Conservation status of species and habitats of community importance on the Romanian Black Sea coast

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Abstract: The Romanian Black Sea coastal zone encompasses two regions according to the Natura 2000 bioregions (Steppic – STE and Black Sea - BLS) and the third is Marine Black Sea (MBLS) according to the Marine bioregion classification. Consequently, this area shelters a high diversity of species (89) and habitats (32) of Community interest. Their conservation status (CS) was assessed in the frame of the national monitoring under the Habitats Directive, article 17, revealing the presence of 11 habitat types and 80 species in the Steppic region area, 21 habitats and 46 species in the Black Sea region, and 7 habitats and 8 species in the marine region, some of them being common for two or all three bioregions. Overall, CS was assessed as "Favourable" for 20 habitat types and 24 species, "Unfavourable-inadequate" for 16 habitats and 88 species, "Unfavourable-bad" for 2 habitats and 11 species, "Unknown" for one habitat, and 11 species. Among the species of Community interest, there are five sturgeon species whose status was assessed as "Unfavourable-bad". Their conservation is actively promoted under the EU Strategy for the Danube Region by the program Sturgeon 2020, where a series of transnational measures and integrative actions were foreseen by the Danube countries.

Key words: conservation status, Steppic biogeographic region, Black Sea biogeographic region, Marine Black Sea region.

Introduction

Because of the massive decline of biodiversity which occurred in the last decades, and the consequent loss of ecosystem services and human wellbeing (MEA 2005), the preservation of biodiversity became an important concern at global, regional and national level policies. It is a key component of the United Nations 2030 agenda for sustainable development (UN 2015) and it also represents a global obligation under the Strategic Plan for Biodiversity 2020 (Pereira et al. 2005, Abaza et al. 2011).

In this paper we present the conservation status (CS) of species and habitat types designated at the European level that occur on the Romanian Black Sea coast within three bioregions: Steppic (STE), Black Sea (BLS), and Marine Black Sea region (MBLS). The CS of species and habitats was assessed using data that were acquired as a result of the first national monitoring of species and habitats. This monitoring was carried out during the 2007-2012 period, following the mandatory requirements arising from Article 17 of the Habitats Directive 92/43/EEC (HD) for European Union (EU) member states, to report the CS in 2013. This was the first national assessment of the CS of species and habitats protected by the HD and the first report to the European Commission since Romania's accession to the EU (for details see Mihăilescu et al. 2015). Also, these results are benchmarks for future reporting's and for actions that have to be taken in order to reach the HD goals and it is the most important tool for significant reduction of the rate of loss of biodiversity (Fenu et al. 2016). Comprehensive studies

on Romanian habitats started in 1993 as part of the CORINE Biotopes Project (Moss & Wyatt 1994), leading to the identification and description of 783 habitat types in 261 areas distributed over the whole country (Doniță et al. 2005). In order to protect species and habitat types of community importance, within the Romanian area of BLS region, 13 Natura 2000 sites were designated (EU 2016/2328).

Coastal regions represent a very sensitive interface between the land and sea, delineated as the part of the land affected by its proximity to the sea, and the part of the sea affected by its proximity to the land. Also, they are fragile ecosystems that are particularly vulnerable to natural and human pressures, which contribute to their deterioration (EEA Report 6/2006). The sea coastal zone extends to east over the littoral and shelf waters. The bottom sea in the area of coastal waters is covered by Danubian sediments (Panin 2008).

The focus of the paper is on the Romanian Black Sea coastal zone and it presents the results of the national assessment of the regions/habitats encompassed in this area.

