) and has been nominated to participate in 12 working groups on crops and documentation.

In the gene bank to the EFA-MAFF, 99 kg of seeds in 96 batches of 30 tree species are collected and stored. Seed collections in forest seed control stations were established by region of origin. Bulgaria is part of the European Forest Genetic Resources Information System (EUFGIS).

Relevant websites, web links and files:
Ministry of Agriculture, Food and Forests: (MAFF): http://www.mzh.government.bg;
Executive Forests Agency (EFA); http://www.iag.bg;
Institute of Plant Genetic Resources "Konstantin Malkov" – Sadovo (IPGR)
http://www.ipgrbg.com.

Other relevant information:

Herbarium and fauna collections, and databases of significant biodiversity of Bulgaria have been created and maintained in the following institutes and natural history museums to BAS and the universities to the Ministry of Education and Science and MAFF:

- Institute of Biodiversity and Ecosystem Research to the Bulgarian Academy of Sciences (IBER-BAS): http://www.iber.bas.bg;
- Forest Research Institute – BAS: http://www.fri.bas.bg;
- Institute of Plant Physiology and Genetics – BAS: http://www.bio21.bas.bg/ippg/bg/);
- National Museum of Natural History – BAS - http://www.nmnhs.com;
- Regional Natural History Museum – Plovdiv: http://www.rnhm.org;
- Institute of oceanology – BAS: http://www.io-bas.bg;
- Agricultural Academy – BAS: http://www.agriacad.bg;

- Sofia University "St. Kliment Ohridski": https://www.unisofia.bg;
- University of Forestry – Sofia: http://www.ltu.bg;
- Agricultural University – Plovdiv: http://www.au-plovdiv.bg;
- Executive Agency of Variety Testing, Field Inspection and Seed Control – MAFF, etc.: http://www.iasas.government.bg.

Problems/obstacles and scientific and technical needs related to the measure:

IPGR - Sadovo points out the lack of targeted national funding for plant gene pool conservation as a limiting factor which hampers the efficiency of PGR conservation activities in Bulgaria. Because of insufficient funding, there is no information system to document the plant gene pool at the national level, which impedes data transfer to international PGR catalogues and limits the access of potential users to the stored gene pool. For this purpose, it is necessary to establish a comprehensive information system to manage the PGR database with specialised software serving the gene bank, the information centre at the IPGR-Sadovo and all institutes with PGR collections in the country.

Activity / Measure 3.: ExEA implementing activities from the National Biodiversity Status Monitoring System on monitoring of NBDSMS sites and implementation and coordination of activities from the National Forest Ecosystems Monitoring Programme (NFEMP) on implementing the two levels of monitoring of forest ecosystems.

Compliance with national targets: A. Strengthening the scientific base of nature conservation activities and B. Supporting legislative initiatives

Compliance with Aichi targets : 1, 2, 5, 6, 7, 9, 19

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☐ the measures implemented are efficient
☒ the measures implemented are partially efficient
☐ the measures implemented are inefficient
☐ unknown

Rationale for selection:

The Executive Environment Agency designs and manages the National Environment Monitoring System, which includes monitoring of biological diversity and forests through the National Biodiversity Status Monitoring System (NBDSMS) and the National Forest Ecosystems Monitoring Programme (NFEMP). Selection of *„partially efficient measure"* is the monitoring under NBDSMS and monitoring of forest ecosystems (NFEMP) in line with the following reasoning from ExEA:

- Delaying the promulgation of the new draft *Ordinance on the terms and procedure for establishment and operation of the National Biodiversity Status Monitoring System*, which was submitted and adopted by Protocol No. 11 of 09.09.2016 of MOEW Collegium;

- A change is necessary to the International Cooperative Forestry Programme, in the framework of which NFEMP is implemented and which dates back to the 1980s, as a response to concerns about the impact of atmospheric pollution on forests in Europe. Currently, the focus has shifted to climate change, extreme climatic events (including prolonged droughts, damage cause by icing, heavy snowfall, etc.), biodiversity and forest ecosystem services loss. In order to address these growing needs for reliable and scientifically robust information on the status of forest ecosystems, the following steps have to be undertaken:

  ✓ Expand the network of permanent sampling plots where intensive monitoring and assessment of biotic and abiotic indicator groups of ecosystem level indicators is carried out (level II);

  ✓ Integrating level-II NFEMP sampling plots in the European Long-Term Ecosystem Research Network (LTER-□ur□□□);

  ✓ Introducing new monitoring and assessment indicators for forest ecosystems – relevant to the large-scale monitoring programme of forest ecosystems. The application of a new approach in the status assessment of forest ecosystems requires research of additional indicators through the application of fully harmonised and standardised assessment methods, primarily related to forest classification and the amount of dead wood. The introduction of new indicators requires development of new or adaptation of existing methodologies, on the basis of which both monitoring and assessment of indicators will be carried out.

Relevant websites, web links and files:

ExEA, National Biodiversity Status Monitoring System:
http://eea.government.bg/bg/bio/nsmbr;

Monitoring of the Forest Ecosystems Status: http://eea.government.bg/bg/nsmos/forest.

Other relevant information:

On the basis of the data collected as a result of the monitoring carried out in the framework of the NBDSMS, the status of the species is assessed, which is the basis for adequate nature conservation measures under scientifically substantiated and approved by the Minister of Environment and Water methodologies. NFEMP is implemented in line with the Programme's Methodological Guidelines, including methods and criteria for harmonised sampling, assessment, monitoring and analysis of indicators and the relevant time series (ICP Forests Manual).

Assessment of efficiency in the implementation of Activity/Measure 3 is based on expert opinion and ExEA judgement, in the context of biodiversity management policies. ExEA to the MOEW designs and manages the National Environment Monitoring System, including biological diversity and forests through the National Biodiversity Status Monitoring System (NBDSMS) and the National Forest Ecosystems Monitoring Programme (NFEMP).

Relevant websites, web links and files:
Ministry of Environment and Water (MOEW); http://www.moew.government.bg;
Executive Environment Agency (ExEA); http://eea.government.bg;

Problems/obstacles and scientific and technical needs related to the measure:

There are needs of managerial, financial and scientific nature in order to address the needs identified in the „Rationale for selection“ for the assessment of efficiency of the measure implemented.

Relevant websites, web links and files: *(to resolve problems)*
Ministry of Environment and Water (MOEW); http://www.moew.government.bg
Ministry of Agriculture, Food and Forests: (MAFF): http://www.mzh.government.bg;

Activity / Measure 4.: EFA maintains web-based information system with module data on the status of forest territories at national, regional and local level, a basis for scientific and applied science projects and forest resources conservation planning.

Compliance with national targets: A. Strengthening the scientific base of nature conservation activities and D. Environmental education and training

Compliance with Aichi targets : 1, 2, 3, 4, 5, 7, 9, 12, 14, 15, 17, 19

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient
☐ the measures implemented are partially efficient
☐ the measures implemented are inefficient
☐ unknown

Rationale for selection:
The EFA-maintained web-based information system with module data on the status of forest territories at national, regional and local level has a significant contribution in the context of biodiversity and its conservation in relation to the forest territories management. Information modules on forest fires, forest pathology monitoring, projects in the forestry sector, etc. have been prepared and maintained. Information from the Forest Management Plans of the territorial units of the state forest enterprises, the activities of the Nature Parks Directorates in Bulgaria (NPDs) to the EFA and the Management Plans of protected territories - "nature parks", "protected areas", “natural landmarks”, in addition to being significant in terms of scientific information content on biodiversity, are also an opportunity to provide eco-education and training.

Relevant websites, web links and files:

Ministry of Agriculture, Food and Forests: (MAFF): http://www.mzh.government.bg;

Ministry of Environment and Water (MOEW): http://www.moew.government.bg;

Executive Forests Agency (EFA): http://www.iag.bg;

Forest Research Institute (FRI - BAS): http://www.fri.bas.bg;

University of Forestry – Sofia: http://www.ltu.bg.

Other relevant information:

Important for the scientific basis for the development of the forest sector are scientific research and educational activities of the Forestry Institute to the BAS and the Forestry University in Sofia, which conduct scientific and applied research related to conservation of the biological diversity of forest ecosystems. The Strategy for Development of the Forestry Sector in the Republic of Bulgaria for the period 2013-2020 was developed on the basis of the results of applied research and the outcomes of projects on the status of forest ecosystems and their biodiversity.

Relevant websites, web links and files:
Strategy for Development of the Forestry Sector in the Republic of Bulgaria for the period 2013-2020: https://www.mzh.government.bg/media/filer_public/2018/03/02/nacionalna-strategiya-razvitie-gorski-sektor-2013-2020.pdf;

Problems/obstacles and scientific and technical needs related to the measure: no problems/obstacles to the implementation of the measure

Relevant websites, web links and files: none *(to resolve problems)*

Activity / Measure 5.: In line with the activities under this NSBDC priority-objective, a system for stakeholders' staff training in conservation of biological diversity and ensuring its functioning was established

Compliance with national targets: B. Supporting legislative initiatives

Compliance with Aichi targets: 1, 4, 13, 15, 16, 17, 18, 19

Assessment of the efficiency of the measure implemented to achieve the desired outcome:
☒ the measures implemented are efficient
☐ the measures implemented are partially efficient
☐ the measures implemented are inefficient
☐ unknown

Rationale for selection:

Programmes for staff training, capacity building and career development are planned and implemented at ***all levels and in all structures of MOEW***. Training programmes have been integrated into projects in development under OP "Environment" during the 2014 - 2020 programming period.

The MAFF and all its structures plan and implement training programmes for their administrative staff and experts under OP "Maritime Affairs and Fisheries" and the Rural Development Programme, as well as under other donor programs and funding.

In the ***Fisheries Sector of EAFA***, information campaigns and training of staff in the sector is carried out regarding the requirements for environmental protection and biodiversity. Support to the fisheries and aquaculture sectors in response to enhanced consumer awareness, expectations and interest in sustainable and environmentally-friendly products is provided through national and European funding.

Scientists from the Institute of Oceanology to the BAS, in the framework of their work as experts to a number of advisory bodies and committees (e.g. the Advisory and Coordination Council on the implementation of the FDMS), prepare opinions and propose measures for sustainable management of the Black Sea ecosystem, including conservation of biodiversity, environmentally friendly methods for fishing and cultivation of commercial species of marine demersal invertebrates in order to limit the impact of fishing on stocks, species and ecosystems within the safe environmental limits.

The Ministry of Defence (MoD) considers environmental protection in the Bulgarian Army (BA) as a mix of legal, economic, social, scientific and organisational and technical activities carried out in peacetime and at time of war, which are aimed at ensuring tasks resolution by the troops and the armed forces in the face of environmentally challenging anthropogenic and natural factors, as well as environmental protection and restoration in the course of military activity.

Relevant websites, web links and files:

Ministry of Environment and Water (MOEW); http://www.moew.government.bg;

National Nature Protection Service Directorate (NNPSD-MOEW);

Ministry of Agriculture, Food and Forests (MAFF): http://www.mzh.government.bg;

Executive Agency of Fisheries and Aquaculture (EAFA); http://iara.government.bg;

Ministry of Defence: https://www.mod.bg/bg/;

Institute of oceanology (IO - BAS); http://www.io-bas.bg;

□ulg□ri□n □irds □f □r□□ □r□t□□ti□n S□□i□t□(□□□□S); http://www.bspb.org;

Green Balkans Federation of Nature Conservation NGOs: http://www.greenbalkans.org;

Bulgarian Biodiversity Foundation (BBF); http://www.bbf.biodiversity.bg;

WWF – Bulgaria Danube - Carpathian Programme; http://www.wwf.bg;

Other relevant information:

MOEW has aimed the training for the experts from Pirin, Rila and Central Balkan National Parks Directorates, the regional inspectorates of environment and water and the river basin directorates that are beneficiaries of the operational programmes. It also involves experts from structures of other stakeholders - ministries, executive agencies, institutes to the BAS, nature parks directorates and representatives of environmental NGOs;

EFA has directed the training towards the expert staff of the 11 nature parks directorates - structures to the Executive Agency and all employees in the forest system who work with different target groups, including adolescents. As a result of these trainings, the employees of EFA, its specialised territorial units and structures, together with the state enterprises under Art. 163 of the Forest Law, work actively with the public and organise national and regional educational initiatives to promote sustainable forest management and biodiversity conservation;

IPGR Sadovo - MAFF has “open days” in the field every year. The team participates in exhibitions to promote the activities of the PGR Programme, to familiarise farmers with the

achievements and role of the local gene pool - old, traditional and forgotten plant varieties and populations, with the aim of achieving sustainability in agriculture and rural development.

The Military Service Statute of the Armed Forces of the Republic of Bulgaria includes Section 9. "Environmental protection". A "Concept for protection and restoration of the environment in the areas of deployment of military formations and in places where military exercises and events related to the defence of the country are carried out" has been developed, as well as a "Handbook on environmental protection for the military men of the Armed Forces of the Republic of Bulgaria" and ecological passports for all military formations.

Relevant websites, web links and files:

Ministry of Environment and Water (MOEW); http://www.moew.government.bg;

National Nature Protection Service Directorate (NNPSD-MOEW);

Regional inspectorates on environment and water (RIEW) to the MOEW (16): Sofia, Pernik, Ruse, Varna, Burgas, Blagoevgrad, Plovdiv, Stara Zagora, Haskovo, Pazardzhik, Smolyan, Shumen, Veliko Turnovo, Pleven, Vratsa, Montana; http://www.moew.government.bg;

Pirin National Park Directorate (PNPD) – MOEW; http://www.pirin.bg;

Rila National Park Directorate (RNPD) – MOEW; http://www.rila.bg;

Central Balkan National Park Directorate (CBNPD) – MOEW; http://www.centralbalkan.bg;

Danube River Basin Directorate (DRBD - Pleven); http://www.bd-dunav.org;

Black Sea River Basin Directorate (BSRBD - Varna); http://www.bsbd.org;

East Aegean River Basin Directorate (EARBD - Plovdiv); http://www.earbd.org;

West Aegean River Basin Directorate (WARBD - Blagoevgrad); http://www.wabd.bg;

Enterprise for Management of Environmental Protection Activities (EMEPA); http://www.pudoos.bg;

Problems/obstacles and scientific and technical needs related to the measure: no problems/obstacles to the implementation of the measure

Relevant websites, web links and files: none *(to resolve problems)*

Activity / Measure 6.: Higher and secondary education curricula in Bulgaria include topics related to biodiversity conservation.

Compliance with national targets : D. Environmental education and training

Compliance with Aichi targets : 1, 18, 19

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient
☐ the measures implemented are partially efficient
☐ the measures implemented are inefficient
☐ unknown

Rationale for selection:

The requirements of the NBDCS regarding university and specialised secondary education curricula are being met and biodiversity is mainstreamed in the curricula.

Main contribution comes from universities with biology science programmes: University of Forestry – Sofia, Sofia University „St. Kliment Ohridski", Agricultural University – Plovdiv, Thracian University - Stara Zagora.

Supporting higher and secondary education in Bulgaria in the field of environmental protection and biodiversity is a commitment of the MOEW and MAFF, and is directed to the MES and BAS institutes and museums related to biodiversity research - IBEI, FRI, IPGR, the National Museum of Natural Science -Sofia and the Natural Science Museum – Plovdiv.

Relevant websites, web links and files:

University of Forestry – Sofia; http://www.ltu.bg;

Sofia University „St. Kliment Ohridski" (SU); https://www.unisofia.bg;

Agricultural University – Plovdiv; http://www.au-plovdiv.bg;

Thracian University - Stara Zagora ; http://www.uni-sz.bg/;

Ministry of Education and Science (MES); http://www.mon.bg;

Executive agency OP „Science and Education for Smart Growth"; http://www.opnoir.bg;

Other relevant information:

The Forest Act regulates support for training and qualification of owners, employees and all forest workers. The FEA encourages, coordinates and controls vocational training in the field of forestry.

IPGR - Sadovo is accredited to teach full-time and part-time PhD students in Selection and Seed Production of Cultivated Plants. It has qualified scientists and good facilities for practical training and apprenticeship of pupils and university students, and for professional guidance of graduates and PhD students in various fields of the agricultural science. IPGR - Sadovo is visited by Bulgarian and foreign scientists, students from vocational schools, university students, PhD students from the Agricultural University - Plovdiv, Thracian University - Stara Zagora, University of Forestry – Sofia. They visit the gene bank, the museum, the botanical garden and the information centre at IPGR - Sadovo.

Relevant websites, web links and files:
Executive Forests Agency (EFA); http://www.iag.bg;
Agricultural Academy (AA); http://www.agriacad.bg;
Institute of Plant Genetic Resources "Konstantin Malkov" – Sadovo (IPGR)
http://www.ipgrbg.com;

Problems/obstacles and scientific and technical needs related to the measure: no problems/obstacles to the implementation of the measure

Relevant websites, web links and files: none *(to resolve problems)*

Activity / Measure 7.: Measures were implemented for development and management of the protected territories, extension of the National Network of Protected Areas as an element of the European Ecological Network Natura 2000, as well as for conservation, maintenance and management of protected territories and protected areas through the respective Plans for management and implementation of planned activities. Measures have been undertaken to review the status of the 17 biosphere reserves in Bulgaria under the United Nations Man and Biosphere Programme and to assess their management needs.

Compliance with national targets: C. Expanding and strengthening the network of protected territories:

Compliance with Aichi targets : 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 17, 20

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient

☐ the measures implemented are partially efficient

☐ the measures implemented are inefficient

☐ unknown

Rationale for selection:

Implementation of activities/measures supporting Priority/Objective C. Expanding and strengthening the network of protected territories under the NBDCS during the reporting period of the Sixth National Report 2014-2018 confirms the responsibility of the state to manage and conserve the protected territories and areas, and to reconcile the operation of the biosphere reserves with the requirements of the Seville Strategy.

The efforts of the MOEW and MAFF and their directorates and regional units in their capacity of beneficiaries are aimed at assigning, assisting the development of management plans of national and nature parks, reserves and managed reserves, management plans of protected areas under Directive 2009/147/ EC on the conservation of wild birds, participation in the process of adopting the plans together with stakeholders - state, regional and local authorities, representatives of the academia, the businesses, environmental NGOs. Adoption of national and nature parks management plans is supported by advisory councils.

During the reporting period of the present Sixth National Report, management plans for Pirin NP, Rila NP, Belasitsa NP, Bulgarka NP and Vitosha NP has been developed. The Council of Ministers adopted in 2016 the management plans of Central Balkan Nature Park, Belasitsa Nature Park and Persina Nature Park. Management plans for 28 reserves and for 18 managed reserves – protected territories managed by the MOEW, have been developed and adopted by Order of the Minister of Environment and Water. Seven management plans of protected areas under Directive 2009/147/EC on the conservation of wild birds were adopted by Order of the Minister of Environment and Water.

In the period 2014 – 2018, an **Integrated management plans for protected areas BG0002051 „Kaliakra", BG0000573 „Kaliakra Complex" and BG0002097 „Belite Skali" has been adopted.** The latter is in the process of adoption.

Based on the national assessment and the declared consent of the local communities, territories in Bulgaria have been identified, which have the highest potential of compliance with the current requirements for biosphere reserves and nomination forms have been drafted, which are submitted to the UNESCO Secretariat, as required by the Seville Strategy. In 2017, at its 29th meeting, the Intergovernmental Coordination Council for the UNESCO Man and Biosphere Programme (MAB - ICC), on the basis of nomination forms submitted, approved the announcement of four Bulgarian new-type biosphere parks: Central Balkan, Chervenata stena, Srebarna and Uzunbudzhak in line with the modern requirements and the principles of the Seville Strategy. Seven biosphere reserves of the old type (Chervenata stena, Uzunbudzhak, Srebarna, Tsarichina, Steneto, Djendema, Boatin) are included in them. The same decision of the MAB-ICC takes out from the network of biosphere reserves three old-type biosphere reserves (Kamchia, Dupkata and Kupena) and the other 6 biosphere reserves that were not brought in line with the current requirements (Parangalitsa, Chuprene, Ali botush, Bistrishko branishte, Bayuvi dupki-Dzhindzhirica, Mantaritsa) will be able to retain their status as biosphere reserves if they are brought in compliance through the respective nomination forms as required.

The main guidelines of the UNESCO Programme Man and Biosphere (MAB) are related to the increase of the contribution of biosphere reserves in the practical implementation of international conventions related to nature conservation and sustainable development, and in particular of the Convention on Biological Diversity. In the framework of the Man and Biosphere Programme, biosphere parks are being built to improve and to demonstrate a balanced relationship between humans and the biosphere.

Relevant websites, web links and files:

Ministry of Environment and Water (MOEW); http://www.moew.government.bg;

National Nature Protection Service Directorate (NNPSD - MOEW);

Regional inspectorates on environment and water (RIEW) to the MOEW (16): Sofia, Pernik, Ruse, Varna, Burgas, Blagoevrad, Plovdiv, Stara Zagora, Haskovo, Pazardzhik, Smolyan, Shumen, Veliko Turnovo, Pleven, Vratsa, Montana; http://www.moew.government.bg;

Pirin National Park Directorate (PNPD) – MOEW; http://www.pirin.bg;

Rila National Park Directorate (RNPD) – MOEW; http://www.rila.bg;

Central Balkan National Park Directorate (CBNPD) – MOEW ; http://www.centralbalkan.bg;

Executive Forests Agency (EFA); http://www.iag.bg;

Other relevant information:

The Ministry of Environment and Water maintains a public Register of protected areas, in line with the requirements of Directive 92/43/EEA on the conservation of natural habitats and of wild fauna and flora. Eleven orders and announcements in the State Gazette from 2015 to 2018, as well as a link to the protected area's online file, are published in the Register.

A total of 119 orders have been published in the public Register of protected areas under Directive 2009/147/ EC on the conservation of wild birds, and in the period 2014-2018 there are amendments to orders for 5 protected areas:

- BG0002051 Kaliakra No. РД-559 of 21.08.2009, amended by Order No. РД - 97/06.02.2014 and No. РД-818 of 12.12.2017

- BG0002077 Bakurlaka No. РД-530 of 26.05.2010, corrected with Order No. РД -563 of 22.07.2014
- BG0002082 Batova No. РД - 129 of 10.02.2012, amended by Order No. РД - 81 of 28.01.2013 and No. РД-389 of 07.07.2016
- BG0002097 Belite skali No. РД - 353 of 03.05.2012, amended by Order No. РД-816 of 12.12.2017
- BG0002115 Bilo No. РД-330 of 28.04.2014, amended by Order No. РД-817 of 12.12.2017

Relevant websites, web links and files:

Public register of protected areas according to Directive 92/43/EEA on the conservation of natural habitats and of wild fauna and flora: https://www.moew.government.bg/bg/publichen-registur-za-obyavenite-zastiteni-zoni-i-promenite-v-tyah-suglasno-direktiva-92-43-eio-za-opazvane-na-prirodnite-mestoobitaniya-i-na-divata-flora-i-fauna/

Public register of protected areas according to Directive 2009/147/EC on the conservation of wild birds :
https://www.moew.government.bg/static/media/ups/articles/attachments/Zapovedi_ZZe45d4d806d93971ff229fd67f8219a41.pdf

Registers of protected territories:

https://www.moew.government.bg/bg/priroda/zastiteni-teritorii/registri-na-zastitenite-teritorii/;

Registers of protected zones under Natura 2000

https://www.moew.government.bg/bg/priroda/natura-2000/;

Biosphere reserves/parks in Bulgaria:

https://www.moew.government.bg/bg/priroda/zastiteni-teritorii/zastiteni-teritorii-s-mejdunarodno-znachenie/programa-chovekut-i-biosferata-na-yunesko/

Problems/obstacles and scientific and technical needs related to the measure: no problems/obstacles to the implementation of the measure

Relevant websites, web links and files: none *(to resolve problems)*

Activity / Measure 8.: The educational requirements related to ecological training are implemented through the responsible institutions at all levels, awareness of the significance of biodiversity conservation is promoted, a continuous publishing and advertising and educational activities are carried out through the media, NGOs activities and through a network of visitor information centres to national and nature parks.

Compliance with national targets : D. Environmental education and training:

Compliance with Aichi targets : 1, 19, 20

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient

☐ the measures implemented are partially efficient
☐ the measures implemented are inefficient
☐ unknown

Rationale for selection:

The state educational standards, state school curricula educational standards developed by the Ministry of Education and Science (MES) include the following:

Natural sciences and ecology: subjects - *environment, man and nature* (II-VI grade); *biology and health education, chemistry and environmental protection* (VII-XII grade). **State pre-school education requirements, 2018** include: orientation in nature – "*natural world educational strand*" with the following: "*animal world, plant world, natural physical environment and natural phenomena."*

In order to meet the needs of environmental training, the Ministry of Education and Science developed ***training programmes for teacher training in environmental issues and biodiversity.***

In order to cover the widest possible range of adolescents in terms of education, a **National Youth Strategy 2010-2020** was developed.

The Strategy Implementation Plan, Priority 1 includes the following ***strategic objective****:* "creating a favourable, encouraging and supportive environment for quality professional realisation of young people in Bulgaria. **Task 1.1**: *Improving the quality of secondary and higher education and non-formal education, and promoting lifelong learning, in line with labour market needs through:*

- improving the efficiency of links between educational and training institutions on the one hand and the businesses on the other, in order to facilitate the transition from education to employment;
- promoting research interest in students through participation in different projects.

Priority 6, ***Operational Objective 3****:* Ensuring effective representation of young people's interests in the process of drafting, implementation and evaluation of sectorial policies at national, regional, district and municipal level, in the context of the National Objective ***Task 3*** *is included: stimulating the participation of young people and their organisations in the conservation, improvement and management of the natural resources.*

Relevant websites, web links and files:

National Youth Strategy 2010-2020:

http://mpes.government.bg/Documents/Documents/Strategii/strategy_youth_2010-2020.pdf ;

E-textbooks for 7th grade:

https://www.prosveta.bg/elektronni-varianti/bezplaten-dostp-7-klas

„I-Life Trodoos project team visits students in Vela Blagoeva school in Veliko Turnovo":
http://www.prosveta.bg/naturall/bg/novini/ekipyt-na-proekt-i-life-trodoos-gostuva-na-uchenicite-ot-su-vela-blagoeva-vyv-veliko-tyrnovo

Other relevant information:

Media has an essential role to play in informing and supplementing the knowledge of different generations. Journalists themselves acknowledge that "… *it is also good to have knowledge in extremely specialised topics ranging from climate change, through biodiversity and natural balance, to legislation, scientific and technical discoveries and research .....*" „How to unleash your coverage of the environment – opportunities for environmental journalists“ – Association of European Journalists - Bulgaria (AEJ - Bulgaria), 15.09.2014.

For the effective implementation of the national objective: D. Environmental education and training, in addition to state policy in the field of ecology and biodiversity conservation, **the role of environmental NGOs** in environmental education and training is essential. In the period 2014-2018, various information and educational projects were developed by NGOs - Bulgarian Society for the Protection of Birds, the Birds of Prey Protection Society, Green Balkans Federation of Nature Conservation NGO, Bulgarian Biodiversity Foundation, World Wildlife Fund Danube - Carpathian Programme Bulgaria (WWF-Bulgaria), etc.

Operated under the control of BBPPS Poda Conservation Center in Poda protected area - Burgas, is visited by those who want to get acquainted with the exceptional biodiversity of the ornithofauna (290 bird species per 1 km²) and a second nature conservation centre in the East Rhodopes – Madzharovo, in which a project team of the LIFE programme "Conservation of Black and Griffon Vultures in the Rhodopes", September 2017, organises children's educational events named "Vulture Day". The Federation of Green Balkans Nature Conservation Associations has a visitors centre “Pomorie Lake” in Pomorie and a Wildlife Rescue Centre in Stara Zagora.

National and Nature Parks in Bulgaria have visitors and information centres with up-to-date exhibitions of the biodiversity in the parks and active participation in educational programmes for high-school students. The parks have an information system consisting of information boards, thematic educational routes, as well as museums of different species of fauna.

Relevant websites, web links and files:

„How to unleash your coverage of the environment – opportunities for environmental journalists“ – Association of European Journalists - Bulgaria (AEJ - Bulgaria), 15.09.2014: http://www.aej-bulgaria.org/bul/p.php?post=4405&c=328;
Bulgari□n □irds □r□t□□ti□n S□□i□t□(□□□S); http://www.bpps.org;
Eastern Rhodopes Nature Conservation Centre: http://bspb.org/madjarovo/;
Bulgarian Birds of Prey Protection Society (BBPPS); http://www.bspb.org;
Green Balkans Federation of Nature Conservation NGOs: http://www.greenbalkans.org;
Bulgarian Biodiversity Foundation (BBF) ; http://www.bbf.biodiversity.bg;
WWF – Bulgaria – Danube – Carpathian Programme; http://www.wwf.bg;
Pirin NP – visitors’ information centre – Bansko:
https://www.pirin.bg/?page_id=593;

Problems/obstacles and scientific and technical needs related to the measure: no problems/obstacles to the implementation of the measure.

Activity / Measure 9.: Implementation of the updated National Strategy for Sustainable Tourism Development in the Republic of Bulgaria 2014 – 2030, discovering and realising opportunities for eco-tourism in the context of the national legislation and the international conventions to which Bulgaria is a party for the promotion of eco-tourism policy through the tools of spatial planning.

Compliance with national targets: E. Developing and implementing an eco-tourism policy:

Compliance with Aichi targets : 2, 3, 4, 5, 11, 17

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient

☐ the measures implemented are partially efficient

☐ the measures implemented are inefficient

☐ unknown

Rationale for selection:

Eco-tourism is included in the *Marketing mix* section of the updated National Strategy for Sustainable Tourism Development in the Republic of Bulgaria 2014 – 2030 as a ***„Product with good potential“.*** . It is, in essence, *"a responsible journey to natural sites (territories, areas, zones) that preserves the environment and maintains the well-being of the local population".* Ecotourism is at the heart of the development of *sustainable tourism* as a whole. In the updated National Strategy for Sustainable Tourism Development in the Republic of Bulgaria 2014 – 2030, the exceptional potential for development of eco-tourism in Bulgaria is described, based on the notified and managed protected territories and areas of rich and valuable biological diversity. Bulgaria ranks third in the EU in terms of protected areas in the European Ecological Network Natura 2000 - 34.9 % The marked trails in the mountains have a total length of over 37,000 km. International tourist routes pass through the territory of the country - Kom - Emine (its route coincides with the final section of the European tourist route E3), the European tourist route E-4 (Vitosha - Verila - Rila - Pirin) and the European tourist route E-8 (Rila - Rhodopes).

The country has a relatively good network of mountain trails, developed and maintained park infrastructure for tourism and recreation, interpretative routes, mainly in national and nature parks, as well as good conditions for accommodation in guest houses and tourist facilities, in line with the peculiarities of the regions.

Relevant websites, web links and files:

Ministry of Tourism (MT); http://www.tourism.government.bg;
updated National Strategy for Sustainable Tourism Development in the Republic of Bulgaria 2014 – 2030: http:/tourism.govenment.bg;
Ministry of Environment and Water (MOEW); http://www.moew.government.bg;
Executive Forests Agency (EFA); http://www.iag.bg;
Enterprise for Management of Environmental Protection Activities (EMEPA); http://www.pudoos.bg;
Municipal administrations (MA):
http://www.iisda.government.bg>ras>adm_struktures>distrit_administrations;
District administrations (DAs);

http://www.iisda.government.bg>adm_struktures>municipality_administrations;
□ulg□ri□n S□□i□t□f□r th□□r□t□□ti□n □f □irds (□S□□); http://www.bspb.org;
Bulgarian Association for Alternative Tourism (BAAT); http://www.cucovata.com;
Bulgarian Biodiversity Foundation (BBF) ; http://www.bbf.biodiversity.bg.

Other relevant information:

Bulgaria's national legislation - the Protected Territories Act, the Biodiversity Act, the Environmental Protection Act, the Spatial Development Act and the respective secondary legislation prescribe that, in the development of the management plans for all categories of protected territories, protected areas, both in the general and in detailed spatial development plans of the municipalities, plans and projects for individual recreation and tourism centres, should reflect and plan for ecotourism opportunities. The drafted general and detailed spatial development plans and investment projects with elements of eco-tourism should be evaluated for the environmental impacts of tourist activities and in terms of fair distribution of economic benefits of tourism activities. In this regard, the tools for spatial planning promote a policy for eco-tourism development.

Relevant websites, web links and files:
Ministry of Regional Development and Public Works (MRDPW);
Municipal administrations (MAs);
http://www.iisda.government.bg>adm_struktures>municipality_administrations;
Ministry of Tourism (MT); http://www.tourism.government.bg;
Ministry of Environment and Water (MOEW); http://www.moew.government.bg;
Pirin National Park Directorate (PNPD) – MOEW; http://www.pirin.bg;
Rila National Park Directorate (RNPD) – MOEW ; http://www.rila.bg;
Central Balkan National Park Directorate (CBNPD); http://www.centralbalkan.bg;
Executive Forests Agency (EFA); http://www.iag.bg;
Belasitsa Nature Park Directorate (BNPD); http://www.belasica.iag.bg;
Vitosha Nature Park Directorate (VNPD); http://www.vitosha.iag.bg;
Vratchanski Balkan Nature Park Directorate (VBNPD); http://www.vrachanskibalkan.iag.bg;
General Spatial Plan of Tourist and Ski Area "Midzhur" – Chuprene Municipality: http://chuprene.com/wp-content/uploads/2017/06/19.

Problems/obstacles and scientific and technical needs related to the measure: no problems/obstacles to the implementation of the measure.

Relevant websites, web links and files: none *(to resolve problems)*

Activity / Measure 10.: Bulgaria fulfils its obligations to protect biodiversity within the Black Sea Fishing Convention, complies with regulations and prohibitions on pollution, bottom trawling and overuse of fish resources, implements the Convention on the Protection of the Black Sea against Pollution, monitors biodiversity, conducts joint research activities at the ecosystem level in the Black Sea and the Black Sea coast. The Bulgarian state and the Government of Bulgaria are pursuing a comprehensive planning policy to organise and preserve the Coastal Zone.

Compliance with national targets: F. Promoting the conservation of the Black Sea basin:

Compliance with Aichi targets : 2, 3, 4, 6, 8, 9, 11, 12, 17, 19, 20

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient

☐ the measures implemented are partially efficient

☐ the measures implemented are inefficient

☐ unknown

Rationale for selection:

In 2017, Bulgaria reports to the EC on the country's compliance with a requirement of the Marine Strategy Framework Directive 2008/56/EO (MSFD), namely that on 29.12.2016 with Council of Ministers' Decision No. 1111 **the Marine Strategy** (MS) and the corresponding **Programme of Measures for Bulgaria** (PoM) were adopted. The objectives of the **Marine Strategy of the Republic of Bulgaria are**: achieving and maintaining **"good status" of marine environment by 2020**.

The Strategic Action Plan for environment protection and Black Sea rehabilitation, updated in 2009, is an agreement between the six countries bordering on the Black Sea - Bulgaria, Georgia, Romania, the Russian Federation, Turkey and Ukraine, to act in unison to support the ongoing rehabilitation of the Black Sea.

An increase in investment has been achieved by all countries in the Black Sea basin for the purpose of restoration of marine biodiversity. Investments are planned and implemented for recovery projects aimed at mitigating the negative impact of pollution:

- Funding for the implementation of the programmes of measures to the Marine Strategy is ensured for 2017 and 2018;
- A budget forecast for the period 2018 - 2020 has been drafted that includes all measures of competence of MOEW, the RBDs and NIMH;
- Preparatory activities have been carried out to draft an Agreement between the MOEW and the Institute of Oceanology - BAS for 2018 regarding monitoring of marine waters, in line with the requirements of Art. 171 (2)(3) of the Water Act and in compliance with Republic of Bulgaria's obligations under the Water Framework Directive and the Marine Strategy Framework Directive in respect to the planned activities and the monitoring plan.

The main objective of monitoring programmes under Descriptors 1, 4 pelagic communities (phytoplankton, zooplankton), D1, 4 types of fish that are not subject to commercial fishing, D1, 4 marine mammals, D1, 6 benthic communities and seabed integrity; D3 Types of commercially exploited fish and shellfish is to assess the current status of populations of species against a set of indicators, as well as to evaluate the negative impact on planktonic, benthic and ichthyological communities resulting from anthropogenic activity. Following the assessment, a final score is formulated for each descriptor, which shows whether good status

of the marine environment has been achieved or whether additional measures are necessary to achieve it.

A joint scientific research activity at the level of Black Sea ecosystem and it biological diversity is currently being implemented:

In the Black Sea River Basin Directorate, 92 surveillance monitoring points were reviewed in 2017, including 14 monitoring points for marine water, and 100 operational monitoring points, including 23 monitoring points for marine water.

- Dissolved oxygen O2 – 72 per cent in high status, 17 per cent in good status and 11 per cent in moderate status.
- Ammoniacal nitrogen NH4-N – 56 per cent in high status, 22 per cent in good status and 22 per cent in moderate status.
- Nitrate nitrogen NO3-N - 50 percent in high status, 22 percent in good status and 28 percent in moderate status.
- Orthophosphates PO4-P - 41 per cent in high status, 22 per cent in good status and 37 per cent in moderate status.
- Biochemical oxygen demand - 28 per cent in high status, 41 per cent in good status and 31 per cent in moderate status.

MAES classification system was used for the selection of indicators relevant to the status of marine ecosystems. Indicators of the two types were selected - "ecosystem structure" (14 indicators) and "ecosystem processes" (2 indicators). The indicators thus selected assess the status through the values of abiotic and biotic components of marine ecosystems and have been developed for the purposes of monitoring of the ecological status of coastal waters (up to 20 m depth) according to the WFD and MSFD criteria - for coastal and offshore ecosystems.

Analysed are the qualitative and quantitative composition of BQE phytoplankton, BQE macrophyobenthos, BQE macrozoobenthos, as well as the indicators for the relevant biological quality elements, which provide the comprehensive information necessary for the assessment of the ecological status of coastal waters. Accompanying are the physico-chemical parameters such as temperature, salinity, dissolved oxygen, biogenic elements and the optional BQE zooplankton.

The Bulgarian state and the Government are pursuing a comprehensive planning policy aimed at the development and protection of the coastal zone.

The Black Sea Coast Spatial Development Act, promulgated in SG No 48 of 15 June 2007, in force as of 01 January 2008, amended in SG No. 21 of 13 March 2020, regulates the public relations related to the rules and conditions for determining the territorial scope of the Black Sea coast and the coastal beaches, the requirements, rules and regulations for their spatial development, use, building development and preservation. *The objectives of the BSCSDA are preventing and reducing pollution of the Black Sea coast, restoring and preserving the natural landscape and the cultural and historical heritage.* **The Black Sea coast covers the part of the territory of the country that falls within the scope of the security zones under Article 9 and the internal marine waters, the territorial sea and the 200 m wide aquatory of the Black Sea , measured from the coastline.**

Relevant websites, web links and files:
Black Sea River Basin Directorate: (https://www.bsbd.org/bg/index_bg_1668393.html;
European Commission (EC):
http://ec.europa.eu/environment/nature/natura2000/management/index_en.htm;
Institute of oceanology „Prof. Fridtjof Nansen“, BAS - Varna: http://www.io-bas.bg;

Information system of protected territories from Natura 2000 network: http://natura2000.moew.government.bg.

Other relevant information:

Following designation of protected marine areas, Bulgaria joins representative networks of marine protected territories as part of the European Ecological Network Natura 2000 for protected areas under Directive 92/43/ EEC on the conservation of natural habitats and wild flora and fauna and Directive 2009/147/ EC on the conservation of wild birds, which is regulated in Article 13 (4) and (5) of the Marine Strategy Framework Directive.

Detailed information and public access to the data on the designated protected areas in Bulgaria is available, including about marine protected areas falling within the Black Sea maritime region. The total area of protected territories under the two Directives is 282 135 ha of maritime territories (Natura 2000 Ecological Network Protected Area Information System).

In 2014, the MOEW commissioned the development of an "Integrated Management Plan for protected area SCI BG0000573 *Kaliakra Complex* for the conservation of natural habitats and of the wild flora and fauna and protected areas SPA BG0002051 *Kaliakra* and SPA BG0002097 *Belite Skali* for conservation of wild birds", which also includes marine territories. Under this commission, there were measures planned to protect the status of benthic marine habitats, as well as efficient measures to halt the harmful effects, restore the damaged habitats (including natural habitat 62C0* Ponto-Sarmatic steppes), as well as monitoring of the impact of implementing the measures. In 2018, the Ropotamo Reserve management plan was approved and the Atanasovsko Lake reserve management plan (RIEW-Burgas) is undergoing processing. These protected territories are of the utmost importance for the conservation of biodiversity and the coastal landscape.

In order to protect the Black Sea biodiversity, responsible state and local authorities monitor compliance with the regulations and prohibitions on ***pollution, bottom trawling and overuse of fish resources.***

In the framework of the implementation of the COST Programme Action CA 15 121: Advancing Marine Conservation in the European and Contiguous Seas (MarCons), *a review of European regulations in the field of marine conservation and management of marine coastal areas in European and contiguous seas was carried out* and, by means of a comparative analysis of emblematic regional and national cases, the efficiency of the implementation of existing legal instruments, the differences in success and the contradictions in their implementation in specific maritime regions and countries, including Bulgaria and the Bulgarian Black Sea were assessed.

The long-term ecosystem quality objectives (LEQO) reflect what stakeholders would like the Black Sea status to be for a longer future period, based on a *resolution on priority issues identified by the 2007 Transboundary - Black Sea Diagnostic Analysis*, which was the basis of the *Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea, updated version of 2009*:

The hierarchical framework and structure of CICES (Common International Classification of Ecosystem Services, http://www.cices.eu, Haines-Young and Potschin, 2013) was adopted for the assessment of ecosystem services, following a major revision of the classes and their adaptation to the peculiarities of the marine environment of the Black Sea basin. *Two ecosystem services* have been mapped: "Wild animals and their outputs" and "Animals from in-situ aquaculture", which relate to catch and production of fish and other economically valuable marine organisms in the Bulgarian water area of the Black Sea (Panayotova et.al, 2018). Available data for both services were analysed against

indicators and subsequently ranked according to a 5-point assessment system. As a result, maps were created for the distribution of services in the Exclusive economic zone in the Bulgarian waters.

Relevant websites, web links and files:

Information system of protected areas for Natura 2000: http://natura2000.moew.government.bg;

COST Programme Action CA 15 121: Advancing Marine Conservation in the European and Contiguous Seas (MarCons)

Common International Classification of Ecosystem Services (CICES), http://www.cices.eu;

Executive Agency of Fisheries and Aquaculture (EAFA); http://iara.government.bg;

Institute of oceanology „Prof. Fridtjof Nansen ", BAS – Varna: http://www.io-bas.bg.

Problems/obstacles and scientific and technical needs related to the measure:

Institute of oceanology „Prof. Fridtjof Nansen" to the BAS -Varna, identified the following challenges facing the preservation of marine biodiversity, regardless of the legal and managerial potential available:

- *The absence of a shared vision limits transboundary cooperation*: although EU countries are committed to implementing European directives and other binding documents, there is a marked difference between the countries in terms of implementing and complying with the common EU law;
- *The absence of systematic procedures for the selection of marine protected areas*: regional and national approaches for designation of Natura 2000 protected areas and national protected marine areas reflect different environmental protection goals and different level of importance of environmental issues on the political agenda;
- *The absence of coordinated ecological networks:* the existing protected marine waters are far from achieving efficient coordinated networks;
- *The presence of hot spots of conflicts with private economic interests outweighing conservation goals;*
- *There is a need for assessment of the current state of genetic diversity of species* - a systematic study of the current state of biodiversity at the population-genetic level, with a view to adequate management measures for the conservation of valuable species and populations, including those subject to industrial catch.
- *There is a need of a system for timely control (screening) and managing the risk of introduction of non-native species (potential invasive species).*

  In order to effectively preserve local biodiversity, it is important to develop a programme for early detection of introduced species, primarily in high-risk areas such as port waters, fairways, etc. The programme should meet modern screening requirements, with a comprehensive approach involving the optimal combination of methods (genetic, microscopic, cultivation, environmental and spatial modelling, etc.).
- *There is a need for flexibility and integration of the monitoring programme, in particular for monitoring and assessment of current and/or emerging threats.*

Balancing the monitoring and research activities of individual ecosystems /or their components, combining European and national priorities, taking into account the fact that the Black Sea and the Bulgarian sea coast have specific environmental problems and threats that require a larger and more comprehensive study.

Relevant websites, web links and files: *(for solving problems)*

Ministry of Environment and Water (MOEW); http://www.moew.government.bg;

Executive Environment Agency (ExEA); http://eea.government.bg;

Black Sea River Basin Directorate: (https://www.bsbd.org/bg/index_bg_1668393.html;

Ministry of Regional Development and Public Works (MRDPW);

Ministry of Agriculture, Food and Forests: (MAFF): http://www.mzh.government.bg;

Ministry of Tourism (MT); http://www.tourism.government.bg;

Municipal administrations (MA):

http://www.iisda.government.bg>adm_struktures>municipality_administrations;

Activity / Measure 11.: Cooperation between the countries of the Balkan Peninsula for research on biodiversity, development of joint transboundary projects, planning landscape protection in border areas, links with adjacent protected territories / zones for the creation of transboundary green corridors.

Compliance with national targets: G. Promoting biodiversity conservation in the Balkans.

Compliance with Aichi targets: 2, 3, 7, 8, 9, 11, 12, 13, 15, 19

Assessment of the efficiency of the measure implemented to achieve the desired outcome:

☒ the measures implemented are efficient

☐ the measures implemented are partially efficient

☐ the measures implemented are inefficient

☐ unknown

Rationale for selection:

The political basis for the implementation of biodiversity conservation is Bulgaria's commitments to the implementation of international conventions in the field of biodiversity. Our country, a party to the conventions and an EU member, has been supported in fulfilling its obligations through transboundary programmes and funding of projects for the conservation and restoration of biodiversity. The European Biodiversity Strategy for the period up to 2020 states: *"The European Union will also support ongoing efforts to improve cooperation, create synergies and establish common priorities between biodiversity conventions ....."*

During the 2014-2020 programming period, there is a continued cooperation, with the aim of protecting the waters in transboundary river basin management regions, with the

neighbouring countries: Turkey, Romania, Greece, Serbia and Northern Macedonia. Activities under the *Convention on Cooperation for the Protection and Sustainable Use of the River Danube and the Convention for the Protection of the Black Sea against Pollution*, *the Convention on the Protection and Use of Transboundary Watercourses and International Lakes* (the Helsinki Convention), and other global and regional water initiatives are ongoing. Source: National Report on the Status and Conservation of the Environment, 2019 ExEA-MOEW.

At the end of 2018, the Scientific Research Fund to the Ministry of Education and Science of Bulgaria signed a contract for funding of a research project of the National Museum of Natural Sciences to the BAS: ***"Cyber taxonomic approach in phylogenetic studies on model invertebrate species (Invertebrata, Arachnida, Insecta, Insecta) to clarify problems of the origin, formation and conservation of invertebrate fauna in the Balkan Peninsula."*** The main objective is to lay the foundation for cyber taxonomic research in model invertebrate species (spiders, beetles) with the prospect the methodology developed to be established and adopted as an updated standard in zoological and phylogenetic research in Bulgaria and the Balkans.

In 2017, in line with the IPA Bulgaria-Turkey Programme (2014-2020), a ***Final Transboundary Assessmen***t was developed in the framework of the project ***Joint Istranca Region Protection for Sustainable Development*** (IRPSD) in line with the European Strategy for Intelligent, Sustainable and Inclusive Growth and the relevant national strategic documents. Prevention of deforestation and soil erosion in the forest territories in Burgas district, Republic of Bulgaria and Kirklareli district, Republic of Turkey includes a joint analysis of the current situation and the prospects for nature conservation in the Strandja forest areas.

The project ***"Exploring the Osogovo Mountain Potential for a Transboundary Biosphere Park",*** with the short title TRANSBIORES was developed in the period from May 2014 to November 2015. It is funded by the European Union under the Instrument for Pre-Accession Assistance Bulgaria-Macedonia Cross-border Cooperation Programme. The Bulgarian Biodiversity Foundation - Belasitsa branch is the leading organisation of the project and the partner from the Macedonian side is the "St. St. Cyril and Methodius " University in Skopje, Faculty of Agricultural Sciences and Food - Strumica regional office. The project aims to achieve sustainable transboundary development of the Osogovo area.

Belasitsa Nature Park Directorate to EFA – MAFF is finalising in 2016 the project ***Belasitsa Beyond Borders - Transboundary Cooperation in the Green Belt of the Balkans***: **Belasitsa Nature Park - sustainable regional development with an emphasis on environmental education and communication, and sustainable tourism**. Transboundary cooperation is of great importance for achieving the common goal and for contributing to the joint long-term protection and promotion of the unique diversity of the transboundary Belasica mountain in Bulgaria, Greece and Northern Macedonia. The project is funded by the German Federal Environmental Foundation (Deutsche Bundesstiftung Umwelt - DBU) and implemented jointly by EuroNatur (Germany), Bulgarian Biodiversity Foundation (BBDF) – Belasitsa branch (Bulgaria), Belasitsa Nature Park Directorate to EFA – MAFF (Bulgaria) the managing authority of Lake Kerkini National Park (Greece), and Planetum Ecological Society (N. Macedonia).

Project: "***Drafting a report on the transboundary ecosystem awareness and connectivity between "Rusenski Lom" Nature Park and "Comana" Nature Park in the Republic of Romania and NATURA 2000 and study of alien and invasive species*** under the "Green management for protection of Nature park Rusenski Lom and Nature park Comana" project,

project code ROBG - 464, with the acronym “Green Management”, funded by *INTERREG V-A ROMANIA - BULGARIA 2014 - 2020*, funded by Contract No. ERDF 127571 / 31.10.2018.

Relevant websites, web links and files:

Executive Environment Agency (ExEA): http://eea.government.bg;

Research project of the National Museum of Natural History - BAS on the origin, formation and conservation of the invertebrate fauna on the Balkan Peninsula; http://www.nmnhs.com;

“Joint Strandzha Region Protection for Sustainable Development – IRPSD” project, funded under the Bulgaria - Turkey Transboundary Cooperation Programme; http://www.greenbalkans.org > document-2070;

Project: Belasitsa Beyond Borders - Transboundary Cooperation in the Green Belt of the Balkans: Belasitsa Nature Park: http://www.belasitsa.com

“Rusenski Lom” Nature Park: http://www.rusenskilom.iag.bg

Other relevant information:

After the borders between Eastern and Western Europe were opened, it became clear that the regions along the Iron Curtain had become particularly valuable shelters for many endangered animal and plant species. In recognition of the unique character of these territories, the International Union for Conservation of Nature (IUCN), the German Federal Agency for Nature Conservation (BfN) and German NGOs launched the ***European Green Belt Initiative***. ***The Balkan countries joined the initiative in 1999 when the concept of the Balkan Green Belt was also created***. The mountains along the borders of Bulgaria - Western Stara Planina, Kraishte, Osogovo, Vlahinska, Malashevska, Ograzhden, Belasitsa, Slavyanka, the Rhodopes and Strandzha are a key element of the Concept. Their conservation and sustainable development contributes to the implementation of the largest conservation initiative in the United Europe.

Relevant websites, weblinks and files:

European Green Belt: http:// www.europeangreenbelt.org;

Problems/obstacles and scientific and technical needs related to the measure: no problems/obstacles in the implementation of the measure.

CHAPTER III. PROGRESS ASSESSMENT OF EACH OF THE NATIONAL BIODIVERSITY CONSERVATION STRATEGY OBJECTIVES

The assessment applies the following approaches:

- quantitative indicators that provide measures or indicators based on verifiable data and a scientifically robust and objective evidence base. These indicators provide a measurable tool for assessing progress towards the objectives;
- expert opinions;
- stakeholder consultations;
- opinion of the authors on the basis of primary evidence;
- case studies – to be applied when collection of information and data is difficult.

PRIORITY/OBJECTIVE A. – Strengthening the scientific base of nature conservation activities:

Categories assessing the progress towards achieving the objective:

☐ On track to exceed the objective
☒ On track to achieve the objective
☐ Progress towards achieving the objective, insufficient speed
☐ No significant progress
☐ Movement away from the objective
☐ Unknown

Date of assessment: 2018

Additional information:

Bulgaria's vision for a change in policies and overcoming the existing socio-economic challenges, including also with respect to nature conservation activities, is at the basis of the National Strategy for Scientific Research Development of 2017 - 2030, which sets out the following objectives:

- formulate a national scientific policy that creates conditions and prospects for achieving the objectives set out in the European 2030 Strategy;
- initiate and stimulate a comprehensive process of modernisation of research units - a prerequisite for substantial increase in public funding for science;
- support the transformation of society into a "knowledge society";
- stimulate an increase in the share of eco-technologies in the national economy.

At present, the largest part of scientific research in Bulgaria is carried out in public scientific organisations, including the Bulgarian Academy of Sciences (BAS). A significant part of the scientific capacity in Bulgaria is concentrated in the institutes of the Bulgarian Academy of Sciences, which generate, absorb and apply scientific knowledge, scientific products and other forms of novel knowledge. The biodiversity-related topics are mainly focused in the Institute for Biodiversity and Ecosystem Research (IBER). The main and/or potential users of the IBER scientific products are the Ministry of Environment and Water (MOEW) and its regional structures (RIEWs, National Parks Directorates - NPDs, River Basin Directorates – RBDs), the

Executive Environment Agency (ExEA) with its regional laboratories, as well as higher education institutions in the country.

An important part of the IBER activities is the study of the emergence, evolution and maintenance of biodiversity in the country; the study, rational and efficient use of natural resources with an emphasis on poorly explored natural territories and protected areas of the Natura 2000 ecological network and groups of organisms on the territory of the country that were insufficiently explored; the distribution, use and conservation of medicinal plants and their biologically active substances.

According to the annual reports of IBER, a number of projects of research and applied value were developed in the period 2014 - 2018 (106 in 2014, 105 - in 2015, 118 - in 2016, 121 - in 2017, 25 of which were completed in 2018 and 102 projects are ongoing). The individual projects are not equal in size, duration, scope, participants or value, however they give an idea of the huge scientific output of the institute, which is aimed at nature and biodiversity conservation in Bulgaria. Almost half of the projects implemented by the Institute are funded with national funds. Some of the significant projects implemented by IBER during the reporting period are:

- Defining prohibitions and restrictions of activities in the declarations for protected areas for the conservation of natural habitats and wild flora and fauna", 2014;
- Updated and supplemented edition of the Red Data Book of Bulgaria, which presents 808 plant species and fungi, 287 animals and 166 natural habitats", 2015;
- "Conservation of rare and endangered species in Bulgaria through the implementation of activities under approved action plans", 2016;
- "Mapping and assessment of ecosystem services in sparsely vegetated area in Bulgaria", 2016.

In pursuit of the objectives of the Innovation Strategy for Smart Specialisation 2014-2020, the efforts of IBER are focused on improving the infrastructure and enhancing the level of research, support and broadening scientific contacts with leading scientific institutions in Europe and the world. Lectures, seminars and meetings in different formats, popular science texts, educational boards and other materials raise the awareness of the population and support the development of conservation activities in order to transform our society into a society of knowledge.

The implementation of Priority A. Strengthening the scientific base of nature conservation activities is also supported by the Council of Scientists to the Minister of Environment and Water established on 12 January 2018 and consisting of 26 representatives of the academia and the scientific community from all over the country - among them are heads of units in the BAS institutes and deans of accredited colleges with expertise in environmental and water issues. The Council of Scientists is an independent advisory body assisting the Minister in developing standpoints in relation to his powers connected to the state policy on environmental management and protection.

Another major project that is underway is DIR-5113024-1-48 "Field survey of the distribution of species, assessment of species and habitats across the country, and restoration of biodiversity". The beneficiary of the project is ExEA and the project is funded under Operational Program "Environment 2007-2013", Priority Axis 3: Preservation and restoration of biodiversity. The main objective of the project is to study and evaluate the status of the

species and habitats included in the National Biodiversity Monitoring System (NBMS). Specific objectives are:

- Developing the NBMS by incorporating new field observation schemes;
- Collecting up-to-date information on the distribution and abundance of species of the NBMS at national level;
- Implementing new/contemporary methods to assess the status of species in the NBMS at national level.

Field studies of nearly 700 species from the NBDSMS were carried out under the project, about 3800 maps illustrating the distribution of species according to literary data, potential habitats, monitoring sites and results of species evaluations were drafted, and 7385 field survey forms were input in the Information System of the NBDSMS. In addition to this, genetic methods have been developed to identify the status of species of brown bear, wolf, wild cat and lynx. Field studies and validation of methodologies for mapping cetaceans have been conducted in the exclusive economic zone of the Black Sea.

Progress Indicators:

As a rule, **the main progress indicators** under this priority are:

- types of interdisciplinary research;
- base information for taxonomic groups determination;
- information about new species and communities /atlases, classifications, endangered species and habitats, etc./;
- access to existing scientific information;
- dissemination of scientific information.

Instruments or tools used to assess progress

Progress assessment is based on examination of specific projects, annual scientific plans and outcomes from their implementation, expert opinions.

Relevant websites, web links and/or files:
http://www.iber.bas.bg/?q=bg/node/85
Action plans for conservation of rare and endangered species in Bulgaria:
https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/zastiteni-vidove/planove-za-dejstvie/

Level of reliability of assessment
☒ Based on extensive evidence
☐ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of reliability indicated above.

The level of reliability is based on reports, projects, specialised scientific research papers published on official websites.

Adequacy of monitoring information in support of the assessment

☐ Monitoring related to this objective is adequate
☐ Monitoring related to this objective is partial (for example, it covers only part of the area or problem)
☐ No monitoring system in place in the country that can be used to assess progress towards achieving this objective.
☒ Monitoring is not necessary.

PRIORITY/OBJECTIVE B. – Supporting legislative initiatives

Categories assessing the progress towards achieving the objective:

☒ On track to exceed the objective
☐ On track to achieve the objective
☐ Progress towards achieving the objective, insufficient speed
☐ No significant progress
☐ Movement away from the objective
☐ Unknown

Date of assessment: 2018

Additional information:

During the reporting period 2014 – 2018, legislation directly related to biodiversity conservation in Bulgaria has been drafted, amended and supplemented.

- **Biodiversity Act** (BDA) - promulgated SG No.77/09.08.2002, amended SG No. 98/28.11.2014, amended. SG No. 61/11.08.2015, amended and supplemented SG No. 101/22.12. 2015, amended SG No. 58/26.07.2016, amended SG No. 58/18.07.2017, amended and supplemented SG No. 76/19.09. 2017, supplemented SG No. 77/18.09.2018, amended SG No.98 / 27.11.2018.
- **Protected Areas Act** (PAA) - promulgated SG no. 133/ 11.11.1998, amended and supplemented SG No. 98/28.11.2014, amended SG No. 61/11. 08.2015, amended SG No. 58/18.07.2017, supplemented SG No. 96/ 01.12.2017, supplemented SG No. 77 /18.09.2018.
- **Animal Protection Act (APA)** - promulgated SG No.13/08.02.2008, amended SG No. 53 /27.06.2014.
- **Plants Protection Act** (PPA) **-** promulgated in SG No.61/25.07.2014, amended in SG No.12/ 13.02.2015; amended and supplemented in SG No.44/10.06.2016, amended in SG No.58/18.07. 2017, ; amended and supplemented in SG No.17/23.02.2018.
- **Forest Act** (FA) **–** promulgated in SG No.19/08.03.2011, amended and supplemented in SG No.28/ 28.03. 2014, amended in SG No.53/27.06. 2014, amended in SG No.61/25.07.2014, amended in SG No.98/ 28.10.2014; amended and supplemented in SG No.60/07.08.2015, amended in SG No.79/13.10.2015; amended and supplemented in SG No.100/18.12. 2015, amended in SG No.13/16.02. 2016, amended in SG No.15/

23.02. 2016, amended in SG No.57/22.07. 2016, amended in SG No.61/5.08. 2016, amended in SG No.95/29.10. 2016; amended and supplemented in SG No.13/ 7.02. 2017, amended in SG No.58/18.07.2017; amended and supplemented in SG No.103/28.12. 2017; amended and supplemented in SG No.17/23.02.2018, supplemented in SG No.77/18.09.2018; amended and supplemented in SG No.83/09.10. 2018.

- **Medicinal Plants Act** (MPA) **–** promulgated in SG No. 29/07.04.2000, amended in SG No.98/ 28.11.2014, amended in SG No.58/18.07.2017, amended in SG No.96/01.12.2017.
- **Hunting and Game Conservation Act** (HGCA) – promulgated in SG No. 78 / 26.09.2000, amended in SG No. 60 / 07.08.2015, amended in SG No. 14 / 19.02. 2016, amended in SG No. 58 / 18.07.2017, amended in SG No. 63 / 04.08.2017; amended and supplemented in SG No. 17 / 23/02/2018, supplemented in SG No. 61 / 24.07. 2018, supplemented in SG No. 77 / 18.09. 2018.
- **Fisheries and Aquaculture Act** (FAA) – promulgated in SG No. 41/24.04.2001, amended in SG No. 53/27.06.2014, amended in SG No. 107/ 24.12. 2014, amended in SG No. 12 /13.02.2015, amended and supplemented SG No. 102/ 29.12.2015, amended in SG No. 105 / 30.12.2016, amended in SG No. 58 / 18.07.2017, amended in SG No. 63 / 04.08.2017, amended in SG No. 92 / 17.11.2017, amended in SG No. 103 / 28.12.2017, amended in SG No. 7 / 19.01.2018, amended in SG No. 17 / 23.02.2018, amended in SG No. 27/27.03.2018, amended in SG No. 55 / 03.07.2018, amended and supplemented in SG No. 77 /18.09.2018, amended in SG No. 91 / 02.11.2018, amended in SG No. 98 / 27.11.2018.
- **Genetically Modified Organisms Act** (GMOA) – promulgated in SG No. 27/29.03.2005, amended in SG No. 14/20.02.2015, amended SG No. 58/26.07.2016, amended in SG No. 58/18.07.2017.

During the reporting period 2014 – 2018, the following ordinances directly related to biodiversity conservation in Bulgaria has been drafted, amended and supplemented.

- Ordinance No. 4 of 8.07.2003 on the terms and conditions of issuing permits for the introduction of non-native or reintroduction of native animal and plant species into nature (promulgated in SG No. 65 of 22 July 2003, amended SG No. 29 of 30 March 2018);
- Ordinance No. 8 of 12.12.2003 on the terms and conditions of granting permits for exemptions from the prohibitions regulated in the Biological Diversity Act for animal and plant species listed in Appendix No. 3, for animal species specified in Appendix No. 4, for all species of wild birds, except those specified in Appendix No. 3 and Appendix No. 4 and for the use of non-selective devices, means and methods of capturing and killing specified in Appendix No. 5 issued by the Minister of Environment and Water and the Minister of Agriculture and Forestry (promulgated in SG No. 4 of 16.01.2004, amended and supplemented in SG No. 62 of 27.07.2018);
- Ordinance No. 1 of 2012 on the control and conservation of forest territories (promulgated in SG No. 11 of 07 February 2012, amended and supplemented in SG No. 79 of 13 October 2015, amended and supplemented in SG No. 66 of 23 August 2016);

- Ordinance No. 21 of 12 November 2012 on the terms and conditions for identification, approval, registration and cancellation of sources from the forest seed production base, collection and harvesting of forest reproductive material, their qualification, trade and import (promulgated in SG No.93 of 27 November 2012, amended in SG No. 59 of 17 July 2018);
- Ordinance № 5 of 24.02.2015 on the implementation of measure 12 „Payments under Natura 2000 and the Water Framework Directive" of the Rural Development Programme for the period 2014 – 2020 (promulgated in SG No. 16 of 27.02.2015, in force as of 27.02.2015, amended in SG No. 19 of 28.02.2017, in force as of 28.02.2017);
- Ordinance on the development of protected territories management plans (promulgated in SG No. 13 of 15 February 2000; amended in SG No. 55 of 07 July 2017);
- Ordinance on the terms and conditions of development and adoption of protected areas management plans (promulgated in SG No. 7 of 27 January 2009, amended in SG No. 93 of 24 November 2009, amended in SG No. 55 of 07 July 2017).

The regulatory framework is completed with more than 100 rules, regulations and methodologies to the relevant laws.

A set of documents has been developed for a draft Ordinance of the Council of Ministers amending and supplementing the Regulation on the Protection of Marine Waters Environment, adopted by Ordinance of the Council of Ministers No. 273/2010, which is in the process of coordination within the Working Group 20 in relation to the transposition of the requirements of Directive (EU) 2017/845 amending the Marine Strategy Framework Directive 2008/56/ EC.

In summary, laws and regulations reflect the relevant socio-economic conditions. In the period 2014 - 2018, all laws and regulations in force related to biodiversity conservation have been amended or supplemented, some in full, in order to be updated and to transpose international and European conventions and directives, strategies and plans for biodiversity conservation.

The conditions under which the Bulgarian legislation was drafted, including the legislation concerning the environment and biodiversity, are characterised by dynamic social changes, accelerated synchronisation with European standards, low standard of living of the population, a very active and competent public sector and still insufficient administrative capacity of municipal and state authorities.

Progress Indicators:

- amendments to existing and adoption of new primary and secondary legislation;
- mainstreaming biodiversity conservation in even more sectorial policies, strategies and plans;
- enhancing cooperation and coordination among various stakeholders and institutions;

Instruments or tools used to assess progress

The assessment of progress towards this objective / priority is the full relevance to the needs of biodiversity conservation activities - 54 amendments were made in 7 current laws and 7 ordinances in force, a new law was drafted and passed, with a specific focus on biodiversity conservation.

Relevant websites, web links and files:

https://www.lex.bg/laws/ldoc/2135456926
https://www.lex.bg/index.php/mobile/ldoc/2134445060
https://www.lex.bg/laws/ldoc/2135579104
https://www.lex.bg/laws/ldoc/2136270173
https://www.lex.bg/laws/ldoc/2135721295
https://lex.bg/laws/ldoc/2134916096
https://www.lex.bg/laws/ldoc/2134941184
https://www.lex.bg/laws/ldoc/2135184393
https://lex.bg/bg/laws/ldoc/2135501153
https://lex.bg/bg/laws/ldoc/2135469339
https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Legislation/Naredbi/BR/Naredba%238-REV%202018.pdf
https://www.lex.bg/laws/ldoc/2135774074
https://www.lex.bg/laws/ldoc/2135824846
https://www.lex.bg/bg/laws/ldoc/2136458720
https://www.lex.bg/laws/ldoc/-549446656

Level of reliability of assessment

Please indicate the level of reliability of assessment
☒ Based on extensive evidence
☐ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of reliability indicated above.
The information above is based on publications in the State Gazette.

Adequacy of monitoring information in support of the assessment
☐ Monitoring related to this objective is adequate
☐ Monitoring related to this objective is partial (for example, it covers only part of the area or problem)
☐ No monitoring system in place in the country that can be used to assess progress towards achieving this objective
☒ Monitoring is not necessary

PRIORITY/OBJECTIVE C. - Expanding and strengthening the network of protected territories

Categories assessing the progress towards achieving the objective:
☐ On track to exceed the objective

☒ On track to achieve the objective
☐ Progress towards achieving the objective, insufficient speed
☐ No significant progress
☐ Movement away from the objective
☐ Unknown

Date of assessment: 2018

Additional information:

In the period following the adoption of the National Biodiversity Conservation Strategy (1998), the Biological Diversity Act (2002) was adopted, respectively, in Bulgaria the network of protected areas of Natura 2000 ecological network was established. The protected areas are focused on conservation of natural habitats and the habitats of species, as well as the conservation of wild birds, and partially overlap with the network of protected territories.

In order to assess of the progress for the 2014-2018 reporting period, the activities carried out in support of the implementation of Objective C. - Expanding and strengthening the network of protected territories (including Natura 2000 protected sites) are presented below.

The actions undertaken that are linked to the implementation of PRIORITY/OBJECTIVE C. - Expanding and strengthening the network of protected territories in 2014 are as follows:

- 34 orders issued for the declaration, change in area or change in the regime of use of protected territories and update of protected territories areas;
- 43 venerable trees have been taken out and 7 new venerable trees have been declared;
- 274 permits and licences issued under the regulations of Chapter III and IV of the BDA;
- 38 permits issued under the regulations of the BDA;
- one order issued for declaration of protected area;
- 228 protected zones from Natura 2000 network mapped;
- 5 new protected territories declared, of which 4 in the category „protected site“ and 1 in category „natural landmark“ with a total area of 59.8079 ha.;
- reduced area of 1 protected territory –„Marsh snowdrop (*Leucojum*) habitat” natural landmark, Sazluka area, due to a more precise measuring;
- one protected territory deleted – „Kaleto” with a total area of 21.4671 ha., due to loss of the object of protection and failure to fulfil its function;
- change in the regime of activities in the protected territories – “Pygmy cormorant habitat” protected site - Plovdiv”, „Irakli” protected site, „Suha reka“ protected site;
- updated area of 24 protected territories related to a more precise measuring;
- draft-orders concerning 27 protected areas for natural habitats conservation developed and published with public access;

- 61 permits issued for exemptions from prohibitions concerning protected animal and plant species, introduced through the Biodiversity act;
- 43 action plans concerning endangered animal and plant species drafted and approved;
- drafted assignments for management plans of protected territories „Danov hulm", "Mladezhki hulm" and "Hulm na osvoboditelite" – Plovdiv; assigned management plans of 6 protected areas[1];
- data in the information system of Protected Territories and Protected Areas Register have been updated and a web application is supported (ongoing).

Progress data provided, including the physical dimensions, speak of enhanced activity for biodiversity conservation in the Republic of Bulgaria, respectively of the current legal and regulatory acts in force. The level of progress is defined as " On track to achieve the objective."

The activities implemented in relation to Priority/Objective C. - Expanding and strengthening the network of protected territories in 2015 are as follows:

- 3 protected areas management plans were developed for the conservation of wild birds;
- 1 new protected territory - "Eastern sowbread (*Cyclamen coum*) habitat" protected site with an area of 3.1925 acres announced;
- the area of „Marsh Snowdrop (*Leucojum*)" protected site was reduced by 78.525 acres;
- 119 species and 87 habitats mapped;
- deleted 1 protected territory –„Marinovets" protected site with an area of 4 ha. because of lack of subject for protection;
- the area of 14 protected territories updated, pursuant to Article 42 (6) of the Protected Territories Act (more precise measuring);
- deleted 80 venerable trees, announced 11 new;
- action plans for 4 plant species have been developed; management plans for 23 protected territories (including 18 reserves, 4 maintained reserves and 1 protected site); management plans for three protected areas for conservation of wild birds;
- DIR 51130-24-1-48 project "Field surveys of species distribution/nationwide assessment of the status of species and habitats" was implemented;
- in the framework of the project "Assessment and mapping of the status of freshwater and marine ecosystems and their ecosystem services in Bulgaria (WEMA) 2015-2017", over 5700 sites of standing freshwater ecosystems with a total area of 456 km^2 were mapped with a minimum mapped area of 0.25 ha.; about 32,000 linear segments of flowing freshwater ecosystems with a total length of about 52 km; about 340 point sources were also mapped. 8 marine ecosystem subtypes and 4 river ecosystem subtypes were identified, as well as transitional waters and open canals;
- Projects for mapping and assessment of the status of 9 major types of ecosystems and their ecosystem services throughout the country outside the Natura 2000 sites have been

[1] Source: Report on the level of implementation of the approved policies and programmes of the Ministry of Environment and Water as of 31.12.2014.

implemented in the framework of the BG03 Programme in the period 2015 - 2017. The activities carried out during this period are assessed as compliant with the national strategy objective, with progress towards achieving the priority.

The activities implemented in relation to Priority/Objective C. - Expanding and strengthening the network of protected territories in 2016 are as follows:

- an action plan for the wolf species has been developed;
- management plans for 30 protected territories have been adopted, including 1 national park (NP), 2 nature parks, 15 reserves (R), 10 maintained reserves (MR), 1 natural landmark (NL), 1 protected site (PS);
- 1 new protected territory has been declared – protected site "*Corylus colurna* habitat" with an area of 3.0038 ha;
- the area of "Atoluka" protected site was reduced by 19.4 ha due to its inability to fulfil its purpose;
- the area of 9 protected territories was updated in connection with more accurate measurements on the basis of the regulations of Article 42 (6) of the Protected Territories Act.

The activities implemented in relation to Priority/Objective C. - Expanding and strengthening the network of protected territories in 2017 are as follows:

- 4 new protected territories were announced – „Kalna mutnitsa" protected site with an area of 22.5712 ha., „Narrow-leaved peony (*Paeonia tenuifolia*)" protected site with an area of 13.520 ha.; „Kashkavalya" protected site with an area of 16.434 ha., „*Shrubby cinquefoil*" protected site with an area of 34.457 ha.;
- updated area of 7 protected territories in connection with newer measurements on the basis of the regulations of Article 42 (6) of the Protected Territories Act;
- deleted 39 venerable trees, announced 3 new;
- completed mapping of the 9 ecosystems in Bulgaria - forests, urbanised, freshwater, marine, agricultural, grassland and shrubs, areas with diffuse vegetation, wetlands;
- project BG03.PDP1 „Improving the Bulgarian Biodiversity Information System" (IBBIS) implemented;
- 30 permits issued under Ordinance 8/2003 for exemptions to the prohibitions introduced by the Biodiversity Act with regard to protected species;
- 6 MOEW coordination opinions were issued under the Fisheries and Aquaculture Act;
- one opinion issued on snowdrop concession to the MAFF;
- 4 letters issued under procedures related to applications/requests for cultivation of non-native species;
- 10 permits issued for visits to reserves and maintained reserves.

The activities implemented in relation to Priority/Objective C. - Expanding and strengthening the network of protected territories in 2018 г. are as follows:

- changes in the activity regime of 1 protected territory – "Karlukovo Karst complex", on the territory of Karlukovo in order to ensure effective protection of the caves "Temnata dupka", "Prohodna", "Svirchovitsa", "Bankovitsa" and "Hajdushka dupka", which are natural landmarks.
- updated area of 26 protected territories in connection with more accurate measurements on the basis of the regulations of Article 42 (6) of the Prtected Territories Act.
- adopted 8 new protected territories management plans – 2 reserves and 6 maintained reserves.
- approved 3 action plans for protected species – lesser white-fronted goose, red-breasted goose, black vulture.
- 2 protected areas were announced for conservation of natural habitats and wild flora and fauna (Devnenski hills and Kraimorska Dobrudzha).
- approved action plan for the conservation of red-breasted goose (*Branta ruficollis*) in Bulgaria for the period 2018 - 2027.
- 2 protected territories announced – „Stulbishte" protected site on the territory of Mechka village and „*Shrubby cinquefoil*" protected site on the territory of Batak with a total area of 722.91 acres.
- one natural landmark has been re-categorised - „Alepu marsh", on the territory of Sozopol in the „Alepu marsh" protected site.
- implemented a procedure to reduce the area of Kaliakra Reserve by 2.1987 ha. and to increase the area of the "Stepite" protected site with an area of 2.0439 ha.
- increased the area of "Marsh Snowdrop (*Leucojum*)" protected site in the "Blatoto" area by 10.8976 ha., in order to preserve the natural habitat of marsh snowdrop on the territory of Sozopol.
- the final version of the management approach for Natura 2000 protected areas has been approved, which envisages the establishment of new Natura 2000 network management structures at national and regional level and the introduction of the mandatory requirement to develop territorial plans for the management of the network.
- ongoing is the phased development and adoption of management plans for protected territories, the implementation of existing ones, as well as the development and implementation of action plans for protected and rare plant and animal species.

Progress Indicators:

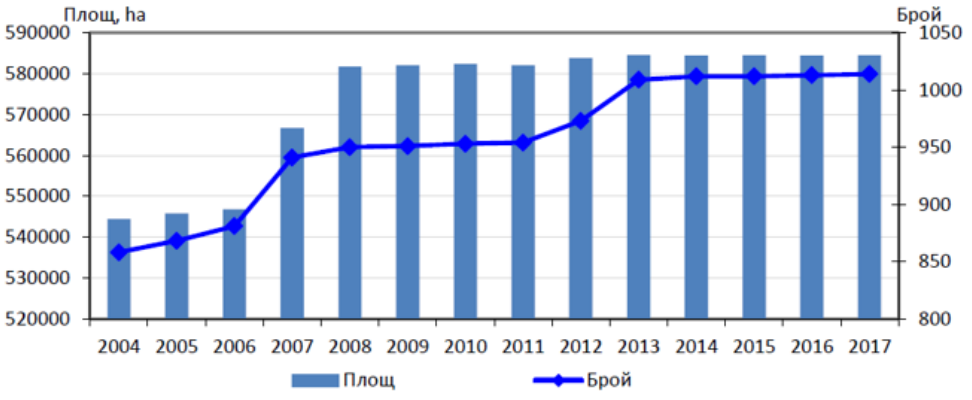
Assessment criteria measuring the progress towards achieving this objective are as follows:

- identified legislative and subordinate units' issues related to the network of protected territories and ways and approaches to address them;
- identifying areas of particular significance due to the high biodiversity established;
- determining the base area required for the implementation of the protected territories network and for improvement of its operation;
- determining the management needs of the protected territories network;

- drafting action plans and management plans for protected territories and for the endangered plant and animal species;
- expanding and strengthening the protected territories network;
- compliance of the actions implemented out during the reporting period with the set objective.

Protected territories under the national legislation in Bulgaria

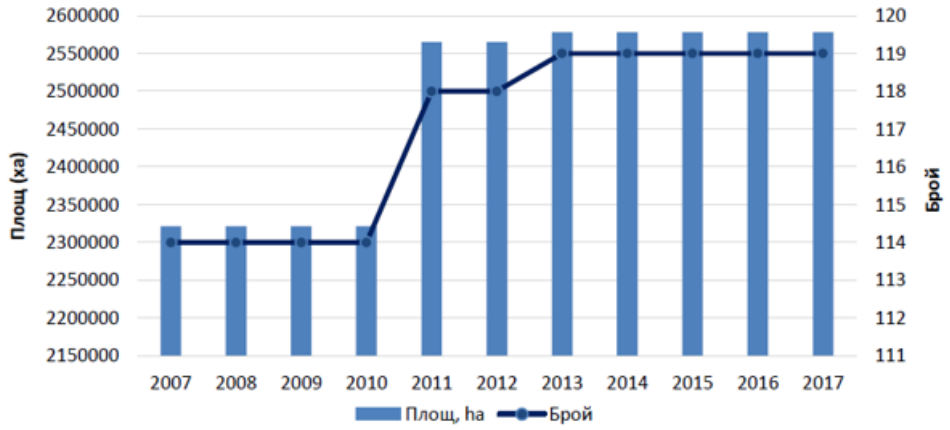
Figure 1. Changes in the number and the area of the protected territories in Bulgaria for the period 2004 – 2017



Source: MOEW/ExEA

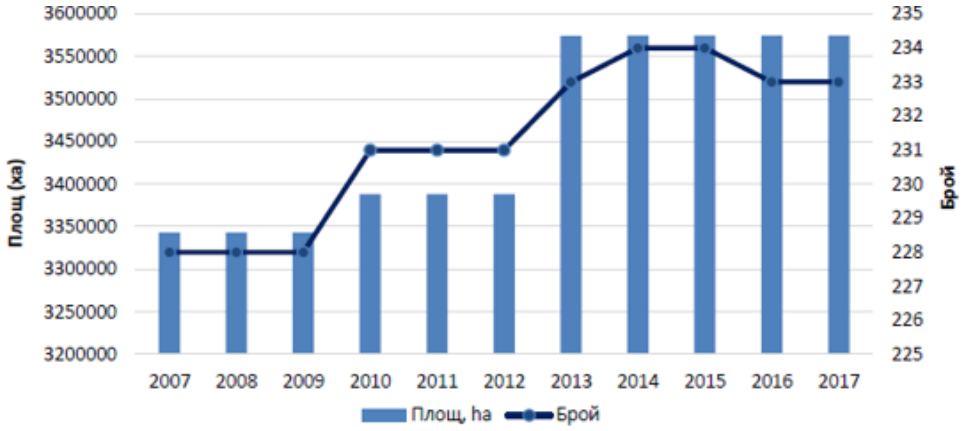
Protected territories in Bulgaria under the Habitats Directive and the Birds Directive

Figure 2. Changes in the number and the area of the protected zones under the Birds Directive in the period 2007 – 2017



Source: MOEW/ExEA

Figure 3. Changes in the number and the area of the protected zones under the Habitats Directive in the period 2007 – 2017, in ha



Source: MOEW/ExEA

Instruments or tools used to assess progress

In order to evaluate the progress, information from scientific, research, pedagogical and departmental sources, as well as information provided by non-governmental organisations is taken into account. Processing and interpretation of this information is carried out by the ExEA and the National Nature Conservation Service Directorate to the MOEW.

During the period 2004-2017, the area of protected territories increased and at the end of 2017 the number of protected territories in Bulgaria is a total of 1 014 with a total area of 584 563.2 ha or 5.27% of the territory of the country.

Relevant websites, weblinks and files:

ExEA, National Biodiversity Status Monitoring System: http://eea.government.bg/bg/bio/nsmbr;

Register of protected territories and protected areas in Bulgaria: http://pdbase.government.bg/zpo/bg/index.jsp

Register of venerable trees in Bulgaria: http://eea.government.bg/v-trees/bg/

Management plans for reserves and maintained reserves: https://www.moew.government.bg/bg/priroda/zastiteni-teritorii/planove-za-upravlenie-na-zastiteni-teritorii-vlezli-v-sila/rezervati-i-poddurjani-rezervati/

Management plans for protected sites and natural landmarks: https://www.moew.government.bg/bg/priroda/zastiteni-teritorii/planove-za-upravlenie-na-zastiteni-teritorii-vlezli-v-sila/zastiteni-mestnosti-i-prirodni-zabelejitelnosti/

Management plans for conservation of rare and protected species in Bulgaria: https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/zastiteni-vidove/planove-za-dejstvie/

Management plans for wild birds conservation protected areas: https://www.moew.government.bg/bg/priroda/natura-2000/planove-za-upravlenie-za-zastiteni-zoni/zastiteni-zoni-za-opazvane-na-divite-ptici/

Level of reliability of assessment

Please indicate the level of reliability of the assessment.

☒ Based on extensive evidence

☐ Based on partial evidence

☐ Based on limited evidence

Please provide an explanation for the level of reliability indicated above.

Progress analysis was done on the basis of data obtained from the National Nature Protection Service Directorate to the Ministry of Environment and Water, implementation of the main scientific research needs, inventories, international projects.

Adequacy of monitoring information in support of the assessment

☒ Monitoring related to this objective is satisfactory.

☐ Monitoring related to this objective is partial (for example, it covers only part of the area or problem).

☐ No monitoring system in place in the country that can be used to assess progress towards achieving this objective.

☐ Monitoring is not necessary.

Please describe how the objective is monitored and indicate whether a monitoring system is in place.

The implementation of this objective is monitored through the supplementation of the national database during the reporting period with new high resolution layers for the following types of land cover - agricultural areas (pastures), artificially sealed territories, forest territories, surface water bodies and wetlands. Data from the 2014 mid-winter count of waterfowl and from the massive monitoring of brown bear and wild goat is being used.

In 2015, all standard forms for protected areas under Natura 2000 were updated. 700 reports assessing status of the species surveyed were drafted.

- During the reporting period, the number of websites in the MOEW system was increased to 29 with the launch of a new specialised site for reserves in the Pazardzhik region, developed under the project “Conservation and restoration of biological diversity” in the framework of OP “Environment 2007–2013."

In summary, the expected benefit to society of the monitoring, analysing and assessing the status of the components of the environment and the factors affecting them, and providing representative and up-to-date information on the state of the environment has been implemented to the extent necessary. The periodic newsletters on the state of the environment in Bulgaria (daily and quarterly) are drafted and published on time, and the National Report on the state of the environment in Bulgaria is published every year.

Provision of up-to-date information that is sufficient in terms of scope, the analysis and assessment of the status of the components of the environment and the factors affecting them; providing access to information; providing the information state institutions need for the purposes of environmental management have been implemented to the extent appropriate for the time range.

Tasks related to maintenance and development of information systems and public registers are being implemented. The information in the databases of the subsystems to the National Environmental Monitoring System is expanded and updated. The software used is maintained and updated. The common nomenclatures of the databases are updated.

Relevant websites, weblinks and files:
http://eea.government.bg/zpo/bg/
http://eea.government.bg/bg/bio/nsmbr
http://natura2000.moew.government.bg
http://rezervati.riewpz.org/
http://ope.moew.government.bg/bg/projects/projectdetail/cid/10/id/359/page/6?active=1

PRIORITY/OBJECTIVE D. – Environmental education and training

Categories assessing the progress towards achieving the objective:

☐ On track to exceed the objective

☒ On track to achieve the objective

☐ Progress towards achieving the objective, insufficient speed

☐ No significant progress

☐ Movement away from the objective

☐ Unknown

Date of assessment: 2018

Additional information:

Conscious and responsible attitude on the part of different social groups towards the environment is promoted through information events and educational activities and initiatives, as well as through the implementation of efficient, transparent and responsible control activities for law enforcement and compliance with the environmental protection legislation.

To this end, information campaigns were carried out during the reporting period in order to raise the environmental awareness and culture of different social groups. In the period 2014-2017, a total of 1192 forums, training seminars, roundtables, conferences for students, teachers, the business, non-governmental organisations, employees of the municipal and state administration of the MOEW and its branches were held.

In the period 2014-2017, a total of 1255 open lessons were held for university and high-school students, as well as for children in the kindergartens. Every year, education campaigns and initiatives are held for an average of 30,000 children and students from more than 760 schools and kindergartens in the country.

"Knowledge for Natura 2000" project is being implemented to harmonise the level of initial information.

In 2016, 12 projects were developed under the BG03.SGS "Developing a national campaign for training and awareness raising through volunteering and supporting activities".

In 2017, 122 school projects, 121 kindergarten projects, and 232 municipal and mayoral projects were funded through a total of 475 grant contracts aimed at improving the environmental education for adolescents.

The MOEW's regional units own and develop 32 information and visitor centres throughout the country, which were contacted for assistance and co-operation by 3,200 individuals in 2017 and by 3,824 individuals in 2018, which demonstrates a clear trend of growth.

Additional training is also provided by IBER, which is accredited for training PhD students in ecology and ecosystems conservation, botany, zoology, mycology, hydrobiology, parasitology and helminthology, and genetics. The Institute runs schools for students and young nature lovers at the Bulgarian Ornithological Centre. The course "Introducing Basic Methods for Ecological Research in Ornithology" - Biological Experimental Station Kalimok was launched and is currently active. During the reporting period, IBER published a university textbook on Conservation Biology, in partnership with Boston University.

Progress Indicators:

The main criterion for assessing progress towards this objective is generally considered to be **environmental education and supplementary training activities**. This indicator measures in a meaningful way the outcomes and the degree of impact on the population coming from informational and educational programmes and campaigns, and raising public awareness and culture in the field of biodiversity and the environment. The main progress indicators under this Priority/objective are:

- Number of information campaigns;
- Number of seminars, discussions, round tables and education campaigns;
- Number of information and training events held by different educational institutions;
- Number of children in kindergartens and students in schools covered by information and education initiatives of the MOEW and its units.

Instruments or tools used to assess progress

- the degree of mainstreaming biodiversity conservation topics into different educational levels and forms of training;
- improving the mainstreaming of the biodiversity conservation in Bulgaria topic in higher and secondary education;
- expert opinions and stakeholder consultations;
- Annual reporting under Programme 5 "Information, Public Participation in Decision-Making and Implementation of Control Mechanisms" from the MOEW budget.

Relevant websites, weblinks and files:
http://www.iber.bas.bg/?q=bg/node/83
https://www.mon.bg
https://www.moew.government.bg/bg/dokladi-za-stepenta-na-izpulnenie-na-politikite-i-programite-po-byudjeta-na-mosv-za-2018-g/#attached-files
http://eea.government.bg/bg/soer/2017/eco-consciousness/index

Level of reliability of assessment
Please indicate the level of reliability of assessment
☐ Based on extensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of reliability indicated above.
It is determined on the basis of an assessment of the current level of environmental education and training obtained as a result of a review of the curricula of secondary schools and higher education institutions, specialised developments related to this priority/objective, interviews, consultations, etc., information and educational initiatives carried out by MOEW and its departments.

Adequacy of monitoring information in support of the assessment
☐ Monitoring related to this objective is adequate
☐ Monitoring related to this objective is partial (for example, it covers only part of the area or problem)
☐ No monitoring system in place in the country that can be used to assess progress towards achieving this objective.
☒ Monitoring is not necessary.

PRIORITY/OBJECTIVE E. - Developing and implementing an eco-tourism policy

Categories assessing the progress towards achieving the objective:
☐ On track to exceed the objective
☒ On track to achieve the objective
☐ Progress towards achieving the objective, insufficient speed

☐ No significant progress
☐ Movement away from the objective
☐ Unknown

Date of assessment: 2018

Additional information:

The national strategy defines eco-tourism as a relatively new but rapidly developing sector in the tourism industry, given that fact that Bulgaria has an exceptional potential for the development of ecotourism, having in mind the following is available in the country:[2]

- over 1,000 protected territories and sites including 55 reserves, 344 natural landmarks, 564 protected sites, 3 national and 11 nature parks, 35 maintained reserves, 574 protected plant species, 483 protected animal species and 1646 protected trees. Ten of the country's reserves are included in declared UNESCO biosphere parks under the UNESCO Man and Biosphere Programme, four of which have been adapted to the "modern" type and three of the "old" type which have not been adapted. Three of the natural sites - Pirin National Park, "Srebarna" Reserve and Central Balkan and the beech forests are included in the UNESCO World Heritage List;
- about 37,000 km. marked mountain trails in the country;
- 3 international tourist routes - Kom – Emine, part of the European tourist route E3, the European tourist route E-4 (Vitosha - Verila - Rila - Pirin) and the European tourist route E-8 (Rila – Rhodopes);
- relatively good network of mountain trails, developed and maintained park infrastructure for tourism and recreation, interpretative routes, mainly in national and nature parks, as well as good conditions for accommodation in guest houses and tourist facilities, in line with the peculiarities of the regions;
- available accommodation for the purposes of eco-tourism is very diverse in terms of quality and accessibility and is scattered almost all over the country.

The new strategic framework for the development of eco-tourism seeks to strike a balance between the economic, environmental and socio-cultural aspects of tourism development, taking into account the basic principles of sustainability:

- optimal use of natural resources, which are a key element in tourism development, supporting the main ecological processes and protection of natural heritage and biodiversity;
- respect for the socio-cultural identity of host communities, protection of their cultural heritage and values, tolerance and contribution to overcoming multicultural differences;
- providing viable, long-term economic operations with fair and equitable socio-economic benefits for all stakeholders, including stable employment, income opportunities and social services for host communities and contribution to fighting poverty.

[2] According to NSI data, 2015

Progress Indicators:

- eco-tourism strategies developed at national and regional level;
- development of biodiversity-friendly forms of ecotourism;
- degree of understanding of biodiversity as an eco-tourism resource.

Instruments or tools used to assess progress

Available strategies, plans, projects for eco-tourism development.

Relevant websites, weblinks and files:

http://www.tourism.government.bg/bg/kategorii/strategicheski-dokumenti
https://www.mrrb.bg
https://www.mzh.government.bg/bg/
https://www.moew.government.bg

Level of reliability of assessment

Please indicate the level of reliability of assessment

☐ Based on extensive evidence

☒ Based on partial evidence

☐ Based on limited evidence

Please provide an explanation for the level of reliability indicated above.

Assessment was made on the basis of existing statistical information, information on strategic planning in the sector and actions undertaken during the reporting period towards meeting this priority/objective.

Adequacy of monitoring information in support of the assessment

☐ Monitoring related to this objective is adequate

☐ Monitoring related to this objective is partial (for example, it covers only part of the area or problem)

☒ No monitoring system in place in the country that can be used to assess progress towards achieving this objective.

☐ Monitoring is not necessary.

Please describe how the objective is monitored and indicate whether a monitoring system is in place.

There is no specifically developed monitoring system under this priority. Statistical data about actual number of visits/accommodation stays are used.

Relevant websites, weblinks and files:

National Eco-Tourism Strategy, 2004 and a 5-year National Action Plan for Eco-Tourism Development for the period 2004-2008: http://www.gorabg-magazine.info;

PRIORITY/OBJECTIVE F. – Promoting the conservation of the Black Sea basin

Categories assessing the progress towards achieving the objective:

☐ On track to exceed the objective
☒ On track to achieve the objective
☐ Progress towards achieving the objective, insufficient speed
☐ No significant progress
☐ Movement away from the objective
☐ Unknown

Date of assessment: 2018

Additional information

During the reporting period a number of actions were undertaken to achieve the objective.

- ongoing work on the implementation of the requirements of the Marine Strategy Framework Directive (MSFD) 2008/56/EC.
- an action plan drafted for the development of a Strategy for protection of the environment in marine waters of the Black Sea and the Republic of Bulgaria.
- monitoring programmes of the current status of the marine environment developed, in line with the requirements of Article 11 of the Marine Strategy Framework Directive.
- participation in a bilateral meeting of the Republic of Bulgaria and the Republic of Romania with the EC on the implementation of Article 12 of the Marine Strategy Framework Directive.
- project proposals being developed under BG02 – Integrated management of marine and inland water programme.
- programme of measures is under development for the achievement and maintenance of good status of the marine environment as a key element of the Strategy for protection of the environment in marine waters of the Black Sea (the Marine Strategy of the Republic of Bulgaria).
- project has been developed to support the development of a National Network for maintaining and achieving good status of the marine environment.
- in the period 2015-2017, the Black Sea River Basin Directorate and the Institute of Oceanology to the BAS conducted a research on the state of the marine environment and improvement of monitoring programmes.
- in the period 2015-2016, a detailed monitoring of marine waters (IMAMO) was carried out by the Black Sea River Basin Directorate.
- a procurement procedure was launched for an Environmental assessment to bring in compliance the Marine Strategy and the Programmes of measures.

Progress Indicators:

No current data for this indicator.

Instruments or tools used to assess progress
Strategies, agreements, scientific research activities, programmes of measures, budget forecasts, wet zones management plans.

Relevant websites, weblinks and files:
Black Sea River Basin Directorate: (https://www.bsbd.org/bg/index_bg_1668393.html;
Institute of oceanology „Prof. Fritjof Nansen", BAS – Varna: http://www.io-bas.bg;
Programme COST Action CA 15 121: Advancing Marine Conservation in the European and Contiguous Seas (MarCons) - https://www.cost.eu/actions/CA15121/#tabs|Name:overview.

Level of reliability of assessment
Please indicate the level of reliability of assessment
☒ Based on extensive evidence
☐ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of reliability indicated above.

Based on the adopted Black Sea Coast Act, a number of strategic, programme, research studies related to the implementation of this priority.

Adequacy of monitoring information in support of the assessment
☒ Monitoring related to this objective is adequate
☐ Monitoring related to this objective is partial (for example, it covers only part of the area or problem)
☐ No monitoring system in place in the country that can be used to assess progress towards achieving this objective.
☐ Monitoring is not necessary.

Please describe how the objective is monitored and indicate whether a monitoring system is in place.

The objectives of the Marine Conservation Strategy of the Republic of Bulgaria are aimed at achieving and maintaining the "good status" of the marine environment by 2020, protecting and preserving the marine environment, preventing its deterioration or, where possible, restoring the marine ecosystems in areas that have been adversely affected and preventing or reducing the introduction and release of substances of anthropogenic origin into the environment in order to phase out pollution and ensure there is no significant impact or risk to human health, biodiversity of marine ecosystems and lawful uses of the sea.

The Programme of measures (PoMs) to the Marine Strategy contains measures aimed at ensuring reduction of anthropogenic pressure, for which no measures were planned in the updated version of the River Basin Management Plan of the Black Sea River Basin District or where measures planned are considered insufficient to achieve good status of the marine water environment.

In 2018, in line with the Programme of measures to the Marine Strategy (MS), the BSRBD, by itself or in partnership, participates in the implementation of the following measures for which action has been taken, namely:

- adoption and implementation of a Regional action plan for the Black Sea regarding marine litter;
- coordinated organisation of/support to annual campaigns to raise the awareness of the business sector and the general public about the consequences and the impact of marine litter on the marine environment;
- development and implementation of a general action plan for early detection, mitigation and impact assessment of non-native species;
- amendments to the legislation in force, if necessary, through the introduction of licensing regime for activities in the marine environment or other regulatory changes;
- monitoring of selected seabird species for 2018, in line with the Descriptor 1 Monitoring Programme - Biodiversity of the Marine Strategy Framework Directive;
- conducting solid waste monitoring along the North/South Black Sea coastline/ beaches for 2018 in line with the Descriptor 10 Monitoring Programme - Marine litter and the MSFD.

In January 2016, an agreement was signed between the MOEW and the Institute of Oceanology - BAS for 2016 on the monitoring of coastal waters in compliance with the requirements of Article 171 (2) (3) of the Water Act and the Water Framework Directive.

Monitoring campaigns have been carried out to collect data on priority substances and pollutants in coastal and territorial marine waters.

A chemical laboratory was opened for the analysis of petroleum products, nutrients and micro-organisms in ballast water discharge from ships.

Every year, EAFA conducts four scientific surveys in the Bulgarian Black Sea waters - two demersal and two pelagic during the spring-summer and autumn-winter seasons, in order to assess the stock in the Bulgarian waters of the Black Sea.

Initial surveys were conducted for marine litter at the surface and at the bottom of the sea in the framework of the ISMEIMP project (2015-2016). In 2017-2018, based on a monitoring programme under Descriptor 10, a survey of the Bulgarian coastline was carried out in order to collect data on the quality and quantity of marine litter and the main sources of pollution.

Ongoing is the data and information collection by the competent ministries and agencies to inform the update of the initial assessment of the current status of the marine environment.

The outcomes under projects *(IMAMO, MARLEN, ISMEIMP, IISSCZM),* funded under BG02 Programme of the financial mechanism of the European Economic Area allowed for:

- addressing the gaps in the initial assessment of the status of marine environment with respect to nutrients, specific pollutants and priority substances in marine waters, sediments and biota;
- developing instruments for assessing the marine environment related to marine litter, eutrophication of surface water and underwater noise;
- setting targets and defining indicators for good status of the marine environment and, in practice, for the overall implementation of the Marine Strategy Framework Directive;

- developing an integrated information system to support the management of the coastal zone, which also supports monitoring of the marine environment, including in relation to oil spills.

A Bulgarian-Romanian meeting was held to coordinate the implementation of the MSFD requirements for the Black Sea region. An interagency expert advisory group on the implementation of the MSFD was set up, comprising representatives from the competent authorities responsible for the implementation of the Maritime Strategy, the scientific community, maritime district administrations and municipalities, which is to provide expert and operational support to the Advisory and Coordination Council on the environmental protection of the marine environment in the Black Sea waters;

A meeting of the Interministerial Expert Advisory Group on the implementation of the MSFD was held to discuss the activities in the short and long term aimed at preventing the negative impacts on the marine ecosystems of the white clam harvesting.

An agreement between the MOEW and IO-BAS for marine waters monitoring is in the process of implementation. In order for an additional monitoring of marine waters to be provided (on the basis of a financial resource provided through EMEPA), an Agreement No. 409/03.07.2018 was signed between the BSRBD and IO-BAS for marine waters monitoring.

During the first half of 2018, MOEW and BSRBD representatives participated in a joint meeting of the Advisory Groups on Ecological Aspects of Fisheries Management and Conservation of the Black Sea Living Resources (21st Annual Meeting of FOMLR AG) and "Conservation on Biodiversity" (21st Annual Meeting of CBD AG), as well as a meeting of the Land-Based Pollution Control Advisory Group (23rd Meeting of LBS AG) to the Black Sea Pollution Protection Commission, Istanbul.

In summary, there has been an increase in investment from all Black Sea countries targeted at marine biodiversity restoration.

Relevant websites, weblinks and files:

http://www.cices.eu; (https://www.bsbd.org/bg/index_bg_1668393.html, http://ec.europa.eu/environment/nature/natura2000/management/index_en.htm; http://www.io-bas.bg , http://natura2000.moew.government.bg

PRIORITY/OBJECTIVE G. – Promoting biodiversity conservation in the Balkans:

Categories assessing the progress towards achieving the objective:

☒ On track to exceed the objective

☐ On track to achieve the objective

☐ Progress towards achieving the objective, insufficient speed

☐ No significant progress

☐ Movement away from the objective

☐ Unknown

Date of assessment: 2018

Additional information

During the reporting period 2014-2018, the following projects, actions and events, relevant to the biodiversity conservation in the Balkans, were carried out:

- Launching the WetMainAreas project, which is implemented on the territory of Bulgaria, Greece, Albania and North Macedonia. The objective of the project is mapping and assessment of wet ecosystems and their interconnectivity on the Balkans with the aim of their better management and conservation;
- "Genetic identity and bioavailability of heavy metals in the populations of the golden jackal in Bulgaria and Serbia", IBER, 2015-2017;
- Management of burned forest areas in South-eastern Europe;
- Monitoring of fires in the European forests through information systems;

During the reporting period, the international projects with the participation of IBER-BAS related to research/conservation of biodiversity on the Balkans are more than twenty and are available here: http://www.iber.bas.bg/?q=bg/node/85

The East and South European Network for Invasive Alien Species (ESENIAS), maintained by IBER-BAS, aims at maintaining a common database of invasive alien species, raising the awareness of the public and the decision-makers about the problem, facilitating early detection, destruction and control of invasive alien species, as well as mitigating their impact. In 2018, the work on updating and mapping data into the ESENIAS database will continue.

Danube Region Invasive Alien Species Network (DIAS) is established in 2014 with main objective to promote and coordinate cooperation between all stakeholders (Germany, Austria, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Bulgaria, Romania, Moldova, Ukraine and Turkey) in the invasive alien species field in the Danube region. Currently, the main task of DIAS is to finalise the Strategy and the Action Plan for invasive alien species. The strategy includes targets and objectives, possible measures and recommendations, as well as the relevant responsible institutions on 7 key topics for the invasive alien species.

The Center for Long Term Ecosystem Research is part of the LTER (Long Term Ecosystem Research) Global Network for analysis and evaluation of the effects of global changes on ecosystems and the ecosystem services they provide. The network maintains a meta database for each of the 6 network sites in the country and data is provided to state (ExEA, MOEW) and non-governmental (WWF) organisations.

Ecosystem services partnership (ESP) is a collaborative network of researchers and practitioners with stakeholders, policy makers and end users of ecosystem services locally and globally. The partnership aims to enhance communication between network members and other users in order to improve the quality of science for ecosystem services analysis and assessment and to put into practice the idea of conservation and sustainable use. Consortium of European Taxonomic Facilities, (CETAF). Since October 2014, the IBER, together with NMNH - BAS, is a member of the Consortium of European Taxonomic Facilities (CETAF). This consortium implements many pan-European initiatives, including the SYNTHESYS project. Thanks to this membership, IBER joined a consortium of more than 100 museums, botanical gardens and research institutes in 21 European countries which submitted a DiSSCo project proposal - Distributed System of Scientific Collections. Through this project proposal Bulgaria applied to be included in the European Roadmap for Scientific Infrastructure of Strategic Importance Development.