Material and methods

Monitoring the conservation status of the habitats and species of Community Interest from each EU member state is an obligation arising from Article 11 and reporting according to the Article 17 of the HD. Moreover, to evaluate the effects of conservation policies and the progress made with the implementation of the HD, the European Commission requires periodical assessments of the CS of species and habitat types at national and biogeographical levels, followed by reporting every 6 years (Evans & Arvela 2011). According to the HD, conservation status assessment is based on the concept of "Favourable Conservation Status", and the degree of deviation from this status (European Commission 2011). The assessment was done using the European guidelines (Evans & Arvela 2011): four parameters (habitat range, area, specific structures and functions, and future prospects) were scored separately according to a "traffic-light scheme" as "Favourable" (FV - green), "Unfavourable-inadequate" (U1 - amber), "Unfavourable-bad" (U2 - red) or "Unknown" (XX
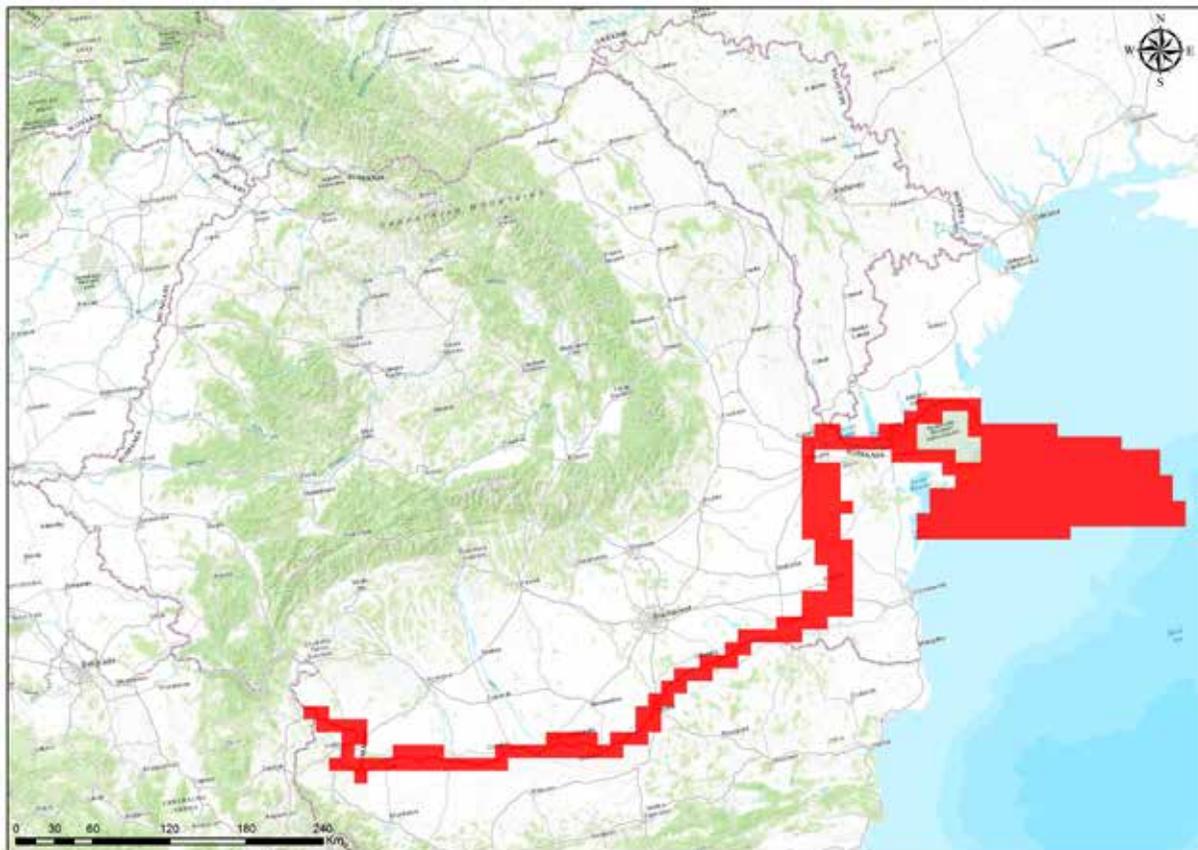

Fig. 1. Distribution map of *Acipenser gueldenstaedtii* in Romania based on the project monitoring period. The red color reveals "Unfavorable-bed" conservation status (compiled after: Mihăilescu et al. 2015; http://discomap.eea.europa.eu/).

- grey). These scores were combined to give an over-all assessment for all species and habitat types and results were summarized, analyzed, and reported in 2013 (Mihăilescu et al. 2015). The assessment followed the methodology set out in two EC official documents available at http://bd.eionet.europa.eu/activities/Reporting/Article_17/reference_portal.