Progress Indicators:

Progress indicators under this priority cover the following elements:

- characteristics of the base information for taxonomic groups determination;
- information about new species and communities - atlases, classifications, red list of endangered species and habitats, etc.;
- interdisciplinary research;
- access to existing scientific information;
- dissemination of scientific information.

Instruments or tools used to assess progress
Available documentation – projects, specialised scientific research.

Relevant websites, weblinks and files:
NMNH - BAS Research Project on the origin, formation and conservation of the invertebrate fauna of the Balkan Peninsula: http://www.nmnhs.com;
"Joint Istranca Region protection for sustainable development – IRPSD" project, funded under the Transboundary Cooperation Programme between Bulgaria and Turkey: http://www.greenbalkans.org > document-2070;
European Green Belt: http:// www.europeangreenbelt.org;
Belasitsa Beyond Borders – transboundary cooperation in the Green Belt of the Balkans: „Belasitsa" Nature Park - http://www.belasitsa.com;
„Rusenski Lom" Nature Park - http://www.rusenskilom.iag.bg.

Level of reliability of assessment.
Please indicate the level of reliability of assessment
☒ Based on extensive evidence
☐ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of reliability indicated above.
Joint transboundary scientific research in the field of biogeography and biodiversity in the Balkan Peninsula, the abundance and distribution of rare and endemic species, threats to biodiversity, sustainable management strategies and other issues of international scale and significance.

Adequacy of monitoring information in support of the assessment.
☒ Monitoring related to this objective is adequate
☐ Monitoring related to this objective is partial (for example, it covers only part of the area or problem)
☐ No monitoring system in place in the country that can be used to assess progress towards achieving this objective.
☐ Monitoring is not necessary.

Please describe how the objective is monitored and indicate whether a monitoring system is in place.

Monitoring is carried out on the basis of joint projects of scientific organisations (national and international), NGOs as well as international cooperation on projects related to biodiversity conservation at the municipal, regional and state level.

Relevant websites, weblinks and files:
http://www.iber.bas.bg/?q=bg/node/85;
https://www.es-partnership.org/;
https://cetaf.org/;
http://www.esenias.org/

CHAPTER IV. NATIONAL CONTRIBUTION TO ACHIEVING THE AICHI TARGETS OF THE GLOBAL STRATEGIC PLAN ON BIODIVERSITY 2011-2020

4.1. Description of the national contribution to the Strategic Plan on Biodiversity 2011-2020

The Strategic Plan includes **20 targets** for 2015 or 2020 (the "Aichi Biodiversity Targets"), grouped in **5 strategic goals:**

Strategic goal A – *Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.*

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Every year, the Executive Environment Agency drafts and publishes a National Report on the Status and Conservation of the Environment in Bulgaria, which also includes a section on Biodiversity and Forests with information on the status of biodiversity and forests against indicators. **The report is an important source of information for the public about the state of biodiversity in Bulgaria.**

The level of biodiversity awareness as of 2017 is shown in Table 1.

Table 1. Tools for public awareness and participation in environmental decision-making

Tools for public awareness and participation in environmental decision-making	2013	2014	2015	2016	2017
Number of visitors to the websites of MOEW and its agencies	1 320 275 total visits; 505 450 unique visitors	1 600 000 total visits; 570 000 unique visitors	2 389 707 total visits; 744 621 unique visitors	1 757 180 total visits; 364 364 unique visitors	897 127 total visits; 468 400 unique visitors

Online databases and public registers maintained by the MOEW and its agencies	256	350	384	394	390
Number of requests for access to information filed in MOEW and and its agencies	969	918	1138	1388	1069
Number of permits for access to information issued by MOEW and and its agencies	777	713	937	1137	883
Number of public discussions held	187	113	121	76	67

Sources: MOEW, ExEA, RIEW, RBDs

In 2017, a total of 897 127 visits of the MOEW websites were registered, including 468 400 unique visits. The number of websites maintained in the system of the Ministry has been increased by 29 with the launch of the new specialized site for Pazardzhik region natural reserves: http://rezervati.riewpz.org/ , which was developed under the Conservation and Restoration of Biological Diversity project of OP Environment 2007-2013. A uniform database is used for control activities - all reports (monthly, quarterly, annual) are unified. Monthly reports on control activities of the 16 RIEWs, the Directorates of the national parks and the Basin directorates are published on the MOEW website.

Awareness-raising activities

Related to Strategic Objective VI - "Establishing new social behavioural models aimed at preserving the environment and at supporting sustainable development and providing better environmental information and monitoring" to OPE 2014-2020**,** in 2018 financed the **Knowledge for Natura 2000** project with the following lots: Lot #1 "Selection of contractor for information and publicity activities under the Knowledge for Natura 2000 project; Lot # 2 "Development and delivery of advertising materials". The aim of the project is to harmonize the initial information, upgrade awareness and provide up-to-date expert information to stakeholders on the Natura 2000 network, as well as to update National Prioritised Action Framework (NPAF) for Natura 2000.

The total value of the project is BGN 4 300 000, of which BGN 3 655 000 come from the European Regional Development Fund and BGN 645 000 – from national funding. The start date of the project is 14 December 2017 and its duration is 65 months.
https://www.moew.government.bg/bg/ministerstvo/strategicheski-celi/prioriteti-za-2018/otchet-za-izpulnenieto-na-celite-na-ministerstvoto-na-okolnata-sreda-i-vodite-za-2018-g/

Raising awareness and involving the general public in the process of conservation and sustainable use of biodiversity is an integral part of all sectorial policies, programmes, strategies and action plans that cover the 2014-2020 programming period and is also set out in the new programming documents by 2020 in the following sectors:

Agriculture

Rural Development Programme 2014–2020 (RDP):

- Measure 10. *Agroecology and Climate* - includes the following areas: "Restoration and maintenance of grasslands of high nature value" (HNV-1); "Maintenance of habitats of

wintering geese species and meadow harrier in arable land of ornithological importance" (HNV-4.1); "Maintenance of habitats of the eastern imperial eagle (Aquila heliaca) and the Egyptian vulture (Neophron percnopterus) in arable land of ornithological importance" (HNV-4.2); "Soil erosion control"; "Traditional practices for seasonal grazing (pastoralism); "Conservation of endangered local breeds"; "Conservation of endangered indigenous plant varieties".

- Measure 11. *Organic farming* - includes the following areas: Organic horticulture; Organic beekeeping; Organic animal husbandry.
- Measure 12. *Natura 2000 payments and the Water Framework Directive*.

Compensation will be provided for the following prohibitions:

- ✓ Prohibition on the removal of landscape features (field boundaries, single trees or groups of trees) when using agricultural land as such;
- ✓ Prohibition on mowing meadows: until 1 July; from the periphery to the centre, with fast-moving mowing equipment before 15 July; from the periphery to the centre, before 15 June;
- ✓ Prohibition on the use of non-selective pesticides in agriculture;
- ✓ Prohibition on the use of pesticides and mineral fertilizers in pastures and meadows.

Under the Rural Development Programme 2014–2020 (RDP):

- Measure 10. *Agroecology and Climate*:
  - ✓ Restoration and maintenance of permanent grassland of high nature value;
  - ✓ Maintenance of habitats of wintering geese species and meadow harrier in arable land of ornithological importance;
  - ✓ Maintenance of habitats of the eastern imperial eagle and the Egyptian vulture in arable land of ornithological importance;
  - ✓ Soil erosion control;
  - ✓ Traditional practices for seasonal grazing (pastoralism);
  - ✓ Conservation of endangered agriculturally-valuable local breeds;
  - ✓ Conservation of endangered indigenous plant varieties of value to the agriculture.

In 2018, a total of 5 546 applications were received under this measure. The largest number of farmers applied for the 'Endangered local breeds' and 'Soil erosion control' - respectively 34.5% and 32% of all beneficiaries.

Forestry

Operational objective 16: *Information provision, public awareness and transparency, and applying the partnership principle in the sustainable management of the forestry sector* under the **Forestry Sector Strategic Plan for Development 2014-2023**. The objective is geared towards the creation of a mechanism for the implementation of the partnership principle and provision of information aimed at involvement and participation of all target groups, including NGOs and the general public, in the decision-making and implementation process and organising a consultation process that takes into account the views of all stakeholders and

reflects all existing policies related to the sustainable development of the forestry sector in line with Measure 3.8. of the National Strategy for Development of the Forest Sector in Bulgaria. The Executive Forest Agency (EFA), which is implementing the Forestry Sector Strategic Plan for Development, has the important task of promoting innovation among forestry workers, forest owners and the general public.

Tourism

1. The Bulgarian Ministry of Tourism is a partner in the DanubEco project. The project aims to improve the capacity of the public administration and of the civil society in the transboundary area to identify funding and financial sources for the development of ecotourism, and to draft and successfully implement transboundary projects. In order to achieve the project objective, 6 series of trainings are to be organised for employees from the Danube region. Following the trainings, there will be educational tours and 10 ecotourism products will be created.

DanubEco, code 16.5.2.009 is implemented within the framework of the Cross border cooperation programme INTERREG VA Romania - Bulgaria 2014 - 2020. Priority Axis 5: "An efficient region", Specific objective 5.1 - To increase cooperation capacity and the efficiency of public institutions in a context of cross-border cooperation. **Partners**: Access for All Association - Romania (lead partner), Ministry of Tourism (Romania), Human Resources Development Agency - Rousse (Bulgaria) and the Bulgarian Ministry of Tourism.

Project website: http://www.danube-ecotourism.com/

2. Ministry of Tourism is an associate strategic partner under the "Coordinating planning, development and integration of cycling and ecotourism in municipalities along the Eurovelo cycle route in the Danube region" (EcoVeloTour) project. The EcoVeloTour project has been developed in pursuit of specific objective 2.2 Improving the sustainable use of natural and cultural heritage and resources under the Danube Transnational Programme.

The EcoVeloTour project aims at transferring knowledge and experience from Germany to the Southeast European countries related to the implementation of conservation and sustainable development policies through cycling and ecotourism. The project promotes the development of sustainable tourism in the Danube region along cycle routes by creating an ecological framework of tourist destinations management and promoting cycling, while revealing the potential of neighbouring regions.

Project website: http://www.interreg-danube.eu/approved-projects/ecovelotour

Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

The current biodiversity-related documents in Bulgaria are integrated into national and local strategies, poverty reduction strategies and planning processes as follows:

- **Environment – documents contributing to integrated values of biodiversity:**

- ✓ National Biodiversity Conservation Strategy – valid until "no deadline specified";
- ✓ National Programme to reduce total annual emissions of sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia in the ambient air - valid until 2019;
- ✓ Strategic Action Plan for Protection of the Environment and Rehabilitation of the Black Sea - valid until "no deadline specified";
- ✓ Third National Action Plan on Climate Change for the period 2013-2020 - valid until 2020;
- ✓ Updated National Implementation Plan for the Management of Persistent Organic Pollutants (POPs) in Bulgaria 2012 - 2020 – valid until 2020;
- ✓ National strategy for management and development of the water sector in Bulgaria - valid until 2037;
- ✓ National waste management plan for the period 2014-2020 - valid until 2020;
- ✓ National Action Program on sustainable land management and combating desertification (updated for the programming period 2014-2020) – valid until 2020;
- ✓ Marine strategy of the Republic of Bulgaria and programme of measures – valid until 2021.

- **Agriculture and rural development - documents contributing to integrated values of biodiversity:**

- ✓ National strategy for the development of viticulture and wine production 2005 - 2025 - valid until 2025;
- ✓ National strategy for the development of the forest sector in the Republic of Bulgaria for the period 2013 - 2020 - valid until 2020;
- ✓ National Action Plan for Sustainable Pesticide Use in the Republic of Bulgaria - valid until "no deadline specified";
- ✓ National program for the prevention, monitoring, control and eradication of animal and zoonotic diseases in Bulgaria 2016 – 2018 - valid until 2018;
- ✓ Common strategy for the management and development of the hydromeliorations and protection against the harmful effects of water – valid until 2030.

The outcomes from the implementation of the plans are included in the national reporting and accounting systems.

Operational Programme Environment 2014 - 2020 (OPE 2014 - 2020)

OPE 2014 – 2020 is primarily aimed at meeting the Europe 2020 Strategy's sustainable growth priority, and in particular the following elements of the definition of sustainable growth:

- *developing* a more competitive low-carbon economy where resources are used in an efficient and sustainable way;
- ***protecting the environment, reducing emissions and preventing biodiversity loss***;
- *taking advantage of Europe's leading position in developing new environmental technologies and production methods*.

OPE 2014 – 2020 also contributes to the implementation of Resource-efficient Europe – one of the two flagship initiatives for sustainable growth in the framework of Europe 2020 Strategy.

Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

The negative impact and the positive incentives for the conservation and sustainable use of biodiversity are regulated in the procedures under the Bulgarian Biodiversity Act.

Conservation and management of Natura 2000 protected areas is governed by the provisions of Article 6 of the Habitats Directive, which also defines the link between conservation of protected areas and other types of land use. Article 6 is divided into two types of measures.

The first type of measures concerns **management of the conservation of all Natura 2000 sites** and setting conservation targets for these sites, which requires the Member States to:

- develop and implement positive conservation measures that meet the environmental requirements of the habitat types; and
- take appropriate measures to prevent the deterioration of habitat types and habitats of the species or of any significant disturbance of the species in these areas.

The second type of measures concerns **the assessment procedure for each plan or project that can affect one or more Natura 2000 areas**. Essentially, the assessment procedure requires that any plan or project that could significantly impact a Natura 2000 site undergoes an appropriate compatibility assessment to examine the impact in detail, with a view to conservation objectives set for the specific Natura 2000 site.

Pursuant to the Bulgarian Biodiversity Act, plans, programmes, projects and investment proposals that are not directly related or necessary for the management of the protected areas and which individually or together with other plans, programmes, projects or investment proposals can have a significant negative impact on protected areas shall be **subject to assessment for their compatibility with the nature and the protection targets of the protected area concerned**.

During the current programming period, as a result of the environmental assessment in the framework of **OP Regions in Growth 2014–2020**, the EC envisaged measures to prevent, reduce and, as fully as possible, offset the adverse effects on the environment and in particular on biodiversity, resulting from implementation of the Programme.

Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

The following actions have been planned to reduce the impact of agriculture and forestry on biodiversity:

- Rural Development Programme 2014–2020 (RDP) – payments under **Measure 10** - „Agroecology and climate“, **Measure 11** - „Organic Farming”, **Measure 12** - „Payments for Natura 2000 and the Water Framework Directive, etc. are carried out on the condition of strict compliance with the programme requirements on the part of the farmers.

In line with the requirements of Measure 10, if an on-the-spot or administrative check revealed that the relevant agricultural plots or animals did not meet the base requirements, the minimum requirements for fertilization and use of plant protection products**, the annual agroecological payments** will be rejected or reduced**.**

Sustainable consumption and production plans

Several national strategies and plans have been developed which set out priorities, measures and activities related to sustainable production and consumption and the conservation of biodiversity:

- National Strategy for Development of the Forest Sector in Bulgaria for the period 2013–2020;
- National Action Plan for Conservation of Wetlands of High Significance in Bulgaria 2013–2022;
- National Strategy for Sustainable Development of Agriculture in Bulgaria for the period 2014–2020 (drafted in 2013);
- Hunting Development Strategy for Bulgaria for the period 2012–2027 (drafted in 2013), etc.

A more detailed description of these documents is available in Chapter I of the present report. The planned measures and activities are to be implemented.

Eco-labelling in Bulgaria:

- “The Authentic Bulgaria” Certificate is a quality and original tourist product based on several core values - professionalism in service and genuine Bulgarian hospitality, impeccable quality of service, responsible attitude to the environment and constant striving for improvement of the working environment. http://www.authenticbulgaria.org;
- The Green House Certificate is issued to guest houses and small hotels that comply with the ECEAT sustainable tourism eco-label and the Eurogites quality standards. The hosts of these houses are locals who have a special regard for the local nature and culture. http://www.baatbg.org/green-lodge/38/49

In Bulgaria for the period 2014-2018 there are 8 registered enterprises under the scheme for environmental management and audit - EMAS. For example: Reg. BG BG-000015/30.11.2018 “Bdintex” Ltd. with address: 1400 Vidin, Tsar Ivan Assen II Str.; Environmental Inspector - TÜV HELLAS (TÜV NORD) S.A. EL-V-0004.
https://www.moew.government.bg/static/media/ups/tiny/EMAS/EMAS_register_BG.pdf

According to OPIC - project BG16RFOP002-3.004-0063 "Resource Efficiency Improvement" - NEW GLOBAL BULGARIA („small business“ category), a manufacturer of cardboard and corrugated board packaging, as well as an innovator in the design and production of eco shelves for various industries in country and abroad.

Strategic goal B – Reduce the direct pressures on biodiversity and promote sustainable use.

Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Every year, the Executive Environment Agency drafts and publishes a National Report on the Status and Conservation of the Environment in Bulgaria, which also includes a section on Forests with information on the status of forests against indicators, including forest area. The forest area and changes in the forest area in particular is a key element in the assessment of the sustainable management of forests.

Forestry

In the forestry sector, the measures of the **National Strategy for Development of the Forest Sector in Bulgaria for the period 2013–2020**, adopted with Council of Ministers' Decision on 27 November 2013, is the main document defining the strategic framework of the state policy aimed at achieving a long-term and sustainable management of vital and productive multifunctional forests and an increasing competitiveness of the forestry sector as the basis for better living standard, especially in mountain and rural regions. According to the interim assessment of the outcomes of the implementation of the National Strategy (2013-2020) for the period 2013-2016 and their impact on the state of the forest sector, a **review** has been made by objectives, priorities, measures and activities, which shows that out of a total of 20 measures, 14 are implemented and the expected results are achieved and 6 are partially implemented. A short summary by priorities and measures of implementation is presented, as follows:

<u>Priority 1.</u> Sustaining vital, productive and multifunctional forest ecosystems, contributing to mitigation of the adverse effects of climate change

Measure 1.1. Increase the forest area, wood stock and carbon stock of forest territories

Submeasure 1.1.1. Increase the forest area through afforestation of abandoned agricultural land, bare and deforested areas, eroded and erosion-threatened areas **- the total area is increased by 59,459 ha or by 1.43%:**

- **Reclaiming „unwooded area for afforestation" in forest territories** – a total of 1287.9 ha are reclaimed or 977.9 ha more than the target value;
- **Afforestation of abandoned agricultural land, bare, eroded and erosion-threatened areas outside forest territories** – "unwooded area for afforestation" is reclaimed - in the period 2013 – 2015, the total area of forested abandoned agricultural land, bare, eroded and threatened by erosion areas is 1218.2 ha - 768.2 ha more than the target value;
- Developing a financial mechanism to support the activities related to planting new forests - RDP 2014-2020 approved by the European Commission on 25.05.2016 – submeasure 8.1. providing the relevant funding. Submeasure 1.1.2. Implementation of the measures in the Third NAPCC 2013-2020 for the sectors land use, change of land use and forestry - 24.5 ha of protective forest belts have been restored and 5.4 ha of new protective forest belts have been created. Intermediate felling of 10.2 ha and sanitary logging of 15.7 ha were done to maintain existing belts;

- Restoration and maintenance of protective forest belts and new erosion prevention afforestation - 1432.6 ha of new erosion prevention afforestation - 436.1 ha in 2013, 542.1 ha in 2014 and 454.4 ha in 2015.

Priority 2. Protection, restoration and maintenance of the biological and landscape diversity in the forest territories

Measure 2.1. Improving the system related to planning and implementation of activities for the conservation of biological and landscape diversity in forest areas, Submeasure 2.1.4. Development and adoption of management plans for Natura 2000 protected sites with predominantly forested areas. Predominantly forested area is protected area BG0002090 Berkovitsa with a management plan approved by Order No. РД-45/26.01.2016 of the Minister of Environment and Water (SG, issue 12/02.02.2016).

Submeasure 1.4.2. Restoration and sustainable management of wetlands. Conservation and protection of wetlands in forest areas, peatlands, marshes (Third NAPCC)

A number of projects[3] are being implemented under Submeasure 1.4.2.:

- *Conservation and restoration of 11 types of riparian and wetland habitats in 10 Natura 2000 sites in Bulgarian forests* project, funded under the European Union's LIFE+ programme, total value: EUR 1 236 834, including EUR 615 199 EU co-financing.
- *Restoration and conservation of alluvial forests of habitat *91E0 in Natura 2000 protected sites and model territories in Bulgaria* project LIFE13 NATBG000801. The project proposal is EUR 537 056, implementation period: 01.09.2014 - 28.02.2019;
- *Enhancing the conservation status of priority natural habitat 91D0 – Marshland forests in the protected area BG 0001030 "Western Rhodopes"* with beneficiaries EFA and the Institute of Biodiversity and Ecosystem Research (IBER) under the EU LIFE programme. During that period, the habitats, part of the wetlands in Bulgaria, were restored under two projects funded by the LIFE+ programme. The two projects cover a total area of 106.4 ha;
- Vrachanski Balkan National Park Directorate has completed a study of the macrophyte component in Natura 2000 wetlands - habitat 3150 Natural eutrophic lakes with Magnopotamion- or Hydrocharition-type vegetation - places with high herpetological diversity;
- Vitosha National Park Directorate, as per contract No. OPE-03-61/ 22.05.2013, implemented Activity 1.2. Sustainable management of peatlands (habitat type 7140) in relation to biodiversity conservation, carbon balance and climate change.
- On the territory of Rila Monastery National Park 60 m wooden grilles were installed over Ribni lakes – Smradlivo lake tourist trail to protect the natural habitats of Rila primrose (*Primula deorum* L.) (under a project of the EU LIFE+ programme).

During the period 2015-2018, in implementation of the project "Mapping and Evaluation of the Ecosystem Services of the Steppe-Shrub Ecosystems in the Territory of Bulgaria (outside NATURA 2000)", the mapping of the status of the shrub and ericoid ecosystems and their

[3] First official report on the implementation of the Third National Action Plan on Climate Change for the period 2013 – 2020, 2017. Otchet_3NAPCCe13136d0d0b576ce640f993ffa1d185c.pdf

ecosystem services on the territory was made for the territory of the country that does not fall within the Natura 2000 ecological network. The project was implemented under the BG03 Program "Biodiversity and Ecosystems" with Beneficiary - Sofia University "St. Kliment Ohridski " http://eea.government.bg/en/ecosystems/heathlandshribses/index5

Waters

A program for hydromorphological monitoring of surface waters is carried out:

- For 2017 in accordance with Order No. РД-229 / 05.04.2017 of the Minister of Environment and Waters, EEA performs river monitoring (macrozoobenthos, macrophytes and phytobenthos monitoring) at 593 points and by outsourcing - phytoplankton and macrophyte monitoring in lakes/dams at 56 points and fish monitoring in rivers at 59 points.
- For 2018 in accordance with Order No. РД-175/02.04.2018 of the Minister of Environment and Waters, EEA performs river monitoring for 638 points (macrozoobenthos monitoring at 638 points, macrophyte monitoring at 229 and phytobenthos monitoring at 262 points) and by outsourcing - of phytoplankton monitoring in lakes and dams for 53 points, macrophytes monitoring at 24 points and fish monitoring in rivers at 59 points.

In 2016, the 4 River Basin Management Plans (RBMPs) were developed and adopted, covering the period 2016-2021. RBMP for the period 2016-2021 are not only limited to updating the information from RBMP 2010, but also have more comprehensive and in-depth approaches for analysis and evaluation, including a new concept for planning measures. RBMP information is available at the following address:

https://www.moew.government.bg/bg/vod/planove-za-upravlenie/planove-za-opravlenie-na-rechnite-basejni-purb/planove-za-opravlenie-na-rechnite-basejni-2016- 2021-g /

In 2016 Flood risk management plans (FRMP) for the 4 Basin Management Areas have been adopted in accordance with the requirements of Article 7 of Directive 2007/60 / EU (Flood Directive) and on the basis of Art. 146 i of the Water Act. Their validity period is 2016-2021. Information on the RMP is available at: https://www.moew.government.bg/en/vod/planove-za-upravlenie/planove-za-upravlenie-na-riska-ot-navodneniya-purn/planove-za-upravlenie-on-riska-ot-irrigation-2022-2027vmchvch /

Institute of Oceanology

As part of the implementation of the CoCoNET project, physical habitats and biotopes were mapped in a selected Ropotamo-Kiten pilot area, which is part of BG0001001 Ropotamo protected area under the Habitats Directive. The maps can be previewed and download requests can be filed here: http://coconetgis.ismar.cnr.it/. Outcomes are published in Todorova et al., 2015.

In Lot 2, the EMODnet project develops and provides free open access to point data from marine observations and the resulting products - modelled maps of seabed habitats in the European Union's marine basins, including the Black Sea. Data and products can be downloaded from: http://www.emodnet-seabedhabitats.eu/

In the framework of the ISMEIMP project, a methodology for surface substrate maps was developed, which was applied to create GIS maps of demersal habitats as per the definition of the Marine Strategy Framework Directive. Distribution and area of the habitats that are

necessary to evaluate whether the ecological objectives for good status as per Descriptors 1.6 - seabed demersal habitats - are met, were determined. Indicator systems were developed to assess the status of sandy seabed habitats, which are representative of the Bulgarian Black Sea coast. Qualitative criteria were formulated and quantitative threshold values were set to assess the good status of seabed habitats. Marine habitat monitoring programmes were developed, in line with the current European Union legislation on marine waters.

https://www.bsbd.org/msfd/2016/BLKBG-D1,6_Seabed_Habitats_revised.pdf.

Target 6: 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 endangered species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Institute of Oceanology

In the framework of the ISMEIMP project, indicators were developed, tested and proposed, as well as threshold values for parameters for the assessment of the status of pelagic habitats (phytoplankton and zooplankton) and of benthos invertebrate species in terms of demographic structure of their populations. Optimised monitoring programmes for the marine environment were developed in line with the requirements of Article 11 of the MSFD under Descriptors 1, 4, 6: seabed habitats, pelagic habitats, marine mammals, fish, food networks, Descriptor 2: Non-indigenous species, Descriptor 3: Commercial fish and shellfish species, Descriptor 5: Eutrophication, Descriptor 7: Permanent alteration of hydrographical conditions, Descriptor 10: Marine litter, Descriptor 11: Underwater noise, which serve to assess the trends in the status of the MSFD descriptors and to achieve good status of the marine environment.

(https://www.bsbd.org/bg/msfd_monitoring.html).

Pursuant to the commitments Bulgaria has undertaken for the implementation of the Water Framework Directive and in line with MOEW agreements in the period 2014-2018, the IO-BAS assessed the ecological status of coastal waters by biological quality elements. The qualitative and quantitative status of BQEs phytoplankton, macrophytes, macrozoobenthos and additional BQE zooplankton were analysed. The monitoring data provides information needed for the assessment of the ecological status of marine coastal waters. The additional results and analyses were used in the National Environmental Assessment Reports (2014-2017) that were submitted to the EC by the ExEA. In addition to that, in 2017-2018, in order to implement MSFD 2008/56/ EC and to support the activities of MOEW and BSRBDD in the development of the Marine Strategy and the implementation of marine monitoring in line with the requirements of the MSFD, monitoring and analysis of results obtained on biodiversity of pelagic and benthic habitats, and non-commercial species (fish, marine mammals), invasive species, commercial fish and shellfish, eutrophication, seabed integrity, hydrographic conditions, marine litter and underwater noise (Report and Analysis of the Marine Environment - 2017).

In accordance with the agreements under the Bucharest Convention and in order to support the activities of the Black Sea Commission, annual expert assessments on the conservation of biodiversity in the Black Sea for all key biological quality elements - phytoplankton, zooplankton, macrozoobenthos, macrophytobenthos and fish – were reported in the period 2014-2018.

In compliance with the commitments that the Republic of Bulgaria has undertaken, biological monitoring of commercial fish species was carried out (2014-2016), research on the current stock of sprat and accompanying species was conducted and the outcomes were reported to the EC and informed the regional assessment of Black Sea fish stock done by the Black Sea working group to the Scientific, Technical and Economic Committee for Fisheries (STECF) to the EC. The Institute of Oceanology participates in the preparation of the WP for the EU Fisheries Data Collection Programme for 2017-2020.

The Keystone Species Catalogue compiled under the DEVOTES project is an overview of potentially significant species from different European marine habitats. The idea behind such a catalogue is that each species contributes unequivocally to biodiversity. Some have important effects and interactions, both primary and secondary, on other components of the ecosystem and therefore, through their presence or absence, the biodiversity of communities as a whole is directly affected. A total of 41 species have been identified for the Black Sea ecosystem, some of which are invasive (Smith et al, 2014). Another focus in the implementation of the project objectives is the development of innovative approaches (molecular, acoustic, satellite) for biodiversity research and assessment of the good status of the marine environment (Danovaro et al, 2016).

Experts from IO-BAS participate in the sturgeon fish (*A. ruthenus*) restocking and restoration programmes in the Danube river by applying genetic markers to identify and prove the origin of producers and their offspring (Ivanova et al, 2017).

Experiments were carried out in a recirculation system with Black Sea water to research sturgeon activity and brackish environment adaptability. Important conclusions were reached - when salinity exceeds 3 ‰ the experimental batch becomes less active and feeds significantly less than the control group. At the threshold of 7 ‰, all individuals stop eating, which is caused by osmoregulation mechanisms of *A. baerii.* (Nita et al, 2018)

In their capacity as experts to a number of advisory bodies and committees (e.g. the Advisory and Coordination Council on the implementation of the MSFD), the scientists at IO-BAS draft opinions and propose measures for the sustainable management of the Black Sea ecosystem, including biodiversity conservation, environmentally-friendly methods of fishing and cultivation of commercial species of marine demersal invertebrates to ensure that fishing impact on stocks, species and ecosystems is within safe ecological limits.

Implementation of commitments undertaken by Bulgaria under Council Regulation (EU) 2017/2360 of 11 December 2017 fixing for 2018 the fishing opportunities for certain fish stocks and groups of fish stocks in the Black Sea:

A. Turbot (*Psetta maxima*) fishing: this type of fishing is subject to a special control regime in relation to our country's commitments. To this end, each year EAFA drafts specific rules for monitoring and control of turbot catches in the Black Sea, setting out the basic requirements for turbot fishing, quota allocation information, inspection levels, landing ports, etc. Bulgaria's main commitments concerning turbot fishing are as follows:

- keep the number of special turbot permits at 116 and minimum allocation of fishing vessels;
- establish an appropriate number of designated landing ports - 8 for Bulgaria - in order to streamline landing controls;

- keep up with the strict policy of recording all catches, including the ones under 50 kg, in the relevant fishing logbooks, landing declarations and first-sale declarations for all fishing vessels that have permit;
- maintain at least the 2017 level of the number of market and offshore inspections, including during closed season, based on a risk assessment methodology and the timetable agreed with the European Commission and the European Fisheries Control Agency (EFCA);
- in 2018, to maintain or increase the number of joint inspections under EFCA coordination, including offshore, landing and markets inspections, as well as monitoring of transport of fish by road;
- monitor discarded rapana (Rapana venosa) catches to assess the impact on young specimens of turbot and Black Sea spiny dogfish, in addition to the provisions of the General Fisheries Commission for the Mediterranean (GFCM) multiannual plan for turbot fishing management in the Black Sea;
- provide all available fishing and biological data for turbot catches since 2010;
- increase by 10% the offshore control on the way in which marking and identification of static fishing equipment is carried out, in accordance with the EU rules;
- carry out statistical monitoring of turbot imports/exports to and from the European Union;
- work in partnership with the Commission and the EFCA to implement Recommendation GFCM/41/2017/4 (multiannual turbot plan), as well as any other measures necessary to counteract submission of false information, the illegal, undeclared and unregulated turbot fishing in the Black Sea and the marketing of illegal catches in the region.

B. Black Sea spiny dogfish fishing

- in 2018, maintain the catch of Black Sea dogfish at the levels from 2015 and inform the Commission every three months of the actions undertaken to achieve this objective;
- continue the implementation of the strict policy adopted in 2016 to record all catches, including the ones under 50 kg, in the relevant fishing logbooks, landing declarations and first-sale declarations for all authorized fishing vessels, as well as for ships with by-catch of Black Sea dogfish;
- implement a pilot project for discarded catches of Black Sea dogfish in 2018.

C. Fishing Data

In view of the further strengthening of fisheries management measures and in order to improve scientific opinions about the Black Sea, Bulgaria and Romania undertake to provide fishing and biological data for all species covered by the data collection framework to support scientific knowledge in this field. Therefore, the Action Plan for 2018 for Bulgaria must meet the above requirements in the control part.

D. Prohibition Period - according to Regulation (EU) 2017/2360, the ban on turbot is from 15 April to 15 June. EAFA will inform interested parties on its official website (<90 cm minimum conservation reference size, MCRS).

Fishing regulations

- **Fishing areas and restrictions in the Bulgarian part of the Black Sea**
  - ✓ **Prohibited areas and prohibition periods:**

Areas prohibited all year round:

- net fishing within a radius of 300 meters from the mouth of the rivers (Article 5 (8) (2) of Ordinance 37 / 10.11.2008);
- commercial fishing in port waters 1 mile offshore;
- Trawling in the 3-mile zone, except for fishing vessels derogating from Recommendation GFCM 36/2012/3.

Prohibition of fishing during the breeding season:

- Turbot: no catches, landing, transhipment, marketing or transport of turbot in fresh state between 15 April and 15 June is permitted. Catfish and skate catches are also prohibited during this period.
- Net fishing goby: from 15 April to 15 May.

✓ **Prohibited appliances and tools (Article 35 of FAA):**

- explosives, poisonous and narcotic substances;
- electrical current and technical devices and equipment using electricity and radiation;
- bottom trawling and dredging facilities, excluding beam trawls;
- fire arm.

Restrictions in inland waters and the Danube River

Prohibition of sturgeon fishing in Bulgarian territory of the Danube river and the Black Sea under joint Decree No. RD-9 / 07.01.2016 and Order No. RD-09-42 / 26.01.2016 of the Minister of Environment and Water and the Minister of Agriculture:

- The following fish species: Russian sturgeon *(Acipenser gueldenstaedtii)*, sterlet *(Acipenser ruthenus)*, starry sturgeon *(Acipenser stellatus)* and beluga *(Huso huso*). The prohibition is valid until 01.01.2021.

Prohibition of fishing during the breeding season:

- Shad (Danube herring) in the Bulgarian section of the Danube river: from 15 April to 15 May.
- Fish breeding in spring and summer depending on the altitude of the fisheries;
- from 15 April to 31 May for fisheries up to 500 m above sea level;
- from 1 May to 15 June for fisheries between 500 and 1500 m above sea level.

Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Forestry

In the 2012 **analysis of the implementation of the Strategic Plan for Development of the Forest Sector 2007–2011,** the work on the implementation of biodiversity conservation measures and activities, on forest reproductive materials and forest certification is evaluated as efficient. Afforested area in Bulgaria is on the increase and exceeding the target set by the Strategic Plan of **500 ha per year**. Various indicators are used to evaluate the outcomes of the implementation of management measures - forest area, tree species composition, forest restoration, etc.

The *Forest Area* indicator measures the area of forested territories classified by type of forest and timber supply capability, as well as the proportion of forests and other forested land to the total land area. It provides comprehensive information on forest resources and national policies and forestry planning, and is a key element in the assessment of sustainable forest management. As of 31.12.2018, the area of forest territories amount to 4 247200 ha, of which 3 893 396 ha (or 35.1%) are afforested areas (including 23 882 ha of bog pine), which represents 38.3% of the country's territory. Coniferous forests cover an area of a total of 1 251 353 ha (or 29.4%), while deciduous forests are 2 995 847 ha (or 70.6%) of the total area of forest territories. In the period 2013–2017, a trend of increase in the total forest area is observed. (Table 2).

Table 2. Total forest area by type of land (in ha) for the period 2014–2018

Year	Afforested area, incl. bog pine (Pinus montana), in ha	Unwooded territories for afforestation, in ha	Non-productive forest territories, in ha	Total forest territories, in ha
2014	3 835 905	66 527	299 583	4 20 2015
2015	3 857 658	65 065	300 151	4 222 874
2016	3 864 965	64 456	301 404	4 230 825
2017	3 877 626	64 126	302 083	4 243 835
2018	3 893 396	62 482	301 322	4 247 200

Source: EFA

The *Forest Damage* indicator identifies the area of forests and other parts of forest territories where abiotic (temperature anomalies, droughts, hurricanes, snowfall, landslides), biotic (insects, fungal pathogens, game, rodents) and anthropogenic factors have been identified.

Data for the period 2014–2017 show a persistent highest share of damage from insect pests, diseases and natural disasters (Table 3).

Table 3. Total forest area affected by damage for the period 2014 – 2017

Type of damage	Forest area affected, in dka			
	2014	2015	2016	2017
Insects	409 032	299 966	458 836	405 378

Diseases	167 071	59 225	45 605	249 683
Natural disasters	263 852	1 057 247	364 254	270 036
Other	8 234	7 145	13 620	19 855
Total	848 189	1 423 583	882 315	944 951

Source: EFA

The findings from the fire situation analysis in the forests of Bulgaria for the past 30 years show a sharp increase after 1989 in the number of fires and the size of affected areas. Fires demonstrate a clear cyclic recurrence, with a peak every 7 years; however this is most probably accidental, therefore different changes in the duration of the individual cycles could be expected in the future. Peak years in terms of fires were 1993, 2000 and 2007.

There is undeniable evidence that over 80% of all forest fires in Bulgaria in the past 30 years are the result of human activity, including burning of stubble and grasslands, which account for 34% of all fires. On average, no more than 2.5% of forest fires per year occur naturally because of lightning. The anthropogenic nature of more than 80% of the fires necessitates the categorization of forests in the vicinity of settlements, in the densely populated parts of the country in particular, as high-risk from fire point of view. The same applies to forests around roads, industrial plants, tourist routes and centres and other locations where there is strong human presence.

In 2017, 513 wildfires were registered in the country that affected 4 569 ha of forested areas, 989 ha of which - by peak fires. A large part of the forest territories that burned down because of peak fires were destroyed by the devastating fire that occurred on the territory of SF-Simitli and spread into SF-Kresna. The fire was extinguished after more than 7 days and affected 1 392 ha, 686 ha of which by a peak fire. For comparison, in 2016 there were 583 registered wildfires in the country affecting 6 339 ha of forested areas, of which 716 ha were peak fires. If we compare with the average 10 000 ha in the country burned every year in an average of 600 fires in the period 2006-2016, in recent years (notably 2018), the values of the main statistical indicators for forest areas destroyed by fire are far from the average. This is due both to prevention and to the considerable financial resources invested by MAFF, the State Enterprises and the Ministry of the Interior in specialized equipment, training and establishment of voluntary units in recent years.

Direct damage from forest fires in 2017 is estimated at almost BGN 4 million, which is also below the average direct damage cost of about BGN 5 million over the last 10 years. This amount does not include the costs for the restoration of forest territories burned by peak fires, which will be incurred in the next 3 years by the State Forest Enterprises and other owners of the forest territories. It also does not include the expenditure of the Ministry of the Interior, MoD, district administrations, municipalities, volunteers and other owners of forest territories made for extinguishing fires during the year.

Table 4. Forest fires in the period 2014 – 2018

Year	Total number of fires	Forest territories affected (in ha)	Reason for the fire (number of fires)		
			Human activity	Natural causes	Unknown
2014	151	916	128	3	20
2015	429	4313	335	12	82

2016	583	6339	463	22	98
2017	513	4569	431	14	68
2018[4]	222	1487	165	7	50
Average	**379**	**3527**	**304**	**10**	**54**

Source: EFA

The main priority of the **National Strategy for the Development of the Forestry Sector in the Republic of Bulgaria** (NSDFS) 2013-2020 is the conservation, restoration and maintenance of biological and landscape diversity in the forest territories. A number of measures and activities are planned in the implementation of this priority, such as:

- Under the "Future-oriented integrated management of European forest landscapes" INTEGRAL (2011-2015) project, pilot management plans for forests and forest territories of 3 municipalities - Velingrad, Teteven and Sarnitsa have been developed. The summarised results integrate biodiversity and landscape diversity goals into the planning and implementation of forest activities.
- A practical guide for Identifying, Managing, and Monitoring of High Conservation Value Forests in Bulgaria provides for measures and requirements for protection of forests at landscape level. Specific requirements are also set in the national FSC standard for forest certification, which is in force since August 2017.
- In the framework of the project **Development and model implementation of sectorial policies focused on ecosystem services - PoliciES,** implemented by WWF Bulgaria in partnership with Emisoft AS from Norway and with the support of the Executive Forestry Agency to the Ministry of Agriculture, Food and Forests, approaches are proposed for valuation of the ecosystem benefits of forests with a pilot region on the territory of RFD-Berkovitsa - Varshets and Berkovitsa municipalities. Under the project, an experimental partial Regional plan for forest territories development was drafted for the territory of Berkovitsa municipality and Varshets municipality.
- Pursuant to the implementation of the activity "Introducing and applying requirements for inventarisation and protection of dead wood as an important component of forest ecosystems", the Ordinance on inventarisation and planning in forest territories regulates the research and quantitative determination of the amount of dead wood and biotopic trees under a methodology approved by the EFA Executive Director.
- In the framework of the implementation of an EFA project under the EU LIFE+ programme, in the period 2014-2016 different methods for inventarisation of dead wood were tested in practice, which resulted in a methodology to measure the quantity and characteristics of dead wood and biotope trees in forest ecosystems, approved in summer 2018.
- Pursuant to the implementation of activity Introducing and implementing special management regimes for the respective forest territories, including preservation of high conservation islands of ancient old-growth related to the conservation of endangered plant and animal species, with Order No. RD 49-421 as of 04.11.2016 of the Minister of Agriculture, the old-growth forests were announced.

Hunting Service

Main measure in **the National Strategy for the Development of the Forestry Sector in the Republic of Bulgaria 2013–2020** (NSDFS) is the improvement and increase of the

[4] Note: 2018 data is not final

game and fish populations in order to preserve the biological diversity and for the sustainable development of forest ecosystems. The activities of the Strategy are: update of the legislation and regulations in the field of hunting; improving the capacity and coordination of all hunting stakeholders in order to protect, improve and increase game and fish populations; and increasing and diversifying game and fish resources, including through genetic selection and introduction.

Agriculture

In 2013, a National Strategy for Sustainable Development of Agriculture in Bulgaria 2014–2020 was developed. Measures and activities in the strategy are funded under the Rural Development Program 2014–2020 described above in the Aichi Target 3.

Aquacultures

- Maritime and Fisheries Programme 2014 - 2020

EU Priority 5 - Promoting marketing and processing

- ✓ Measure 5.4. - Processing of fishing and aquaculture products – admission under the measure opens on 01.06.2018, with budget BGN 11 119 499.82 grant, 12 project proposals received totalling BGN 8 613 968.52.

The measure supports projects aimed at expanding, equipping and modernising businesses in the fishery sector.

Pollinators conservation measures

Project "Study of Honey Flora and Pollinators in the Western Balkan Mountain Floristic Region" with a contractor "Naturalistic" Association is financed by EMEPA in 2017. The survey data is used by the MoEW to implement the biodiversity conservation policy and to supplement the data with the National Biodiversity Monitoring System.

http://pudoos.bg/wp-content/uploads/2017/07/US-2-26.06.2017.doc

Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Every year, the Executive Environment Agency drafts and publishes a National Report on the Status and Conservation of the Environment in Bulgaria, which also includes a section on Forests with information on the status of forests against indicators, including atmospheric deposition of pollutants based on which critical load is calculated under which ecosystems retain their sustainable development with no damage or changes in their structure.

Ambient air pollution

The *Airborne Hazardous Emissions by Source Group* Indicator represents the national emissions of airborne pollutants calculated using the EMEP / EEA air pollutant emission inventory guidebook 2016 and the Unified Methodology for Inventory of Airborne Hazardous Substances Emissions, approved by the Minister of Environment and Water for 11 groups of emission sources and covers the following harmful substances: sulfur oxides (SO_X), nitrogen oxides (NOx), non-methane volatile organic compounds (NMVOC), ammonia (NH_3), carbon monoxide (CO) , heavy metals (mercury - Hg, cadmium - Cd, tin - Pb), polycyclic aromatic

hydrocarbons (PAH), dioxins and furans (DIOX), fine particulate matter (PM10) and other specific pollutants.

According to the requirements of national and European legislation, the territory of the country is divided into six Regions for Assessment and Management of Ambient Air Quality (RAMAAQ) - Sofia metropolitan area, Plovdiv agglomeration, Varna agglomeration, North / Danube, South-western and South-eastern. The analysis of ambient air quality data (AAQ) is carried out by region, taking into account the specifics of each locality under which control is carried out.

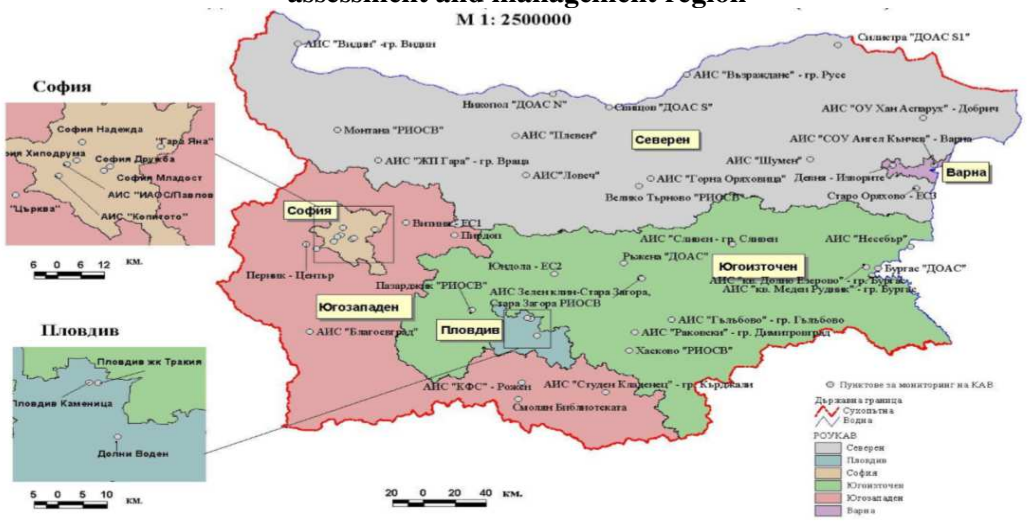
Thermal power plants (including refineries) are the largest source of sulphur dioxide – 48% of the total amount emitted in the country. In 2017, emissions of sulphur dioxide in all large combustion plants **were reduced** by 8 thousand tons compared to 2016 – from 57,6 kt to 49,6 kt. Household heating continues to be a major source of PM_{10} and $PM_{2.5}$.

The main sources of pollution with nitrogen oxide are the road transport – 38%, thermal power plants (including refineries) – 19%, other transport – 14% and agriculture (use of inorganic nitrogen fertilizers) - 14%.

Agriculture emits 84% of the total ammonia (use of inorganic nitrogen fertilizers). Another major pollution source is industrial processes - 7% (emissions from the chemical industry and the production and use of ammonia soda ash). The main source of NMVOC is nature - 71% of the total amount emitted. Another source is residential burning - 8%.

Residential heating is a major source of fine particulate matter, with 57% of the total PM_{10} and 83% of the total $PM_{2.5}$ emitted into the atmosphere. Other sources of PM_{10} are non-combustible industrial processes (mainly asphalt paving) and farms. As regards $PM_{2.5}$, the other major source is road transport - 8%.

Figure 4. Ambient air quality monitoring stations in Bulgaria – by ambient air quality assessment and management region



https://www.eea.europa.eu/publications/emep-eea-guidebook-2016

In 2017, the National automated ambient air quality monitoring system had a total of 47 stationary monitoring stations - 33 automatic stations, 9 stations with manual sampling and subsequent laboratory analysis, 5 DOAS systems (differential optical absorption

spectroscopy), which were located in Svishtov, Nikopol, Silistra, Burgas and Stara Zagora (Razhena village).

The monitoring stations are approved with a ministerial order No. РД-66/28.01.2013 http://www.eea.government.bg/bg/legislation/air/ZapovedRD-66-2013.pdf. Ambient air quality monitoring stations are located in 34 settlements.

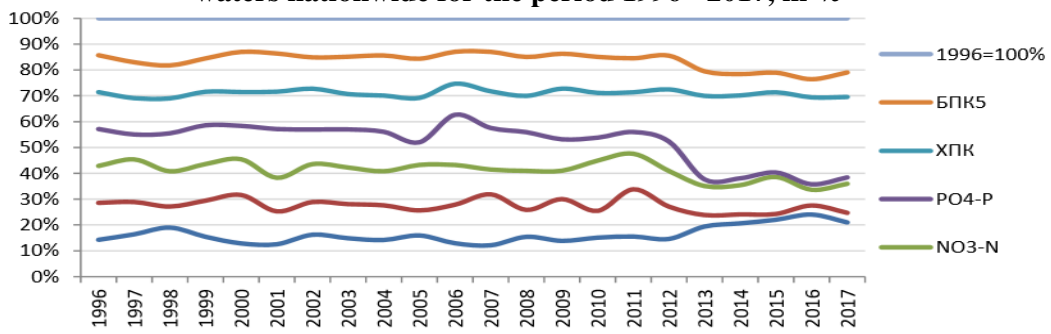
Surface water pollution

During the period 1996 - 2017, the trend observed in recent years towards improvement in the water quality is maintained. Despite this trend, there are still water bodies identified as being at risk – programmes of measures to achieve good ecological status have been drafted to improve their status.

In 1996 - 2017, concentrations of O_2 (dissolved oxygen), NH4-N (ammonium nitrogen), N-NO3 (nitrate nitrogen), BOD5 (biochemical oxygen demand) and PO4-P (orthophosphates) demonstrated decrease in their levels from previous years. There was a slight increase in COD (chemical oxygen demand) in 2017.

Figure 5 shows the change in the average annual values of the indicators for the period 1996-2017, recalculated in % (percentages) compared to 1996, which was selected as the baseline year. The chart visualises the change and the dynamics of the indicators over a long timeframe. This approach clearly demonstrates the continuing trend for improving water quality, which is also a major water management objective.

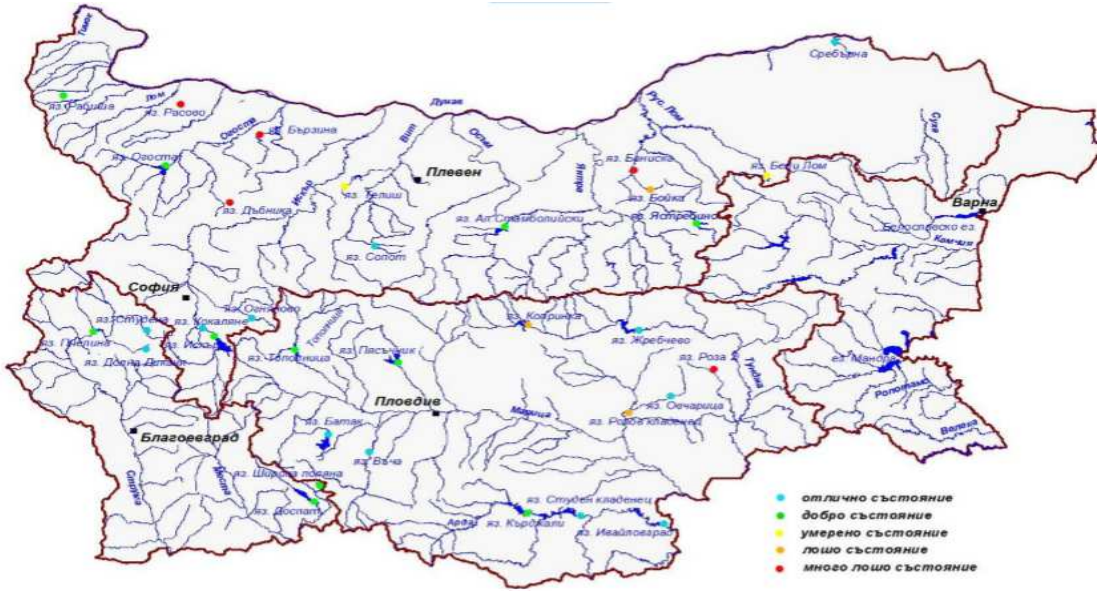
Figure 5. Trends in the change of the main indicators for the chemical status of surface waters nationwide for the period 1996 - 2017, in %



Source: ExEA

Regarding the biological indicators for surface waters, 56% of the monitored sites for "river" category and 30% of the monitored sites for "lake" category do not achieve the targets for good status. Biological assessment of the lake types was carried out based on annual average values from 2017 sampling in line with the requirements of a methodology approved by Ordinance No. H-4 of 14.09.2012 on the characterisation of surface waters. Assessment is made in 5 status categories - high, good, moderate, poor, bad (Figure 6).

Figure 6. Biological assessment of lake types by phytoplankton biomass for 2017



Source: ExEA

Data from 33 monitoring points in water bodies of the "lake" category are presented - one lake and 32 dams. Overall, 70% of the monitored points fall in the high - good status range, 6% are in moderate status and 24% are in the poor – bad status range, i.e. 30% of the surveyed monitoring points do not reach the good status targets. For 2017, national-level data is available for about 60% sites less compared to 2016 and about 40% sites less compared to 2015. No data is available for the Black Sea River Basin District for 2017. Based on the data available for the period 2015-2017, water bodies with a persistent deterioration tendency are Rasovo dam, Barzina dam and Boyka dam in the Danube River Basin District and Koprinka dam in the East Aegean River Basin District, which require measures to improve their status. The large complex and drinking water dams are in high or good status, which is a lasting trend.

Soil contamination

During the period 2005 – 2017, soils in Bulgaria are in good ecological status as regards contamination with heavy metals, metalloids and persistent organic pollutants: polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine pesticides.

As regards heavy metals and metalloids:

In order to assess soils contamination with heavy metals in 2017, 606 soil samples were taken and 5 151 analyses were made from 101 points of the base network. The data obtained were assessed against the maximum permissible concentrations as set out in Ordinance No. 3 on the levels of permissible concentrations of harmful substances in soils, in force as of 12.08.2008.

In 2017 14 out of a total of 101 points were reported to have an elevated content of heavy metals and metalloids. (Table 5).

Table 5. National soil monitoring network points with established exceedances of the maximum permissible concentrations for 2017

Site/Settlement	District	Cu, in mg/kg	Zn, in mg/kg	Cd, in mg/kg	Pb, in mg/kg	Ni, in mg/kg	Cr. in Mg/kg	As. in Mg/kg	Hg, in mg/kg
Depth I (0-10 cm/0-20 cm)									
Ribaritsa village	Lovech							30,17	
Anton village	Sofia	105,52							
Panagyurski koloni village	Pazardzhik	172,33							
Kalugerovo village	Pazardzhik	116,67							
Pashkul village	Haskovo					78,57			
Chokmanovo village	Smolyan					82,03			
Nanovitsa village	Lovech							25,67	
Dryanovo village	Plovdiv				191,00				
Orizari village	Sliven	121,00							
Krustatitsa village	Smolyan				145,33				
Dolni Romanci village	Pernik								
Depth II (10-40 cm/20-40 cm)									
Beli Iskar village	Sofia					180,63			
Gabra village	Sofia					82,59			
Nanovitsa village	Lovech							25,77	
Panagyrski koloni village	Pazardzhik	162,67							
Ribaritsa village	Lovech							32,47	
Dryanovo village	Plovdiv				194,33				
Drachevo village	Burgas						278,00		
Orizari village	Sliven	100,67							
Krustatitsa village	Smolyan				137,33				

Source: ExEA

Target 9: 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.

According to the definition provided by the Convention on Biological Diversity and IUCN, **invasive alien species** are alien species whose introduction and/or distribution is a threat to the biodiversity and/or to the ecosystem services, human health and socio-economic values.

The first **EU-relevant species list** was defined by Commission Implementing Regulation (EU) 2016/1141 of 13 July 2016 adopting a list of invasive alien species of Union concern pursuant to Regulation (EU) No 1143/2014 of the European Parliament and of the Council. The list contains 37 invasive alien species, most of which occur only in some Member States. Bulgaria immediately included these species in its surveillance and control mechanisms in order to ensure that actions are taken to prevent their further spread and/or to reduce damage caused by the ones that have already spread in the country. In this regard, an **Atlas of Invasive Alien Species of Significance to the European Union** was developed in Bulgaria. The atlas contains information and original country data for the 37 species included in the original list to the Regulation (see section 7, Chapter VII for further details). By Commission Implementing Regulation (EU) 2017/1263 of 12 July 2017 updating the list of invasive alien species of Union concern established by implementing Regulation (EU) 2016/1141 pursuant to Regulation (EU) No 1143/2014 of the European Parliament and of the Council, to the list of invasive alien species concerning the Union, 12 more IASs are added. (see section 7, Chapter VII for further details)

In pursuance of the target, National Standard 7 of the National Standards for Good Agricultural and Ecological Status of the Land was adopted by Order No RD09-122 of 23.02.2015 of the Minister of Agriculture and Food, according to which it is mandatory to prreserve and maintain the existing permanent grasslands, meadows from the entry of unwanted vegetation - eagle fern (*Pteridium aquilinum*), hellebore (*Veratrum spp.),* tree of heaven (*Ailanthus altissima*) and amorpha (*Amorpha fruticosa*).

In addition, Annex 8 of the National Forest Stewardship Council (FSC) Standard for Responsible Forest Management (2016), lists invasive and shrub invasive alien species that should not be used for afforestation in the territories of the scope of FSC FM certification. The list is in accordance with the national report on the state and protection of the environment in the Republic of Bulgaria in 2010 (2012 edition).

The East and South-European Network of Invasive Alien Species (ESENIAS) is maintained by IBER -BAS. The purpose of the network is to maintain a common database of invasive alien species, to raise awareness in the community and among the ones in charge; to support the early detection, destruction and control of invasive alien species, as well as to mitigate their impact. Six of the member countries (Romania, Greece, Turkey, North Macedonia, Serbia, Croatia), together with Iceland, are IBER-BAS partners in the ESENIAS-TOOLS project under FM EEA 2009-2014. In 2016, a large number of field studies, meetings and scientific forums were conducted with the aim of collecting and exchanging data on the invasive alien species. Scientific outcomes are summarised in 20 scientific articles, 1 book, 1 symposium, 1 dissertation and 37 abstracts.

The Danube Region Invasive Alien Species Network (DIAS), with representatives from 15 countries (Germany, Austria, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Bulgaria, Romania, Moldova, Ukraine and Turkey), develops an Invasive Alien Species Strategy within the framework of the EU Strategy for the Danube Region. Under the ESENIAS-TOOLS project, the 4th DIAS meeting was held in Sofia (November 15-16, 2016). The objective of the meeting was to exchange information on the activities implemented as a result of the combined efforts of the Member States and the work on the Danube Region Invasive Species Strategy. DIAS has been approved to participate as a permanent observer in the meetings of the Steering Group under Priority Area 6: *Conservation of Biodiversity, Landscape and Air and Soil Quality* of the EU Danube Region

Strategy. In 2016, two such meetings were attended, where the activities of the network were reported and the work plan for 2017 was presented.

Institute of Biodiversity and Ecosystems Research, BAS - 2016 Report
http://www.iber.bas.bg/sites/default/files/2017/Report_IBER_2016/Report_IBER_2016.pdf

ESENIAS Tools - as regards the marine ecosystem, during the period 2015-2016, the population structure of six alien species (4 zooplankton - *Acartia tonsa, Oithona davisae, Mnemiopsis leidyi* and *Beroe ovata*, one zoobenthos - *Rapana venosa* and one fish species - *Liza haematocheila*) was assessed in the Varna bay. Observed was a tendency to preserve the significance of alien zooplankton and benthos species in the total number and biomass of the respective taxonomic groups, while for the fish species a drastic decrease of the stock was observed. Summarised data and analysed outcomes are presented in Ivanova et. al., 2017; Karachle et. al. 2017; Ivanova et al., 2017:
https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=LEGISSUM:200701_1&from=BG

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

There is no data of Bulgaria taking any actions to achieve the global target of reducing pressure on ecosystems vulnerable to climate change and/or ocean acidification.

Strategic goal C – *Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.*

Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

National Ecological network - protected territories and protected areas

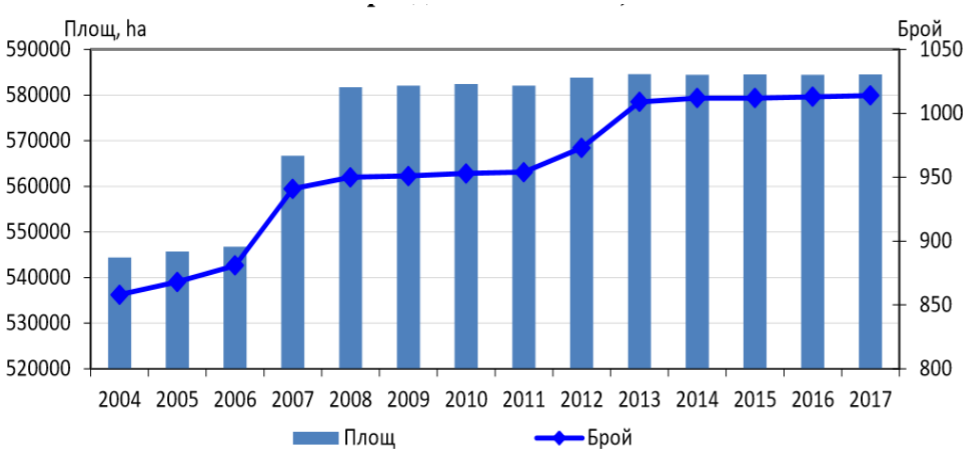
In 2017, 3 new protected territories in the "protected area" category were declared, with a total area of 52,826 ha. One protected territory was removed from the "protected area" category – with a total area of 2 ha, and the area of 7 protected territories was updated based on the regulations in Article 42 (6) of the Protected Territories Act due to more accurate measurements. Data and digital boundaries of protected territories are reported on an annual basis to the European Environment Agency (EEA). Reporting is carried out in line with the EEA Annual Management Plan in order to maintain a common European database of territories protected under the national legislation.

The trend is towards an increase in the number and the area of protected territories in the period 2004-2017 (Figure 7).

In 2017, 3 new protected areas were declared in the category of "protected area", with a total area of 52,826 ha; one protected area has been deleted from the category “protected area” with an area of 2 ha and the area of 7 protected territories has been updated, on the grounds of Art. 42, para. 6 of the Protected Areas Act, in connection with more accurate measurements.

At the end of 2017 the number of protected areas in Bulgaria is 1 014 with a total area of 584 563.2 ha or 5.27% of the territory of the country.

Figure 7. Changes in the number and area of protected territories in Bulgaria in the period 2004 – 2017, in ha



Source: MOEW/ExEA

As of the end of 2017, the Council of Ministers of the Republic of Bulgaria has approved 339 NATURA 2000 protected areas (a total of 352, however 13 of them have common border under the two directives), covering a total of 34.4% of the country's territory (Table 8, Figure 5). At the end of 2017, the number of designated protected areas in Bulgaria under the Birds Directive is 119 with a total area of 2 523 661 ha - 22.7% of the total territory of the country (Figure 4), and the number of designated protected areas under the Habitats Directive is 233 covering an area of 3 326 973 ha (30% of the total territory of the country). The protected areas include a total of 282 135 ha of marine open space.

Table 6. Number and area of Natura 2000 protected areas network in Bulgaria

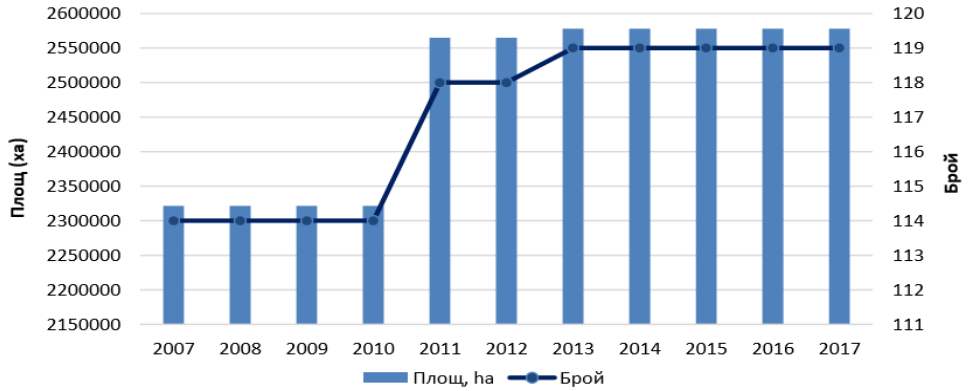
	Number	Area/ha	Territory/ha	Sea aquatory/ ha	% of the national territory
Habitat protected areas	233	3 574 673	3 326 949	247 724	30%
Birds protected areas	119	2 578 150	2 523 661	54 489	22.7%
Total Natura 2000	**339***	**4 105 306**	**3 823 170**	**282 135**	**34.4%**

* 13 out of 33 are with common boundary under the two Directives

Source: MOEW-NNPS

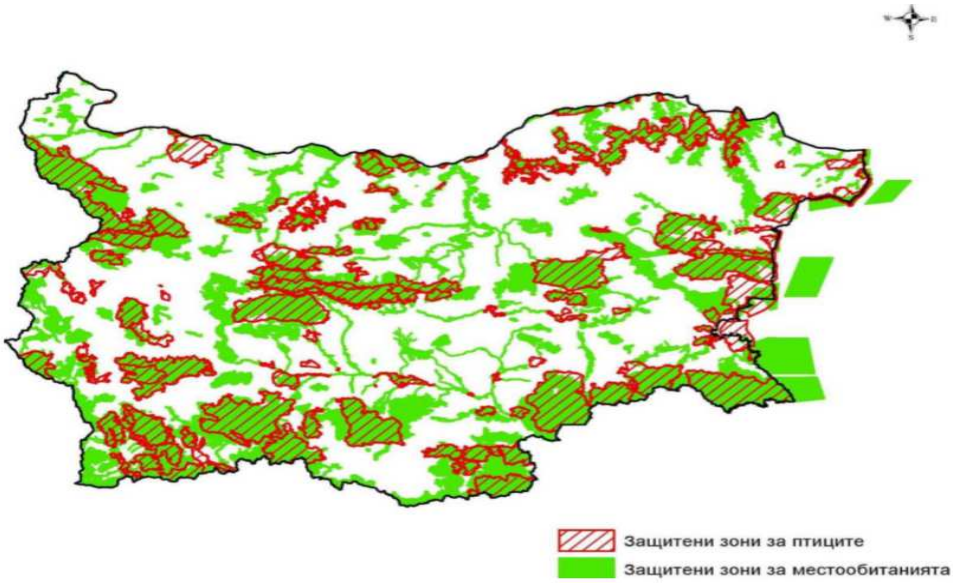
In terms of coverage of NATURA 2000 network as a percent of the national territory, Bulgaria ranks third in the EU, after Slovenia and Croatia. The Natura 2000 network sufficiency index is close to 100%.

Figure 8. Change in the number and area of the protected areas under the Birds Directive for the period 2007-2017 in Bulgaria, in ha



Source: MOCB-NNPS

Figure 9. Map of protected areas in NATURA 2000 environmental network in Bulgaria



Source: http://eea.government.bg/bg/soer/2017

Policies and measures for conservation and National Ecological Network (NEN)

In 2017, updated management plans were approved and entered into force for 4 protected territories: Bunardzhik Hill natural landmark (NL), Danov Hill NL, Mladezhki Hill NL, Ardachlaka reserve.

In 2017, by order of the Minister of Environment and Water, new management plans for 7 protected territories were approved, including: Uchilishtna gora reserve, Bogdan reserve, Zhenda reserve, Chamlaka reserve, Boraka reserve, Borovets reserve, Vulchi dol reserve, which entered into force in 2018.

In 2017, another 11 management plans are in the process of development and/or under the procedures of the PTA:

- 2 national parks – Rila and Pirin;
- 2 nature parks – Vitosha and Bulgarka;
- 3 protected areas – Defileto, Botanical garden – Balchik, Chokliovo blato;
- 3 reserves (conservation areas) – Ropotamo (RIEW - Burgas), Bistrishko branishte and Torfeno branishte (RIEW – Sofia);
- 1 maintained reserve – Atanasovsko ezero (RIEW - Burgas);

Seven wild birds protected areas management plans have been approved by 2017: BG0002015 Konush dam, BG0002023 Ovcharitsa dam, BG0002086 Tsalapitsa rice field, BG0002090 Berkovitsa, BG0002052 Zhrebchevo dam, 2000099 Kocherinovo and BG0002101 Meshchitsa.

International initiatives related to protected territories in 2017

- **Under UNESCO's Man and Biosphere Programme**

At its 29th Session, held from 12 to 15 June 2017, the International Co-ordinating Council of the UNESCO's Man and Biosphere Programme (MAB - ICC) approved the proclamation of four Bulgarian biosphere reserves - Central Balkan, Red Wall, Sreburna and Uzunbudzhak, in accordance with the requirements and principles of the Seville Strategy. The sites' nomination in 2016 was supported by the respective municipalities and the relevant state institutions.

At its 29th Session, the International Co-ordinating Council decided to remove (withdraw) from the official list of biosphere reserves "old" type reserves - Kamchia, Dupkata and Kupena, because of lack of support from the respective municipalities (incl. Avren, Dolni Chiflik, Batak, Peshtera and Bratsigovo) to have such sites at the territory of their municipality.

The decision of Bulgaria (acting through the Chairperson of the National Committee on the Man and Biosphere Programme) to request the withdrawal of these biosphere reserves from the world network was taken during a meeting of the National Committee in September 2016 on the basis of letters submitted by the respective municipalities.

At the same session of the MAB - ICC, the removal of 5 "old" biosphere reserves, for which the relevant municipalities (Sofia municipality, Blagoevgrad, Belogradchik, Rakitovo and Sandanski) expressed the desire for compliance with the current Programme requirement – Bistrishko branishte, Parangalitsa, Chuprene, Mantaritsa and Ali Botush, was postponed. MOEW informed these municipalities in due time that, in order for the «old» biosphere reserves to be in compliance with the current requirements of the Programme, nomination forms for compliance need to be filled in, which, after they undergo a procedure and discussion at a National Committe meeting, will be submitted to the UNESCO Secretariat by September 30, 2018.

The municipalities on the territories of which the four new biosphere reserves are located, as well as the competent RIEWs – Plovdiv, Burgas, Rousse and the Central Balkan National Park Directorate, were requested to organise the establishment of management authorities (advisory councils) with the participation of the stakeholders.

At a meeting of the National Committee to the UNESCO Man and Biosphere Programme, the Chairman of the Committee presented the certificates of the newly announced four biosphere reserves to representatives of the respective municipalities: Silistra,

Asenovgrad, Karlovo, Troyan, Anton, Pavel banya, Sevlievo and Malko Tarnovo and the RIEWs - Plovdiv, Burgas, Ruse and the Central Balkan National Park Directorate.

Listing the beech forests in the nine reserves on the territory of Central Balkan National Park in the UNESCO World Heritage Site - Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe:

During the 41st session of the UNESCO World Heritage Committee, held in July 2017 in Krakow (Poland), the joint nomination of 10 countries for the extension of the World Heritage Site – Primeval Beech Forests of the Carpathians and Ancient Beech Forests of Germany, located in the territory of Slovakia, Ukraine and Germany was discussed.

Following debate, UNSC adopted Decision 41 COM 8B.7, approving the extension of the World Heritage site, which at present is called Ancient and Primeval Beech Forests of the Carpathians and Other Regions in Europe and includes 78 components located on the territory of 12 European countries - Austria, Albania, Belgium, Bulgaria, Romania, Slovenia, Spain, Italy, Croatia, Germany, Ukraine and Slovakia.

Bulgaria participated in the nomination with its most representative beech forests in the nine reserves at the territory of Central Balkan National Park - Boatin, Tsarichina, Kozya stena, Steneto, Sokolna, Peeshti skali, Stara reka, Dzhendema and Severen Dzhendem.

The extended site meets the requirements of Criterion ix - outstanding examples representing significant on-going ecological and biological processes in the evolution and development of the ecosystems and aims at the conservation of the representative primeval beech forests in Europe. It is a prime example of intact, complex temperate forests that demonstrate the spread of European beech from the last glacial age to the present. Unique to the heritage site is the large number of participating countries - a precedent in the history of the World Heritage Convention.

The inclusion of Bulgaria in the UNESCO World Heritage Site for Europe is yet another recognition of the unique Bulgarian nature and the traditions in its conservation.

The decision for Bulgaria's participation was made following consultations with the stakeholder institutions at regional and local level - the respective regional governors and municipalities, on the territory of which the natural reserves are located.

The inclusion of Central Balkan National Park beech forests in the World Heritage Site does not impose any additional restrictions, as they are anyway currently part of the most stringent conservation areas.

Long-term specific financial and administrative commitments stemming from the countries' participation in the World Heritage Sites will be the subject of a special Joint Declaration of Intent and other agreements that are to be adopted by the European countries involved.

Ecosystem-related issues and the provided ecosystem services are a subject of considerable scientific activity at **IBER-BAS (Report 2016):** http://www.iber.bas.bg/sites/default/files/2017/Report_IBER_2016/Report_IBER_2016 .pdf

The Center for Long-Term Ecosystem Research is part of the Global LTER Network for analyzing and evaluating the effects of global change on ecosystems and their ecosystem services. Within the network a meta database is maintained for each of the 6 sites of the network in the country, data is provided to state (EEA, MOEW) and non-governmental (WWF) organizations.

During the period 2014-2016 **IBER-BAS** was a contractor of the most significant biodiversity projects, financed under the European Economic Area Financial Mechanism (2009-2014), awarded by the MoEW, and related to the mapping and evaluation of different types of ecosystems. The projects are available in the 2016 IBER Report: http://www.iber.bas.bg/sites/default/files/2017/Report_IBER_2016/Report_IBER_2016.pdf

Bulgaria participates together with the Black Sea countries in the ***BlackSeaWet*** Regional Initiative for Protection of the Black Sea Wetlands under the Ramsar Wetland Convention. The ***BlackSeaWet*** Regional Initiative was created between the six Black Sea countries - Bulgaria, Georgia, Romania, Russia, Turkey and Ukraine. The main objective of the ***BlackSeaWet*** initiative is to coordinate the conservation and sustainable management of Black Sea coastal wetlands, as in recent years degradation and loss of coastal ecosystems has continued to grow as a result of regional development processes in these areas.

In September 2017, an international project entitled "Improving the Conservation Efficiency of Wetlands" (WetMainAreas) started, whose main objective is the conservation and development of wetlands in the Balkans - Mediterranean (Bulgaria, Greece, Albania, Northern Macedonia and Cyprus). The project involves the designation of 4 pilot demonstration territories that will represent good wetland management and conservation practices in the context of the European Directives.

Target 12: 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.

The National Biodiversity Monitoring System (NBMS) in Bulgaria aims to provide an information base for the implementation of an effective national nature conservation policy. The sites for monitoring within the NSMSB are as follows:

- Invertebrates - 156 species, of which 52 are included in the annexes of the Habitats Directive;
- Fishes - 65 species, 38 of which are included in the Annexes to the Habitats Directive;
- Amphibians and reptiles - 55 species, 44 of which are included in the annexes of the Habitats Directive;
- Birds - 414 species, of which 312 are reported under the Birds Directive;
- Mammals (without bats) - 23 species, 20 of which are included in the Annexes to the Habitats Directive;
- Bats - 33 species, all of which are included in the Annexes to the Habitats Directive;
- Mushrooms - 14 species;
- Mosses - 13 species, of which 6 species and 1 genus (Sphagnum spp., Including 3 species for Bulgaria) are included in the Annexes of the Habitats Directive;
- Land plants - 199 species, of which 26 species and 1 genus (Lycopodium spp., Including 4 species for Bulgaria) are included in the Annexes of the Habitats Directive;

http://eea.government.bg/bg/bio/nsmbr/osnoven-dokument-na-nsmbr

In 2017, for a second year (after 2014), monitoring of the fungal species by NBMS was carried out (for a total of 14 species) and current assessments of their status were made at national level. The monitoring and status assessment of fungal species was carried out in line with the Fungi Monitoring Methodology and the Methodology for Assessment of Fungi Species of the NBMS approved by an order of the Minister of Environment and Water. Observations were

conducted at 42 monitoring sites, with a total of 117 field visits, each documented with a field form.

In the period 2010-2017, field observations of the populations of 10 plant species of conservation importance in Bulgaria were conducted by the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences.

Table 7. Plants species researched

Plant species	Conservation status	Endangering factors	Populations observed
Swertia punctata	Critically endangered	Erosion; competition of other plant species	1.Stara Planina (western part – along Burza river, above Gorni Lom village
Astragalus dasyanthus	Critically endangered	Mowing; changes in the dynamics of native species – shrubbing; invasive species into the habitat	1. Danube plains (Komarevo village); 2. Struma valley (Boboshevo); 3. Northeast Bulgaria (Mechka village)
Astragalus physocalyx	Critically endangered	Intraspecific causes; terrain erosion; grazing and trampling; competition of other plant species	1. Struma valley (Kulata village); 2. Thracian valley (Plovdiv)
Erodium absinthoides	Endangered	Grazing and trampling by domestic animals; Erosion	1. Vlahina mountain (Logodazh village)
Serratula bulgarica	Critically endangered	Changes in the dynamics of vegetation; invasion of competing species (reeds)	1. Danube plains (Hadzhidimitrovo village)
Verbascum spathulisepalum	Endangered	Unregulated grazing, trampling and mowing of private meadows; acquisition of land for cultivation of tobacco; limited area of suitable habitats.	1. Eastern Rhodopes (Gorni Yurutsi village)
Achillea thracica	Critically endangered	Ploughing field boundaries and building dirt roads.	Thracian valley, northwest of Manole village - the population is the only one in the world. – Its condition is rated as critical
Centaurea trinervia	Critically endangered	Small population; low potential for renewal and poor competitiveness of the species; parasites and plant diseases; changes in the composition of the plant community (shrubbing); fires; afforestation.	1. Northeast Bulgaria (Taushan tepe and Tepichkite area, the territory of Nevsha village)
Centaurea waginitziana	Critically endangered	Plowing; high forest cover and shrubbery.	1. Tundzha hilly plain, Golyam Dervent village

Bupleurum uechtritzianum	Endangered	Unfavourable climate conditions; grazing and trampling; habitat ruderalization; changes in the dynamics of native species	1. Northeast Bulgaria (Ostritsa village); 2. Black Sea coast (Aksakovo); 3. Black Sea coast (Balchik)

Source: IBER-BAS

During the reporting period, calculations were made to estimate the **brown bear** population, which for 2017 is 364 individuals. This is the lowest value of the species number for the period 2011-2017, i.e. in 2017, the smallest number of traces and traces of life activity was recorded in the territories where annual monitoring of the species is carried out. The largest number of species in total for all monitoring sites was registered in 2013, and in 2017 the fewest individuals were calculated - 364. (http://eea.government.bg/en/bio/nsmbr)

The number of **wild goat** has also been estimated and found to be relatively constant. In the spring of 2017, more feral goats (1189 ind.) Were registered than those observed in the fall (1116 ind.). The average number of feral goats in 2017 is the highest for the entire eight-year period.

Venerable trees[5]

In 2017, three venerable trees were announced under the Biodiversity Act, and another 39 were taken off the register due to withering or irreversible damage. The declared venerable trees are entered in the State Register of Centuries-old and remarkable trees in the MoEW in accordance with Chapter Five of the BDA. Public access to this register is provided by the EEA. (http://eea.government.bg/v-trees/bg/)

During the period 2014-2018 the following Action plans for wild birds are up-to-date in Bulgaria:

- Action plan for conservation of the Dalmatian Pelican (Pelecanus crispus) in Bulgaria 2013 – 2022: https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_P_crispus%202013-2022.pdf ;
- Action plan for conservation of the Eastern imperial eagle (Aquila heliacal) in Bulgaria 2013 – 2022: https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_Aheliaca_2013-2022.pdf ;
- Action plan for protection of the Saker falcon (Falco cherrug) in Bulgaria 2013 – 2022: https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_F.sherrug_2013-2022.pdf
- Action plan for conservation of the Ferruginous Duck (Aythya nyroca) in Bulgaria 2014 – 2023: https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_Aythya_nyroca_2014-2023_Adopted.pdf ;
- Action plan for conservation of the Eurasian bittern (Botaurus stellaris) in Bulgaria 2014 – 2023:

5 http://eea.government.bg/v-trees/bg/

https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_B.stellaris_2014-2023_Adopted.pdf ;

- Action plan for conservation of the Pygmy Cormorant (Phalacrocorax pygmaeus) in Bulgaria 2014 – 2023: moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_Ph.pygmeus_2014-2023_Adopted.pdf
- Action plan for protection of the White-headed duck (Oxyura leucocephala) in Bulgaria 2014 – 2023: https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_O.leucocephala_2014-2023_Adopted.pdf
- Action plan for conservation of the Lesser White-fronted Goose (Anser erythropus) in Bulgaria 2018 – 2027: https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_Dendrocopos_leucotos-2020-2029-RD955-20122019.pdf
- Action plan for conservation of the Red-breasted Goose (Branta ruficollis) in Bulgaria2018 – 2027: https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_ANIMALS/AVES/AP_Branta_ruficollis_2018-2027.pdf

In the period 2014 - 2018, Action plans for the conservation of 50 plants have been developed and approved in Bulgaria: *Achillea ochroleuca*, *Achillea thracica*, *Aethionema arabicum*, *Amygdalus webbii*, *Anthemis argyrophylla*, *Artemisia chamaemelifolia*, *Astracantha thracica*, *Astragalus dasyanthus*, *Astragalus physocalyx*, *Bupleurum uechtritzianum*, *Centaurea finazzeri*, *Centaurea trinervata*, *Centaurea wagenitziana*, *Centhranthus kellereri*, *Convolvulus althaeoides*, *Convolvulus holosericeus, Corynephorus divaricatus, Erodium absinthoides*, *Eriolobus trilobata*, *Ephedra fragilis*, *Genista germanica*, *Geranium aritatum*, *Lathyrus palustris*, *Lathyrus pancicii*, *Leontodon saxatilis*, *Limonium bulgaricum*, *Lycopodiella inundata*, *Mannia androgyna*, *Matthiola odoratissima*, *Ophrys insectifera*, *Orchis provincialis, Plantago maxima, Potentilla fruticosa, Ranunculus stojanovii, Riccia crustata Trab., Salix rosmarinifolia L., Serratula bulgarica, Silene vulgaris, Spiraea crenata, Swertia punctata*, *Tragopogon floccosus*, *Trichocolea tomentella*, *Tulipa pirinica*, *Verbascum anisophyllum*, *Verbascum purpureum*, *Verbascum spathulisepalum*, *Veronica multifida*.
(https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/zastiteni-vidove/planove-za-dejstvie/)

Action Plans for the Conservation of 4 Species Animals have been commissioned: European ground squirrel (Spermophilus citellus), Roach's mouse-tailed dormouse (Myomimus roachi), rock partridge (Alectoris graeca graeca Meisner, 1804), Triton (Triturus cristatus Laurenti, 1768)

In 2017, drafts of Action Plans for the following protected species were submitted to the MOEW:

- "Action Plan for the Conservation of the Cinereous vulture (Aegypius monachus) in Bulgaria 2015-2024";

- "Action Plan for the Conservation of the Griffon Vulture (Gyps fulvus) in Bulgaria 2015-2024";
- "Action Plan for the Conservation of the Bearded Vulture (Gypaetos barbatus) in Bulgaria 2015-2024";
- "Action Plan for the Western capercaillie (Tetrao urogalus) in Bulgaria for the Period 2016-2025";
- "Action Plan for the White-backed Woodpecker (Dendrocopos leucotos) in Bulgaria for the Period 2016-2025";
- "Action Plan for the Three-toed Woodpecker (Pycoides tridactilus) in Bulgaria for the Period 2016-2025".

All action plans were discussed at a meeting of the National Biodiversity Council and a procedure for their approval is underway.

The main activity of the Convention is carried out by the Managing Authority for CITES for Bulgaria, which is the MoEW, with the Ministry working in partnership with the Customs, Police, Prosecutor's Office, BAS and the veterinary authorities to implement the Convention. An Instruction on Interaction between the Ministry of Environment and Waters, the Customs Agency and the Bulgarian Food Safety Agency has been created to increase the effectiveness of the control of the introduction, trade, transit and export of specimens of endangered species of wild fauna and flora. Registration requirements are part of the measures that Bulgaria applies to activities and controls under the Convention, and they are more stringent than those required by Regulation (EC) No 338/97. In this regard, activities are carried out in accordance with Ordinance No. 3 of October 31, 2008 on the marking and labelling of specimens of species under Regulation 338/97 for the conservation of species of wild fauna and flora by regulating their trade in Bulgaria. species tagging, which helps control and track the specimens. An example in this regard is the uniform marking of specimens for species A and B - for example, bird rings.

It should be noted that Bulgaria is one of the countries in Europe with **compulsory registration.**

http://awsassets.panda.org/downloads/13_2008_ command_8_marked_and_labeled_on_cites_vidove_moew_en.pdf

http://www.stz.riew.e-gov.bg/Registratsiya_na_ekzemplyari_ot_vidove_po_CITES-c237

Bulgaria holds two actions in 2013 and 2015 to return to the wild confiscated, appraised wild birds - Jaco parrots. The actions were carried out with the support of the World Parrot Trust. There are no other similar actions to bring back birds from Europe to Africa:

https://www.vesti.bg/bulgaria/vryshtame-32-papagala-zhako-na-uganda-5589331 ;

https://www.dnevnik.bg/zelen/bioraznoobrazie/2015/12/09/2666227_dvaiset_spaseni_ot_brakonieri_papagala_jako_poeha/ .

During the reporting period in Bulgaria (2014), among other confiscations, wild birds (African gray parrots) were confiscated. In 2016, the birds were temporarily shipped to France. The return of birds to Africa is forthcoming and will be carried out with the assistance of France and its CITES Managing Authority: https://www.parrots.org/parrot-blogger/arrival-of-grey-parrots-to-kiwa-centre-uk .

In 2018, specimens of the European eel (Anguilla Anguilla, Linnaeus, 1758) were confiscated at customs at Sofia Airport due to lack of documents and handed over to the Institute of Fisheries Resources - Varna, at the Agricultural Academy, as a rescue center. for fish. European eels were raised in a private fish farm and under the control of RIEW-Varna and RIEW Ruse 70 kg (150,000 copies) were released in the Danube River near Silistra.

https://www.moew.government.bg/en/confiscated-zmiorki-byaha-pusnati-v-reka-dunav/

In 2014 and 2015, WWF - Bulgaria became the first conservation organization to fish the Danube, launching 50,000 sturgeon in the river basin. For more information: https://www.wwf.bg/?uNewsID=348390

To support the conservation of rare and endangered species, a Wildlife Rescue Center - Stara Zagora has been established in Bulgaria. The Center is recognized by the Bulgarian Government as a Rescue Center within the meaning of the CITES Convention and, together with the competent state institutions, actively assists in the implementation of international normative documents and the Biodiversity Act. More about the Centre's activities: https://greenbalkans-wrbc.org/en/Vryshtane_v_prirodata-c264 .

In addition to this center in Bulgaria there are 5 other rescue centers for animals and 2 for plants, ordered by the Ministry of Environment and Water.

https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Legislation/Zapovedi/Zapoved_No_826-2012_RC.pdf and

https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Legislation/Zapovedi/RD-619-08.09.15.pdf

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Plant genetic resources

The Plant Genetic Resources Programme to the Institute for Plant Genetic Resources - Sadovo participates in the **National Strategy and the National Action Plan** in the part – „*Ex situ* conservation and sustainable use of components of biological diversity for food and agriculture" *(Article 9, CBD).* Conservation and preservation of diversity methods for cultivated species, their wild ancestors, useful and weed species, as well as wild species under a specific protection status are the following: ***ex situ*** – monitoring in seed gene bans and botanical gardens (*in vivo*); ***in situ / on farm –*** monitoring and protection of natural ecosystems / monitoring and protection of agro-ecosystems; ***in vitro –*** of vegetatively propagated species.

European and national strategies for biodiversity conservation and the interest of foreign partners are focussed on collecting and preserving local gene plasma - wild species, breeding lines, old Bulgarian indigenous varieties, populations, ecotypes of grassland and pasture habitats, etc. Collections are enriched annually with an average of 600-1200 samples of new germplasm, with a focus on local plant genetic resources in recent years.

European standards for plant genetic resources research have been adopted, thus making the assessment database comparable to any other country's genetic diversity. The range of crops undergoing ECPGR, Bioversity International, UPOV uniform descriptors assessment is expanding. Each year, 2000-2500 samples are examined. On the basis of the complex assessment, characteristic collections are created.

Data on specimens to be maintained in the National ex situ Collection are available in the European electronic catalog EURISCO (http://eurisco.ipk-gatersleben.de/). The Bulgarian Collection (NI PGRBGR) in EURISCO covers passport data for 63 713 samples, including BGR001 / IPGR Sadovo - 59 292 forms, BGR029 / DAI General Toshevo - 3 857 forms and BGR005 / IREMC Kazanlak - 564 forms. Of all specimen of Bulgarian origin are 13 269

specimens from 238 cultural species: 33 - cereals, 34 – grain legumes, 41 - technical, 29 - vegetable, 43 - forage, 19 - decorative, 39 - durable.

Forest genetic resources

Conservation of forest genetic resources is one of the indicators for sustainable forest management adopted at European Union level. The conservation of forest genetic resources is legally regulated (Section V "Preservation and storage of forest genetic resources" in Ordinance No. 21 of 12.11.2012 on the terms and conditions for the determination, approval, registration and cancellation of sources from the forest seed production base, collection of forest genetic resources, their qualification, trade and import). A gene bank with two refrigeration chambers was built, rules for operation of the gene bank were prepared and 99 kg of seeds in 96 batches from 30 tree species were collected and currently stored. A list of tree species and seed quantities by region of origin - seed collections maintained by the Forest Seed Control Stations was prepared and approved by the Executive Director of EFA. Bulgaria is part of the European Forest Genetic Resources Information System (EUFGIS), and so far, 6 conservation units were input in the information system, mainly covering dispersed species such as *Acer pseudoplatanus, Acer platanoides, Sorbus torminalis, Pyrus pyraster, Fraxinus excelsior, Populus nigra*, etc.

Genetic resources in livestock breeding

The Executive Agency for Breeding and Reproduction in Livestock Breeding (EABRLB) is an executive body in the field of livestock breeding to the Minister of Agriculture and Foods which assists him in the implementation of the state policy in the field of breeding and management and conservation of genetic resources. EABRLB controls 28 autochthonous breeds, which are also subject of support under Measure 10 "Agroecology and Climate" of the Rural Development Program 2014-2018. For more details on the conservation and conservation of autochthonous breeds of domestic animals see SECTION VII.

Strategic Goal D - ***Enhance the benefits to all from biodiversity and ecosystem services.***

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

In line with the requirements of the **EU Biodiversity Strategy 2020**, a number of ***projects and activities for mapping and assessment of the status of ecosystems and ecosystem services*** using biodiversity data are being implemented in the European Union and in Bulgaria. The significance of biodiversity is considered in the context of the assessment of the status, conservation and restoration of ecosystems and ecosystem services at local, national and European level.

Assessment and mapping of ecosystems and ecosystem services is an important prerequisite for establishing a baseline for assessing changes over time in the status of ecosystems and the ecosystem services they provide. Successful ecosystem management, as part of human welfare policies, plans and projects (UNEP 2014), requires identification of long-term trends in ecosystem development in Bulgaria. In the period 2015 - 2017 for the territory of the country outside the NATURA 2000 ecological network, this baseline was created in the reference timeframe of the 2015-2016 field seasons under seven projects that carried out mapping and assessment of nine main types of ecosystems under the BG03

Biodiversity and Ecosystem Services Programme, funded by the Financial Mechanism of the European Economic Partnership. A large number of scientists from the institutes of the BAS, from various universities and specialists from the state institutions (MOEW, MAFF), as well as representatives of non-governmental organisations participated in these projects. The leading institutions under these projects were MOEW, EFA-MAFF, IBER-BAS, FRI-BAS, Sofia University St. Kliment Ohridski.

Ecosystem types and general characteristics

Ecosystem types are suggested as the main ecosystem mapping units in Europe. These main units should allow for a consistent assessment of the status and services on local, national, regional and European scale. The MAES typology differentiates between three major types of ecosystems at level 1: **terrestrial, freshwater** and **marine**. At level 2, the main ecosystem types are further subdivided (see Table 8). The proposed typology combines CORINE Land Cover classes with EUNIS classification of types of habitats.

Table 8. Main ecosystems types in Bulgaria and their subdivision

Level 1	Level 2	Level 3, EUNIS2 BG-specific
Terrestrial	Urbanised ecosystems Cropland ecosystems Grassland ecosystems Forest and woodlands Heathland and shrubs Sparsely vegetated land Wetlands	1 - 10 (10 subtypes) 1 - 5 (5 subtypes) 1 - 5 (5 subtypes) G1 - 4 (4 subtypes) F2,3,9 (3 subtypes) 1 - 5 (5 subtypes) D1,4,5 (3 subtypes)
Freshwater	Rivers and lakes	C, J, X (16 subtypes)
Marine	Marine ecosystems typology reduces the 3-D ocean structure to 2-D habitats at the sea bed (bottom habitats), referring the third dimension, the water column (pelagic habitats) to deep zoning. Brackish waters and marine ecosystems on the land-sea border are grouped together in one type.	1 - 8 (8 subtypes)

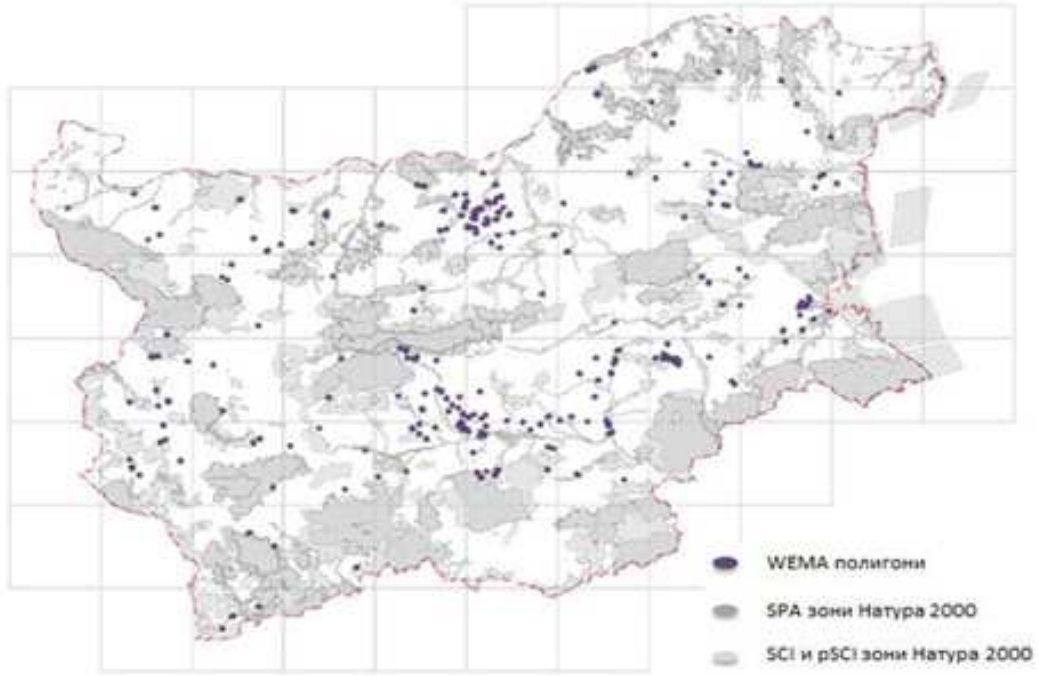
Outcomes of types of ecosystems mapping

- **Wetlands**

The total number of mapped polygons with inland wetlands is 285, one of which is of subtype 701 - transition mires and quaking bogs (EUNIS code D2), six are of subtype 702 - alkaline swamps and wetlands (EUNIS code D4) and 278 are of subtype 703 - sedge and reedbeds, normally without free-standing water (EUNIS code D5) (see Figure 10). The main mapping methods used are visual inspection and interpretation of images and vector layers with attributes in GIS environment, vectorization of image objects, and fieldwork with GPS receivers and mapping tablets. The mapped polygons of ecosystems of the type inland wetlands fall within 44 squares of the coordinate network, respectively 44 maps were prepared for the ecosystem types, for the status of the ecosystems and for each ecosystem service. The colour codes for the visualization of the level 3 ecosystem types are in line with those used in the map

of European ecosystem types, and the colour codes for the visualization of the status and the services provided are in accordance with the established methodology for mapping ecosystem services.

Figure 10.Types of inland wetlands (WEMA polygons) in Bulgaria

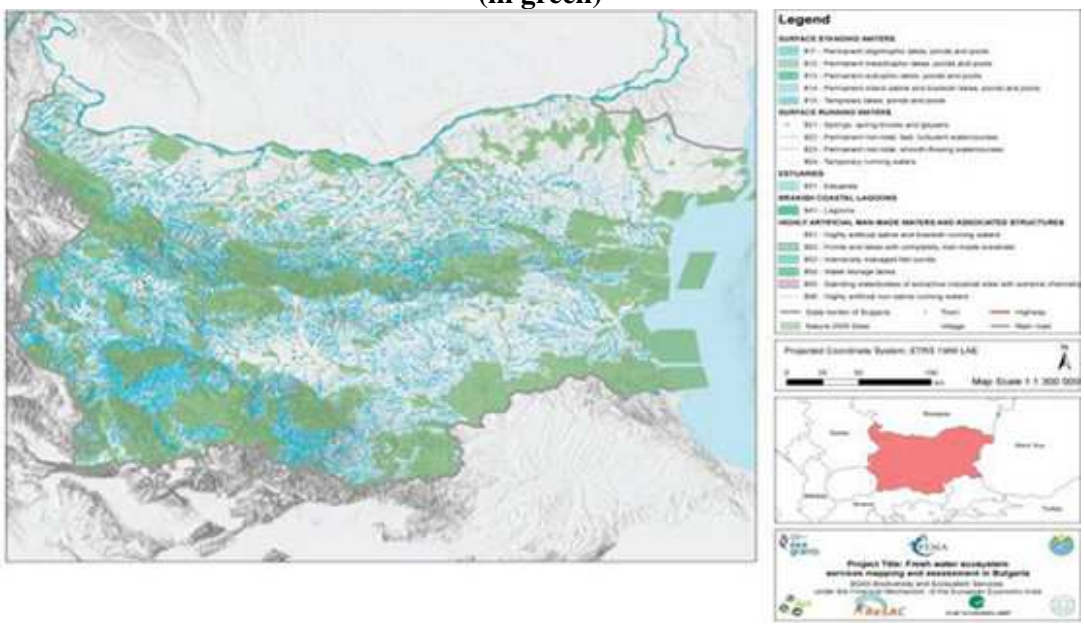


Source: ExEA

- **Freshwater ecosystems**

Mapping of ecosystem types of freshwater ecosystems covers the entire territory of the country outside the Natura 2000 sites. Mapped from the freshwater ecosystems are: 1) more than 5700 sites of standing freshwater ecosystems with a total area of 456 km^2 (Figure 11). Their minimum mapped area is 0.25 ha. These include natural lakes, dams, temporary water basins, artificial reservoirs; 2) about 32,000 linear segments of flowing freshwater ecosystems with a total length of approximately 52,000 km. These include all rivers and artificial canals; 3) about 340 point sites, such as springs, captures, etc. The result of the mapping were three GIS layers containing the following types of ecosystems: 1) Point layer containing 338 springs; 2) Linear layer containing about 38 000 objects - rivers and canals, with a total length of about 52 000 km; 3) Polygon layer containing over 5700 standing water bodies - lakes and dams, with a minimum area over 0.25 ha, and a total mapped area of 456 km^2.

Figure11. Map of the types of freshwater systems in Bulgaria outside NATURA 2000 (in green)



Source: ExEA

- **Marine ecosystems**

Level 2 classes for marine ecosystems were identified and mapped during the implementation of the Initial Assessment: Marine Environment project in line with the requirements of the MSFD (Moncheva, Todorova et al., 2013). The outcomes of this mapping are: a coastal area of 2 177 km^2; shelf area – 9 928 km^2 and high seas - 22,418 km^2. Data used to map ecosystem subtypes include point data (excerpts from scientific articles), regional data (information and reports on watersheds, settlements and resorts; protected and other specifically studied areas), and data of European and national coverage (e.g. EUSeaMap). Pilot field verification of the distribution of major ecosystem subtypes in selected sites in the Black Sea coastal zone has been carried out. During the course of work, a combination of remote sensing methods (drones and satellite imaging), insitu video- and photocapture and diving and underwater sampling were applied. During this study, 26 km of boat transects were completed, capturing over 90 video- and photo-recordings covering the distribution of ecosystem subtypes in selected coastal research areas in the vicinity of Sozopol.

- **Grassland ecosystems**

In Bulgaria, outside the NATURA 2000 network, grassland ecosystems have an area of 6695 km^2. This is approximately 5% of the territory of the country. They are represented in over 200 000 polygons, of which those that are larger than 1 ha are 1/3 of all polygons. The largest area is occupied by dry grassland ecosystems - 81.02% of the area, followed by moderately moist grassland - 17.22%, wet and seasonally wet - 1.31%, inland salt-steppes - 0.37% and alpine and subalpine grassland ecosystems - 0.07%. This logically follows from the fact that the country, with its southern orientation, is characterized by a dry climate, which implies the presence of drought-resistant vegetation. Mesophile meadows are of limited distribution not only due to climatic and hydrological reasons but also because many of them were ploughed in the past. The low percentage of high mountain grassland ecosystems is

explained by the fact that most of the mountainous territories fall within the NATURA 2000 network and therefore very few grassland ecosystems remain outside it.
A total of 123 152 individual grassland ecosystems polygons (total area: 63 4518.23 ha) have been established outside the Natura 2000 network. Of these, 72 972 polygons belong to Xerothermic (dry) grassland ecosystems (E1), 35 270 polygons - to Mesic grassland ecosystems (E2), 14 174 - to Seasonally wet and wet grassland ecosystems (E3), 128 polygons to Alpine and subalpine grassland ecosystems (E4) and 608 polygons to Inland salt ecosystems (E6).

- **Sparsely vegetated land ecosystems**

Initially, 1018 polygons were identified based on existing information from project DIR-59318-1-2 Mapping and determining the conservation status of natural habitats and species - stage I (completed in 2013). This initial number was subsequently reduced through refining the ortho-photo maps to about 770, about 3900 new polygons were added that were obtained from the sample by land category or by direct recognition and outlining on the ortho-photo images of the territory. The final total number of polygons is 4673.

- **Heathland and shrub ecosystems**

When mapping heathland and shrub ecosystems, shrub ecosystems are defined as those ecosystems in which the ocular projective coverage is 10% and more than 10%. In order to determine this percentage divide, the instructions of the Land Use/Cover Area frame Survey (LUCAS), of the Statistical Office of the European Commission – EUROSTAT were followed, assigned to category D: Shrubland, of the 8 major categories of land cover defined. Shrubs are almost always complex communities, respectively ecosystems between grasslands and dispersed in them, with varying degrees of density, groups of shrubs. Even with low coverage, they continue to perform ecosystem functions, which is why the minimum coverage is assumed to be 10%. The dominant subtype is 502 (F3. Temperate and Mediterranean-montane shrubs), because subtype 501 (F2. Arctic, alpine and subalpine shrubs) is mainly present in the NATURA 2000 network, while subtype 503 (F9. Riverine and fen shrubs) is restricted to narrow strips (up to 20-30 m wide) along rivers or water bodies.

- **Cropland ecosystems**

In total, 213 210 polygons with cropland were mapped, covering an area of about 3 435 029.43 ha. These polygons and their respective area are distributed among five subtypes of cropland ecosystems, as follows:

- ✓ 201 Annual crops (mostly cereals) - 107 767 polygons – 2835754.04 ha;
- ✓ 202 Perennial crops (orchards and vineyards) - 30 565 polygons -151 061.54 ha;
- ✓ 203 Perennial crops (mainly legumes) - 15 910 polygons - 61 634.5 ha;
- ✓ 204 Mixed crops - 44 376 polygons – 358723.83 ha;
- ✓ 205 Livestock farms for large and small animals, including bees - 92 polygons, 27 855.87 ha.

At this stage, stage when there is only one ecosystem mapping, there is no way to analyse the change of lands and their conversion from one type of use into another. There need be two consecutive mappings in order to analyse changes in the land and the ecosystems status.

- **Forest ecosystems**

The Forest Act is the first legislative document to introduce the concept into the management of territories and ecosystems in Bulgaria (Chapter 17: Public Ecosystem Benefits in Forest Territories). Pursuant to Article 249 (8), the methodology for determining payment for the respective public ecosystem benefits, the terms and procedure for payment and allocation of the funds raised in the municipality are regulated by an ordinance of the Council of Ministers. The implementation of the district plans will be the first actual inclusion of ecosystem services in the planning and management processes.

The Executive Forestry Agency implemented a Forests and Forest Areas - Mapping and Assessment of Ecosystem Services Outside NATURA 2000 - FOR OUR FUTURE project in the framework of which types of forest ecosystems are classified according to EUNIS (EU Nature Information System) and an algorithm was developed to determine habitats according to EUNIS based on descriptions from forest databases. The typology of habitats was updated and supplemented - it includes four main subtypes of level 2 forests - high-deciduous, coppice, coniferous and mixed coniferous-deciduous, and deciduous-coniferous forests. At level 3, the typology includes 4 main habitat groups with codes G1- Broadleaved deciduous woodland, G1- Broadleaved evergreen woodland, G3- Coniferous woodland and G4- Mixed deciduous and coniferous woodland. Level 4 identified 26 subtypes of ecosystems, including 3 new ones. The status of forest ecosystems and their ecosystem services (ES) was assessed and mapped. Algorithms were developed to identify data with a list of indicators for assessing the status of forest ecosystems, of each individual type of ES for each plantation, and systems for assessing the status of forest ecosystems and their ESs at subdivision level. Digital maps of forest ecosystems, their status and the ESs provided were developed. Research and activities were carried out on an area of 1 803 862 ha of forest territories outside the Natura 2000 territories. The project was implemented in the period 09.2015 - 04.2017 under BG03 Biodiversity and Ecosystems Programme. The project identified, described, assessed and mapped all representative forest ecosystems up to the subdivision level, located in forest areas outside NATURA 2000 network. A national layer "Forests outside NATURA 2000" was created, as well as a centralised database containing information of topologically processed spatial data, ecosystem status assessment and assessment of the ecosystems services they provide to the public.

Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Forest territories and related ecosystems

Bulgaria's considerable forest resources and its sustainable management and development are important factors for the reduction of greenhouse gases. Projections of the dynamics of forest resources for the period 2015-2030, drafted in line with the European Forest Information SCENario Model - EFISCEN (2009), show that Bulgarian forests are currently a reservoir of 229 million tonnes of carbon, which is expected to reach 264 million tonnes in 2020 and 288 million tonnes of carbon by 2030.

Data from the Third National Action Plan on Climate Change shows that in the past 21 years, the absorption of greenhouse gases from forests, pastures and meadows has offset between 11.35% and 19.9% of the total greenhouse gas emissions in Bulgaria. The largest

contribution to carbon sequestration and storage (94-95% of total absorption) are forested areas.

Bulgaria's national legislation provides for improving and enhancing the role of forests as a reservoir for carbon stocks. According to the Forest Act, reducing the existing forest cover on the territory of Bulgaria is not allowed, **the main objective being to preserve and increase the forests area.** Maintaining **vibrant, productive and multifunctional forest ecosystems** that contribute to mitigating the effects of climate change is among the priorities of the National Strategy for Development of the Forest Sector in the Republic of Bulgaria (NSDFS) 2013-2020.

In the Strategic Plan for the Development of the Forest Sector 2013–2023, an ***Operational objective 4: Improving resilience and adaptability of forest ecosystems to climate change*** is set.

The objective is geared towards creating conditions for enhancing resilience and adaptability of forest ecosystems to climate change in compliance with Measure 1.4 of NSDFS 2013-2020. In order to achieve this, 6 activities with the respective sub-activities are set.

MOEW envisages the development of a National methodology for identification, management and monitoring of forest territories of high conservation value by 2020. Amendment to the Forest Act and the adoption of Ordinance No. 8 on felling in woodlands introduce requirements for suitable management systems in the face of changing climatic conditions. Registered forest territories are subject to regimes and monitoring in line with the FSC certification system standards. In 2016, a national methodology has been developed and validated as a practical guideline - Identifying, managing and monitoring forests of high conservation value in Bulgaria by the WWF Danube-Carpathian Programme. A system for conservation of genetic diversity has been established for 26 woodland species.

Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the convention on Biological Diversity was ratified by the Bulgarian Parliament on 16 June 2016, and the Ratification Act was promulgated in State Gazette, issue 49/28.06.2016 with Decree No. 206 of 21.06.2016 of the President of the Republic of Bulgaria.

Access to Bulgarian genetic resources (GRs) is regulated and is effected in accordance with the provisions of Article 66 of the Biodiversity Act (BDA).

Efficient implementation of the Nagoya Protocol requires all GRs users to take due care to ensure that access to the genetic resources is done in accordance with the applicable legal or regulatory provisions of the supplier country that is party to the Nagoya Protocol, and that the resulting benefits are fairly and equally shared. This includes also the obligation to store information of relevance to the access and benefit-sharing and its provision to subsequent users, as well as to the competent authorities in the country where the activity takes place.

It is planned to update and supplement the applicable legislation towards:

- Establishment of differentiated access procedures, depending on the type of usage requested.

- Update part of the provisions of the Biodiversity Act regarding access to genetic resources.

Strategic Goal E - *Enhance implementation through participatory planning, knowledge management and capacity building.*

Target 17: By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

For the implementation of this target, a new National Biodiversity Conservation Strategy is envisaged, as well as drafting a National Plan for Biodiversity and Genetic Resources Conservation 2020-2024.

Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Traditional knowledge can turn into a vital tool of proving national identity. Traditional knowledge touch upon areas such as food, agriculture, biodiversity conservation, human health, and traditional medicine in particular, human rights, and aspects of commercial and economic development. The aim is to promote capacity-building opportunities, including the necessary financial resources and innovative methods, peer training to strengthen technical knowledge and skills in order to halt biodiversity loss, to restore biodiversity and ecosystems, and to prevent invasive alien species and illegal hunting and trade of wild plants and animals at all levels, to ensure involvement of local communities, experts and professionals (including hunters, fishermen, shepherds and farmers) in the management of biodiversity.

Since 2004, Bulgaria joined the Slow Food Foundation (www.slowfood.com) that supports conservation of local communities and their native knowledge for sustainable use of agro biodiversity. A network of local communities in Bulgaria is supported in preserving local breeds, plant species and traditional food products. (http://www.slowfood-bg.com/),

Six traditional Bulgarian products are supported by the Slow Food Foundation for Biodiversity: East Balkan swine, Karakachan sheep, Kurtovo Konare pink tomato, Smilyan beans, Tcherni Vit green cheese, and meurche.

https://www.fondazioneslowfood.com/en/nazioni-presidi/bulgaria-en/

Association *Traditional raw-dried meat products* (http://www.meat-tradition.bg/) was established in 2009 when 34 companies across the country came together to preserve the Bulgarian tradition in the production of local delicacies, which are part of our cultural identity. The objective of the Association is to protect the specific characteristics, production technology and titles of the traditional Bulgarian meat products as national intellectual property.

The protected five traditionally Bulgarian meat products listed in the Traditional speciality guaranteed register are: Pastrama, Dried Pastarma, Roll “Trapezitsa”, Pork Collar “Trakiya”, Fillet “Elena” and Panagyurska Lukanka.

Implementation of the Convention by local communities is reflected in the development of numerous micro-projects related to local practices - cultivation of medicinal plants, development and implementation of projects related to pastoralism for biodiversity conservation (domestic animals grazing) in national parks, restoration and support to the biodiversity of meadows and pastures.

The project under development - *Promoting Citizens' Initiatives for Sustainable Development and Biodiversity Conservation in Mountain Meadows and Pastures by Controlling Bracken* - implemented by the Association Centre for Regional Development and Initiatives in partnership with the Research Institute of Mountain Stockbreeding and Agriculture - Troyan, Bulgaria, supports the development of civil society and enhancing its contribution to the sustainable development of the territory of Troyan municipality through the introduction of environmentally-friendly methods for restoration and maintenance of the biodiversity of meadows and pastures. Through the implementation of the project, the contribution of non-governmental organisations to the conservation of biodiversity and endangered species will be increased by controlling the distribution of bracken and utilising its foliage for various practical purposes. The project partner – RIMSA-Troyan, has an extensive experience in combating bracken, and will therefore be directly involved in the activities envisaged under the project.

The implementation of the project impacted favourably all stakeholders through the educational seminars held which were attended by local communities, young people, farmers, public administration officers and NGOs representatives. 45 participants were trained, 6 publications were prepared, 6 shows were broadcast on local media and 300 educational leaflets were published. A 20-minute movie was filmed and 100 reports were prepared. These activities contributed to raising the awareness of local communities and young people about environmentally-friendly ways to restore and maintain biodiversity of meadows and pastures and composting bracken.

Project webpage: https://www.facebook.com/pages/Сдружение-Център-за-регионално-развитие-и-инициативи/404859149666158

Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Development strategies and operational plans of R&D units in the country are in line with the main international, European and national goals in the field of biodiversity research, utilisation and conservation.

The Agricultural Academy (https://www.agriacad.bg/) activities are implemented within the framework of the state agricultural policy. The Academy comprises of 25 scientific institutes do basic scientific research, applied research, innovative and consulting activities in the food and agricultural sectors. The 4 scientific centres provide research, innovation and consultancy in the field of agriculture and food. The state enterprise Scientific Production Centre carries out scientific, applied, experimental and production, and other types of activities. The Academy has 13 experimental stations. The National Agricultural Museum in Sofia was established in 1956 and has the following main functions: research, collection, preservation, and exhibition of artefacts of the material and spiritual culture of the Bulgarian people, that reflect the agricultural tradition in the Bulgarian lands from ancient times to the present day.

The museum puts together and presents temporary exhibitions in Bulgaria and abroad. The museum has a rich library stock of specialised literature.

The Agricultural Academy is the lead project coordinator of the development and implementation of *Scientific Research and Innovation Infrastructure in Agriculture and Foods* project for the period 2018-2023 (RINA, Research, Innovation, Agriculture) - https://www.agriacad.bg/bg/science-and-education/projects/nauchna-infrastruktura-za-izsledvane-i-inovacii-v-zemedelieto-i-hranite-2

Reports on the activities of the Academy can be accessed here: https://www.agriacad.bg/bg/documents/ssa-report

The total number of researchers at the Academy at the end of 2018 is 494 – 79 professors, 171 associate professors, 127 senior assistants and 117 assistants. PhD - 397 scientists and Doctor of Sciences - 11. The ratio between habilitated and non-habilitated scientists is 1.02.

In 2018, 14 scientists were habilitated - 7 professors and 7 associate professors. During the same year, 26 assistants were promoted to senior assistants.

In 2018, in the National Evaluation and Accreditation Agency documents were submitted to launch accreditation procedure for training at the PhD degree level under a new programme in the Academy – PhD in Viticulture, professional field Crop Production at the Institute of Viticulture and Winemaking - Pleven.

The main universities in which there are R&D and academic activities in the field of agriculture, forestry and food technology are:

- Agricultural University – Plovdiv;
- Thracian University – Stara Zagora;
- University of Forestry – Sofia;
- Food Technology University – Plovdiv;
- Rousse University – Rousse.

In these universities there are consulting units, which disseminate scientific knowledge and the outcomes of the scientific and applied research activities of the lecturers and researchers at the university.

There is one measure in the RDP 2014-2020: "Knowledge transfer and awareness-raising to enhance the knowledge and improve the skills of farmers and forestry workers", which has not yet been launched (as of 2018). Two procedures are planned: BG06RDNP001-1.001 and BG06RDNP001-1.002 – selection procedures for project proposals under sub-measure 1.1. Vocational training and skills to measure 1. Knowledge transfer and awareness-raising action about the Rural Development Program 2014 - 2020; http://2020.eufunds.bg/bg/8010510/0/PriorityLines

In the Forest Act, there is a separate chapter (Chapter 15) dedicated to supporting vocational training in the forestry field, qualification and retraining of owners and employees in the forest sector.

The Bulgarian Academy of Sciences (BAS) is the leading scientific, spiritual and expert centre of Bulgaria. It conducts research, training and activities of national and international importance and resolves problems related to the development of the Bulgarian society and the state. BAS carries out scientific activities compliant with the universal human values, the

national traditions and interests. It participates in the development of global science and helps to multiply the spiritual and material values of the nation.

At the BAS there is a special section – Biodiversity, bio resources and ecology with the following institutes and specialised academic departments:

- Institute of Biodiversity and Ecosystem Research (http://www.iber.bas.bg/?q=bg);
- Forest Research Institute (https://fri.bas.bg/);
- Institute for Plant Physiology and Genetics (http://www.bio21.bas.bg/ippg/bg/);
- National Museum of Natural History (http://www.nmnhs.com/index_bg.php);
- BAS Botanical Garden (http://garden-bas.org/).

Projects that Biodiversity, bio resources and ecology section implements can be found here: http://www.bas.bg/%D0%BF%D1%80%D0%BE%D0%B5%D0%BA%D1%82%D0%B8-%D0%BD%D0%B0-%D0%B1%D0%B0%D0%BD/.

Specialised education in biology, ecology and the environment is available at the following institutions:

- Department of Biology, Sofia University St. Kliment Ohridski, Sofia;
- Department of Biology, Plovdiv University Paisii Hilendarski, Plovdiv;
- Faculty of Natural Sciences and Mathematics at the South-western University, Blagoevgrad;
- Faculty of Ecology and Landscape Architecture at the University of Forestry, Sofia;
- Department of Ecology and Environmental Protection, Faculty of Naval Architecture, Technical University, Varna;
- Faculty of Plant Protection and Agro-ecology, Agricultural University, Plovdiv;
- Faculty of Agriculture at the Thracian University, Stara Zagora; etc.

The **National Strategy for Scientific Research Development 2017-2030** has been updated: http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=1231.:

The main objective of the strategy is to make Bulgaria an attractive centre for cutting-edge scientific research and development of new technologies through a large-scale, fast and long-term development and modernisation of the research system, to elevate the standing of the country in the field of science, to enhance public confidence in science, to retain and attract young people and leading scientists in Bulgaria. The final outcome is to achieve sustainable economic growth and a significant improvement in the quality of life in the country. The strategy has 3 specific objectives:

- Specific objective 1. Provide highest qualification and effective career development of scientists based on a high level of scientific research.
- Specific objective 2. Improve the quality of life and the social status of scientists and research professionals by ensuring that remuneration is adequate and results-driven, and provide good working conditions.
- Specific objective 3. Increase the number of scientists to reach the EU levels and ensure their balanced distribution by age, gender, scientific field and region.

One of the priority areas for the development of applied scientific research in Bulgaria is: Environmental protection. Environmental monitoring. Utilization of raw materials and bio resources. Purification and zero-waste technologies.

For the purposes of the Strategy, scientific priorities for targeted basic research are linked to current society challenges and are also related to: **improving the quality of life** - food, health, biodiversity, environmental protection, urban environment and transport, etc.

Executive Environment Agency

The activities of the Executive Environment Agency (ExEA) in relation to biodiversity are mainly linked to the above-mentioned objectives A. Strengthening the scientific base of conservation activities, and B. Support to legislative initiatives. ExEA designs and manages the National Environment Monitoring System, including the biodiversity and forests part through the National Biodiversity Monitoring System (NBMS) and the National Forest Ecosystems Monitoring Programme (NFEMP). http://eea.government.bg/bg/bio/nsmbr http://eea.government.bg/bg/nsmos/forest .

The following activities were implemented during the 2014 – 2018 reporting period:

- **National Nature Protection Service Directorate to the Ministry of Environment and Water**

The Directorate has launched the implementation of Knowledge for Natura 2000 project. Being a beneficiary of the Operational Program "Environment 2014-2020", the Directorate received a grant for the implementation of project BG16M1OP002-3.006-0001, Knowledge for Natura 2000.

The objective of the project is to align the initial awareness, upgrade the knowledge and provide up-to-date expert information to stakeholders in the Natura 2000 network, as well as to update the Natura 2000 National Priority Action Framework. The last update of the NPAF is from August 2019.

The total value of the project is BGN 4 300 000 – BGN 3 655 000 from the European Regional Development Fund and BGN 645 000 national co-funding. The start date of the project is 14 December 2017, the duration is 65 months.

- **Institute of Oceanology, Varna**

✓ Analysis of the current state of biodiversity of marine hydrobionts on the basis of genetic markers such as sturgeon (Ivanova et. al 2017 a), species of wrasses (Ivanova et. al 2017 b), black mussel (Ivanova§ Petrova, 2018), turbot populations in western Black Sea (Nikolov et. al, 2015), distinguishing between *Mullus barbatus* species (western Black Sea) and *Mullus surmuletus* typical of the Mediterranean (Ivanova et. al, 2014), genetic analysis of the population of chamois (Turan et.al. 2015), phenotypic plasticity of the *Apollonia melanostomus* (Apostolou et.al. 2016), etc.

✓ Phytoplankton Cysts project - encoded memory and potential for biodiversity and harmful algal blooms in the Black Sea - ФНИ ДН01/8 of 16.12.2016 – determination of species diversity of phytoplankton benthos stages in marine sediments. The importance of conducting such studies is the fact that cysts are an "archive" of biodiversity, structure and dynamics of phytoplankton in marine environment, and a "signal" for potential harmful algal blooms phenomena (HABs). The project is successfully implemented with the use of innovative (molecular) research methods (Dzhembekova et.al, 2017 a, b; Dzhembekova et.al, 2018 a, b).

- **Institute for Plant Genetic Resources - Sadovo**

The Institute for Plant Genetic Resources – Sadovo (IPGR-Sadovo) is accredited to train full-time and part-time PhD students majoring in Selection and Seed Production of Cultivated Plants. It has qualified scientific staff and a good material equipment for conducting study practices, student internships and scientific guidance for graduates and PhD students in various areas of the agricultural science.

IPGR-Sadovo is visited by Bulgarian and international scientists, students from vocational schools, university students, PhD students from the Agrarian University in Plovdiv, Thracian University in Stara Zagora, University of Forestry in Sofia.

Every year at IPGR-Sadovo open field days are held. The institute's team participates in exhibitions to promote the activities of the Plant Genetic Resources programme, to familiarise farmers with the achievements and role of the local gene pool – the old, traditional and forgotten crop varieties and populations, in order to achieve sustainability in agriculture and rural development.

There are educational visits to the gene bank, the museum, the botanical garden and the information centre at IPGR-Sadovo.

- **Executive Forest Agency (EFA)**

Some of the more important projects implemented by the Executive Forest Agency, the outcomes of which contribute to the biodiversity targets are:

- ✓ Project: FORests and woodlands - ecOsystem services mapping and assessment in the bUlgaRian Forest territories oUTside natURa2000 nEtwork (FOR OUR FUTURE);
- ✓ Project: Methodological Support for Ecosystem Services Assessment and Biophysical Valuation, MetEcoSMap
- ✓ Project: Restoration and conservation of riverside forests of type *91E0 in key Natura 2000 sites and model territories in Bulgaria
- ✓ Project: Conservation of key woodland habitats of the lesser spotted eagle (*Aquila pomarina*) in Bulgaria
- ✓ Project: LIFE09 NAT/BG/000229 Conservation and Restoration of Black Sea Oak Habitats.
- ✓ Project: Measures to improve the living conditions of four rare and endangered forest bird species on the territory of Bulgarka National Park
- ✓ Project: BG 16M1OP002-3.007 Improving the conservation status of species and types of natural habitats on the territory of Natura 2000 network in national parks, nature parks and maintained reserves
- ✓ Project: Better management and implementation of NATURA 2000 sites;

- **Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences**

All projects implemented by IBER – BAS related to biodiversity are available on the institute's webpage: http://www.iber.bas.bg/?q=bg/node/83.

All books and scientific publications of IBER – BAS published in the period 2014-2018 are available here: http://www.iber.bas.bg/?q=bg/node/93.

All projects implemented by the **Faculty of Biology at Sofia University St Kliment Ohridski** are available here: https://www.uni-sofia.bg/index.php/bul/nauka/proekti_na_su

As an outcome of the implementation of research projects during the reporting period, a number of books were published: An Atlas of Sphagnum-Dwelling Testate Amoebae in Bulgaria; Mesta River: biological quality elements and ecological status; Identification and sustainable use of wild edible mushrooms in rural areas, volume 32 of the series Fauna in Bulgaria; Birds on the Balkan Peninsula, etc.

The table below shows available statistics from the NSI for the period 2014 – 2017 about PhD students in the following majors:

Table 9. PhD students

			(number)
	2014/2015	2015/2016	2016/2017
Natural Sciences	270	256	301
Agriculture, Forestry and Aquacultures	159	128	125
Environment Conservation	79	85	104

Source: NSI

Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

In the period 2014-2018, Bulgaria implemented a policy to increase the financial flows and co-financing of projects related to biodiversity conservation and sustainable use activities. The financial mechanisms used are:

- OP Environment 2014-2020;
- EMEPA;
- National Trust Fund;
- Programmes to remedy past environmental damage;
- Financial Mechanism of the European Economic Area Programme BG02 - "Integrated management of marine and inland waters";
- Financial Mechanism of the European Economic Area Programme BG03 – „Biodiversity and Ecosystem Services“;
- BAS transfer for activities under the Water Act;
- LIFE 14 IDP/BG/000013 CAPTA BG - Capacity Building Technical Assistance to the Bulgarian Ministry of Environment and Water for implementing the LIFE programme, etc.

According to the MOEW budget programmes consolidated expenditures report, as of December 31, 2018 **BGN 521 333 975** were spent (for 2018).

In 2018, activities for the preparation and development of the River Basin Management Plans for the period 2022-2027 and for research and assessment in connection with the Flood Risk Management Plans for the period 2022-2027 were launched.

Under the NTEF-funded Climate Investment Programme, energy efficiency measures have been implemented in 86 sites, with a total value of BGN 33.931 million and carbon dioxide savings of 637 622 tCO^2-eq.

For the period since the launch of the Electric Vehicle Scheme until the end of 2018, 22 electric vehicles and 4 hybrid vehicles have been purchased, as well as 1 electric L7e vehicle with additional equipment that prevented the emission of 2 911 tCO^2eq greenhouse gas emissions.

https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/obsta-informaciya-za-biologichnoto-raznoobrazie/

4.2. Level of implementation of the Sustainable Development Goals 2030

The 2030 Programme for Sustainable Development (hereinafter referred to as the 2030 Programme), adopted by the United Nations in September 2015, is a new and ambitious blueprint to achieve sustainable development and eradicate poverty. It is a collection of 17 sustainable development goals (SDGs) and related practical tasks.

The present Chapter IV of the Sixth National Report 2014-2018 to the Convention contains the information that provides a basis for the biodiversity status in the country. It is of crucial importance to addressing the key issues identified by the 17 sustainable development goals of the 2030 Programme. Seven of the UN sustainable development goals are of particular relevance to the sustainable development of biodiversity. These are: **Goal 6: Clean Water and Sanitation; Goal 12: Responsible Consumption and Production; Goal 13: Climate Change Action; Goal 14: Life Below Water; Goal 15: Life On Land, and Goal 17: Partnerships for the Goals.**

Regarding the country's contribution to the Aichi targets, it should be noted that the main source for the development of the Sixth National Report 2014-2018 to the Convention is the National Report on the Status and Conservation of the Environment 2019, where biodiversity information was analysed and assessed. These are population trends indicators, such as the *Index of Common Bird Species*, which provide an actual basis to assess the extent of biodiversity loss. The overall trend for the period 2005-2017 for a total of 50 species constituting the indicator is for an 11% increase in numbers. This is entirely due to the positive trends in forest species and birds from other habitat types. The highly unfavourable trend for the species living in habitats that are in some way influenced by agricultural policies and practices remains unchanged. The decrease in the index of the state of the bird populations is a sign of the deterioration of these species and their habitat.

In order to meet the requirements of the **EU Biodiversity Strategy 2020**, a number of activities have been carried out in the European Union, including in Bulgaria, to map and assess the state of ecosystems and ecosystem services. **Seven** indicators, containing information on Bulgaria's biodiversity, are presented in 2019 NSEP of the ExEA, three of which correspond to key EU indicators of the *SEBI 2010* set.

In 2017, in the framework of the **2030 Programme**, the International Co-ordination Council of the UNESCO Man and Biosphere Programme (MAB - ICC) approved the proclamation of four Bulgarian biosphere reserves - Central Balkan, Chervenata stena, Sreburna and Uzunbudzhak in line with the requirements and the principles of the Seville Strategy. In the same year, on its 41st session, the UNESCO World Heritage Committee adopted Decision 41 COM 8B.7, approving the extension of the World Heritage site, which is currently known as the Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe and includes 78 components located in 12 European countries. Bulgaria participates in the nomination with its most representative beech forests in the 9 reserves located on the territory of the Central Balkan National Park - Boatin, Tsarichina, Kozya Stena, Steneto, Sokolna, Peeshti skali, Stara Reka, Dzhendema and Severen Dzhendem, which are already on the UNESCO list.

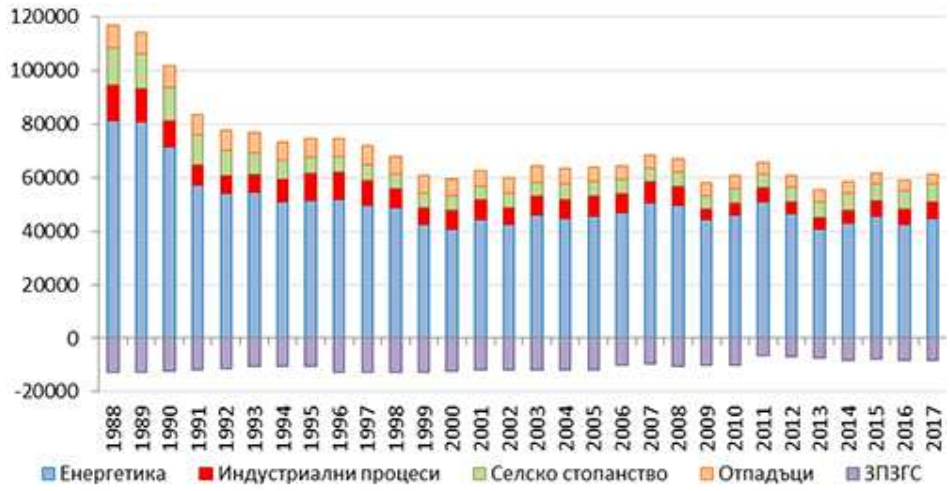
Bulgaria's **climate change policy** is based on two main principles related, on the one hand, to the international commitments undertaken by the country to ratify the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, and on the other - with the European legislation in this field (the climate and energy legislative package).

During the period 1988–2017, the main greenhouse gases emissions in the country showed a trend to decrease. In 2017, the total GHG emissions were 61 367.16 Gg CO_2-eq. or 53% of the emissions in the base year (1988).

Data analysis from national inventories for the period up to 2017 shows that greenhouse gas emissions are significantly lower than the baseline 1988 and currently Bulgaria has the necessary reserve to ensure that the Kyoto Protocol commitments will be met.

Figure 12 below shows the total GHG emissions by sectors for the period 1988–2017 in Gg CO_2-eq. Also shown are the amounts of CO_2 absorbed by forests, which leads to emission reductions.

Figure12. Total GHGs emissions by sector for the period 1988 – 2017, Gg CO_2 eq.



Note: land use, change in land use and forestry

Source: ExEA, National Inventory of Emissions of GHGs for 2017

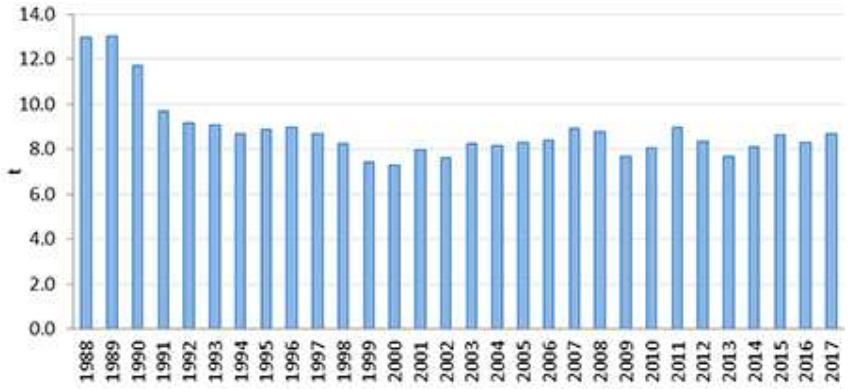
Note: blue:energetics; red: industrial processes; green: argriculture; orange: waste; purple: land use and forestry

Data analysis shows that the largest share of total GHG emissions in 2017 is of energy sector - 72.7%, followed by the agriculture sector - 10.7%. The industrial processes and product

use sector and the waste sector are each with 10.5% and 6.2% respectively from national emissions. The main reason behind the observed reduction of GHG emissions in Bulgaria in the period up to 2000 are the structural changes in the economy due to the radical economic transition process - from a centrally-planned to a market economy. This led to reduction of TPP energy (and an increase in the share of hydro- and nuclear energy), structural changes in the industry (comprising reduction of energy-intensive production and improving energy efficiency), better insulation of buildings and transition from solid and liquid fuels to natural gas.

Main indicator for the assessment of GHGs emissions internationally is GHGs emissions per capita.

Figure13. Annual GHGs emissions per capita, tonnes of CO_2 equivalent



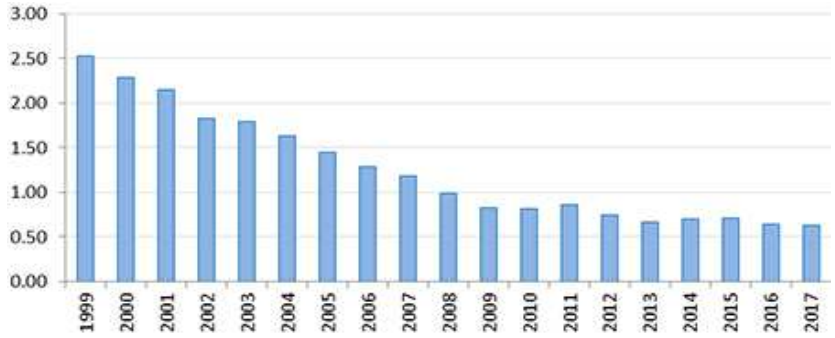
Source: ExEA

Per capita greenhouse gas emissions were reduced by 13 tonnes of CO_2-eq. in 1988 to 8.7 tonnes of CO_2-eq. in 2017. The lowest levels were in 2000 - 7.3 tonnes of CO_2 -eq. The levels of this indicator bring Bulgaria closer to the average level for the European Union - 7 tonnes of CO_2-eq.

Greenhouse gas emissions are closely linked to economic growth, as energy and natural resources consumption increase as economic activity increases. Reducing this interdependence is a sign of sustainability of development, which is why annual GHGs emissions per unit of GDP are an important indicator. The figure below presents data for this indicator for Bulgaria for the period 1999 - 2017.

Over the period, the GHG emissions from the creation of BGN 1,000 gross domestic product significantly decreased - from 2.53 tonnes of CO_2 - eq. in 1999 they reach 0.63 tonnes of CO_2- eq. In 2017. In the period between 1990 and 2007, emissions per GDP were reduced by more than a third in the EU-27.

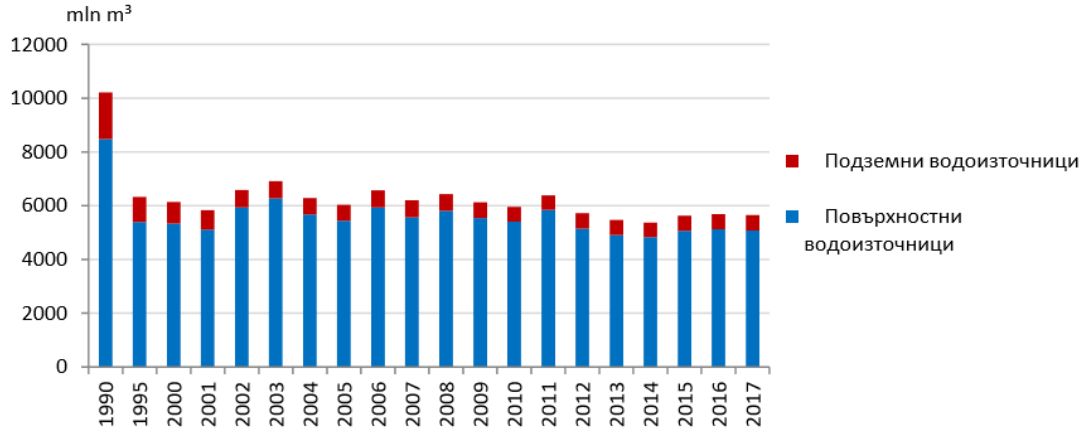
Figure14. Annual GHGs emissions per unit of GDP, tonnes of CO_2 equivalent for BGN 1000



Source: ExEA

In the period after 1990, as a result of the restructuring of the economy, there is a downward trend in water abstraction in the country. In the period 2000-2017, about 6 billion m^3 of fresh water are abstracted annually for water supply and for own consumption. Water abstraction after 2010 is below the annual average, except for the relatively dry 2011. In 2017, freshwater abstracted for the economy is estimated at 5.7 billion m^3, which is 0.6% less than in 2016 and 6.9% less than the annual average for the period 2000 - 2016. Surface water bodies provide the main water quantities needed for the economy (90%).

Figure15. Total of freshwater abstracted



Source: NSI

Note: red - underground water sources; blue - surface water sources

The predominant part of fresh water was self-abstracted for cooling processes in the energy sector - between 3.2 billion m^3 (for 2013) and 4.4 billion m^3 (for 2002) or an average annual of about 60% of all freshwater abstracted (for the period 2000 - 2017). The largest relative share was registered in the period 2015 - 2017 - 65%, with the absolute volume estimated at 3.7 billion m^3. The share of total water abstraction for the industry is diminishing (except for cooling processes in the energy sector) - by 9% in 2000 to up to 4% in 2017. The share of water abstracted for public water supply in 2017 is stable at 16% of fresh water abstracted, which is also the average for the period 2000-2016 - 16%.

Bulgaria joined the UN Sustainable Development Goals at the Summit held on September 25, 2015 in New York, at the UN headquarters.

The main objective of Bulgaria's policy in the field of environmental protection is to improve the ambient air quality and more specifically - to reduce the fine particulate matter (PM) concentrations. Policies' focus **remains the protection and maintenance of the rich biological and landscape diversity of the Republic of Bulgaria and its regions.** Achieving this priority plays a significant role in the achievement of **Goal 3:** "Ensure healthy lives and promote well-being for all at all ages"; **Goal 13:** "Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy"; **Goal 14:** "Conserve and sustainably use the oceans, seas and marine resources for sustainable development" and **Goal 15:** "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss", as well as certain aspects of **Goal 8:** "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all", as well as **Goal 11:** „Make cities and human settlements inclusive, safe, resilient, and sustainable" and **Goal 12:** „Ensure sustainable consumption and production patterns" of the **UN Sustainable Development Goals.**

4.3. Relevant websites, web links and files for further information

https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Kalina/Strategicheski_doc/GlobalStratPlants2020.pdf
https://www.biodiversity.bg/files/File/106_plant_conservation_strategy.pdf

CHAPTER V. DESCRIPTION OF THE NATIONAL CONTRIBUTION TO THE ACHIEVEMENT OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION OBJECTIVES

Bulgaria has included the main objectives and activities related to the targets of the Global Strategy for Plant Conservation in all strategic and planning documents.

☒ Yes. We provide information on implementation and contribution:

A major contribution to the efforts to preserve the unique natural heritage (including plant conservation) is the development of a **national network of protected territories in Bulgaria**. The Protected Territories Act (https://www.lex.bg/index.php/mobile/ldoc/2134445060) defines six categories of protected territories, in compliance with current international requirements (IUCN categories) and categories that differ in terms of status and degree of conservation of natural elements, objective and management type: Reserve (IUCN Category I), National Park (IUCN Category II), Natural Landmark (IUCN Category III), Maintained Reserve (IUCN Category IV), Nature Park (IUCN Category IV or V) and Protected Site (IUCN Category IV and/or V).

Both in the framework of the nature conservation legislation of the European Union and the legislation of Bulgaria, conservation of species and of their habitats is regulated with Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora – the Habitats Directive. Under the Habitats Directive Bulgaria has developed the ecological network Natura 2000, as part of the European network.

The programme "Important Places for Plants", developed on the territory of Bulgaria, makes a significant contribution to the identification of the best places for wild plants, fungi and their habitats, as well as for their conservation.

Active plant conservation networks in Bulgaria - the following botanical gardens and expositions are important:

- **Botanical garden to the Bulgarian Academy of Sciences**, Sofia: http://garden-bas.org/;
- **University Botanical garden**, Balchik: http://opoznai.bg/view/universitetska-botanicheska-gradina-v-balchik?gclid=EAIaIQobChMI5OLKuY3s5wIVRYXVCh0n_Q0YEAAYBCAAEgK93fD_BwE;
- **Botanical garden to IPGR,** Sadovo: https://ipgrbg.com/;
- **Hortus Australis Botanical Garden,** Krapets, Shabla municipality: https://www.facebook.com/hortus.australis/;
- **Botanical garden Borika**, Borika, Ihtiman municipality: https://bg-bg.facebook.com/pages/category/Landmark---Historical-Place/.

The measures and the actions undertaken to achieve the objectives of the **Global Plant Conservation Strategy** are presented in Chapters II, III and IV of the present National report.

Bulgaria's progress category towards the achievement of the **Global Plant Conservation Strategy at the national level – Objective 1, 2, 3…:**

☒ On track to achieve the objective at the national level

Bulgaria ranks on one of the top places (third place) in Europe in terms of area of Natura 2000 areas, with currently over 33% of the country's area.

Detailed information about the sixteen objectives, the measures undertaken and the level of progress

The Global Strategy for Plant Conservation (GSPC) addresses the challenges as a result of threats to plant diversity. The ultimate objective of the Strategy is to achieve the three objectives of the Convention on Biological Diversity: conservation, sustainable use of biological diversity and the equitable distribution of the benefits of genetic resources, in particular in terms of plant diversity, taking into account Article 8 (j) of the Convention and Cartagena Protocol on Biosafety. The Strategy applies to plants inhabiting terrestrial, freshwater and marine environments. In addition, the Strategy applies to the three main levels of biodiversity recognised by the Convention, namely plant genetic diversity, plant species, communities and related habitats and ecosystems. While the Strategy addresses the kingdom Plantae by focusing primarily on higher plants and other well-studied groups such as mosses and ferns, the parties, governments and other stakeholders may also consider developing strategies to preserve also other groups, such as algae and fungi (including lichen).

https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/obsta-informaciya-za-biologichnoto-raznoobrazie/

OBJECTIVES OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION 2020

Objective I: ***Understanding, documenting and recognising plant diversity***

Target 1 / Objective 1 of the GSPC: An online list of all known plants.

In Bulgaria plants are presented in Bulgarian Flora Online (http://www.bgflora.eu/) with a short description and photos taken in Bulgaria. Species are listed both in a common list of all species included on the site (with their Latin names) and in lists by family and genus (Bulgarian and Latin names). Links to the different lists are as follows:

- Plants are sorted by colour ;
- FAMILIES I GENUS I SPECIES;
- Trees in Bulgaria I Shrubs in Bulgaria ;
- Plants on our streets I Spring wildflowers ;
- Natural habitats.

Updates and new pages in the Bulgarian Flora Online:

- text added to 14 genera;
- completely updated are 6 genera of plants;
- photos added to 3 species of plants.

Target 2 / Objective 2 of the GSPC: An assessment of the conservation status of all known plant species, as far as possible, to guide conservation activities.

Description of species in Bulgarian Flora Online (for instance: http://www.bgflora.eu/Salvia%20verticillata%20L.%20BUL.html) contains information about each plant species in line with the regulations in Bulgaria:

- Distribution in Bulgaria;
- Common distribution of the species;
- **Protected status** (in the Annexes to the Biodiversity Act);
- **Medicinal plant** (in Annexes to the Law on Medicinal Plants - list of medicinal plants regulated by law);
- **Bulgarian endemic species** (included in the Annex to the Biodiversity Act and the Habitats Directive);
- **Balkan endemic species** (included in the Annexes to the Biodiversity Act and the Habitats Directive).

Target 3 / Objective 3 of the GSPC: Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared.

In relation to the research, outcomes and information sharing required for the implementation of the Strategy, in the period 2014-2018 IBER - BAS conducted field surveys of the status of the populations of 10 plant species of conservation significance in Bulgaria, see. Section IV, Table 10.

Objective II: ***Plant diversity is urgently and effectively conserved***

Target 4 / Objective 4 of the GSPC: At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration.

Regarding progress under **Target 4,** please refer to the information about Aichi Target 11 (protected territories) and target 15 (restoration and sustainability of the ecosystem) in Chapter IV of the present National report.

Target 5 / Objective 5 of the GSPC: At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity.

In the period 2014-2018, a number of management plans for protected territories (national parks, nature parks, reserves and nature landmarks) have been developed - the more important ones are the management plans for Pirin National Park, Rila National Park, Central Balkan National Park, Vitosha Nature Park, Belasitsa Nature Park and Bulgarka Nature Park. Precise research has been carried out, as well as detailed characteristics, assessments and analyses of the status of plants at species, plant communities, habitats and ecosystems level.

Target 6 / Objective 6 of the GSPC: At least 75 per cent of production lands in each sector managed sustainably, consistent with the conservation of plant diversity.

Bulgaria's contribution to sustainable forestry, agriculture and aquaculture is related to Aichi Target 7 and is addressed in Section IV of the Sixth National Report. The forestry sector covers more than 38% of the country's territory and is of crucial importance for plant diversity conservation, since it concentrates a large part of the plant resources. In relation to this, a new ordinance (Ordinance No. 18 of 7 October 2015 to the Forest Act) was adopted which regulates the forest inventory and planning in forest territories. Its main highlights are:

- drafting district forest territories development plans with a main task – to identify the types of economic activities for which payment for **public ecosystem benefits** is due;
- drafting **forest management plans** with the task to define forestry management guidelines and the optimal use of forest resources, including a special section on forestry activities envisaged in Natura 2000 protected areas in order to implement the special conservation, maintenance and restoration measures in forests;
- sections on "**biodiversity**" and "**medicinal plants**" are to be drafted in forest management plans with the aim of sustainable use of plant resources.

Target 7 / Objective 7 of the GSPC: at least 75 per cent of known threatened plant species are conserved *in situ*.

As of 2010, endangered plant species are conserved ***in situ*** in Bulgaria under the Action plan for the conservation of *Eriolobus trilobata* species (M. J. Roem.) in Bulgaria 2015 – 2024". The Action plan was developed by IBER – BAS, Sofia in the framework of Life08NAT/BG/000279 „A Pilot Network of Small Protected Sites for Conservation of Rare Plants in Bulgaria" using the model of plant micro-reserves – a project (www.bulplantnet-bg.s-kay.com), funded by the Life+ Programme of the European Commission and the MOEW. https://www.moew.government.bg/static/media/ups/tiny/filebase/Nature/Biodiversity/Protected_specie/Action_Plans/AP_PLANTS/Eriolobus%20trilobata-AP-RD652-29092015.pdf

Target 8 / Objective 8 of the GSPC: at least 75 per cent of threatened plant species in *ex situ* collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes.

Endangered plant species are protected **ex situ** in Bulgaria under the Action plan for the conservation of *Eriolobus trilobata* species (M. J. Roem.) in Bulgaria 2015 – 2024". For further details, please refer to the information about this plan in Task 7 of GSPC.

Target 9 / Objective 9 of the GSPC: 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge.

Regarding progress under **Target 9,** please refer to the information about Aichi Target 13 in Chapter IV, as well as section 6.1. in Chapter VII of the present National report.

Target 10 / Objective 10 of the GSPC: Effective management plans in place to prevent new biological invasions and to manage important areas for plant diversity that are invaded.

Regarding progress under **Target 10,** please refer to the information about Aichi Target 9 in Chapter IV, as well as section 4. in Chapter VII of the present National report.

Objective III: ***Plant diversity is used in a sustainable and equitable manner***

Target 11 / Objective 11 of the GSPC: No species of wild flora endangered by international trade.

Regarding progress under **Target 11,** please refer to the information about Aichi Target 4 (sustainable production and consumption) in Chapter IV of the present National report.

Target 12 / Objective 12 of the GSPC: All wild harvested plant-based products sourced sustainably.

Regarding progress under **Target 12,** please refer to the information about Aichi Target 4 (sustainable production and consumption) in Chapter IV of the present National report.

Target 13 / Objective 13 of the GSPC: Indigenous and local knowledge innovations and practices associated with plant resources maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security and health care.

Regarding progress under **Target 13,** please refer to the information about Aichi Target 18 (preserving traditional knowledge) in Chapter IV of the present National report.

Objective IV: ***Education and awareness about plant diversity, its role in sustainable livelihoods and importance to all life on earth is promoted***

Target 14 / Objective 14 of the GSPC: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.

Regarding progress under **Target 14,** please refer to the information about Aichi Target 1 (raising awareness) in Chapter IV of the present National report.

Objective V: ***The capacities and public engagement necessary to implement the Strategy have been developed***

Target 15 / Objective 15 of the GSPC: The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy.

The institutions listed below are leading science and higher education institutions in the field of plant science / plant conservation.

- ***Bulgarian Academy of Sciences:*** http://www.bas.bg/;
- ***Sofia University "St. Kliment Ohridski", Faculty of Biology:*** https://www.unisofia.bg/index.php/bul/universitet_t/fakulteti/biologicheski_fakultet2;
- ***IBER – BAS:*** http://www.iber.bas.bg/?q=bg;
- ***National Museum of Natural History:*** http://www.nmnhs.com/index_bg.php;
- ***Agricultural University – Plovdiv:*** https://www.au-plovdiv.bg; /
- ***Thracian University – Stara Zagora:*** http://www.uni-sz.bg/#;
- ***University of Forestry – Sofia:*** https://ltu.bg/bg/.

Target 16 / Objective 16 of the GSPC: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy.

The Institute of Plant Genetic Resources (IPGR) https://ipgrbg.com/ is the national coordinating body for conservation of the biodiversity of crops and their wild relatives in the framework of the European Cooperative Programme for Plant Genetic Resources – ECPGR. The scientific programme and strands are coordinated in line with the priorities of the European Commission for Agriculture and Rural Development. IPGR hosts the National Seed Genebank, which guarantees the conservation of plant species through long-term storage of seeds. Collections stored at the National Seed Genebank contain over 60 000 seed samples of 1 360 species. Over 70% of the samples are at conditions for long-term storage. Preservation of the original germplasm includes not only products of plant breeding but also traditional for the country but little known in other regions raw material sources:

- medicinal, oleaginous and decorative plants, spices, etc.;
- "forgotten" plant varieties, the use of which directly corresponds to organic farming nd h lth lif st l (l f v g t bl s, r t r s, nuts);
- local varieties related to gastronomic traditions and agriculture that lend unique diversity to the Bulgarian table.

In a policy context, the IPGR is the implementing authority for: the Convention on Biological Diversity (1992), the National Biodiversity Conservation Strategy (1998), the Strategic Plan for Biological Diversity 2011-2020, the EU Biodiversity Strategy to 2020 and the **Global Strategy for Plant Conservation 2011-2020**.

Relevant websites, weblinks and files with additional information:
https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/zastiteni-vidove/rasteniya/

CHAPTER VII. BIODIVERSITY IN BULGARIA - PROFILE UPDATE

A. The importance of biodiversity in the country

Bulgaria ranks among the richest countries in Europe in terms of biodiversity. Despite its small area (**111 001,9 km^2**), the country's territory includes parts of three biogeographical regions – Alpine, Black Sea and Continental. The geographical location of the country in the south-eastern part of the continent, the complex palaeogeographic and paleoclimatic history, diverse topography and climate, sufficient freshwater resources and proximity to the Black Sea, considerable forest resources, etc. are basic and important factors determining the rich diversity of species, communities and natural habitats.

Biodiversity of Bulgaria is an invaluable asset, which, along with other characteristics, determines the national identity of the country. Biodiversity is at the heart of the ecosystem services (supporting, provisioning, regulating, and cultural) that provide for the quality of life of the population and the socio-economic prosperity of the country. Research, rational and efficient use of biodiversity are among the national priorities and underpin the development of cognitive and ecological tourism, green energy and transport, modern agriculture, stock breeding, forestry, fisheries and aquaculture, expanding of the raw material base for the pharmaceutical, food and cosmetics industries, traditional herbalism and gathering the "gifts of nature".

Conservation of biodiversity and provision of favourable conditions for its sustainable use, and in specifically – the genetic resources in agriculture, is vital for the development of agriculture. Hence, its adaptation to environmental and climate changes, as well as to overcoming disease, is impossible without the natural resources provided by the plant and animal diversity. Of particular significance is the fact that conservation of genetic resources provides for the conservation of agricultural traditions, so that the end user – the farmer – will have ample opportunities to develop related industries that contribute to the enrichment of food quality and acquisition of new sustainable positions in the changing markets. On the other hand, the agricultural land constitutes the predominant type of land use in Europe and covers 47 % of the territory of the EU and about 50% of biodiversity in Europe belongs to agricultural habitats.

B. Status and trends in biodiversity in Bulgaria, including benefits from biodiversity and ecosystem services and functions

1. Flora and vegetation (information by taxonomic groups, populations, new species, updated conservation status)

- **Non-vascular/Lower plants biodiversity – algae**

✓ ***Assessment of general biodiversity of algae in Bulgaria***

Analysis of scientific literature and data published on the algal flora in Bulgaria in the period 2014-2018 shows that there is new data about the composition and distribution of algae in the country which leads to an increase in the number of taxa identified. As a result, it can be claimed that **a total of 5493 species, varieties and forms from 777 genera and 9 divisions (phyla):** Cyanoprokaryota, Rhodophyta, Pyrrhophyta (Dinophyta), Euglenophyta, Cryptophyta, Chlorophyta, Streptophyta, Haptophyta (Prymnesiophyta) and Ochrophyta are found in Bulgaria**.** This assessment is made after adding the new for Bulgaria **one class, one order, 84 genera, 467 species, 25 varieties and 9 forms** (СТОЙНЕВА 2014; STOYNEVA ET AL. 2015B), 59 taxa of 28 genera new diatoms (ISHEVA & IVANOV 2015), of **1 species** cryoseston (LUKAVSKÝ & CEPÁK 2014) and **8 species and 5 genera** thermophyton (GÄRTNER ET AL.

2015B; STRUNECKÝ ET AL. 2017) to the already known 561 genera and 4923 intra-generic taxa (TEMINISKOVA ET AL. 2005). Among the newly found taxa, the rare on a global and continental scale species of *Palmellopsis texensis* stands out (Groover et Bold) Ettl et Gärtner, phylum Chlorophyta, order Tetrasporales, class Palmellopsidaceae, cultivated from soil collected in the root of Bulgarian endemic and glacial relict *Primula deorum* Velen. (GÄRTNER ET AL. 2015A). *Palmellopsis texensis* has so far been identified only once in the US and the Rila's Gornoprekorechko lake (=Strashnoto ezero; IBW0285) is its second locality in the world (GÄRTNER ET AL. 2015A; GUIRY & GUIRY 2018). Together with it, the rare species *Chlorococcum pinguideum* Arce et Bold (Chlorophyta, Chlamydomonadales, Chlorococcaceae) was found; the locality identified in Bulgaria is its seventh in the world. (GÄRTNER ET AL. 2015A; GUIRY & GUIRY 2018).

According to the results obtained, the **highest biodiversity on Bulgaria has the green evolution lineage** (divisions (phyla) Chlorophyta and Streptophyta), the representatives of which are approximately 48% of known algae. Results from analyses from previous periods are similar - green algae make up about 43%. (VODENICHAROV ET AL. 1998/; TEMNISKOVA ET AL. 2005). This statement, however, is conditional on the fact that it is made at a different degree of study of the representatives of different systematic and ecological groups and subgroups in Bulgaria and the different views of different authors about the scope of the species and the taxonomic status in the classifications. It is beyond doubt that the differences in the number of species by division (phylum) are due to the collection method and working with predominantly fixed material mainly on a light microscope.

No new species are described during the reporting period, however BEROV ET AL. (2015) suggest restoring the taxonomic rank of the species *Cystoseira bosphorica* Sauvageau (Sargassaceae, Phaeophyceae, Ochrophyta), which has for a long time been regarded as a form of the species *Cystoseira crinita* (Desf.) Bory (Dimitrova-KONAKLIEVA 2000). Insofar as the form was reported separately for the Bulgarian aquatory of the Black Sea (Dimitrova-KONAKLIEVA 2000 et al.), such taxonomic change will not lead to any change in the number of taxa identified for Bulgaria.

✓ ***New localities***

As a result of all research done during the reporting period, **there are new, unpublished localities for 1201 taxa,** that were already reported for the country (ДОЧИН 2015; СТОЙНЕВА 2014; СТОЯНОВ 2013 /=DOYCHIN 2015; STOYNEVA 2014; STOYANOV 2013/; BELKINOVA ET AL. 2014; BESHKOVA ET AL. 2014; DIMITROVA ET AL. 2014A,B; ISHEVA & IVANOV 2016; LUKAVSKÝ & CEPÁK 2014; MICHEV ET AL. 2018; DOCHIN & STOYNEVA 2014, 2015; PAVLOVA ET AL. 2014, 2015; STOYANOV ET AL. 2016; STOYNEVA ET AL. 2015A; STRUNECKÝ ET AL. 2017; TENEVA ET AL. 2014; VIDEV ET AL. 2016), seven of which were found for the first time in our Black Sea waters. (TENEVA ET AL. 2015).

✓ ***Algae biodiversity by habitat and ecological groups***

Besides demonstrating greater biodiversity, during the reporting period **41 taxa** were found on new substrates and in new habitat types, 9 of which are new to thermophyton, 6 - to endolithophyton, 3 - to speleophyton, 1 – to cryoseston (СТОЙНЕВА 2014/=Stoyneva 2014; GÄRTNER ET AL. 2015B; LUKAVSKÝ & CEPÁK 2014; STRUNECKÝ ET AL. 2017). In addition to that, during this period, work began for the first time in Bulgaria on exploring the surface of basidiomycetous fungi as a habitat for algae. For these algae, the outdated term *epiphyte* is proposed to be replaced with the term *epimycotic* (STOYNEVA ET AL. 2015) - 11 ***epimycotic***

green algae species were found on the surface of *Fomes fomentarius* and *Trametes versicolor* (STOYNEVA ET AL. 2015; VIDEV ET AL. 2016).

Biodiversity data about algae of the **thermal springs**, which belong to the extremophillous group thermophyton, spanning a 120-year study period was summarised by STOYNEVA-GÄRTNER ET AL. (2018). According to them, a total of 206 taxa of algae from 4 divisions (phyla) were found in the thermophyton: Cyanoprokaryota (82), Rhodophyta (4), Ochrophyta (44), Chlorophyta (32) and Streptophyta (44). Thus, algae from this ecological group make up 38% of the country's total biodiversity.

- ✓ ***Algae biodiversity by geographical region and in protected territories***

Summarised data about algal biodiversity along the Black Sea cost of Bulgaria spanning a period of almost 120 years (1898-2017) are published by DESCY ET AL. (2018), DIMITROVA ET AL. (2018) and GÄRTNER ET AL. (2018). They list the number of algae from the Cyanoprokaryota division (phyla) (330 taxa - DESCY ET AL. 2018), from the ecological group *hygrophyton* (a total of more than 850 taxa in phytoplankton and phytobenthos - DIMITROVA ET AL. 2018) and the ecological groups aerophyton and edaphophyton (164 taxa - GÄRTNER ET AL. 2018). According to these estimates, algae found only on the Black Sea coast represent 22% of the total biodiversity of these organisms in the country.

Data about microalgae in the Black Sea during the reporting period were published by DZHEMBEKOVA ET AL. (2017), PETROVA & GERDZHIKOV (2015) and TENEVA ET AL. (2015). The ratio in phytoplankton biodiversity divisions (phyla) is the same as compared to previous periods (TEMNISKOVA ET AL. 2005), with general prevalence of Pyrrhophyta (Dinophyceae) – circa 42% and Ochrophyta (Bacillariophyceae) – circa 36 % (PETROVA & GERDZHIKOV 2015; TENEVA ET AL. 2015).

Macroalgae in a protected area along the Bulgarian Black Sea coast are the subject of research by BEROV ET AL. (2016, 2018), where *Cystoseira*-dominated communities have been established.

Specific data about biodiversity in individual protected territories are published by ISHEVA & IVANOV (2015) for Vitosha Nature Park (353 taxa), GÄRTNER ET AL. (2015) for Rila National Park (3 species of green algae) and MICHEV ET AL. (2018) for the "Atanasovsko Ezero" Maintained Reserve (a total of 210 algae taxa).

- ✓ ***Threatened, toxic and invasive species***

The data collected makes it possible to draw some conclusions about the biodiversity of algae and the status of their habitats in Bulgaria. The big role **Cyanoprokaryota play in the structure of phytoplankton reflects a general negative trend in the development of water bodies in the country, which is most often the outcome of anthropogenically accelerated eutrophication in the face of global warming and climate change.** Evidence of the unfavourable conditions in some of our wetlands - significant from a sanitary and conservation point of view, are the detected during the reporting period **toxic species** and their blossom, as well as microcystins **-** algal toxins that are dangerous to human health and to other organisms - including the tendency to appear in previously unusual for their species reservoirs (for example in the mountain dams Studena, Dospat, etc.) (for further details see STOYNEVA-GÄRTNER ET AL. 2017). According to the STOYNEVA-GÄRTNER ET AL. summary (2017), based on a total of 36 research papers, of which 12 are from the reporting period 2014-2018, 4 out of the total of 115 water bodies researched in the country are, according to the World Health

Organisation's (WHO) criteria, at medium risk and 5 others are at low risk to human health – a total of 8% of the water bodies researched. Special attention is paid to the species that are problematic for the Black Sea coastal waters in the DESCY ET AL. (2018) and DIMITROVA ET AL. (2018) reviews, while the increasing role of cyanoprokaryotes in the Black Sea waters along the Bulgarian coast and the development of potentially toxic species is reflected in the TENEVA ET AL. (2015) review.

The strong anthropogenic influence and eutrophication under global climate change has led to significant changes in the quality of the Black Sea waters and the transformation of phytoplankton from "diatome" to "dinophyte" (Temniskova et al. 2005). The predominance of dinophyte algae and the emergence of harmful species, causing blooms, as well as the abundant development of cyanoprokaryotes off the Bulgarian coast (DZHEMBEKOVA ET AL. 2017; PETROVA & GERDZHIKOV 2015; TENEVA ET AL. 2015) demonstrate that these unfavourable trends in the development of the Black Sea system persist during the reporting period.

Negative trends in the development of natural thermal habitats leading to fragmentation or even to loss of localities and species are presented in the summary of STOYNEVA-GÄRTNER ET AL. (2018).

It is beyond doubt that many species were lost and are being currently lost because of the changes which have occurred and are currently occurring in the habitats, but it is equally certain that new algae species are entering the country due to the general processes of globalization (STOYNEVA-GÄRTNER & UZUNOV 2015). Some of these species are **invasive**, harbouring potential threats not only because of the general disturbances they may cause with the displacement of native species but also because of their often toxic nature, which in some cases remains unknown for a long time. Data obtained so far demonstrate that these algae species are more easily accommodated in *disturbed, stressed water bodies* (and most probably in stressed habitats of other types), which means that *preventative measures and habitat conservation are among the best measures to prevent the development of such species*. At the same time, it is precisely the lack of preliminary data that makes it difficult to assess the specific species as invasive in almost all cases, which calls for extreme caution and a thorough analysis of the known worldwide distribution of the species concerned. **Only 3 taxa** from two divisions (phyla) **are listed as invasive** – *Raphidiopsis raciborskii* (Woloszynska) Aguilera, Berrendero Gómez, Kastovsky, Echenique & Salerno (Syn. *Cylindrospermopsis raciborskii* (Woloszynska) Seenayya & Subba Raju), *Microcystis wesenbergii* (Komárek) Komárek ex Komárek of the Cyanoprokaryota and *Compsopogon coeruleus* (Balbis ex C. Agardh) Montagne (Balbis ex C. Agardh) Montagne of the Rhodophyta (СТОЙНЕВА 2014; /=STOYNEVA 2015; KOKOCIŃSKI ET AL. 2017), but it is our expert opinion that this number is larger.

- ✓ ***Species of conservation significance***

The presence of **rare species** in our flora gives ground to the compilation of lists of species of conservation significance, the conservation of which is possible in nature through habitat conservation. This is a good basis for future work when proposing new protected territories in the country or specific management measures for known territories of conservation significance. ***The first Red List of Microphytic Algae of Bulgaria*** **was developed according to an original methodology with quantitative assessment of the algae distribution** and the corresponding formula. (STOYNEVA-GÄRTNER ET al. 2016A,B). The list includes **757 taxa** of continental algae in Bulgaria (613 species, 83 varieties and 61 forms) from 7 divisions (phyla) (Cyanoprokaryota, Euglenophyta, Pyrrhophyta, Ochrophyta, Haptophyta, Chlorophyta, Streptophyta), classified in 6 standard IUCN categories. The

distribution of taxa by category is shown in **Table 10,** and both among general biodiversity and among endangered species, algae from the green evolution lineage (Chlorophyta and Streptophyta) occupy the largest place, accounting for 63% of all endangered species.

Table 10. Distribution of endangered microalgae in Bulgaria by taxonomic division and IUCN categories (CR – Critically Endangered, EN – Endangered, VU – Vulnerable, NT – Near Threatened, LC – Least Concern and DD – Data Deficient) according to the Red List of Microalgae (STOYNEVA-GÄRTNER ET al. 2016b).

IUCN category	Cyano-pro-karyota	Euglen o-phyta	Pyrrho -phyta	Ochro-phyta	Hapto-phyta	Chloro - phyta	Strepto - phyta	Total
CR	4 sp., 2 f.	1 sp.	-	10 sp., 2 var.	-	18 sp., 1 var., 3 f.	5 sp., 18 var., 17 f.	**38 sp., 21 var., 22 f.**
EN	24 sp., 1 var.	8 sp., 4 var., 4 f.	2 sp.	77 sp., 8 var., 1 f.	1 sp.	47 sp., 2 var., 1 f.	22 sp., 6 var., 2 f.	**181 sp., 21 var., 8 f.**
VU	20 sp.	10 sp.	-	114 sp., 8 var.	-	64 sp., 2 var.	49 sp., 8 var., 1 f.	**257 sp., 18 var., 1 f.**
NT	14 sp.	12 sp., 2 var.	2 sp.	31 sp.	-	25 sp., 1 var.	24 sp., 2 var.	**108 sp., 5 var.**
LC	1 sp.	1 sp.	-	1 sp.	-	-	-	**3 sp.**
DD	1 f.	3 sp.	-	14 sp., 6 var.	-	5 sp., 5 var., 4 f.	4 sp., 6 var., 25 f.	**26 sp., 17 var., 30 f.**
Total	**63 sp., 1 var., 3 f.**	**35 sp., 6 var., 4 f.**	**4 sp.**	**247 sp., 24 var., 1 f.**	**1 sp.**	**159 sp., 11 var., 8 f.**	**104 sp., 40 var., 45 f.**	**613 sp., 81 var., 61 f.**

The number of algae taxa included in the Red List of Microalgae is 14% of their total biodiversity in Bulgaria, and together with the taxa from the Red List of Macroalgae (TEMNISKOVA ET AL. 2008) and the Red Data Book (PEEV 2015), **all algae species of conservation significance in the country account for 15% of the total biodiversity.** The Red List of Microalgae and the methodology available may be considered a good basis for further sozological activities in the country and for identifying and studying new rare and endangered species.

During the reporting period, the final paper version of the Red Data Book of the Republic of Bulgaria was published, in which algae are included in Volume 1. Plants and fungi (PEEV 2015). The Red Data Book includes only 6 species of macroalgae (4 Streptophyta, 1 Rhodophyta and 1 Ochrophyta, Phaeophyceae), of which 5 in the Critically Endangered category and 1 in the Endangered category (STOYNEVA & TEMNISKOVA 2015; STOYNEVA ET AL. 2015C; TEMNISKOVA & STOYNEVA 2015A-D).

The species of conservation significance are distributed by regions and ecological groups as follows:

1) in the phytoplankton and phytobenthos of the Black Sea water bodies 78 species of conservation significance have been identified, of which 64 microphytes and 14 macrophytes listed in the Red Lists of Bulgarian macro- and microalgae (DIMITROVA ET AL. 2018);

2) in the aerophyton and edaphophyton along the Black Sea coast of conservation significance are 4 species of algae in the Red List of Microalgae (GÄRTNER ET AL. 2018);

3) 21 of the species in thermal springs are of conservation significance according to the Red Lists of Bulgarian macro- and microalgae and the Red Data Book of Bulgaria (STOYNEVA-GÄRTNER ET al. 2018);

4) in the hydrophyton of Vitosha Nature Park, 107 taxa of diatoms of conservation significance from the Red List of limnetic diatoms in Central Europe (ISHEVA & IVANOV 2015).

Conservation measures

Due to the microscopic nature of most algae, the key and most popular conservation measure is the **conservation of their habitats** (STOYNEVA-GÄRTNER ET AL. 2016A). This includes, more specifically, measures to reduce anthropogenic impact and, in particular, eutrophication of water bodies, as well as protecting habitats against transformation (for example thermal springs catchments) and fragmentation (STOYNEVA-GÄRTNER ET AL. 2018). In addition, living algae collections are extremely important for preserving biodiversity. In Bulgaria, such collections are the Sofia University collection, which was initially completely transferred to the University of Plovdiv and its Plovdiv Algal Culture Collection (PACC) and the newly created (in 2011) Algal Collection of the University of Sofia (ACUS). Collection of species and strains of biotechnological significance is also available at the Institute of Plant Physiology and Genetics (IPPG) to the BAS.

- **Vascular flora – assessment of the overall biodiversity of higher flora**

✓ **Moss flora**

In the period 2014-2018, as part of the development of management plans for a number of protected territories (national parks, nature parks, reserves and natural landmarks), assessments and analysis of their moss flora were also carried out. In Rila National Park (2016), 282 species of moss from all ecological groups were identified. They represent 41% of the Bulgarian moss flora at the level of species and 62% of the families which occur in Bulgaria. It has been established that 42 species of moss are of conservation significance.

Following field studies in 2014, moss flora in Pirin National Park has the following taxonomic composition: 2 divisions (phyla) (Marchantiophyta and Bryophyta), 6 classes, 64 families, 132 genera and 330 species. They represent 43.7% of the known species in the Republic of Bulgaria. Out of the 251 species included in the Red List of Mosses in Bulgaria (Natcheva et al. 2006), **34 species or 13.5%** are distributed at the territory of Pirin National Park. Two species are in the Critically Endangered (CR) category, 2 are Endangered (EN), 29 are Vulnerable (VU) and 1 is Near Threatened (NT).

✓ **Vascular flora**

Vascular flora biodiversity, new localities, habitats and their conservation significance

Analysis of scientific literature and data published on the vascular flora in Bulgaria in the period 2014-2018 shows that there is new data about the composition and distribution in the country which leads to an increase in the number of taxa identified. Thus, it can be claimed that **on the territory of Bulgaria a total of 4064 species, belonging to 921 genera and 159**

families have been identified. As a result of the floristic studies in the country, which were conducted during the reporting period, many new localities of higher plants were reported, which undoubtedly helps to clarify the current spread of different species. **During this period, 127 species (51 alien) has been registered for the first time on the territory of the country and 11 new to science species were described.** (Szeląg 2006; Vladimirov & Szeląg 2006; Pavlova 2007a, 2009a, 2014; Teppner 2008; Tan et al. 2009; Стоянов 2010a; Ташев и Димитров 2012 /=Stoyanov 2010a; Tashev and Dimitrov 2012/; Bancheva & Raimondo 2013; Szeląg & Vladimirov 2013). Seventeen subspecies have also been reported for the first time in the country, two of which are new to science (Ančev 2007, 2012a, b), as well as 18 hybrids, four of which are new to science (Zieliński et al. 2006; Ančev et al. 2013). Nine species have been confirmed for the country, while another 78 are synonymous, unconfirmed taxa or misreported species. Six new combinations have also been made, five on the species level and two on the subspecies level.

Some of the floristic studies conducted in Bulgaria during this period are devoted to aquatic macrophytes and wetlands.

Tosheva & Traykov (2010, 2013, 2015) report horological data for some submerged macrophytes from different types of linear water bodies in different eco-regions of Bulgaria.

Hristeva et al. (2015) report information on the species composition and distribution of 60 aquatic macrophytes in 13 rivers of southern Bulgaria. Stoineva et al. (2015) assessed the ecological status and potential of a number of water bodies based on their phytoplankton and macrophytes and presented the monitoring results of 13 dams and six lakes.

During the reporting period, the new edition of the **Red Data Book of the Republic of Bulgaria, Volume 1 - Plants and fungi** was published (Peev et al. 2015). This edition contains detailed information about the biological characteristics, distribution, habitat quality, the conservation measures undertaken, the necessary measures for the species conservation, etc. for a total of 810 plant species, of which: algae – 6 species (critically endangered – 5, endangered – 1); moss – 102 species (Marchantiophyta: critically endangered – 10, endangered – 17, vulnerable – 6; Bryophyta: critically endangered – 17, endangered – 25, vulnerable – 27); fern plants – 7 species (regionally extinct – 1, critically endangered – 6); gymnospermous plants – 4 species (critically endangered – 2, endangered – 2); Angiosperms plants – 542 species, of which: extinct – 1, regionally extinct – 11, critically endangered – 198, endangered – 293, vulnerable – 39, selected species – Bulgarian and Balkan endemic species, listed in Appendix 3 to the Biodiversity Act and in the Habitats Directive; fungi – 149 species (critically endangered – 38, endangered – 103, vulnerable – 8). Each species is illustrated with an original colour drawing or a photograph, and a map of its distribution.

The Red Data Book of the Republic of Bulgaria - Volume III elaborates on the habitats on the territory of the country, classified in four main categories according to the degree of threat - critically endangered, endangered, vulnerable and near threatened. **The 166 natural habitats included in the Red Data Book of Bulgaria are a sample of the total of habitats in the country - 542.** Such diversity can be estimated as extremely large. **A total of 96 habitats are found only in Bulgaria.** In the framework of the implementation of environmental programmes and biodiversity assessment, intensive scientific research is underway, the outcome of which will be qualitative and quantitative changes over the years. **According to Annex I to Directive 92/43/ EEC and respectively, Annex 1 to the Biodiversity Act, 90 Bulgarian habitats are considered of Community importance and require special attention.**

✓ **Threats and invasive species**

Invasive alien species are alien species whose introduction and spread outside their native areals poses a threat or adversely affects local biodiversity. In Bulgaria, circa 60 species of flowering plants are considered invasive or potentially invasive. Among the most problematic ones for local biodiversity are *Ailanthus altissima, Amorpha fruticosa, Fallopia* × *bohemica*, and more recently - *Opuntia humifusa*. The impact of these species is due to their competition with native plants, changes in the composition and structure of plant communities and habitats, cases of parasitism.

Over the past decade, special attention has been paid to alien species that have penetrated the Bulgarian flora. A total of 51 alien species have been reported during this period. Some of them were recorded for the first time, others that were known for a long time and were introduced for decorative or other purposes, became naturalised in local habitats (*Elaeagnus multiflora, Eucommia ulmoides, Koelreuteria paniculata, Laburnum anagyroides, Laurus nobilis, etc.*).

✓ **Conservation measures**

Conservation and rehabilitation and, where necessary, the reconstruction of biodiversity and habitats in Bulgaria require enormous effort and resources. The development of new action plans for the conservation of other plant species needs to continue through a detailed study of the localities of deficient plants and specific habitats. Currently, 1057 endangered species in Bulgaria are protected by law, 574 of which are vascular plants. Conducting specialised research will ensure a gradual increase in the number of legally protected plants. The establishment of a national network of small protected territories is already a fact. The concept of plant micro-reserve was applied and currently this network comprises of 58 legally protected sites for 44 vascular plant species and 3 species of bryophytes, which are critically endangered in the Bulgarian flora and have single or highly fragmented populations. It is necessary to proceed with the fast restoration of specific habitats of the individual plant species and populations affected. So far, the habitats of 3 plant species and 5 populations of endangered plants have been restored. Maintaining and refreshing the National Gene Bank would prevent the irreversible loss of seed and spore plants from the Bulgarian genetic fund by successfully storing seed and vegetative material. During the past years, seeds of more than 90 endangered species from the Bulgarian flora has been successfully stored.

✓ **Plant communities**

The diversity of plant communities in Bulgaria is considerable - over 1250 associations and over 300 groups. Dominant are tree coenoses which occupy about 3.9 million ha of the total area of the country. They are followed by grassy communities, mainly grasslands and meadows, covering an area of over 2 million ha. The shrub and semi-shrub community covers a much smaller area. In recent years, research focused mainly on herbaceous vegetation, resulting in the description of 12 associations and four subassociations new to science. (Русакова, В., 2015/=Rusakova, V., 2015)

According to the bio-geographic zoning of the European Topic Center on Biodiversity and Nature Protection, adopted by the European Commission and included in the Habitats Directive (92/43 / EEC), Bulgaria refers to 3 bio-geographical regions: Alpine, Continental and Black Sea.

There is a well-developed alpine zone is the Rila Mountain. In Pirin it is more limited, and elsewhere it is only fragmentary in the mid-high mountains of Bulgaria, as well as in other mountains on the Balkan Peninsula. The grass and shrub vegetation of the alpine and subalpine zones is dominated by quite a few Balkan endemics (*Sesleria comosa, Festuca riloensis, F. valida, F. penzesii,* etc.), as well as some local endemics (*Primula deorum, Carex tricolor, C. parviflora, C. bulgarica, Sesleria korabensis*, etc.) together with Arctic-alpine and alpine species (*Carex curvula, Festuca airoides, Juncus trifidus, Cetraria islandica, Salix herbacea, Vaccinium uliginosum*, etc.). Main component of the shrub vegetation in the upper part of the subalpine sub-belt are the phytocoenoses of *Pinus mugo and Juniperus sibirica*, however there are also endemic phytocoenoses such as those of *Chamaecytisus absinthioides*. Most prominent among the grass endemics in this sub-zone are *Primula deorum, Festuca valida, F. penzesii, F. balcanica, F. pirinensis*, etc.

In the coniferous belt, along with the widespread in Europe *Picea abies* and *Pinus sylvestris* forests, there are also *Pinus peuce* (Balkan endemic) and *P. heldreichii* (Balkan sub-endemic) forests. Communities of *P. peuce* are close to mesophilic, prefer a silicate bedrock, the composition of the foot layer is the same as that of the spruce forests (*Vaccinium myrtillus, Luzula sylvatica, Calamagrostis arundinacea*, etc.). Phytocoenoses of *Pinus heldreichii* are xerothermic, they develop on alkaline rocks and include xerothermal sub-Mediterranean species (*Festuca penzesii*, etc.). (Русакова, В., 2015/=Rusakova, V., 2015)

Coniferous forests in the lower subalpine sub-belt are assumed to be subarctic, whereas beech coenoses in the mountain belt have Central European features. However, in the beech belt of Bulgaria there are phytocenoses with *Laurocerasus officinalis, Haberlea rhodopensis* and their endemics and relic species such as *Acer heldreichii*. The *Fagus sylvatica* species is divided by many authors into *subsp. sylvatica* and *subsp. moesiaca*, *Abies alba* is divided into *subsp. alba* and *subsp. borisii-regis*. The southern boundary of the first fir subspecies areal is located in the southernmost mountain of Bulgaria - Slavyanka (Ali botush), and the tsar-Boris fir (Abies borisii-regis) is spread in the mountains in south-western Bulgaria, northern half of Greece, but rarely has any major functions.

In the lowest parts of the mountains, Bulgarian authors distinguish a "hornbeam - sessile oak" belt, fragments of which are also found outside the mountains. The vegetation in this belt demonstrates the southern characteristics associated with the Mediterranean forest vegetation. Dominant here are: *Fagus sylvatica subsp. moesiaca, Carpinus betulus, Quercus dalechampii, Fraxinus excelsior, Acer pseudoplatanus, A. hyrcanum*, etc., and species such as *Ostrya carpinifolia, Castanea sativa, Aesculus hippocastanum, Tilia tomentosa, Pinus nigra subsp. pallasiana*, which are missing or almost missing in Central Europe.

The vertical distribution of vegetation cover in the different mountains of Bulgaria also displays great diversity. In Stara Planina, the coniferous belt is underdeveloped, the forest cover is dominated by beech, a little bit of mountain pine and fragments of alpine vegetation. In the Rhodopes and Vitosha mountain, there is well-developed coniferous vegetation, some mountain pine and only fragments of alpine belt. Some of the mountains are dominated by limestone cliffs, others by silicate and the vegetation has the respective significant characteristics.

A particular place in the vegetation cover in Bulgaria have phytocenoses of South Caucasian species occurring in Strandzha and eastern Stara Planina. Forests composed of *Fagus orientalis* and *Quercus polycarpa* are a complex composition of South Caucasian Middle European species: *Rhododendron ponticum, Laurocerasus officinalis, Daphne pontica, Vaccinium arctostaphylos, Trachystemon orientalis, Calluna vulgaris, Festuca drymeja, Acer platanoides, A. campestre, Carpinus betulus, Tilia tomentosa, Quercus cerris, Crataegus monogyna, Poa nemoralis* , etc. Forests of *Quercus cerris, Q. frainetto and Q. pubescens* in the hilly territories and plains of the country have their areals in the south-east part of the

nemoral zone and are characterised by the presence of some species of southern nature. Xerothermic oak forests, in the composition of which the following species are included or form independent phytocenoses *Fraxinus ornus, Carpinus orientalis*, etc., possess distinct Mediterranean characteristics. In their composition there are *Cotinus coggygria, Paliurus spina-christi, Juniperus oxycedrus, J. excelsa, Colutea arborescens, Coronilla emerus, Clematis flammula, Anemone pavonina, Ranunculus rumelicus, Cyclamen hederifolium*, etc. Some shrub species form phytocoenoses that are quite widespread. Phytocoenoses of *Genista rumelica, G. lydia* and other southern species or local endemics such as *Astracantha aitosensis, A. thracica*, etc. develop locally. Of particular interest are the relic coenoses of steppe species such as those of *Amygdalus nana, Artemisia lerchiana, Stipa lessingiana, Paeonia tenuifolia, Caragana frutex*, etc. The spread of ponto-pannonian continental loessic and sand steppes is limited, but essential for biodiversity in Bulgaria. Specific is also the participation in the vegetation of the country of endemic oro-Mediterranean communities of spiny dwarf shrubs (*Astragalus angustifolius*, etc.) and subcontinental shrub communities. Evergreen shrub coenoses of *Quercus coccifera* penetrate the country mainly along the Struma river valley. They include other southern species (*Phillyrea latifolia, Pistacia terebinthus*, etc.), some of which are also edifiers or dominant species.

The structure of the herbaceous vegetation is also very complex, with the participation of many semishrubs, especially in calcareous and eroded areas. The area of the mesophytic (meadow) herbaceous vegetation dominated by *Festuca pratensis*, *Cynosurus cristatus, Lolium perenne, Poa sylvicola*, etc. is progressively shrinking. Following logging of the forests, the xeromesophytic and xerophytic coenoses of *Chrysopogon gryllus, Bothriochloa ischaemum* (*Dichantium ischaemum*), *Poa bulbosa, Stipa spp., Festuca valesiaca, Artemisia alba, Satureja montana, Agropyron brandzae, etc.* develop more often. In most of the cases the vegetation cover is a complex of shrub and herbaceous coenoses. Preserved forests of *Quercus pedunculiflora, Q. robur, Fraxinus oxycarpa, Ulmus minor* and other mesophytic and hygrophytic tree species occur increasingly more rarely in the lowlands of the country. Significantly decreased is also the distribution of swamp and marsh coenoses of *Phragmites communis, Typha sp. div., Schoenoplectus sp. div., Nymphaea alba, Nymphoides peltata, Nuphar lutea*, etc. To the diversity of the vegetation cover in Bulgaria is added the halophytic (including in some inland parts of the country) and psamophytic vegetation. The halophytic coenoses are most often dominated by *Puccinellia convoluta, Limonium gmelinii, Aeluropus littoralis, Salicornia europaea, Camphorosma monspeliaca* и др. A considerable number of rare and endemic species occur in the psamophytic coenoses of *Leymus racemosus, Ammophila arenaria, Galilea mucronata, Aurinia uechtritziana, Artemisia campestris*, etc. Coastal reefs and inland rock outcrops are the habitats of particularly rare phytocoenoses and endemic species. (Русакова, В., 2015/= Rusakova, V., 2015).

2. Fauna (information by taxonomic groups, populations, new species, updated conservation status)

Bulgaria ranks high in Europe in terms of richness of biological diversity. At present, more than 30 360 animal species have been identified in Bulgaria. They belong to 28 phyla and 75 classes (including Protozoa). Invertebrates include 251 orders and over 1740 families. It is estimated that these are about 50% of the invertebrates in the country. Among invertebrates the highest species richness have phylum Arthropoda and phylum Nematoda, class Insecta, class Arachnida and class Crustacea, and the following orders: Coleoptera, Hymenoptera, Diptera, Lepidoptera, Homoptera and Hemiptera.

In general, Bulgarian fauna is not sufficiently researched. Well researched are individual groups, for which catalogues or monographs are available, part of the series „The Fauna of

Bulgaria“: Polychaeta, Trombidioidea, Chilopoda, Odonata, Heteroptera (Pentatomoidea), Coleoptera (Carabidae, Hydrocanthares, Chrysomelidae, Curculionidae, Rhynchophora, Buprestidae and Cerambycidae), Hymenoptera (Symphita, part of Ichneumonidae and Formicidae), Lepidoptera (Noctuidae, Geometridae and Rhopalocera), Diptera (Chloropidae and Muscidae), Gastropoda Terrestria and the freshwater Mollusca.

Well-studied are some small taxa, such as Ctenophora, Branchiobdellea, a number of the arthropods order (Scorpiones, Diplura, Archaeognatha, Embioptera, Mantodea, Blattodea, Isoptera, Anoplura, Raphidioptera, Megaloptera and Mecoptera), in the species composition of which no significant changes are to be expected.

The species composition is constantly being supplemented and enriched due to the development of research and the improved methods and technologies. This is mainly due to a more in-depth study of individual taxa, as well as a gradual accumulation of information.

During the past five years, there were no summaries on the species composition of invertebrates in Bulgaria. There are separate data about the numbers in individual smaller systematic groups in some collections of reviews or in reports to protected territories management plans - Rila and Pirin National Parks, Vitosha and Vrachanski Balkan Nature Parks, etc. (Popov, 2014). The data obtained reflect the conservation challenges of invertebrates in the management plans. The main groups researched for almost every territory e.g. for Mollusca are considered a model for the assessment of the invertebrate fauna in Bulgaria (Hubenov, 2015).

During the past five years, from 2014 onwards, new unknown insects were described and published (class Insecta), as well as insects that are new for the fauna in Bulgaria.

A new genus and new species of freshwater snail of the *Hydrobiidae* family was described by Georgiev & Glöer (2015).

Several new species of flies of the *Muscidae* family, several tick species and ants (Hymenoptera: Formicidae) have been described.

In Bulgaria, vertebrates are undoubtedly much better studied. According to the Red Data Book of Bulgaria, there are 781 species in our country: 2 species of Cyclostomata, 4 species of cartilaginous fish, 213 bony fish, 19 species of amphibians, 37 reptiles, 409 birds and 97 species of mammals.

During the past years – in the period 2014 - 2018, the species composition was supplemented and updated.

A new species of bony fish was described - *Serranus hepatus* from the Black Sea region around Kiten (Apostolou, 2014).

Figure16. Serranus hepatus - a single specimen caught near the town of Kiten on the Bulgarian Black Sea coast

The amphibians' species composition currently comprises 23 species. Two new species of frogs have been described. The small pool frog (*Pelophylax lessonae*), which was considered to be present along the Danube river and which has two confirmed localities along the river (Lukanov, Tzankov, Naumov, 2017) and the Levant water frog (*Pelophylax bedriagae*) from the Varbitsa river and Arkutino marsh region (Lukanov, Popgeorgiev, Tzankov, 2018).

The polytype species of the smooth newt (*Lissotriton vulgaris)* was genetically divided into five new species, three of which occur in Bulgaria - *L. graecus, L. schmidtleri and L. vulgaris* (Wielstra et al, 2018).

The current species of the Reptile class includes a total of 38 species - turtles are 7 species (one of them - the pond slider - is not an autochthonous species, and two species of sea turtles were established in the Bulgarian Black Sea waters), lizards are 13 species of 4 families, and snakes are 18 species from 4 families.

According to the List of Bird Species in Bulgaria, as of 31 December 2014 (BUNARCO, 2014), the ornithofauna includes 420 bird species, of which 2 species were observed in the wild during the period 1880 - 1949 and one species was introduced into the country or escaped from collection and free to breed in nature.

http://www.bunarco.org/bg/dokladi.html

In 2017, a new, endemic species of mole - *Talpa martinorum* was discovered and described in the Strandzha region (Kryštufek et al, 2018).

In 2017, the presence of ground dormouse (*Myomimus roachi*) in Bulgaria, again in the Strandzha region, was confirmed, after the species had not been captured in the last 40 years.

Populations

Population studies focus primarily on vertebrate animals. Population status for individual species is indicated in the action plans for some bird species adopted in recent years – the Dalmatian Pelican (*Pelecanus crispus*), the eastern imperial eagle (*Aquila heliaca*), the saker falcon (*Falco cherrug*), the ferruginous duck (*Aythya nyroca*), the great bittern (*Botaurus stellaris*), the pygmy cormorant (*Phalacrocorax pygmeus*), the white-headed duck (*Oxyura leucocephala*), the lesser white-fronted goose (*Anser erythropus*), and the red-breasted goose (*Branta ruficollis*).

Populations of wintering waterfowl species are monitored on an annual basis through mid-winter censuses and reports are submitted to the Executive Environment Agency. Periodically, numbers of migratory birds are also published, some related to private investment projects. During the period 2015-2018, numbers in the populations of marine birds - the yelkouan shearwater (*Puffinus yelkouan*) and the Mediterranean shag (*Phalacrocorax aristotelis desmarestii*) are being monitored, as well as the populations of marine mammals species.

Conservation status

The conservation status of animals in Bulgaria is reflected in the second edition of the Red Data Book of the Republic of Bulgaria and is presented in the Fifth National Report. In the period 2014-2018, there are no additions, nor new published conservation status. The second, revised and supplemented edition of the Red Data Book of the Republic of Bulgaria includes a total of 442 animal species. For the first time, the Red Data Book includes separate entries for 51 species of invertebrates, of which 12 species are Extinct and 39 species are Critically Endangered. The assessment and inclusion of invertebrates in the Red Data Book, as

well as the critical reassessment of the degree of threat to vertebrate animals in Bulgaria in line with the IUCN criteria, led to a significant increase in the number of species of Bulgarian fauna included in this edition. A total of 30 species are extinct (EX), 87 species are critically endangered (CR), 107 species are endangered (EN), 137 species are vulnerable (VU), 14 species are categorised as near threatened (NT), 42 species are least concern (LC) and 25 for species the existing data are deficient (DD).

The Biodiversity Act (BDA) lists species with conservation status under Bulgarian law. Appendix 2 includes species under Directive 92/43/ EEC on the conservation of natural habitats and wild fauna and flora, as well as species under Directive 2009/147/EC on the conservation of wild birds. A total of 26 mammal species are included in this Appendix, of which 12 species of bats; 119 species of birds, 8 species of reptiles, 5 species of amphibians, 23 species of fish and 35 species of invertebrates.

Appendix 2a (two bird species) and Appendix 3 include protected species on the territory of the whole country, including their habitats that are also subject to conservation.

Endemism

To this category belong taxa that are not distributed outside of the Balkan Peninsula. In most cases, they are divided into Balkan and Bulgarian endemics. The latter are regional (found in more than one locality in a specific area) and local (with one limited locality). Endemics are an important element of high conservation value in the evaluation of territories and point out to the unique nature of the fauna.

Endemic taxa in invertebrates predominate. The total number of endemic taxa is about 1300. Balkan endemics are about 450 species and Bulgarian endemics are about 850 species. They are unevenly distributed between different groups of animals. In some groups the rate of endemism is very high (Hydrobiidae – 83%, Clausiliidae – 71%, terrestrial Isopoda – 50.0%, Diplopoda – 53.6% and Ensifera – 42.9%), in others it is average (Opiliones – 33,3%, Orthoptera – 28.0%, Mollusca – 26.9%, Plecoptera – 25.7%, Pseudoscorpiones – 25.0%, Oligochaeta – 18.5%, Ephemeroptera – 15.7% and Trichoptera – 13.2%), while in most of the bigger groups it is low, however there might be broad variations in the respective (Coleoptera – 7.3%, Heteroptera – 4.2%, Lepidoptera – 3.6% and Diptera – 0.7%). Endemic insects are highest in number (761 or 3.6% of the Bulgarian entomological fauna and 58.5% of the endemic animals known in Bulgaria). The largest part is Bulgarian (385), followed by Balkan (273) and local (103) endemics. More than half of the endemic insects belong to the Coleoptera order (393 or 51.8 %). Endemic butterflies are also significant in number – 103 (7.9%). Endemic molluscs are the most numerous of the other groups – 116 (8.9%).

The richest territories in terms of endemics in respect to most groups are: Rila – 268, Pirin – 220, Western Stara Planina – 184, Western Rhodopes – 183, Sredna Stara Planina – 181, Black Sea coast – 172, Eastern Rhodopes – 157, Vitosha – 138 and Sandanski-Petrich valley with Kresna gorge – 137. In these regions are the most active local centres of formation in the Bulgarian fauna (Hubenov, 2008; /=Хубенов, 2015).

In vertebrates, endemism is very rare. According to some authors and literary sources, there are Balkan endemics with lizards and some lizards subspecies. With birds, Balkan endemics are also present only at sub-species level. The newly discovered blind mole described above - *Talpa martinorum* and the Balkan chamois (*Rupicapra rupicapra balcanica*) are Balkan endemic mammals.

List of some insects (class Insecta), described as new to science by Bulgaria after 2014

- *Empis* (*Leptempis*) *rhodopensis* Barták, 2018 (Diptera: Empididae)
- *Empria aridicola* Macek & Prous, 2019 (Hymenoptera: Tenthredinidae)
- *Helina dabovetsa* Zielke, 2017 (Diptera: Muscidae)
- *Helina rilae* Zielke, 2017 (Diptera: Muscidae)
- *Helina siutkae* Zielke, 2017 (Diptera: Muscidae)
- *Hilara bulgarica* Barták, 2018 (Diptera: Empididae)
- *Limnophora ljubomirovi* Zielke, 2017 (Diptera: Muscidae)
- *Messor ponticus* Steiner et al, 2018 (Hymenoptera: Formicidae)
- *Omphale rodopiensis* Yefremova, Yegorenkova et Boyadzhiev, 2017 (Hymenoptera: Eulophidae)
- *Phaonia sandanskii* Zielke, 2017 (Diptera: Muscidae)
- *Rhamphomyia* (*Amydroneura*) *stojanovae* Barták, 2018 (Diptera: Empididae)
- *Tachysphex nobilis* Straka, 2016 (Hymenoptera: Crabronidae)
- *Tachysphex punctipleuris* Straka, 2016 (Hymenoptera: Crabronidae)
- *Temnothorax crasecundus* Seifert & Csősz 2014 (Hymenoptera: Formicidae)
- *Temnothorax strymonensis* Csősz et al, 2018 (Hymenoptera: Formicidae)

Some new species of insects found in Bulgaria after 2014

- *Araeopteron ecphaea* (Hampson, 1914) (Lepidoptera: Erebidae)
- *Ardis pallipes* (Audinet-Serville, 1823) (Hymenoptera: Tenthredinidae)
- *Empis* (*Euempis*) *calcarata* Bezzi, 1899 (Diptera: Empididae)
- *Empis* (*Leptempis*) *discolor* Loew, 1856 (Diptera: Empididae)
- *Empis* (*Planempis*) *frauscheri* Linnaeus, 1758 (Diptera: Empididae)
- *Empis* (*Xanthempis*) *stercorea* Linnaeus, 1761 (Diptera: Empididae)
- *Empria liturata* (Gmelin, 1790) (Hymenoptera: Tenthredinidae)
- *Empria parvula* (Konow, 1892) (Hymenoptera: Tenthredinidae)
- *Empria pravei* Dovnar-Zapolskij, 1925 (Hymenoptera: Tenthredinidae)
- *Empria pumiloides* Lindqvist, 1968 (Hymenoptera: Tenthredinidae)
- *Endelomyia filipendulae* Lacourt, 1998 (Hymenoptera: Tenthredinidae)
- *Epitheca bimaculata* (Charpentier, 1825) (Odonata: Corduliidae)
- *Euura humeralis* (Audinet-Serville, 1823) (Hymenoptera: Tenthredinidae)
- *Euura pedunculi* (Hartig, 1837) (Hymenoptera: Tenthredinidae)
- *Euura venusta* (Brischke, 1883) (Hymenoptera: Tenthredinidae)
- *Euura vittata* (Audinet-Serville, 1823) (Hymenoptera: Tenthredinidae)
- *Gilpinia frutetorum* (Fabricius, 1793) (Hymenoptera: Diprionidae)
- *Heterarthrus wuestneii* (Konow, 1905) (Hymenoptera: Tenthredinidae)
- *Hilara albitarsis* von Roser, 1840 (Diptera: Empididae)
- *Hilara albiventris* von Roser, 1840 (Diptera: Empididae)
- *Hilara anglodanica* Lundbeck, 1913 (Diptera: Empididae)
- *Hilara coracina* Oldenberg, 1916 (Diptera: Empididae)
- *Hilara discalis* Chvála, 1997 (Diptera: Empididae)
- *Hilara femorella* Zetterstedt, 1842 (Diptera: Empididae)
- *Hilara fuscipes* (Fabricius, 1794) (Diptera: Empididae)
- *Hilara galactoptera* Strobl, 1910 (Diptera: Empididae)
- *Hilara lasiopa* Strobl, 1892 (Diptera: Empididae)
- *Hilara longivittata* Zetterstedt, 1842 (Diptera: Empididae)
- *Hilara lurida* (Fallén, 1816) (Diptera: Empididae)
- *Hilara nigrocincta* de Meijere, 1935 (Diptera: Empididae)
- *Hilara nitidorella* Chvála, 1997 (Diptera: Empididae)
- *Hilara quadriseta* Collin, 1927 (Diptera: Empididae)
- *Hilara splendida* (Straka, 1976) (Diptera: Empididae)

- *Hilara sturmii* (Wiedemann, 1822) (Diptera: Empididae)
- *Hoplocampa cantoti* (Chevin, 1986) (Hymenoptera: Tenthredinidae)
- *Hoplocampa fulvicornis* (Panzer, 1801) (Hymenoptera: Tenthredinidae)
- *Macrophya recognata* (Zombori, 1979) (Hymenoptera: Tenthredinidae)
- *Nematus lucidus* (Panzer, 1801) (Hymenoptera: Tenthredinidae)
- *Nematus umbratus* (Thomson, 1871) (Hymenoptera: Tenthredinidae)
- *Neomessa steusloffi* (Konow, 1892) (Hymenoptera: Tenthredinidae)
- *Pamphilius marginatus* (Audinet-Serville, 1823) (Hymenoptera: Pamphiliidae)
- *Pantala flavescens* (Fabricius, 1798) (Odonata: Libellulidae)
- *Parna apicalis* (Brischke, 1888) (Hymenoptera: Tenthredinidae)
- *Pristiphora abbreviata* (Hartig, 1837) (Hymenoptera: Tenthredinidae)
- *Pristiphora armata* (Thomson, 1863) (Hymenoptera: Tenthredinidae)
- *Pristiphora biscalis* (A. Förster, 1854) (Hymenoptera: Tenthredinidae)
- *Pristiphora depressa* (Hartig, 1840) (Hymenoptera: Tenthredinidae)
- *Pristiphora fausta* (Hartig, 1837) (Hymenoptera: Tenthredinidae)
- *Pristiphora maesta* (Zaddach, 1876) (Hymenoptera: Tenthredinidae)
- *Pristiphora monogyniae* (Hartig, 1840) (Hymenoptera: Tenthredinidae)
- *Pseudodineura fuscula* (Klug, 1816) (Hymenoptera: Tenthredinidae)
- *Rhamphomyia claripennis* Oldenberg, 1922 (Diptera: Empididae)
- *Rhamphomyia crinita* Becker, 1887 (Diptera: Empididae)
- *Rhamphomyia dudai* Oldenberg, 1927 (Diptera: Empididae)
- *Rhamphomyia magellensis* Frey, 1922 (Diptera: Empididae)
- *Rhamphomyia nudipes* Oldenberg, 1927 (Diptera: Empididae)
- *Rhamphomyia sphenoptera* Loew, 1873 (Diptera: Empididae)
- *Rhamphomyia umbripennis* Meigen, 1822 (Diptera: Empididae)
- *Rhamphomyia umbripes* Becker, 1887 (Diptera: Empididae)
- *Sciapteryx byzantina* Benson, 1968 (Hymenoptera: Tenthredinidae)
- *Sterictiphora geminata* (Gmelin, 1790) (Hymenoptera: Argidae)
- *Sterictiphora longicornis* Chevin, 1982 (Hymenoptera: Argidae)
- *Strongylogaster xanthocera* (Stephens, 1835) (Hymenoptera: Tenthredinidae)
- *Tenthredo giraudi* (Taeger, 1991) (Hymenoptera: Tenthredinidae)
- *Tetrodontophora bielanensis* (Waga, 1842) (Collembola: Onychiuridae)
- *Xiphydria picta* Konow, 1897 (Hymenoptera: Xiphydriidae)
- *Xyela curva* Benson, 1938 (Hymenoptera: Xyelidae)
- *Xyela menelaus* Benson, 1960 (Hymenoptera: Xyelidae)
- *Biston achyra* Wehrli, 1936 (Lepidoptera: Geometridae)
- *Phigaliohybernia budashkini* (Kostjuk, 2009) (Lepidoptera: Geometridae)
- *Dyscia conspersaria* ([Denis& Schiffermüller], 1775) (Lepidoptera: Geometridae)
- *Charissa mutilata* (Staudinger, 1878) (Lepidoptera: Geometridae)
- *Acosmetia caliginosa* (Hhübner, [1813]) (Lepidoptera: Noctuidae)
- *Penestoglossa dardoinella* (Millière, 1863) (Lepidoptyera: Psychidae)
- *Hadena tephroleuca* (Boisduval, 1833) (Lepidoptera: Noctuidae)
- *Cydalima perspectalis* (Walker, 1859) (Lepidoptera: Crambidae)
- *Agrochola luteogrisea* (Warren, 1911) (Lepidoptera: Noctuidae)
- *Araeopteron ecphaea* (Hampson, 1914) (Lepidoptera: Noctuidae)
- *Garella musculana* (Erschov, 1874) (Lepidoptera: Noctuidae)
- *Rubrapterus bavius* (Eversmann, 1832) (Lepidoptera: Lycaenidae)

New bird species on the territory of Bulgaria, according to the List of bird species in Bulgaria as of 31.12.2014 (BUNARCO, 2014).

- *Anser brachyrhynchus* (BAILLON, 1833) - Pink-footed goose
- *Charadrius mongolus* (PALLAS, 1776) - Lesser sand plover
- *Lanius isabellinus* (HEMPRICH ET EHRENBERG, 1833) - Isabelline shrike
- *Phylloscopus trochiloides* (SUNDEVALL, 1837) - Greenish warbler
- *Phylloscopus humei* (Brooks, 1878) – Hume's leaf warbler
- *Hippolais languida* (Hemprich & Ehrenberg, 1833) – Upcher's warbler
- *Turdus naumanni* (TEMMINCK, 1820) – Naumann's thrush
- *Passer italiae* (VIEILLOT, 1817) – Italian sparrow
- *Prunella atrogularis* (BRANDT, 1844) – Black-throated accentor
- *Serinus pusillus* (PALLAS, 1811) – Red-fronted serin
- *Emberiza caesia* (CRETZSCHMAR, 1826) – Cretzschmar's bunting

3. Mycota (information by taxonomic groups, populations, updated conservation status)

✓ Assessment of overall biodiversity of fungi (including lichenised fungi or lichens), pseudofungi and myxomycetes (slime mold) in Bulgaria

The latest summary assessment of Bulgarian mycota is in the Red Data Book of Bulgaria (PEEV, 2015), where for the first time together with plants fungi are also included. According to this assessment, the number of fungi, pseudofungi and slimy fungi in Bulgaria is over 4870 species. Later on, as of 2018, another 36 taxa of fungi were reported (including lichens) that are new to the country (ГЬОШЕВА-БОГОЕВА 2015/=GYOSHEVA-BOGOEVA 2015; ASSYOV 2017; ASSYOV & SLAVOVA **2016; GYOSHEVA & NEDELIN 2015; GYOSHEVA ET AL. 2016, 2018;** LUKAVSKÝ & CEPÁK 2014; NEDELIN ET AL. 2016; SHIVAROV 2017; SHIVAROV & LŐKÖS 2015; SHIVAROV ET AL. 2017; STOYKOV ET AL. 2014; TOSHKOVA ET AL. 2015; UZUNOV 2016). Thus, the total number of species of fungi, pseudofungi and slimy fungi in Bulgaria exceeds **4906**.

According to published data, **the largest biodiversity in Bulgaria is observed in the phylum Dikaryomycota**, which includes all fungi (including lichenised fungi) with a dikaryon phase in their development (the former phyla Ascomycota and Basidiomycota). However, this statement is conditional on the different degree of research of the representatives of the different systematic and ecological groups and subgroups in our country.

✓ New localities

In the period 2014 – 2018, besides the already mentioned new species on the territory of Bulgaria, a number of new localities for 242 fungi species from various taxonomic groups were communicated. Their distribution by main habitats and ecological groups is presented in the text below. **As a result of a research of Bulgarian wetlands, new localities of four species of basidiomycetes have been reported in their immediate vicinity. (UZUNOV 2016;** MICHEV **ET AL. 2018). There is a growing interest in fungi, which form fruiting bodies in urbanised territories, in particular in the city parks of Sofia and Plovdiv: 1)** STOYNEVA & UZUNOV (2016) and VOYKOV et al. (2017) report of 52 new species for the territory of *Knyaz Boris Garden* in Sofia, that were supplemented with three new hypogean species by NEDELIN ET AL. (2017); 2) GYOSHEVA & NEDELIN (2015) and GOSPODINOV ET AL. (2018) complement the mycota of *Vrana* Park in Sofia with 73 new species; 3) NEDELIN ET AL. (2017) report about two new species in Loven Park and one new species in Yuzhen Park in Sofia, as well as three

and two new species in Bunardzhika and Lauta parks in Plovdiv respectively. GYOSHEVA & NEDELIN (2015) publish 2 species from the Balchik Botanical Garden. New localities for 120 species of macromycetes are also reported in the works of GYOSHEVA & TZONEV (2015), VELEV ET AL. (2015), GYOSHEVA & NEDELIN (2015), NEDELIN ET AL. (2016), **UZUNOV ET AL. (2016) and GYOSHEVA ET AL. (2018). Two species of micromycetes, developing in cryoseston communities are reported in snow samples in the Central Rhodopes** (LUKAVSKÝ & CEPÁK 2014).

- ✓ **Fungi biodiversity in protected nature territories**

For the territory of Bulgarka Nature Park, 235 macromycetes species were reported (**GYOSHEVA ET AL. 2016**). Two macromycetes were reported for the maintained reserve "Atanasovsko ezero" (MICHEV ET AL. 2018). In the Rhodopes, on the territory of Dupkata reserve 42 macromycetes species were reported (VELEV ET AL. 2015), while for the Kupena reserve they are 78 (VELEV ET AL. 2016). One species each were reported for Tisata reserve (UZUNOV ET AL. 2015) and Chervenata stena (GYOSHEVA & NEDELIN 2015), 2 species are in the maintained reserve Dolna Topchiya and 4 - from the territory of Pirin National Park (GYOSHEVA & NEDELIN 2015).

- ✓ **Species of conservation significance**

In the second edition of the Red List of Fungi in Bulgaria, a total of **215** species of fungi from Dikaryomycota phylum are included (37 Critically Endangered (CR) species, 105 Endangered (EN) species, 40 Vulnerable (VU) species, 14 Near Threatened (NT) species and 19 Data Deficient (DD) Species). The number of macromycetes of conservation significance, included in the Red Data Book of the Republic of Bulgaria (PEEV, 2015) is **149,** of which Critically Endangered are 37, Endangered – 104, and Vulnerable – 8.

In the Rhodopes, in Dupkata reserve, 3 species of macromycetes from the Red List of Fungi in Bulgaria were found, 2 of which are also in the Red Data Book of the Republic of Bulgaria (VELEV ET AL. 2015); in Kupena reserve, 4 species of macromycetes from the Red list of fungi in Bulgaria were established, 2 of which are also in the Red Data Book of the Republic of Bulgaria (VELEV ET AL. 2016).

GYOSHEVA & NEDELIN (2015) publish 5 species from the Red List of Fungi in Bulgaria (3 of which are also included in the Red Data Book of the Republic of Bulgaria) from the following territories: 1 species form Chervenata stena reserve, 1 – from the Dolna Topchiya reserve, 1 – form Pirin National Park, 1 – form Vrana park and 1 – form the Western Rhodopes.

GYOSHEVA & TZONEV (2015) publish for the Danube valley 9 species of macromycetes from the Red List of Fungi in Bulgaria, 3 of which are also in the Red Data Book of the Republic of Bulgaria. From the Black Sea region, 1 species of macromycetes was reported, which is included in the Red List of Fungi in Bulgaria and in the Red Data Book of the Republic of Bulgaria (UZUNOV 2015; MICHEV ET AL. 2018).

In the urbanised territories of the city parks in Sofia and Plovdiv, 8 species of macromycetes from the Red list of fungi in Bulgaria were reported, all of which are also on the Red Data Book of the Republic of Bulgaria (STOYNEVA & UZUNOV 2015; NEDELIN ET AL. 2017; VOYKOV ET AL. 2017).

- ✓ **Alien and invasive species**

The introduction of alien fungal species in our country is mainly through the import of ornamental vegetation for landscaping parks and gardens. Such was the case for the

macromycete species *Mycena seynii* Quél., which develops saprotrophically on Mediterranean pine cones. For Bulgaria, the species was first reported on cones of *Pinus pinaster* Aiton and *Pinus halepensis* Miller (ASSYOV 2017). In terms of vectors carrying micromycetes, seasonal migration of animals is of great importance. Related to this is the establishment of a fatal bat disease in Bulgaria – White-nose syndrome, which is caused by the *Pseudogymnoascus destructans* fungus (Blehert & Gargas) Minnis & D.L. Lindner (TOSHKOVA ET AL. 2015). In our expert opinion, the invasive nature of the latter species, because of its dangerous nature and proven spread in more than one cave, should be taken into account.

- ✓ **Conservation measures and commercially valuable species**

The main threats related to Bulgarian mycota are linked mainly to the economically valuable macromycetes, and more specifically to the excessive harvesting of fruiting bodies of edible mushroom species, mainly for commercial export but also for personal needs of the numerous tourists. This leads to increasing exploitation of wild mushrooms in all mountainous parts of the country. The economically valuable mushrooms in Bulgaria are more than 200 species. Among them are the edible porcini, the golden chanterelle, etc., however the species that have been especially overused in recent years are the truffles. Their market price is very high and, because of this, they have suffered a *predatory* collection by humans. Due to their specific ecology related to the underground formation of fruiting bodies, very often their uncontrolled excavation is linked to a threat to the root system of the trees with which truffles form ectomycorrhiza. All this necessitates the development of a legal framework to regulate the collection and export of these valuable mushrooms, as well as the conservation of the related plant species. In the continued efforts to protect the biodiversity of Bulgarian mycota of primary importance is to ensure maximum protection of their main habitat - the natural forests. According to some authors, they, as well as other habitats in the protected natural territories, especially in the mountains, are threatened by damage caused by snow storms and wind storms, as well as bark beetles. Trees in the natural forest ecosystems are crucial for the existence of all economically valuable wild macromycetes species that form ectomycorrhizas with their roots.

There are economically valuable species among micromycetes in Bulgaria - of particular interest are micromycetes that develop on deli foods, including the unique Bulgarian green cheese (UZUNOV & STOYNEVA 2017). Protecting their genetic resources is of particular importance to the country.

Lichens (lichenised fungi) are very slowly growing organisms and disturbances in their coenoses recover very slowly. Sometimes this process may take decades. One of the most important conditions for the conservation of lichen biodiversity is the conservation of specific biotopes inhabited by lichens. Lichen groups and communities are most often influenced by changing their habitat substrates - destruction of tree species (illegal logging, clearings for ski lifts, etc.), trampling - with respect to epigenetic species (near huts, recreational facilities, ski lift stations, hiking trails, etc.), anthropogenic load - occurrence of nitrophilic species in places with excessive anthropogenic load. In addition, it is a common knowledge that representatives of many lichenised fungi are also highly sensitive to air pollution, hence general measures to protect air quality are required.

4. Habitat diversity

In the Bulgarian part of the EU ecological network Natura 2000 as of the end of 2018, 92 types of natural habitats were identified and characterised, or 39.66 % out of a total of 232

habitat types currently reported and adopted in the European Union (Annex I of Directive 92 / 43/EEC). Habitats found in Bulgaria have a characteristic distribution by main categories and groups of natural formations. The largest part belongs to the category "Forests" - 27, or 33.75% of this group in Europe. Next in number are those belonging to the category "Natural and semi-natural grassland formations" - 18, or 58.06%. Third rank the habitats in the category "Coastal and halophytic habitats" - 12, or 42,86%. Habitats of the category "Temperate Heathlands and Shrubs" - 8, or 66% of those in Europe, rank also relatively high at the national level. The remaining types are distributed as follows: "Rocky habitats and caves" - 9, or 64,29%; "Freshwater Habitats" - 6, or 31.58%; "Coastal Sand Dunes and Continental Dunes" - 6, or 28.57%; "Raised bogs and mires and fens" - 4, or 33.33% and "Sclerophyllous scrub (matorral)" - 2 or 15.38%. According to the Habitats Directive (92/43) and the Interpretation Manual - EUR 28, the priority nature habitats in Bulgaria are 28, or 30.44% of the total number of habitats that are protected in the NATURA 2000 network in the country. They represent 39.44% of the priority habitats in the European Union.

Further information regarding Article 17 of the Habitats Directive can be found in Bulgaria's national reporting summary for the period 2014-2018:
https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-national-summary-dashboards/general-information-on-habitats-and-species

It should be noted that in line with the reporting under Article 17 of the Habitats Directive for the period 2014-2018, two new natural habitats for Bulgaria have been reported, which is a contribution to the conservation of biodiversity. These are nature habitat code 8150 **Medio-European upland siliceous screes** and priority nature habitat with code 8160 *** Medio-European calcareous scree of hill and montane**.

5. Biological resources in Bulgaria

✓ Forests, non-timber forest resources

As of 31.12.2018, woodlands in Bulgaria occupy 4 257 200 ha, which constitutes 38,4% of the country's territory. Of these, 3 893 396 ha (91.45%) are forests. Compared to 2013, the total area of woodlands in the country has increased by 77 079 ha (1.98%), and the area of forested territories – by 57 491 ha (1.35%). Main factors that favour the dynamics of this process are inventarisation of forests that were never inventoried and self-forestation between the two inventarisations in certain forests of treeless forest areas or abandoned lands outside forest territories.

Compared to 2013, by 31.12.2018 the coniferous forests had decreased by 11 823 ha and constitute 28,82% of the total afforested area of forest territories. In the period 2013–2018, the area of deciduous high-forest woodland has increased by 34 081 ha, coppice conversion forests - by 58 574 ha and low-stem forests - by 1 427 ha. The deciduous forests (deciduous high-stem, coppice conversion and low-stem forests) cover a total of 71.18% of the forested area in the country. The following trends have been observed:

- In the period 2014-2018 were created as a result of afforestation on an average annual basis on an area of 1 790.0 ha (the largest area was covered by the afforestation in 2016 - 2 469.6 ha and the smallest in 2014 - 1509,9 ha). It should be noted that part of the afforestation (an average of 516.0 ha per year) during this period was done in order to protect the soil from water erosion.

- Reduction of the coniferous forests and coniferous plantations. It is expected that their area will be further reduced because of several factors: (1) the process of natural regeneration, which favours deciduous tree species; (2) secondary succession accompanying the resumption of areas occupied by coniferous plantations, that are mature and ready for cutting; (3) impact of forest fires and subsequent regeneration, mainly with deciduous species.

Regarding the **non-timber forest resources,** in the period 2012–2017 there was a reduction of the amount of non-timber products harvested from state forests – wild mushrooms, berries, herbs, rose hips, forest seeds and forest saplings. During the last year, this trend changed and the quantities of non-timber forest products harvested reaches numbers that are close to the ones from 2012 (Table 11.).

Table 11. Goods obtained from the state-owned forest territories in the period of 2012–2017

Product type	Unit	2012	2013	2014	2015	2016	2017
Nuts	t	26 825	35 374	14 894	553	5 969	11 958
Wild fungi	kg	237 804	26 549	21 213	13 109	9 287	10 792
Forest fruits	kg	346 766	138 484	121 125	219 172	154 860	122 011
Tilia flowers	kg	399 071	447 170	346 724	340 225	348 069	364 667
Rosehips	kg	38 830	23 500	19 100	17 530	11 220	72 070
Other herbs	kg	437 596	423 263	276 375	371 842	316 455	406 323
Forest seeds	kg	27 094	23 880	23 783	47 303	42 732	56 171
Forest saplings	pcs.	15379000	10026497	10484680	9942000	12536000	11536640
Decorative saplings	pcs.	34 482	52 759	34 313	31 601	24 905	211 166

Source: EFA

✓ **Game resources**

There are 42 game species on the territory of Bulgaria – 16 mammals and 26 bird species (Table 12.). In terms of its number of game species Bulgaria occupies a leading position in Europe. In 2017, the following number of game species have been recorded: red deer - 29 331, fallow deer - 9231, roe deer - 116441, wild boar - 99 729, mouflon - 4219, western capercaillie - 3229, grey partridge - 324 265 and alectoris - 18 780. Compared to data until 2011/2012, it is obvious that the populations of 8 species have not increased, 11 species have decreased, 10 species remain stable and for 22 species there is no official data published. Game populations of the large game species have increased in the period of 2012 - 2018 in all game enterprises in the country. Slow but steady growth is reported for part of the small game species and for the rest (common magpie, hooded crow and western jackdaw) a significant decline in populations is established. The health status of the game species in Bulgaria have been characterised as good.

Table 12. Game species in Bulgaria and their status (2011/2012-2018). Migration status: R – local population; M - local population, seasonal migration; P - part of the population conducts seasonal migrations; + increasing population; - decreasing population; = stable population

	Species	Migration status	Number, in 2017	Number, in 2018	Trend as of 2017
	Mammals				
1	*Cervus elaphus*	R	27915	29335	+
2	*Dama*	R	8544	9231	+
3	*Capreolus*	R	110948	116533	+
4	*Ovis ammon musimon*	R	4043	4219	=
5	*Sus scrofa*	R	94868	99839	+
6	*Lepus europeus*	R	350781	351742	+
7	*Sciurus vulgaris*	R			
8	*Martes foina*	R	20455	20502	=
9	*Putorius putorius*	R	7985	7741	–
10	*Meles meles*	R	19716	21065	+
11	*Nyctereutes procyonoides*	R	75	53	–
12	*Canis lupus*	R	2580	2641	+
13	*Canis aureus*	R	49674	50226	+
14	*Vulpes vulpes*	R	43525	44074	+
15	*Ondatra zibethica*	R			
16	*Myocastor coypus*	R	3955	3039	–
	Birds				
17	*Columba palumbus*	P			
18	*Streptopelia turtur*	M			
19	*Streptopelia decaocto*	R			
20	*Coturnix coturnix*	M			
21	*Scolopax rusticola*	P			
22	*Gallinago gallinago*				
23	*Anas platyrhynchos*	P			
24	*Anas Penelope*	M			
25	*Anas clypeata*	M			
26	*Anas querquedula*	M			
27	*Anas crecca*	M			
28	*Anas acuta*	M			
29	*Aythia fuligula*	M			
30	*Fulica atra*	P			
31	*Anser albifrons*	M			
32	*Perdix perdix*	R	332751	324282	–
33	*Alectoris graeca graeca*	R	10596	10997	+
34	*Alectoris chukar*	R	7719	7823	+
35	*Phasianus colchicus*	R	163166	171871	+
36	*Phasianus colchicus mongolicus*	R			
37	*Tetrao urogallus*	R	3249	3229	–
38	*Pica pica*	R	79677	84176	+
39	*Corvus cornix*	R	45455	48774	-
40	*Garrulus glandarius*	R			
41	*Corvus monedula*	R	17291	18568	-
42	*Sturnus vulgaris*	R			

Source: EFA

- ✓ **Fish resources (fishery and aquaculture)**

Over 60 species of Black Sea and freshwater fish as well as other aquatic organisms (mussels, crabs, snails) are used for commercial and recreational fishing in the country. Commercial fishing is done in the Black Sea, the Danube River and inland waters (reservoirs). The largest share is the catches in inland waters (reservoirs) - Table 15.

The catch and production of fish during the period from 2015 to 2018 differs significantly, displaying an overall average annual increase from 9747.2 tonnes to 23886.4 tonnes or an increase of 145.0% compared to the previous period from 2009 to 2012. This increase is due mainly to the production of fish in inland reservoirs.

Commercial and recreational fishing

It should be noted that as of 2012 commercial fishing in the inland water bodies in Bulgaria **is not permitted**.

In 2018, the total commercial catch of fish and other aquatic organisms in the country amounts to 8 602.4 tonnes (Table 17), of which 8 546.7 tonnes - in the Black Sea and 53.7 tonnes - in the Danube River. The total quantity is 1% above the 2017 levels - with catches in the Black Sea increasing by 0.9% and in the Danube river - by 4.1%.

During 2018, a total of 4 403.9 tonnes of marine fish were caught, an increase of 9.9% compared to the previous year. Traditionally, the largest share is the catch of Sprattus sprattus sulinus, amounting to 3 187.8 tonnes, or 3.2 tonnes more than in 2017. Among the other Black Sea species, a significant share belongs to Mullus surmuletus – 594,6 tonnes, Pomatomus saltatrix – 260,7 tonnes, Trachurus mediterraneus ponticus – 196,7 tonnes and Psetta maxima – 55,5 tonnes.

Rapana catches, accounting for the largest share of catches of aquatic organisms in the Black Sea (85.1% in 2018), are down by 2.8% compared to the previous year. At the same time, catches of Mytilus galloprovincialis increased by 1.3 tonnes, reaching 12.5 tonnes, while that of Mya arenaria declined by 26.7% to 600.5 tonnes. Crangon sand shrimp accounts for 1 tonne or 30.7% less on an annual basis.

Table 13.Total catch of fish and other aquatic organisms (in tonnes) in Bulgaria for the period 2015–2018

	2015	2016	2017	2018	Variation 2018/2017
Total catch in the Black Sea, including:	**8 745,2**	**8 540,0**	**8 467,1**	**8 546,7**	**+0,9%**
- marine species	4 490,2	4 473,9	4 007,1	4 403,9	+9,9%
- anadromous species, Pontic shad	17,7	15,6	10,3	10,8	+4,4%
- rapana, mussels, shrimps	4 237,3	4 050,5	4 449,6	4 132	–7,1%
- other species	-	-	-	-	-
Total catch in the Danube River, including:	**96,96**	**52,21**	**53,52**	**55,74**	**+4,1%**
- freshwater fish	85,6	50,2	49,1	54,3	+10,6%
- anadromous species, Pontic shad	0,6	1,1	0,5	1,0	+100,0%
- other water organisms	10,7	0,9	4,0	0,5	–87,5%
Fish produced in fish farms in the country	**13 561**	**15 432**	**16 237**	**15 758**	**–3,0**
Total catch and produced fish and other species in the country	**22 403,16**	**24 024,21**	**24 757,62**	**24 360,44**	**–1,6**

Source: EAFA

The main species that were subject to commercial fishing in the Danube river and the Black Sea in 2018 are presented in Table 14 below.

Table 14. Catches by type of fish/ aquatic organism and other aquatic organisms from the Danube River and the Black Sea for commercial fishing in 2018

№	Fish species / aquatic organisms	Quantity (in tonnes)
A. Danube River		
1	Rutilus ritilus	0,032
2	Chalcalburnus chalcoides	0,423
3	Ctenopharingodon idella	1,909
4	Hypophthalmichthys molitrix	3,680
5	Barbus barbus	11,585
6	Sander lucioperca/Stizostedion lucioperca	2,337
7	Zingel zingel	0,007
8	Caspialosa pontica/Alosa pontica	1,016
9	Lota lota	0,028
10	Vimba vimba	3,307
11	Leuciscus idus	0,062
12	Ballerus /Abramis ballerus, Ballerus sapa/	0,064
13	Abramis brama	5,224
14	Aristhichthys nobilis	5,003
15	Aspius aspius	1,112
16	Leuciscus cephalus	0,023
17	Perca fluviatilis	0,022
18	Pelecus cultratus	0,002
19	Chondrostoma nasus	2,234
20	Sillurus glanis	4,416
21	Carassius sp,	3,785
22	Alburnus alburnus	1,572
23	Scardinius erythrophthalmus	0,082
24	Cyprinus carpio	6,870
25	Esox Lucius	0,477
26	Other species	0,470
Total for the Danube River		55,742
B. Black Sea		
27	Atherina spp.	15,734
28	Mullus surmuletus	0,572
29	Mya arenaria	600,510
30	Polychaeta	0,016
31	Belone belone	3,327
32	Liza saliens	3,438
33	Psetta maxima	55,506
34	Caspialosa pontica/Alosa pontica	10,809
35	Mugil soiuy	0,534
36	Pomatomus saltatrix	260,650
37	Margaritifera margaritifera	0,250
38	Anodonta	1,680
39	Dasyatis pastinaca	1,338
40	Raja clavata	13,122
41	Lophius piscatorius	0,016

42	Solea nasuta	0,003
43	Mugil cephalus	4,404
44	Leander spp.	0,633
45	Eriphia verrucosa	0,180
46	Sarda sarda	22,907
47	Platichthys flesus luscus	0,187
48	Liza aurata	0,606
49	Gobiidae	25,138
50	Crangon sp.	0,991
51	Rapana spp,	3 515,392
52	Sardina pilchardus	0,042
53	Trachurus mediterraneus ponticus	196,687
54	Spicara spp.	0,006
55	Engraulis encrasicholus ponticus	4,757
56	Sprattus sprattus sulinus	3 187,799
57	Mytilus galloprovincialis	12,455
58	Mullus barbatus ponticus	594,640
59	Squalus acanthias	10,082
60	Merlangius merlangus euxinus	2,261
61	Other species	0,047
Total for the Black Sea		8 546,719
Total for the Danube River and the Black Sea		8 602,400

Source:EAFA

Aquaculture

The total number of active fish farms at the end of 2018 was 764, up from 707 the previous year. Of these, 730 are for freshwater aquaculture and 34 are for marine aquaculture. The number of active registered aquaculture producers continues to increase because of the ban on commercial fishing in inland water bodies, which entered into force in August 2012, and the related re-registration. Production of fish species that are bycatch in extensive and semi-intensive warmwater farms has been reported – *Abramis brama*, *Alburnus alburnus*, *Perca fluviatilis*, *Carassius gibelio and Scardinius erythrophthalmus*. These species are not subject to targeted breeding in aquaculture production.

In 2018, the total production of aquaculture (stocking material, fish and other aquatic organisms for consumption) in the fisheries amounts to 15 758,08 tons (Table 15) or about 3% less than the previous year. Decrease is reported in the production of both of stocking material and of fish for consumption.

Table 15. Production of stocking material, fish and other aquatic organisms in fish farms (in tons)

№	Name	Stocking material		Fish for Consumption		Total quantity	
		2017	2018	2017	2018	2017	2018
1	*Salmo trutta fario*	4,80	7,80	17,34	6,39	22,15	14,19
2	*Oncorhynchus mykiss*	1 014,95	845,72	2 213,02	3 828,14	3 227,96	4 673,86
3	*S. fontinalis*	0,20	0,41	10,06	0,41	10,26	0,81
4	*Esox lucius*	1,97	2,09	23,57	9,91	25,53	11,99
5	*Squalius cephalus*	0,10	0,00	0,04	0,56	0,14	0,56

6	*Aspius aspius*	0,00	0,00	0,00	0,50	0,00	0,50
7	*Tinca tinca*	0,17	2,97	5,39	3,14	5,56	6,11
8	*Alburnus alburnus*	0,08	0,00	5,79	2,79	5,87	2,79
9	*Abramis brama*	0,05	0,00	27,09	31,72	27,14	31,72
10	*Vimba vimba*	0,00	0,00	0,00	0,50	0,00	0,50
11	*Chondrostoma nasus*	0,00	0,00	0,13	0,13	0,13	0,13
12	*Cyprinus carpio*	667,61	659,56	3 705,68	3 897,48	4 373,28	4 557,04
13	*Carassius carassius*	0,00	0,00	0,30	0,45	0,30	0,45
14	*Carassius gibelio*	3,48	3,62	423,80	220,13	427,28	223,74
15	*Hypophthalmichthys molitrix*	22,75	4,55	209,29	184,38	232,04	188,93
16	*Aristhichthys nobilis*	154,62	333,37	2 389,58	1 708,29	2 544,20	2 041,66
17	*Ctenopharingodon idella*	45,03	79,20	291,39	212,20	336,42	291,40
18	*Mylopharyngodon piceus*	0,00	0,00	2,50	1,52	2,50	1,52
19	*Sillurus glanis*	17,30	22,51	197,64	222,90	214,94	245,41
20	*Ameiurus nebulosus*	0,00	0,21	19,00	19,42	19,00	19,63
21	*Sander lucioperca*	4,20	4,17	70,59	48,17	74,79	52,34
22	*Perca fluviatilis*	0,05	0,01	1,44	1,91	1,49	1,92
23	*Acipenser ruthenus*	0,08	0,00	2,00	2,18	2,11	2,18
24	*Huso huso*	0,00	0,00	11,42	17,37	11,42	17,37
25	*Acipenser stellatus*	0,00	0,00	1,01	2,36	1,01	2,36
26	*Acipenser gueldenstaedtii*	3,12	10,89	129,60	247,52	132,72	258,41
27	*Anguilla anguilla*	0,00	0,00	40,01	35,00	40,01	35,00
28	*Mytilus galloprovincialis*	132,00	0,00	3 159,58	2 531,12	3 291,58	2 531,12
29	*Other species*	0,00	0,00	2,24	2,05	2,24	2,05
30	*Salmo salar*	17,16	0,88	4,29	0,00	21,45	0,88
31	*Polyodon spathula*	2,50	6,04	67,71	59,71	70,21	65,74
32	*Green algae*	0,00	0,00	0,05	0,14	0,05	0,14
33	*Scardinius erythrophthalmus*	0,06	0,00	10,23	7,25	10,29	7,25
34	*Rutilus rutilus*	0,00	0,00	0,70	0,73	0,70	0,73
35	*Clarias gariepinus*	0,00	0,63	908,97	280,23	908,97	280,86
36	*Acipenser baeri Brandt*	48,70	0,35	87,96	108,52	136,66	108,87
37	*Astacus leptodactylus*	0,33	0,60	13,82	4,65	14,14	5,25
38	*Huso huso* × *Acipenser ruthenus*	0,00	0,00	3,68	4,43	3,68	4,43
39	*Other hybrids from the Sturgeon family*	0,31	0,11	38,08	64,66	38,38	64,77
40	*Tilapia*	0,00	0,35	0,00	3,14	0,00	3,49
	Total	**2 141,60**	**1 986,02**	**14 094,99**	**13 772,06**	**16 236,60**	**15 758,08**

Source: EAFA

The total reported production of stocking material in fish farms in 2018 was 1 986.02 tonnes. This is 7.3% less than the previous year, mainly as a result of a reduction by 197 tonnes of the production stocking material from rainbow trout (down to 845.72 tonnes) and Siberian sturgeon (down to 0.35 tonnes).

There is a significant decrease in the production of stocking material from silver carp (*Hypophthalmichthys molitrix)* and Atlantic salmon (*Salmo salar*). No production of stocking material from Mediterranean mussel (*Mytilus galloprovincialis*) was reported in 2018, while in 2017 it was 132 tonnes. On the other hand, a significant increase was reported in the production of stocking material from bighead carp (*Aristhichthys nobilis*) – up to 333,37 tonnes and grass carp (*Ctenopharyngodon idella*) – up to 79,20 tonnes.

Traditionally, the largest share has the production of fish for consumption - rainbow trout (*Oncorhynchus mykiss*), carp (*Cyprinus carpio*) and bighead carp (*Aristhichthys nobilis*). The main species of marine aquaculture grown in the coastal waters of Bulgaria is the Mediterranean mussel (*Mytilus galloprovincialis*). In 2018, its production for consumption decreased by 19.9% compared to the previous year - to 2 531.12 tonnes. The production of Danube crayfish (*Astacus leptodactylus*) was also less, by 66,4%. Aquaculture production is expected to increase in 2019. The development of the sector is supported by the construction of new farms, as well as the modernisation and expansion of production facilities.

6. Genetic resources

The negative impact on biodiversity from agriculture is a well-known fact and is mainly because of two trends:

- Current agricultural policies focus to a greater extent on intensive agricultural production than on agricultural practices that provide more environmental public goods, such as biodiversity;
- Desertification of rural areas with specific infrastructural constraints, limited employment and demographic changes.

As a result, the plant diversity in the farms is reduced because of the implementation of an intensive model and monocultural agriculture, or there is loss of valuable plant species because of the desertification and marginalisation of typical agricultural areas: meadows, pastures, home vegetable gardens. The result is loss of agro-biodiversity, reduction of genetic diversity, and disturbance of the ecological balance in the agricultural ecosystems. Undoubtedly, the administrative support must be changed in such way that the state aid systems favour those farmers who are keepers of the rural areas, of the natural diversity of species and habitats that ensures their conservation.

✓ Genetic resources in agriculture

The activities of the Plant Genetic Resources Programme at the **IPGR** are focused in several directions: collection, assessment, storage, documenting and sustainable use of original specimens originating in the country. Currently, Bulgaria is a party to the International Convention on Biodiversity, as well as a partner in the European Biodiversity Programme. As mentioned above, the plant diversity conservation activities are part of the National Biodiversity Conservation Plan. The National collection of plant genetic resources is part of the European e-catalogue EURISCO (http://eurisco.ecpgr.org). The Gene Bank of Sadovo has been nominated by the European Cooperative Programme for Plant Genetic Resources (ECPGR) as a contact centre for Bulgaria. This protects the right of participation in EURISCO of all institutes in the country, which can join the system through the nominated centre. The

Bulgarian National Inventory database includes passport information for 69,336 specimens, of which 17,823 (25%) are of Bulgarian origin, listed under FAO / Bioversity descriptor. Currently, the *ex situ* collections of IPGR have been joined by the collections of DZI Gen. Toshevo and IREMC - Kazanlak. According to the information at EURISCO, the Bulgarian PGR collection is the seventh largest in Europe, after the UK, Russia, Germany, Ukraine, Spain and Poland, accounting for 3.5%. As regards taxonomic composition, specimen belong to 532 genera and 1 927 plant species. The largest share in the Bulgarian PGRs collection is for the following families: *Triticum, Hordeum, Zea, Phaseolus, Avena, Pisum, Linum, Arachis, Capsicum*.

In line with an agreement signed in 2009, IPGR – Sadovo participates in the European Genebank Integrated System AEGIS (http://aegis.cgiar.org). As of 2018, the Bulgarian collection in the AEGIS database includes information about 341 local specimens.

In line with its responsibilities as a National Coordinator, every year IPGR prepares and submits information as per an international descriptor about the updated during the previous year of the database of FAO WIEWS (http://www.fao.org/wiews).

The total size of the collection at the National Genebank, maintained under medium and long-term controlled storage conditions is 64 916 seed samples of which 15 990 are of Bulgarian origin. The available gene pool is enriched on an annual basis, its preservation is controlled and it can be sent to national and international research centres upon request. Enrichment of the collections is achieved through field trips to specific regions depending on the tasks of the projects implemented. The main focus of the collection are native varieties and populations, wild species with genetic resource potential, wild relatives of cultivated plants, rare, endangered and endemic species, and alien varieties with valuable production qualities. Over the years, field trips have collected a wealth of information for on-farm storage of some of old varieties and local forms of field and vegetable crops. A GPS data description of the settlements was made, lists of addresses of farmers supporting local resources were drawn up and a characterisation of the collected material was carried out.

The successful preservation of original seeds germplasm at the National Genebank is a reason for scientists from other institutes to the AA and BAS to provide their varieties and lines, subject to regulated access and respecting the intellectual property rights of the experts performing the selection, as well as seeds from rare and endangered species for long-term storage.

The provision of seed specimens at home and abroad is carried out in accordance with the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the Nagoya Protocol.

Conservation of the unique Bulgarian specimens in crisis situations and natural disasters necessitates their duplication in a genebank abroad. On the recommendation of ECPGR and Biodiversity International, on 21 February 2014, an agreement was signed between IPGR - Sadovo and the Ministry of Agriculture and Food of the Kingdom of Norway for the safe duplication of small seed samples from the National Genebank of Bulgaria at Svalbard Global Seed Vault. The first consignment of unique Bulgarian specimens was sent on 06.10.2014 and included a total of 933 samples of 14 plant species.

✓ **Genetic resources in stock breeding**

Conservation of the available genetic resources of livestock species in Bulgaria is of key importance for maintaining the overall genetic diversity in the various species of productive animals.

Executive Agency "Selection and Reproduction in Animal Breeding" and the breeding organisations in the country control 28 autochthonous breeds, which are also subject to support under the current cycle of the Rural Development Programme for the period 2007-2013 under measure 214. Agri-environment payments of the Conservation of endangered local breeds strand and under measure 10. Agro-ecology and climate of the new Rural Development Programme. **Breeds eligible for support under measure 10 of the RDP are**: Bulgarian Rhodope cattle, Bulgarian brown cattle, Bulgarian red cattle, Bulgarian murrah, Northeast Bulgaria thin fleece sheep, Karnobat thin-fleece sheep, Thracian thin-fleece sheep, white Bulgarian milk sheep and four breeds of horses - Eastern Balkan horse, Danube horse, Pleven horse and Bulgarian Heavy Draft horse, as well as the Danube white pig. The dynamics of the number of some of the autochthonous breeds in Bulgaria for the period 2014-2018 is presented in Table 16.

Table 16. Dynamics of the number of animals from the autochthonous breeds in Bulgaria in the period 2014–2018

Breed	2014	2015	2016	2017	2018
Cattle and bulls					
Rhodopi shorthorn cattle	1247	1788	2494	3141	3551
Bulgarian brown cattle				31	899
Bulgarian red cattle				11	10
Sheep					
Local Stara Zagora sheep	683	639	777	872	834
White Maritsa sheep	467	672	712	684	886
Local Karnobat sheep	253	820	1062	1274	1656
Sakar sheep	2816	1798	1676	1955	2238
Horses					
Pleven horse	70	95	96	96	87
Pigs					
East Balkan pig	1344	1227	1114	1234	1068
Danube White pig	3702	304	795	800	912

Source: MAFF, EASRL

The horses of the **Pleven horse** breed were 70 in 2014, and four years later the herd increased to 87 animals. The number of animals from the **Local Stara Zagora sheep** breed increased in the period 2014 - 2018 from 683 to 834. An increase was also registered in the national herd of **White Maritsa sheep**, with animals increasing from 467 to 886 over the reporting period. The situation with the **Local Karnobat sheep** is very good. Over the past five years, the number of animals has increased from 253 to 1656. A decrease in the herd has been observed with the **Sakar sheep**. There were 2816 animals from tis breed in 2014, while in 2018 they dropped to 2238.

In 2017, **measures were undertaken to restore two national breeds**, one of which is the **Bulgarian brown cattle**. During the reporting period, the first 31 animals of this breed were registered in Bulgaria in 2017. A year later, they were already 899. The other breed is the

Bulgarian red cattle. A breeding plan was developed, which continues to run during this year, with the herd of Bulgarian red cattle having 11 animals in 2017 and 10 animals in 2018.

The Danube white pig is considered in real threat of extinction. The national herd of this breed had 3702 animals in 2014; in 2017 their numbers were reduced down to 800 and in 2018 there is a slight increase - 912 animals.

- ✓ **Genetic resources in microbiology**

As of the end of 2018, the Institute **"National Bank for Industrial Microorganisms and Cell Cultures"** (NBIMCC) contains 7382 strains and cell cultures, preserved in 94785 samples (89756 are lyophilized, and 5029 – frozen in liquid nitrogen). The oldest lyophilized ampoule dates back to 1948.

The microbiological diversity at NBIMCC includes:

- Bacteria (incl. plasmid-containing) – 5347 strains, belonging to over 400 species of over 100 genera;
- Actinomycetes – 494 strains, belonging to nearly 200 species of 27 genera;
- Yeasts – 759 strains, belonging to 170 species of over 80 genera;
- Moulds – 497 strains, belonging to over 180 species of 85 genera;
- Plant viruses – 104 strains, belonging to 21 species of 10 genera;
- Animal viruses – 62 strains (44 animal and 18 human), belonging to 31 species of 15 families;
- Animal cell cultures – 119, of which 90 animal and 29 human. 43 of them are hybridomas.

NBIMCC maintains a reference collection of 100 control strains of bacteria, yeasts and mould, which have WDCM Reference Strain Catalogue number and are recommended by ISO 11133/2014 for control of nutrient media, food and water. There are also many other strains required for application of microbiological standards, for verification and validation of microbiological methods for analysis of disinfectants, cosmetic products, antibiotics, etc., as well as those required by the European Pharmacopoeia. NBIMCC stores also a number of type-specific or study crops. All these microorganisms are certified as having passed quality control for cellular and colonial morphology, biochemical profile with commercial polymicrotests and other identification systems.

The number of microbiological objects deposited in connection with copyright certificates and patent procedures is 864. NBIMCC is one of the 47 international depositories under the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure in the world and still the only one on the Balkan Peninsula.

In 'Gene Pool Bulgaria' the strains from Bulgarian depositories are 2160, of which 2051 are isolated from Bulgarian biotopes, and the rest are from Antarctica, Arctica, Jordan, Guinea, etc. The strains deposited as a result of scientific research are 238.

NBIMCC offers public services for the provision of microbiological specimens and certification.

B. Threats to biodiversity in Bulgaria and drivers for change

1. Deterioration, fragmentation and loss of habitats

Habitat deterioration is any form of damage affecting a habitat. The Republic of Bulgaria takes into account all impacts on the habitat environment (location, water, ambient air, soil). In case these impacts lead to a decrease in the values of the habitat parameters compared to the previous values, a deterioration may be considered to have occurred. In order to assess the degree of such deterioration, a comparison can be made with the **conservation objectives** of the site and its environmental characteristics, due to which it has been designated as a protected area. These ecological characteristics for **habitat types** are noted in the Standard Data Form through the following parameters (Commission Implementing Decision of 11 July 2011 concerning a site information format for Natura 2000 sites (notified under document C(2011) 4892) (2011/484/EU) OB L 198, 30.7.2011.):

- ✓ degree of representativity of the habitat gives a measure of 'how typical' a habitat type is;
- ✓ area of the site covered by the natural habitat type in relation to the total area covered by that natural habitat type within the national territory;
- ✓ degree of conservation of the structure and functions of the natural habitat type, concerned and restoration possibilities.

The disturbance of the species subject to conservation in the respective area is assessed by estimating the *favourable conservation status of the species*, based on the following factors: **species dynamics data, natural range and sufficiently large area of the habitat**. This also applies in the case of habitats of species, such as wetlands for birds. Any damage to any of the above-mentioned factors, which are necessary for the long-term conservation of the habitats and habitats of the species, is regarded as a deterioration of the status, for example the deterioration may be caused not only by the physical reduction of the habitat size but also by degrading its quality as a breeding, feeding, resting place or intermediate zone for the species.

It should be noted that threats to biodiversity are related to deterioration, fragmentation and loss of habitats in Bulgaria, which are mainly because of:

- ✓ change in land use for construction of roads, settlements, industrial and commercial sites, energy production, etc.;
- ✓ changes in the hydrological regime, for example: drainage of wetlands, hydropower plants;
- ✓ pollutants or soil conditioners in semi-natural habitats, which is associated with invasion of invasive/ruderal species;
- ✓ tourist activities that have a negative impact, both in terms of cumulative effect and as a direct disturbance to species;
- ✓ invasion of invasive alien species displacing native species;
- ✓ climate change, which promotes the development of thermophilic species at the expense of cold-hardy species, especially in the high mountainous areas of the country, etc.

- **Freshwater and brackish habitats**

Mapping of the ecosystem types resulted in the identification of the following:

- ✓ **Wetlands** – the total number of mapped polygons with inland wetlands is 285, of which one is subtype 701 – Transition mires and quaking bogs (EUNIS code D2), six are subtype 702 – Alkaline swamps and marshes (EUNIS code D4) and 278 are subtype 703 – Beds of large sedges normally without free-standing water (EUNIS code D5);
- ✓ **Freshwater ecosystems** – mapping freshwater ecosystems covers the whole territory of the country outside Natura 2000 areas, over 5700 sites of standing freshwater ecosystems with a total area of 456 km^2.

Due to the lack of significant tide in the Black Sea, Estuaries (EUNIS - X1) and Brackish coastal lagoons (EUNIS - X3) are outside the scope of marine ecosystems and are included in the freshwater habitats.

Habitat changes in inland water bodies of Bulgaria as a result of human activity (existing plans for construction of recreation facilities, spa centres, golf courses and other infrastructure facilities such as Hydroelectric Power Plants, small HPPs, etc.). along the banks and shores of water bodies would in practice turn reservoirs that are of key importance for many wild birds into inaccessible places. Hydromorphological alterations and water flow regulation are also important reasons for failure to achieve good ecological status of surface water bodies.

- **Marine habitats**

The proposed typology of marine ecosystems (Level 1 and Level 2) corresponds to the ecosystem classification of „Mapping and assessment ecosystems and their services " (MAES, 2013). Level 3 of the typology of marine ecosystems is defined according to the classification of the European Nature Information System (EUNIS). For the purposes of a more detailed typology of marine ecosystems (level 3), the EUNIS Level 2 classification units were adopted. A total of 8 marine subtypes were selected. They are part of EUNIS groups A, B and X: A1, A2, A3, A4, A5, A6, B3 and X2. The typology of marine ecosystems reduces the three-dimensional structure of the ocean to the two dimensions of the seabed habitats (benthic habitats), transferring the third dimension - the water column (pelagic habitats), to deep areas. (MAES, 2013).

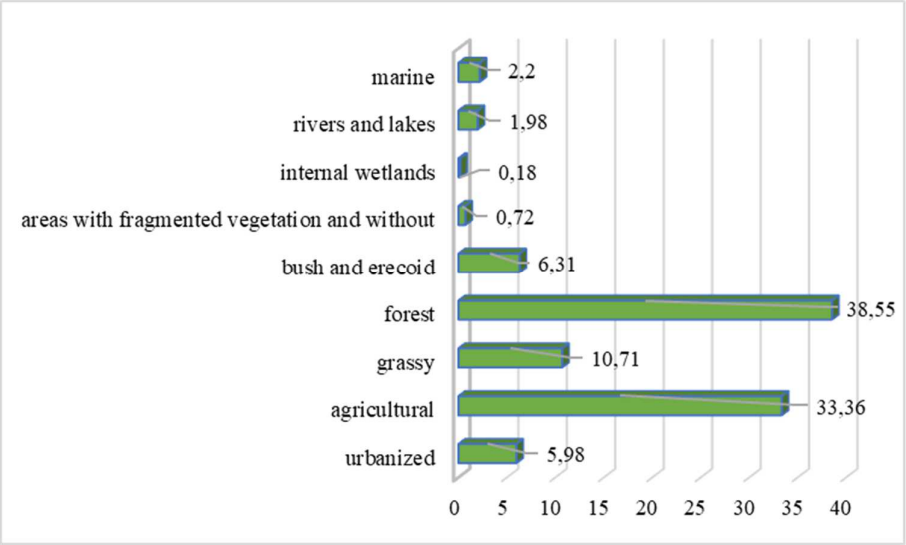
Main threats for marine habitats are pollution, import of nutrients (eutrophication) in the water, introduction of non-native species, destructive fishing practices, construction of coastal protection facilities, etc. Some of the harmful effects of climate change are already evident both for the marine and for the terrestrial and freshwater ecosystems, and there is a serious risk these will become worse in the future.

- **Terrestrial habitats**

Terrestrial habitats include: urbanized ecosystems, agricultural ecosystems, grassland ecosystems, forests and forest territories, shrubs ecosystems, areas with diffuse vegetation and wetlands (Level 2 types of ecosystems).

Figure 17 shows that the predominant ecosystem type in the country is the forest type – 38.55%, followed by agricultural – 33.36%, while scattered vegetation and no vegetation type is the least prevailing – 0.72%.

Figure17. Distribution of ecosystem types by area in the country



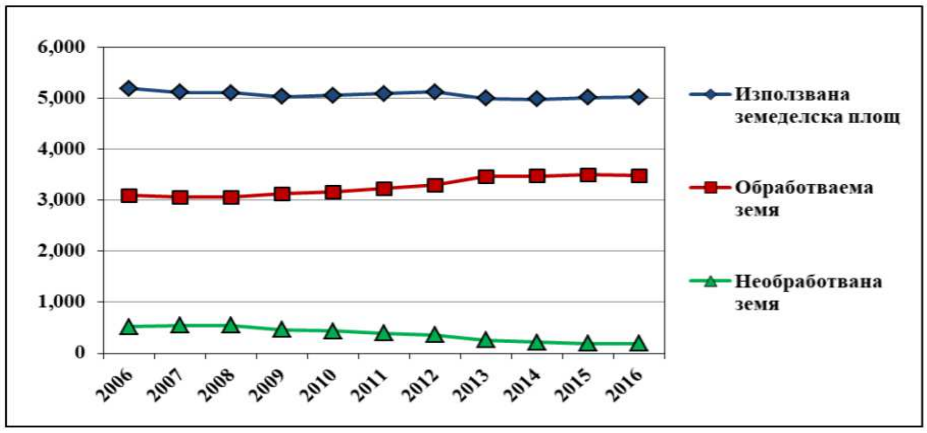
Source: NPAF for NATURA 2000

In the period 2014-2018, environmental problems continue to exist in Bulgaria as of 2017. These are problems related to unbalanced fertilization, the share of arable land in usable agricultural areas, the share of organic farming areas, the breeding conditions of farm animals, the deserted lands in mountainous and less favoured areas, the management of common pastures and meadows, etc.

At present, arable land is about 70% of the utilised agricultural area (UAA), with permanent grassland of about 26%, indicating a good environmental balance. For comparison in the EU, the proportion of permanent grassland in UAA is about 33%. In Bulgaria, this backlog is largely offset by the higher percentage of **afforested areas**, which, together with the permanent grassland, greatly exceeds the area of arable land.

Figure 18 illustrates the dynamics of agricultural land, in '000 ha, for the period 2006-2016.

Figure18. Agricultural land dynamics, in '000 ha



Source: Agrstatistics, MAFF; Eurostat, (http://appsso.eurostat.ec.europe.eu)
http://azpb.org/app/uploads/2017/07/CAP-Bulgaria-Analysis.pdf
Note: blue – utilized agricultural area; red – arable land; green - uncultivated land;

- **Subterranean habitats (caves)**

Subterranean fauna includes both organisms inhabiting macro caverns (caves, precipices and mining galleries) and those living in inaccessible underground cavities, deep soil layers, and crevices of underlying rocks. Subterranean habitats (caves) provide an environment for about 800 species of animals found so far in Bulgarian caves. 160 species are categorised as troglobionts or stigobionts i.e. organisms whose life cycle is spent entirely in underground cavities or waters. The largest number of cave species are among ground beetles, Bathyscia, millipedes and woodlice. Widespread in Bulgarian caves, but with less troglobionts are representatives of the harvesters (*Opiliones*), pseudoscorpions (*Pseudoscorpiones*) and spiders (*Araneae*).

According to the NATURA 2000 classification, the types of caves in Bulgaria are code **8310** Caves not open to the public and code **8330** Submerged or partially submerged sea caves.

Bulgaria has a unique large variety of bats. Of the 35 species of bats identified in Europe, 33 species are present in Bulgaria. Cave-dwelling bats breed and hibernate exclusively in caves. They are spread mainly in areas with karst, volcanic or marine caves. [6]

2. Overexploitation of biological and genetic resources (forest; game stock; fish; farm animals and crops)

✓ **Harvested wood resources – timber**

Data on harvested wood includes total harvested wood from industrial logging, logging from the local population, dry and fallen trees and sanitation harvest in public, municipal and private forests. The harvested wood for the period 2015-2018 in Bulgaria varies in a narrow range from 8 300 to 8 600 thousand dense cubic meters in a standing position, the lowest was 2017, the highest in 2018 (Figure 19). It should be noted that the harvested wood is in line with the approved by the respective state authorities forest management plans and no excessive use of the resource has been detected, except in some cases of illegal logging where the perpetrators were penalised under the Forest Act.

Figure19. Timber

Source: EFA

Note: green: surrent status, dark blue: construction timber in lying condition; light blue: firewood and top in lying condition

6 *National Museum of Natural History, Bulgarian Academy of Sciences:* http://www.nmnhs.com/index_bg.php

✓ **Game resources**

The number of game species in Bulgaria is reported annually through taxation. The Executive Forestry Agency maintains a national register of spring taxation by year. In the period 2014-2017, stocks of various small game species were relatively constant, with the exception of the hare, which is reduced from 3,700 thousand to 3,500 thousand.

✓ **Fish resources**

In the period 2014-2020, the EAFA implemented actions to conduct bottom surveys in the Black Sea in order to assess the status of turbot stocks, as well as a hydroacoustic survey to assess the status of stocks of pelagic species. Catches will also be researched (on board fishing vessels, upon disembarkation and discards).

Four scientific studies are carried out every year in the Bulgarian Black Sea waters - two demersal and two pelagic during the spring-summer and autumn-winter seasons in order to assess the stock in the Bulgarian waters of the Black Sea. These studies are conducted with the financial support of the European Commission in line with Regulation 199/2008 and Decision 2010/93 / EU, designed to assist Member States in the preparation of technical reports to establish a common framework for the collection, management and use of data in the Fisheries sector and in support of scientific consultations on the overall fisheries policy.

In addition to that, for the purposes of collection of biological, technical, environmental and socio-economic information, existing data collection activities are expected to continue in the following areas:

- Commercial fishing - by conducting open waters research for biological and environmental information.
- Recreational fishing - information on recreational fishing will be obtained from the number of fishing tickets sold, as well as from questionnaires.
- Aquaculture - data on the quantity of aquaculture produced will be obtained on an annual basis from completed forms.
- Fish processing - economic data will be collected by questionnaires and an administrative database.

3. **Farm animals and crops**

The outcome of a specialised survey in Bulgaria is statistic data on the number of farm animals by type and category. Table 17 shows the livestock by type as of 01.11. for the respective years.

Table 17. Farm animals by type as of 01.11.

(in '000)

Type of animal	2015	2016	2017	2018
Cattle	550,2	557,9	540,1	526,5
incl. cows	325,6	357,2	348,7	340,8
Buffalo	10,8	12,3	12,8	15,6
incl. buffalo-cows	6,8	7,6	8,7	10,3
Pigs	600,1	616,4	593,1	650,5

incl. sows	46,9	47,2	44,7	51,5
Sheep	1331,9	1360,1	1316,8	1350
incl. ewes	1117,0	1128,9	1096,4	1119,9
Goats	277,0	237,5	257	271,7
incl. does	219,9	199,4	220,8	231,2
Birds – total	15600,0	12700,0	14756,0	15519,0
incl. laying hens and pullets	6980,0	7158,0	6898,0	6951,0

Source: MAFF; NSI

Table 18. Harvested areas, produce and average yield from main crops

Crops	Harvested areas, in ha		Produce, in '000 tonnes		Average yield, in kg / ha	
	2017	2018	2017	2018	2017	2018
Wheat	1144519	1212013	6132	5833	5358	4812
Barley	128365	103570	595	438	4635	4224
Corn	398152	444622	2563	3463	6437	7822
Sunflower	898844	788656	2057	1927	2289	2443

Source: MAFF, NSI, https://www.nsi.bg/sites/default/files/files/publications/StatBook2019.pdf

4. Pollution of ambient air, soil and water

A major indicator of the quality of life of the population in terms of ambient air is the percentage of the population living at excess levels of pollution with PM_{10}, O_3, NO_2, $PM_{2.5}$, Benzo[a]pyrene and SO_2.

Soils in Bulgaria in the period 2005 - 2017 are in good ecological status with respect to pollution by heavy metals, metalloids and persistent organic pollutants: polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine pesticides.

Diffuse pollution of soils is a result of atmospheric depositions and unsustainable agricultural practices. Diffuse pollution is assessed by determining the concentrations of heavy metals and metalloids - Zn, Cu, Pb, Cd, Ni, Co, Cr, Hg, As and persistent organic pollutants - PAHs (16 compounds), PCBs (6 compounds) and organochlorine pesticides (22 compounds) in soil samples.

As regards heavy metals and metalloids, 606 soil samples were collected in 2017 to assess soil pollution with heavy metals, 5 151 analyses were made, sampled from 101 points in the base network. The data obtained have been assessed against the maximum permissible concentrations set out in Ordinance No. 3 on the values for permissible content of harmful substances in soils, in force as of 12.08.2008.

The monitoring points reporting heavy metals and metalloids exceedances of the maximum permissible concentrations represent 13.86% of the total number of sampled points for 2017 (101 points) from the National soil monitoring network. They fall within the administrative boundaries of the districts of Sofia, Pazardzhik, Haskovo, Smolyan, Lovech, Plovdiv, Sliven, Pernik, Lovech, Burgas. In 2017, there are no points in the national soil monitoring network in which exceedances in more than one element are recorded.

In the period 2005 – 2017, soils in Bulgaria were in good ecological status with respect to pollution by heavy metals, metalloids and persistent organic pollutants: polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine pesticides.

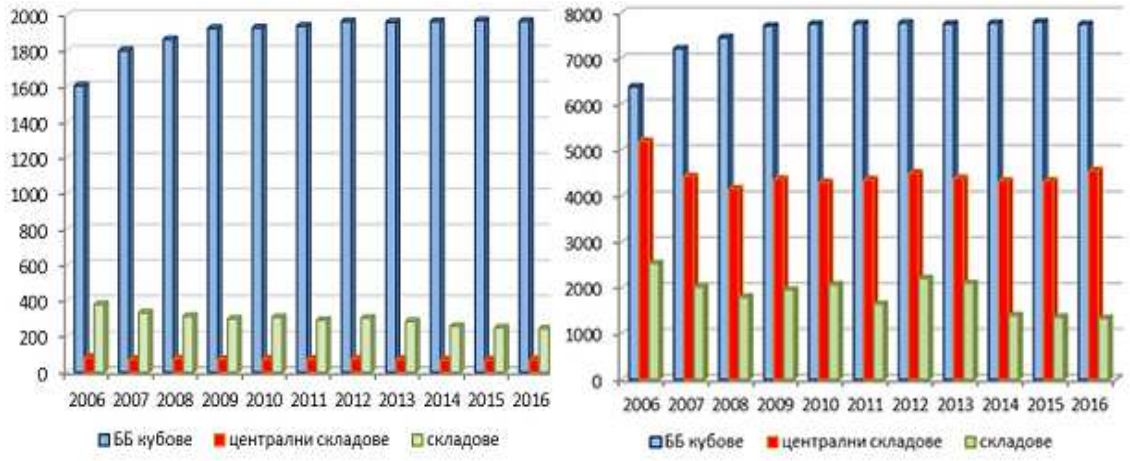
Local soil pollution is the result of storage of unusable plant protection products, mining sites and industrial plants, etc. It is assessed in terms of:

- ✓ number of storage facilities for prohibited and unusable plant protection products.
- ✓ quantities of expired plant protection products.

Assessment of the indicator

As of 31 December 2017, in Bulgaria there were 237 warehouses for unusable PPPs, 1951 BB cubes and 68 central warehouses located in 304 settlements on the territory of the country. The total quantity of prohibited and unusable pesticides for 2017 amounts to approximately 13 000 tonnes, with 59.1% of them permanently deposited in 1 951 BB cubes and 33.2% repackaged and stored in 68 central warehouses, and only 7.7% of the pesticides are stored in 237 warehouses for which measures for their disposal are yet to be applied (Figure 20). The largest number of pesticide storage facilities are in the districts of Pleven (44), Lovech (35) and Stara Zagora (28).

Figure20. Storage of prohibited and unusable pesticides, quantities and number of prohibited and unusable pesticides, in t



Source: ExEA, „Electronic register of prohibited plant protection products" http://eea.government.bg/flexviewers/pesticides/

Note: blue - BB cubes; red -central warehouses; green - warehouses

Water

Section IV presents the trend of the changes in surface water chemical status basic indicators nationwide for the period 1996-2017, as well as the biological assessment of the lake types by phytoplankton biomass for 2017.

5. Invasive alien species

Stringent control of invasive alien species is one of the objectives of the EU Biodiversity Strategy 2020. Invasive alien species cause billions of euros in damage each year in the EU, not only to ecosystems but also to crops and livestock. A key feature of Regulation 1143/2014 on the prevention and management of the introduction and spread of invasive alien species is the list of invasive alien species affecting the EU.

According to the European Alien Species Information Network, there are currently more than 14 000 alien species in the European natural environment. Some of them are starting to show negative impact in various aspects. The alien species, the introduction or spread of which in new territories/waters is endangering or adversely affecting biodiversity and the related ecosystem services are called invasive alien species. According to the European Commission, approximately 10% of the alien species in Europe are considered invasive.

The **Atlas of Invasive Alien Species of Union Concern** contains information and original country data for the 37 species included in the initial list to the Regulation on the IASs. The list includes 14 plants, 7 invertebrates and 16 vertebrates (two species of fish, one species of amphibian, one species of reptile, three species of birds and nine species of mammals). Of these, two species of crab (Eriocheir sinensis, Orconectes limosus), two species of fish (Perccottus glenii, Pseudorasbora parva), one species of reptile (Trachemys scripta) and one species of mammal (Myocastor coypus) have already been reported in Bulgaria, some of them (**P. parva, M. coypus**) are widespread throughout the country. The information about each species is divided in 6 sections: 1) Characteristics and biological features (data on taxonomy, morphological peculiarities, distinctive features and biology); 2) Origin and general spread; 3) Distribution in Bulgaria; 4) Habitats; 5) Ways of entry and distribution; and 6) Impact. The articles are illustrated with pictures of the species. According to the Atlas, the following invasive alien species of Union concern have been reported:

Higher crustaceans:

- ✓ **Eriocheir sinensis** (H. Milne Edwards), 1853 Chinese mitten crab – Class: Malacostraca, Order: Decapoda, Family: Varunidae – found in the Bulgarian section of the Danube river (reported 2 specimens);
- ✓ **Orconectes limosus** (Rafinesque, 1817) American spiny-cheek crayfish – Class: Malacostraca, Order: Decapoda, Family: Cambaridae – found for the first time in Bulgaria on 17.06.2015 in Topolovets river (Vidin district).

Fish:

- ✓ **Perccottus glenii Dybowski**, 1877 Chinese sleeper – Class: Actinopterygii, Order: Perciformes, Family: Odontobutidae - found for the first time in Bulgaria in 2005 in the Danube river. Twelve species were caught in April 2005 at 5 sites in a 100 km section of Vruv river, near Lom.
- ✓ **Pseudorasbora parva** (Temminck & Schlegel, 1846) Pseudorasbora – Class: Actinopterygii, Order: Cypriniformes, Family: Cyprinidae – in Bulgaria the species were first observed in 1975 in the state fishery near Mechka village, Ruse district. In 1976 it was found also in the marshes near Malak Preslavets village and in the Danube river near Krivina village, Ruse district. Soon after that, Pseudorasbora spreads to water

bodies in Lom, Sofia and Plovdiv districts. About 20 years after its first establishment, the species has already colonised water bodies throughout the country.

Reptiles:

- ✓ **Trachemys scripta** (Thunberg in Schoepff, 1792) Yellow-bellied slider, Red-eared slider, Cumberland slider; Class: Reptilia, Order: Testudines, Family: Emydidae - information on the distribution of the species in Bulgaria was first published in 2011, briefly presenting the main localities of the species in the country. This species has been found to be expanding its spread in the country compared to previous years: besides the subspecies encountered so far in the country – the red-eared slider T. scripta elegans (Wied-Neuwied, 1839), representatives of the subspecies yellow-bellied slider T. scripta (Thunberg in Schoepff, 1792) are also reported. In some areas, successful breeding has also been reported, hence it should be assumed that there is an increasing risk posed by this invasive species (Tsankov et al. 2017). Sources of information: IBER – BAS.

Mammals:

- ✓ **Myocastor coypus Molina**, 1782 Nutria Class: Mammalia, Order: Rodentia, Family: Myocastoridae - the species was first introduced into nature in Bulgaria in 1953, when nutria were settled into the Mandra Lake and the Arkutino Reserve, and the species is currently distributed mainly in the lower parts of the country.

According to Commission Implementing Regulation (EU) 2017/1263 of 12 July 2017 updating the list of invasive alien species of Union concern established by Implementing Regulation (EU) 2016/1141 pursuant to Regulation (EU) No 1143/2014 of the European Parliament and of the Council, in the list of invasive alien species of Union concern, the following species are added, in alphabetical order: *Alopochen aegyptiacus* Linnaeus, 1766; *Asclepias syriaca* L.; *Asclepias syriaca* L.; *Elodea nuttallii* (Planch.) St. John; *Gunnera tinctoria* (Molina) Mirbel; *Heracleum mantegazzianum* Sommier & Levier; *Impatiens glandulifera* Royle; *Microstegium vimineum* (Trin.) A. Camus; *Microstegium vimineum* (Trin.) A. Camus; *Myriophyllum heterophyllum* Michaux; *Nyctereutes procyonoides* Gray, 1834; *Ondatra zibethicus* Linnaeus, 1766; *Pennisetum setaceum* (Forssk.) Chiov.

Invasive species:
https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=LEGISSUM:200701_1&from=BG
https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/nemestni-i-invazivni-chujdi-vidove/invazivni-chujdi-vidove/
http://esenias.org/files/ESENIAS_Atlas_WEB.pdf

6. Climate change

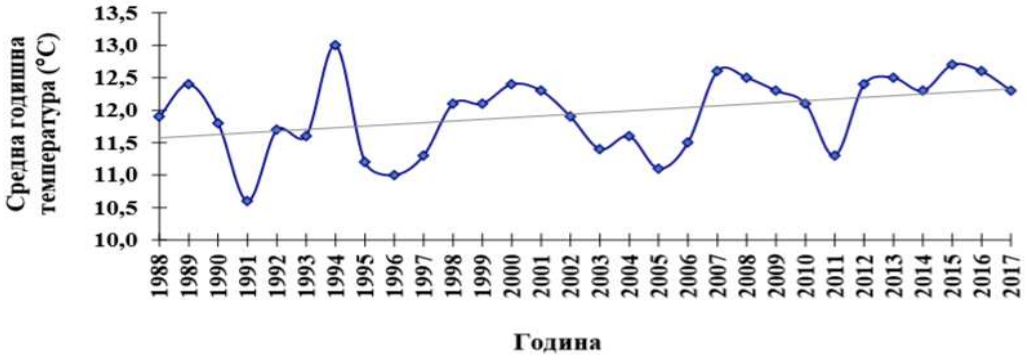
Bulgaria is located in a geographical region that is among the most vulnerable to climate change. On the recommendation of the World Meteorological Organisation, the average indicators for the period 1961-1990 are used to describe the current climate. Hence, the monthly and annual temperatures and rainfall are compared to this period and apply only to the flat part

of the country. The record highs in temperature over the last decades, the melting of glaciers, the increasingly humid air and seven other key indicators prove that global warming is an indisputable fact. The ten key indicators showing global warming are: (1) higher land air temperature; (2) higher marine air temperature; (3) increasing ocean heat content; (4) higher land surface temperature; (5) increasing humidity; (6) higher sea surface temperature; (7) sea levels are rising; (8) sea ice is decreasing; (9) snow cover is decreasing; (10) glaciers are shrinking.

Climate and meteorological conditions affect natural and anthropogenic processes that in turn affect the state of the environment. High temperatures affect drainage, increase eutrophication of stagnant water and can cause to fires. Meteorological conditions affect the economy and thus increase the environmental pressures coming from these sectors. Rainfall has a significant impact on agriculture through the use of water for irrigation, fertilization, agrochemicals, the spread of pests and the amount of yield.

For Bulgaria, with an average annual temperature of 12.3°C, the year 2017 was among the 15 warmest years for the period 1988 - 2017. In 2017, the anomaly of the average annual air temperature for the regions with altitude up to 800 m ranged from +0.5 ° C to +1.8 ° C, exceeding +1.5 ° C only in three areas. In the period 1988 - 2017, the average annual air temperature for the lower part of the country (the regions with an altitude of up to 800 m) increased by an average of 0.85°C compared to the reference period 1961-1990, varying from 10.6 ° C to 13.0 ° C (Figure 21). The trend of increase in fluctuations in the average annual air temperature remains, and the temperature anomalies for all years after 2007 (with the exception of 2011) are above + 1 ° C.

Figure21. Fluctations of the average annual air temperature (in ºC) for the period 1988 - 2017



Source: NIMH

Note: average annual temperatute ºC/ year

On 27.09.2017, in the village of Gramatikovo, Bourgas district, the highest amount of 24-hour rainfall of the year was measured (Figure 22.) - 198 mm (374% of the monthly average). The highest exceedance of the monthly average rainfall was recorded in Karnobat on 25.10.2017 (178.1 mm / 24 h or 457% of the monthly average). Overall, in the period 1988-2017, there is an increasing trend of fluctuations in the maximum 24-hour rainfall in areas with altitudes up to 800 m.

Figure22. Fluctuations of the maximum 24-hour rainfall (in mm) for the period 1988 - 2017

Source: NIMH

Note: maximum 24 hours precipitation(mm)/ year

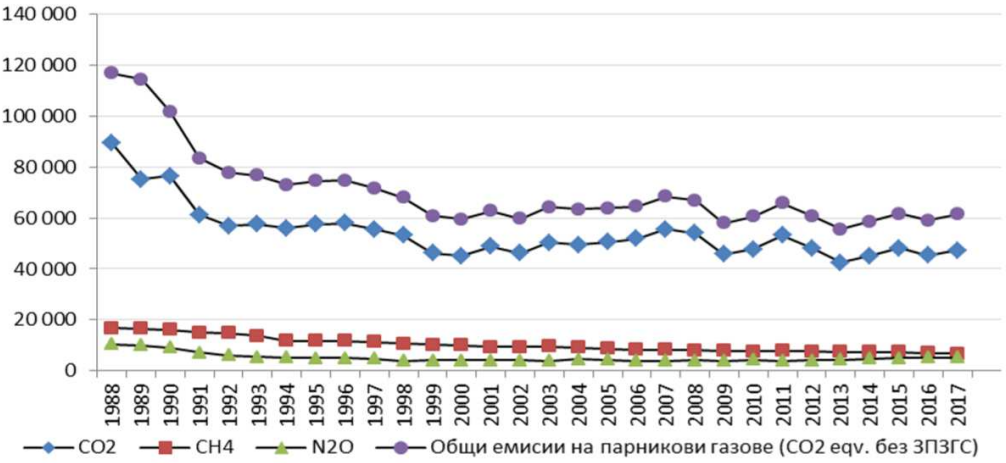
These climate scenarios for Bulgaria were developed at NIMH-BAS within the framework of the CECILIA project. Simulations of the regional climate in the future were made for two timeframes - "near future" (2021-2050) and "distant future" (2071-2100), with results obtained for trends (i.e. the change compared to the current reference climatic period 1961-1990) for the average annual air temperature and the average annual rainfall, are the following:

- ✓ As far as temperature is concerned, positive trends are observed practically all over the country i.e. an increase in the average annual temperature is expected, with this increase being relatively uniform, by about 1.5°C - 2° C for the near future and between 2.5°C and 3.5 ° C for the distant future;
- ✓ The spatial distribution of the trend in the annual rainfall amounts is more uneven than that of temperature. In Eastern Bulgaria a negative trend is expected, with an average change of between 5 mm and 10 mm during both periods (up to 15mm - 20 mm in some regions). The most noticeable difference between the two periods is that the areas with a negative trend in the second period are larger than in the first and cover also parts of Western Bulgaria.

It should be noted that the results obtained are the product of numerical simulation and are based on a specific physico-mathematical model of the atmosphere, and therefore may differ from other obtained by applying different approaches. In particular, they depend on a specific emission projections scenario of greenhouse gases and aerosols.

Figure 23. presents a trend in the emissions of the main GHGs - CO_2, CH_4 and N_2O, as well as the total GHGs emission (including HFCs, PFCs and SF6) for the period 1988-2017, in Gg CO_2 – eqv.

Figure23. Trends in emissions of main GHGs - CO2, CH4 and N2O and the total GHGs emissions (including HFCs, PFCs and SF6) for the period 1988-2017, in Gg CO_2 – eqv.



Analysis shows that during the period 1988 – 2017, emissions of main GHGs show a declining trend. In 2017 г. total emissions of GHGs emitted are 61 367,16 Gg CO_2-eqv. or 53% of the emissions during the base year, with the minimum in 2013 (48%).

7. Threats to the ecosystem services

Bulgaria is a country of rich biodiversity. Confirmation of this fact can be found in the above-mentioned data on plant collections at the National Genebank. Based on FAO studies, Bulgaria ranks sixth in the world in terms of concentration of wild relatives of cultivated plants. This extraordinary plant diversity on the territory of our country places a particular responsibility on us to identify threats to its conservation. The most significant threats are caused by global climate change, natural disasters and unexpected calamities. They inflict great damage but are difficult to predict or control. Other threats, no less destructive to biodiversity, are the result of human activity. It is the type of threats that can be managed by implementing different forms of administrative control. Loss of genetic resources is most often related to habitat loss because of:

- ✓ pollution from municipal, agricultural and industrial waste;
- ✓ issues related to land use of agricultural land: ploughing of meadows, including land that was deserted in the past; abandoned long-standing meadows and pastures;
- ✓ overgrazing in highland meadows and in meadows and pastures in the foothills;
- ✓ expansion of monoculture agriculture and the chemicalisation and intensification of agriculture, in particular the intensive use of fertilizers and pesticides;
- ✓ poorly planned construction and development projects, including tourist sites and resorts, highways and other road facilities, reservoirs, mines and quarries, as well as urbanization as a whole;
- ✓ introducing new species for commercial purposes that replace traditional local species.

D. Socio-economic and cultural consequences of changes in biodiversity and ecosystem services in Bulgaria

- **Types of ecosystem services**

The concept of ecosystem services (ESSs) highlights the numerous benefits of ecosystems to humans (MA 2005) and its use can facilitate collaboration between scientists, professionals, practitioners and decision-makers and other stakeholders. The ecosystem services mapping is, therefore, not aimed at identifying the maximum potential of a single service but at understanding the spatial distribution of the provision of multiple services from interconnected ecosystems.

Each ecosystem can provide many services. There are three international classification systems for the classification of ecosystem services, published respectively in the Millennium Ecosystem Assessment (MA), the Economics of Ecosystems and Biodiversity (TEEB) and the Common International Classification of Ecosystem Services (CICES). In essence, they are largely correlative; all three classifications include provisioning, regulating and cultural services.

Material / Provisioning services - these are the material benefits people obtain from ecosystems, including food, fibre, biofuel, genetic resources, medicine, fresh water. Material services refer to the production obtained from ecosystems and used directly in production or for personal consumption by humans.

Regulating and supporting services

Regulating services - these are the benefits people receive from regulating ecosystem processes, including air quality, climate, water, erosion, disease, pests, flood threats. This group of services relates to the capacity of natural and semi-natural ecosystems to regulate natural processes and systems through biogeochemical cycles and other biosphere processes. Besides maintaining the good ecosystem status, regulatory functions provide many services that directly and / or indirectly affect human wellbeing.

Supporting services – these are services required to maintain all other ecosystem services, including soil formation, photosynthesis, primary production and the circulation of biogenic substances.

Supporting services differ from provisioning, regulatory and cultural services in that, unlike other types of services that can be directly used by people, their impact on human well-being is indirect and usually long-term. Soil formation, for example, lasts for decades or centuries. Support services are highly interconnected and are generally conditioned by a wide range of physical, chemical and biological interactions.

Cultural services – these are the intangible benefits derived from ecosystems, including spiritual enrichment, cognitive development, recreation, entertainment and more. Cultural services are intangible benefits that people derive from ecosystems in the form of aesthetic enjoyment of beautiful nature, cultural, intellectual and spiritual inspiration, a sense of belonging to a particular place, moral satisfaction with the existence of pure and unspoiled nature, the pleasure from recreational activities and eco-tourism.

Ecosystem services assessment (for part of ecosystems):

- Wetlands

Assessment of ecosystem services in inland wetlands outside Natura 2000 ecological network was made on the basis of 16 indicators out of the 19 proposed in the methodology (Table 19). Of the 16 ecosystem services assessed, 9 are assessed as "no relevant capacity", meaning that the inland wetlands cannot provide these services. The analysis of the rest of the ecosystem services shows that the biggest relevant capacity (high and very high) has „*Maintaining nursery populations and habitats (2312)"*service. High capacity have also „*Flood protection (2222)*" and „*Scientific interest (3121)"*. Low relevant capacity has „*Mass stabilisation and control of erosion rates (2211)*".

Table 19. Summarised data of ecosystem services assessment by ecosystem subtypes in inland wetlands at national level (in bold, ecosystems that were not assessed)

№	Inland wetlands			
	Code	**Transition mires and quaking bogs, 701 (D2)**	**Alkaline swamps and marshes, 702 (D4)**	**Beds of large sedges normally without free-standing water. Coastal communities are excluded. 703 (D5)**
1	1122. Ground water for drinking purposes	0, no relevant capacity		
2	1211. Fibres and other materials from plants, algae and animals for direct use or processing	0, no relevant capacity		
3	1221. Surface water for non-drinking purposes	0, no relevant capacity		
4	1222. Ground water for non-drinking purposes	0, no relevant capacity		
5	2211 Mass stabilisation and control of erosion rates	no relevant capacity (0)	low (1) to relevant (2) capacity	low (1) to relevant (2) capacity
6	**2212 Buffering and attenuation of mass flows**	**0, no relevant capacity**		
7	**2221 Hydrological cycle and water flow maintenance**	**0, no relevant capacity**		
8	2222 Flood protection	average capacity (3)	average (3) to high (4) capacity	high capacity (4)
9	2312 Maintaining nursery populations and habitats	very high capacity (5)	high (4) to very high (5) capacity	high capacity (4)
10	2332 Decomposition and fixing processes	high capacity (4)	low (1) to relevant (2) capacity	average (3) to high (4) capacity
11	2341 Chemical condition of freshwaters	-	average capacity (3)	average capacity (3)
12	**2352 Micro and regional climate regulation**	**0, no relevant capacity**		
13	3111 Experiential use of plants, animals and land-/seascapes in different environmental settings	0, no relevant capacity		
14	3112 Physical use of land-/seascapes in different environmental settings	0, no relevant capacity		

15	3121 Scientific interest	high capacity (4)	high capacity (4)	high capacity (4)
16	3122 Educational interest	0, no relevant capacity		
17	3125 Aesthetic delights	0, no relevant capacity		
18	3211 Symbolic relationships	very high capacity (5)	relevant capacity (2)	average capacity (3)
19	3221 Existence /conservation significance	0, no relevant capacity	0, no relevant capacity	0 no relevant capacity

- **Freshwater ecosystems**

Table 20 shows the average values for the assessment of ecosystem services provided by sub-species of freshwater ecosystems in the country.

Table 20. Summarised data of ecosystem services assessment by ecosystem subtypes in freshwater ecosystems at national level

EUNIS Ecosystem types											
EUNIS Ecosystem subtypes		C1. Surface standing waters (lakes)					C2. Surface running waters (rivers)				
CICES Codes	C1.1 Permanent oligotrophic lakes, ponds, and pools	C1.2. Permanent mesotrophic lakes, ponds and pools	C1.3. Permanent eutrophic lakes, ponds and pools	C1.5. Permanent inland saline and brackish lakes, ponds and pools	C1.6. Temporary lakes, ponds and pools	C2.1. Springs, spring brooks	C2.2. Permanent non-tidal, fast, turbulent water-courses	C2.3. Permanent non-tidal, smooth-flowing water-courses	C2.5. Temporary running waters	X01. River estuaries	X03. Brackish coastal lagoons
1111. Cultivated crops	0	0	0	0	0	0	0	0	0	0	0
1112. Reared animals and their outputs	0	4	4	4	3	0	0	0	0	0	0
1113. Wild plants, algae and their outputs	0	0	0	0	0	0	0	0	0	0	0
1114. Wild animals and their outputs	1	4	4	3	3	1	1	3	1	4	4
1115. Plants and algae from in-situ aquaculture	0	0	0	0	0	0	0	0	0	0	0
1116. Animals from in-situ aquaculture	4	4	4	4	4	5	2	2	0	0	0
1121. Surface water for drinking	5	4	2	2	0	5	5	0	0	0	0
1122. Ground water for drinking	0	0	0	0	0	5	4	4	0	0	0
1211. Fibres and other materials from plants, algae and animals for direct use or processing	0	0	0	0	0	0	0	0	0	0	0
1212. Materials from plants, algae and animals for agricultural use	0	0	0	0	0	0	0	0	0	0	0

1213. Genetic materials from all biota	0	0	0	0	0	0	0	0	0	0	0
1221. Surface water for non-drinking purposes	0	5	5	0	0	0	5	5	1	0	4
1222. Ground water for non-drinking purposes	5	4	2	2	0	5	5	0	0	0	0
1311. Plant-based resources for energy	0	0	0	0	0	0	0	0	0	0	0
1312. Animal-based resources	0	0	0	0	0	0	0	0	0	0	0
1321. Animal-based energy	0	0	0	0	0	0	0	0	0	0	0
2111. Bio-remediation by micro-organisms, algae, plants, and animals (water self-purification)	5	5	5	4	2	5	4	3	2	4	4
2112. Filtration/sequestration/ storage/accumulation by aquatic biota	2	3	4	4	2	2	2	4	4	2	2
2121. Filtration/sequestration/ storage/accumulation by ecosystems	2	3	4	4	2	2	2	4	4	2	2
2122. Dilution by atmosphere, freshwater and marine ecosystems	2	2	2	2	2	2	2	2	2	2	2
2123. Mediation of smell/noise/visual impacts	4	4	4	4	4	4	4	4	4	4	4
2211. Mass stabilisation and control of erosion rates	5	5	5	4	2	2	2	4	4	4	4
2212. Buffering and attenuation of mass flows	2	4	4	4	2	4	4	4	2	4	4
2221. Hydrological cycle and water flow maintenance	2	5	5	5	2	4	4	4	2	4	4
2222. Flood protection	2	5	5	5	2	4	4	4	1	5	5
2231. Storm protection	1	3	3	3	1	1	3	3	3	5	5
2232. Ventilation and transpiration	5	5	5	5	5	5	5	5	5	5	5
2311. Pollination and seed dispersal	1	5	5	5	2	1	5	5	2	5	5
2312. Maintaining nursery populations and habitats	5	5	5	5	5	5	5	5	5	5	5
2321. Pest control	??	??	??	??	??	??	??	??	??	??	??
2322. Disease control	2	5	5	5	2	2	5	5	2	5	5
2331. Weathering processes	5	4	2	2		5	5	5	2	2	2
2332. Decomposition and fixing processes	5	5	5	2	2	5	5	5	2	2	2
2341. Chemical condition of freshwaters	5	4	4	4	2	5	5	4	4	2	2

2342. Chemical condition of salt waters											
2351. Global climate regulation by reduction of greenhouse gas concentrations	3	4	5	5	2	5	5	5	2	3	3
2352. Micro and regional climate regulation	2	4	5	5	2	2	5	5	2	4	4
3111. Experiential use of plants, animals and land-/seascapes in different environmental settings	??	??	??	??	??	??	??	??	??	??	??
3112. Physical use of land-/seascapes in different environmental settings	5	5	5	5	5	5	5	5	5	5	5
3121. Scientific	5	5	5	5	5	5	5	5	5	5	5
3122. Educational	5	5	5	5	5	5	5	5	5	5	5
3123. Heritage, cultural	??	??	??	??	??	??	??	??	??	??	??
3124. Entertainment	5	5	5	5	2	5	5	5	2	5	5
3125. Aesthetic	5	5	5	5	2	5	5	5	2	5	5
3211. Symbolic	5	5	5	5	2	5	5	5	2	5	5
3212. Sacred and/or religious	5	5	5	5	2	5	5	5	2	5	5
3221. Existence	5	5	5	5	5	5	5	5	5	5	5
3222. Bequest	5	5	5	5	5	5	5	5	5	5	5

Example: 11106 ***Macrophyte index for assessing lakes***

Higher aquatic plants (macrophytes) are an important component of lake ecosystems as they are primary producers and provide not only food but also numerous habitats for animal species. The species composition of the communities that macrophytes form, as well as the quantitative relationships between species in these communities, are sensitive to a number of environmental factors such as fluctuations in water levels, water pollution, especially with nutrients (eutrophication), and other additional pressures and impacts. Macrophytes are a main biological quality element (defined in the WFD) in the assessment and monitoring of the ecological status of surface water bodies. The macrophyte-based monitoring and assessment methodology has been adapted for Bulgaria (Gecheva et al., 2010) on the basis of the reference index method approved by the Bavarian Environmental Agency (Schaumburg et al., 2006; 2007). The macrophyte-based reference index has been adopted as a normalised indicator of the ecological status of surface water bodies of the "lake" category, in line with the requirements of Ordinance No. H-4/2013.

- **Sparsely vegetated ecosystems**

The majority of sparsely vegetated areas are rated 2 and 3 in terms of ecosystem service provision. These ratings reflect the actual capacity of this type of ecosystems, given the set of specific characteristics in terms of biotic diversity, abiotic factors, distribution in Bulgaria, use, potential for use. The territories along the Black Sea coast are of greater value and potential as

places offering good conditions for tourism, in combination with places of cultural, historical and archaeological interest. They offer opportunities for training and research, and preserve specific biodiversity. Rocky and talus habitats in the interior of the country have so far been mainly used for biodiversity research, however, definitely have potential as sites of aesthetic value, especially the more accessible ones, near settlements, tourist sites and routes.

Table 21 below presents average values for assessment of the ecosystem services provided by sparsely vegetated ecosystems subtypes.

Table 21. Average values for the ecosystem services assessment by sparsely vegetated ecosystem subtypes

		Sparse vegetation ecosystems subtypes				
		B1 Coastal dunes and sandy shores	B2 Coastal shingle	B3 Rock cliffs, ledges and shores, including the supralittoral	H2 Screes	H3 Inland cliffs, rock pavements and outcrops
ESs class codes CICES	1114	0	0	0	2	2.5
	2311	1	1	1	1.5	3
	2312	3	3	3	4	4
	3112	4	3	4	2.5	3
	3121			5	5	4
	3122	4	3	4	2.5	3
	3123	0.5	0	0	0	0.5
	3124	0	0	0	0	0
	3125	5	4	5	2	3
	3211	2.5	3	3.5	2	2
	3212	0.5	0	0	0.5	0.5
	3221	0	0	0	0	0

For each polygon, a value and an assessment for the total realised capacity of the ecosystem services provided were obtained - the sum of the assessments for each group of ecosystem services (12 groups, values 0-60):

Total	Number	Total realised capacity rating
0-12	0	1
12-24	2154	2
24-36	2487	3
36-48	32	4
48-60	0	5

- **Marine ecosystems**

MAES classification system was used in the selection of indicators for the status of marine ecosystems. Indicators of the two types were selected - “ecosystem structure” (14 indicators) and “ecosystem processes” (2 indicators). The indicators thus selected assess the status through the values of abiotic and biotic components of marine ecosystems and were developed for the purposes of monitoring the ecological status of coastal waters (up to 20 m depth) in line with the requirements of the WFD and MSFD – criteria for coastal and offshore ecosystems. Most of these indicators are set out in Regulation H-4/2013 for the characterisation of surface water, including coastal marine water, which substantially facilitated the assessment

process. Selected indicators are summarised below - their units of measurement and rating scale.

Macroalgae and angiosperms indicator

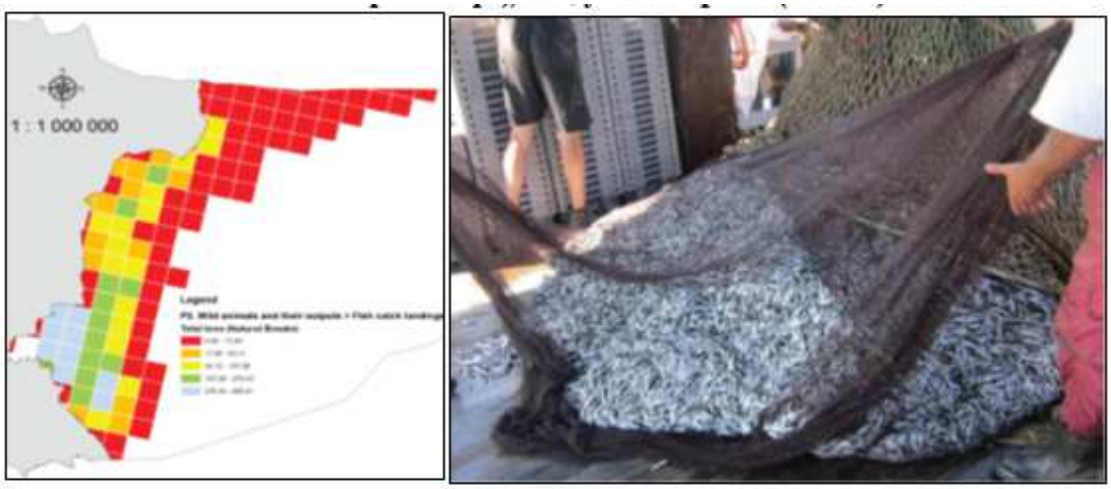
This parameter assesses the ecological status of Black Sea coastal marine waters through the ratio of biomass of macroalgae species (e.g. brown algae of the genus *Cystoseira*) that are vulnerable to the impact of nutrient load (eutrophication) and sustainable species of opportunistic macroalgae (e.g. green algae of *Ulva*, *Cladophora* genus). The index has been widely applied in monitoring the ecological status of coastal marine water bodies in Bulgaria and Romania and provides a relevant assessment of the long-term change in the status of the researched ecosystems.

Parameter 1114. Wild animals and their output

The ecosystem service includes industrial fishing catches, as well as those made for subsistence. Official data from the EAFA fishing statistics on Bulgarian catches with active (trawls, etc.) and passive fishing gear (nets, pound nets, etc.) in the Bulgarian coastal and shelf areas of the Black Sea, were used to assess the ESSs. Fishing vessel monitoring system (VMS) data were used to geo-reference catches. Filtering of records of trawl routes from the total traffic of fishing vessels was carried out based on the speed of the fishing vessels.

The total fish catch (in tonnes) indicator was proposed for the assessment of the ESSs. Data on total landings are summarised in an estimate grid (10 km^2).

Figure24. Capacity of the ecosystem service „ Wild animals and their output" and parameter „total catch of fish (in tonnes)"



- **Grassland ecosystems**

Provision of raw materials **(fresh grass and hay) for use by farm animals and, consequently, receiving a number of produce from them (meat, milk, wool, etc.)** is one of the main direct provisioning services provided by grassland ecosystems (meadows and pastures). Provision of this ecosystem service can be assessed both in terms of the capacity of a grassland ecosystem polygon to feed a certain number of farm animals and in terms of the quantity of animal products received. For the purposes of this ecosystem services assessment,

the indicator of ***Farmed Animals*** was selected, as the most appropriate to reflect the capacity of each grassland ecosystem polygon to provide this service. This calculation, however, requires taking into account the land category (soil fertility), the productivity of the plant community, its botanical composition, the nutritional value of the raw material (in foodunits), the species and age of the animal, and last but not least the intended purpose (for meat or for milk). This approach requires a lot of time, resources and specific research, as well as expert potential. Following a review of a number of reference sources (see Detailed Ecosystem Services Mapping Protocol), we have used the productivity (biomass) of grassland ecosystems in order to calculate their capacity to provide for breeding animals. It is noteworthy that grassland ecosystems with very high potential are concentrated in the Pre-Balkan region.

A very important ecosystem service is the ***maintenance of pollinator populations***, since a lot of crops, including orchards and vegetables, depend on the presence of insects that provide for the formation of products used for human consumption. There is limited data about pollinators on the territory of the country. At European level, a model has been developed to assess the pollination potential of ecosystems, taking into account the number of pollinators and the availability of plants that they use for food. This model was tailored to the conditions in Bulgaria and was used for the assessment under this project. It was reported that the capacity of ecosystems to provide a polluting potential is lower in the mountainous areas.

Outside of the Natura 2000 network, grassland ecosystems in Bulgaria have less opportunities for ***cognitive tourism***. This is because of the fact that the infrastructure for cognitive tourism in nature (eco trails, wildlife monitoring centres, etc.), as well as most of the interesting rare plants and animals are in the mountain areas. Concentrations of polygons with good capacity for cognitive tourism are found in the foothills of Rila, Eastern Rhodopes and Sakar. In order to calculate the capacity of grassland ecosystems for ***physical use of the environment*** (for tourism and recreation), we have taken into account the availability of fishing reservoirs, hiking-, biking- and horseback riding trails in nature, as well as the presence of natural resources such as caves or hunting species that would provoke people's interest. Unlike the capacity for cognitive tourism, in this case, grassland ecosystems outside the Natura 2000 network have been found to have relatively high capacity also in the lowland regions of the country. This is due to the fact that in these territories there are a number of species of animals subject to hunting.

E. Measures to improve the implementation of the Convention

It should be noted that in the period 2014-2018, the actions for the implementation of the Plant Genetic Resources Programme on the part of the IPGR - Sadovo contributed to improve the implementation of the Convention for the implementation of the National Biodiversity Strategy and the Action Plan. The PGRs Programme at the IPGR - Sadovo is an integral part of the National research and conservation of genetic resources programme. The main activities are focused on collection, evaluation, storage, documenting and sustainable use of PGRs in *ex situ* (field and seed), *in vitro* and *in situ* collections. *Ex situ* collections contain more than 75% of the collected plant wealth of main plant species. Collection, evaluation and conservation of valuable wild plant species originating from different habitats is a key activity. An extensive genetic diversity of local resources has been collected through field trips. Inventory of the PGR was carried out jointly with other institutes in the country and documentation was prepared on the available plant diversity and the preserved germplasm from field crops. The assessment of samples was done in line with the FAO unified classification systems and standards and the

European PGR Programme. So far, over 51% of the collections containing genetic diversity of species and varieties have been assessed. The National Seed Bank in Sadovo is filled with seeds from 9 838 native plant specimens, representatives of the local flora, including native wild species and relatives of cultivated plants.

The botanical garden of IPGR – Sadovo has a total of 470 plant species of 60 families. The largest share have species from the Legumes family. The other popular species are from the families Asteraceae, Cruciferous, Liliaceae and Ranunculaceae. **Rare, endemic and endangered plants are stored.** Eight species are Balkan endemics: *Achillea clypeolata, Allisoides bulgarica, Knautia macedonica, Chamaecitisus janke, Iris reichenbachii, Iris suaveolens, Aegilops cylindrica, Haberlea rhodopensis*, 5 species are Bulgarian endemics: *Allium rhodopaeum, Sedum album, Vicia incisa, Aegilops neglecta , Soldanella rhodopaea*; 4 species of endangered plants: *Leucoyum aestivum, Artemisia pedemontana, Anemone sylvestris, Pyracantha coccinea;* and 11 rare species: *Meum athamanticum, Artemisia lerchiana, Artemisia pontica, Leontopodium alpinum, Leucanthemum vilgare, Andrachne telephioides, Aegilops triuncialis, Koeleria brevis, Secale cereale var. perene, Clematis alpina, Paeonia tenuifolia*.

F. Support mechanisms for national implementation

(legislation, funding, capacity building, coordination, etc.)

In the process of review of support mechanisms for the implementation of the Convention at national level, the following was observed:

- Substantial problem hindering the implementation of comprehensive activities, for example: on conserving PGRs in Bulgaria, is the **limited** funding. The implementation of the programme for conservation, management and use of the PGRs requires targeted funding in the context of the strategic nature of the research, the expected long-term results, the multifaceted impact on the social and economic development of human society in the country and international authority.
- Because of **insufficient** funding, there is no information system yet to document the plant gene pool at national level, which impedes the transfer of data to the international PGRs catalogues and limits the access of potential users to the stored gene pool.
- There is **good** coordination between the IPGR in its capacity as the national PGRs Coordinator and the Biodiversity International. The PGRs Programme is a member of the European PGR Programme (ECPGR) and has been nominated to participate in 12 working groups on crops and documentation.

G. Monitoring and performance management mechanisms

As far as the mechanisms for monitoring and reviewing the implementation of the Convention are concerned, it should be noted that Bulgaria is a country with a rich biodiversity of wild plant species, including relatives of cultivated plants. This wealth must be protected because it is a valuable gene pool, both in terms of building resistance to adverse climate changes and in conserving the biological balance in nature. For this purpose, it is necessary to develop a **comprehensive information management system for**

the PGR database with specialised software serving the genebank, the information centre at IPGR - Sadovo and all institutes in the country that own PGR collections.

MOEW: https://www.moew.government.bg/bg/priroda/strategicheski-dokumenti/;

EU Biodiversity Strategy by 2020:

https://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm#stra;

First interim national report on the implementation of the Nagoya Protocol on genetic resources: https://absch.cbd.int/search/nationalRecords?schema=absNationalReport;

Fourth national report on the implementation of the Cartagena Protocol om biological safety:

https://beta.bch.cbd.int/database/records/248082;

National Development Programme Bulgaria 2020:
http://www.strategy.bg/StrategicDocuments/View.aspx?Id=765;

Agricultural report 2019: https://www.mzh.government.bg/bg/politiki-i-programi/otcheti-i-dokladi/agraren-doklad/.

APPENDICES

APPENDIX 1: List of institutions, organisations and individuals who provided information for this report

Institutions and organisations

Ministry of Environment and Water (MOEW); http://www.moew.government.bg

Ministry of External Affairs (MEA); http://www.mfa.bg

Ministry of Tourism (MT); http://www.tourism.government.bg/

Ministry of Finance; https://www.minfin.bg/

Ministry of Energy; https://www.me.government.bg/bg

Ministry of Transport, Information Technologies and Communication; https://www.mtitc.government.bg/

Executive Environment Agency (ExEA); http://eea.government.bg

Executive Forests Agency, Ministry of Agriculture, Food and Forests (EFA-MAFF); http://www.iag.bg

Bulgarian Food Safety Agency (BFSA); http://www.babh.government.bg/

Institute of Plant Genetic Resources "K. Malkov" – Sadovo (IPGR – Sadovo); https://ipgrbg.com/

Ministry of Defence, Center for monitoring and control of radiation, chemical, biological and environmental conditions;

Executive Agency for Selection and Reproduction in Animal Breeding (EASRAB); http://www.iasrj.eu

Institute of Oceanology, BAS; http://www.io-bas.bg

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Biological diversity of algae in Bulgaria

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APPENDIX 3: STAKEHOLDERS

PRIORITY/OBJECTIVE - A. Strengthening the scientific base of nature conservation activities:

Ministry of Environment and Water (MOEW); http://www.moew.government.bg
Executive Environment Agency (ExEA) ; http://eea.government.bg;
National Nature Protection Service Directorate (NNPSD-MOEW);
Regional inspectorates on environment and water (RIEW) to the MOEW (16): Sofia, Pernik, Ruse, Varna, Burgas, Blagoevrad, Plovdiv, Stara Zagora, Haskovo, Pazardzhik, Smolyan, Shumen, Veliko Turnovo, Pleven, Vratsa, Montana; http://www.moew.government.bg
Pirin National Park Directorate (PNPD) – MOEW; http://www.pirin.bg
Rila National Park Directorate (RNPD) – MOEW ; http://www.rila.bg
Central Balkan National Park Directorate (CBNPD) - MOEW; http://www.centralbalkan.bg
Danube River Basin Directorate (DRBD-Pleven); http://www.bd-dunav.org;
Black Sea River Basin Directorate (BSRBD - Varna); http://www.bsbd.org
East Aegean River Basin Directorate (EARBD - Plovdiv); http://www.earbd.org;
West Aegean River Basin Directorate (WARBD - Blagoevgrad); http://www.wabd.bg;
Enterprise for Management of Environmental Protection Activities (EMEPA); http://www.pudoos.bg;
Ministry of External Affairs (MEA); http://www.mfa.bg
Ministry of Agriculture, Food and Forests: (MAFF): http://www.mzh.government.bg;
Executive Forests Agency (EFA); http://www.iag.bg
Bulgarian Food Safety Agency (BFSA) ; http://www.babh.government.bg
Belasitsa Nature Park Directorate ; http://www.belasica.iag.bg;
Balgarka Nature Park Directorate ; http://www.balgarka.iag.bg;
Vitosha Nature Park Directorate ; http://www.vitosha.iag.bg;
Vrachanski Balkan Nature Park Directorate; http://www.vrachanskibalkan.iag.bg
Zlatni Piasuci Nature Park Directorate ; http://www.zlatnipiasaci.iag.bg;
Persina Nature Park Directorate ; http://www.persina.iag.bg;
Rila Monastery Nature Park Directorate ; http://www.rilskimanastir.iag.bg;
Rusenski Lom Nature Park Directorate ; http://www.rusenskilom.iag.bg
Sinite Kamuni Nature Park Directorate ; http://www.sinitekamani.iag.bg
Stranzha Nature Park Directorate ; http://www.strandja.iag.bg
Shumensko Plato Nature Park Directorate ; http://www.shumenskoplato.iag.bg
Executive Agency of Fisheries and Aquaculture (EAFA) ; http://iara.government.bg
Executive Agency of Variety Testing, Field Inspection and Seed Control; http://www.iasas.government.bg;
Executive Agency for exploration and maintenance of the Danube river; http://www.appd-bg.org;
State Agency National Statistical Institute (NSI); http://www.nsi.bg
Ministry of Education and Science (MES); http://www.mon.bg
Executive Agency OP „Science and Education for Smart Growth; http://www.opnoir.bg;
Institute of Biodiversity and Ecosystem Research to the Bulgarian Academy of Sciences (IBER-BAS): http://www.iber.bas.bg
Institute of oceanology (IO - BAS); http://www.io-bas.bg
Forest Research Institute (FRI - BAS): ; http://www.fri.bas.bg
Institute of Plant Physiology and Genetics – BAS ; (http://www.bio21.bas.bg/ippg/bg/);
Information and Communication Technologies Institute – BAS ; http://www.iict.bas.bg
Agricultural Academy (AA); http://www.agriacad.bg;

Institute of Plant Genetic Resources "Konstantin Malkov" – Sadovo (IPGR)
http://www.ipgrbg.com;
National Museum of Natural History (NMNH-BAS) ; http://www.nmnhs.com;
Regional Natural History Museum –Пловдив; http://www.rnhm.org;
Sofia University „St. Kliment Ohridski" (SU); https://www.unisofia.bg
University of Forestry – Sofia; http://www.ltu.bg
Agricultural University – Plovdiv (AU-Plovdiv); http://www.au-plovdiv.bg
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Bulgarian Birds Protection Society (BBPS); http://www.bspb.org
Green Balkans Federation of Nature Conservation NGOs: http://www.greenbalkans.org;
Bulgarian Biodiversity Foundation (BBF) ; http://www.bbf.biodiversity.bg
WWF-Bulgaria ; http://www.wwf.bg;

PRIORITY/OBJECTIVE - B. Supporting legislative initiatives:

Ministry of Environment and Water (MOEW); http://www.moew.government.bg;
Ministry of Regional Development and Public Works (MRDPW); https://www.mrrb.bg/;
Ministry of Agriculture, Food and Forests ; http://www.mzh.government.bg;
Ministry of Health (MH); https://www.mh.government.bg/bg/;
Ministry of Justice(MJ); http://www.justice.government.bg;
Ministry of External Affairs (MEA); http://www.mfa.bg
Executive Environment Agency (ExEA); http://eea.government.bg
Executive Forests Agency (EFA); http://www.iag.bg
Institute of Plant Genetic Resources "Konstantin Malkov" – Sadovo (IPGR)
http://www.ipgrbg.com;
National Nature Protection Service Directorate (NNPSD-MOEW);
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Green Balkans Federation of Nature Conservation NGOs: ; http://www.greenbalkans.org;
Bulgarian Biodiversity Foundation (BBF) ; http://www.bbf.biodiversity.bg
WWF-Bulgaria; http://www.wwf.bg;

PRIORITY/OBJECTIVE - C. Expanding and strengthening the network of protected territiories:

Ministry of Environment and Water (MOEW); http://www.moew.government.bg
National Nature Protection Service Directorate
Ministry of Agriculture, Food and Forests (MAFF): http://www.mzh.government.bg;
Executive Forests Agency (EFA); http://www.iag.bg;
Ministry of Culture (MC); http://www.mc.government.bg;
National Institute of Immovable Cultural Heritage (NIICH);
Institute of Biodiversity and Ecosystem Research to the Bulgarian Academy of Sciences (IBER-BAS): http://www.iber.bas.bg
Institute of Oceanology – BAS; http://www.io-bas.bg
Bulgarian Biodiversity Foundation (BBF) ; http://www.bbf.biodiversity.bg

PRIORITY/OBJECTIVE - D. Environmental education and training:
Ministry of Environment and Water (MOEW); http://www.moew.government.bg

Enterprise for Management of Environmental Protection Activities (EMEPA); http://www.pudoos.bg;
Ministry of Education and Science (MES); http://www.mon.bg;
National Agency for Vocational Education and Training (NAVET); http://www.navet.government.bg;
Bulgarian Biodiversity Foundation (BBF); http://www.bbf.biodiversity.bg;
WWF-Bulgaria ; http://www.wwf.bg;

PRIORITY/OBJECTIVE - E. Developing and implementing an eco-tourism policy:

Ministry of Tourism (MT); http://www.tourism.government.bg;
Ministry of Environment and Water (MOEW); http://www.moew.government.bg;
Enterprise for Management of Environmental Protection Activities (EMEPA); http://www.pudoos.bg;
District administrations (DA):
http://www.iisda.government.bg>ras>adm_struktures>distrit_administrations;
Minicipal administrations (MA):
http://www.iisda.government.bg>adm_struktures>municipality_administrations;
Bulgarian Birds □f □r□□ □r□t□□ti□n S□□i□t□(□□□□S); http://www.bspb.org;
Bulgarian Association for Alternative Tourism ; http://www.cucovata.com;
Bulgarian Biodiversity Foundation (BBF); http://www.bbf.biodiversity.bg

PRIORITY/OBJECTIVE – F. Promoting the conservation of the Black Sea basin:
Ministry of Environment and Water (MOEW); http://www.moew.government.bg;
Advisory and Coordination Council on the environmental protection of the marine environment in the Black Sea waters: http://www.saveti.government.bg;
Executive Agency of Fisheries and Aquaculture (EAFA); http://iara.government.bg;
Institute of Oceanology – BAS ; http://www.io-bas.bg;
Institute for Fisheries and Aquaculture (IFA); http://www.ira-plovdiv.bg
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Green Balkans Federation of Nature Conservation NGOs:
http://www.greenbalkans.org;

PRIORITY/OBJECTIVE - G. Promoting biodiversity conservation in the Balkans:
Ministry of Environment and Water (MOEW); http://www.moew.government.bg;
Ministry of External Affairs (MEA); http://www.mfa.bg
Ministry of Transport, Information Technologies and Communications (MTITC); http://www.mtits.government.bg;
Institute of Biodiversity and Ecosystem Research to the Bulgarian Academy of Sciences (IBER-BAS): http://www.iber.bas.bg;
National Museum of Natural History - BAS (NMNH-BAS) ; http://www.nmnhs.com;
Bulgarian Biodiversity Foundation (BBF); http://www.bbf.biodiversity.bg;
Fund for Wild Flora and Fauna (FWFF); http://www.fwff.org;
Balkani Wild Nature Partnership; http://www.balkani.org;