Therefore, the efforts required for this reporting were particularly demanding, especially due to the lack of data availability, unclear definition of some habitats, and existence of scientific reserves for some species, according to the Biogeographical Seminars guided by the European Commission (ETC/BD 2012).

Data gathering and data-base compilation

Site selection and sampling for habitat assessment were performed both within Natura 2000 sites and in areas that had no such protection. For each habitats group, the project used *The Interpretation manual of European Union habitats*, EUR 28 (European Commission 2013), the Romanian version of the Habitats Interpretation Manual (Gafta & Mountford 2008), technical handbooks (Doniță et al. 2005), and agreed assessment matrices for the conservation status of each habitat at local or site level.

All field data were collected, processed and grouped within an information management system that was designed specifically for this purpose: the Information System for Monitoring Species and Habitats of Community Interest (*SIMSHAB*), which represented an enterprise information system for species and habitat monitoring in Romania.

Based on Member States national reports, European Environmental Agency (EEA) prepared in 2015 a technical report integrating the results from reporting under the HD, at EU level for each biogeographical region, during 2007-2012 period (https://www.eea.europa.eu/publications/state-of-nature-in-the-eu). A synthetic document concerning the reporting on the State of Nature across the EU for the same period time can be accessed at http://ec.europa.eu/environment/nature/pdf/state_of_nature_en.pdf. The present paper comes with additional information related to the conservation status of species and habitat types that were assessed within Romanian MBLS. In order to evaluate the sites of the Natura 2000 network and the other protected area categories in the Romanian Black Sea coastal zone, we used GIS data which were downloaded from the website of the Ministry of Environment, Waters and Forests from Romania, available at http://www.mmediu.ro/articol/date-gis/434.

Results

The Romanian Black Sea coastal zone shelters a high diversity of species (89) and habitats (32) of Community interest. Their CS was assessed in the frame of the national monitoring under the Habitats Directive, article 17, and reported in 2013 to the EC (Eionet 2013). In the study area we found 11 habitat types and 80 species in the STE, 21 habitats and 46 species in BLS, and 7 habitats and 8 species in MBLS, some of them being common for two or all three bioregions.

Species types and their conservation status

The conservation status of the species types was assessed as:

"Favourable" (FV): 24 species (11 STE, 11 BLS, 2 MBLS),

"Unfavourable-inadequate" (U1): 88 species (55 STE, 29 BLS, 4 MBLS),

"Unfavourable-bad" (U2): 11 species (6 STE, 3 BLS, 2 MBLS),

"Unknown" (XX): 11 species (8 STE, 3 BLS).

Among all the species of Community interest, six were sturgeon species, threatened at global level. According to IUCN criteria, out of the six native sturgeons species that have inhabited the Danube River Basin and the Black Sea, one was assessed as Vulnerable (*Acipenser ruthenus* (Linnaeus, 1758) - Gessneret et al. 2010a), four were assessed as Critically Endangered (*Acipenser gueldenstaedti* (Linnaeus, 1758), *Acipenser nudiventris* (Lovetzsky, 1828), *Acipenser stellatus* (Linneus, 1758), *Huso huso* (Linneus, 1758) - Gessneret et al. 2010a, b, Qiwei 2010), while one is considered Extinct - *Acipenser sturio* (Linnaeus, 1758). All species populations are in decreasing trend. Moreover, their conservation status has changed compared to the previous assessment, the degree of threat increasing with one rank (Gessneret et al. 2010a, b, Qiwei 2010). In Romania, for these five surviving species, the CS was assessed as unfavorable bad. The distribution map as well as the conservation status for 2007-2012 period according to EU requirements for "*5040 Acipenser gueldenstaedtii*" (Russian sturgeon) is presented in Fig. 1. Nowadays, within the MBLS, this species occurs only in Romania and Bulgaria. It is listed as Critically Endangered in The Red Book of the Republic of Bulgaria (Golemansky 2015) and as Endangered in The Red Book of Vertebrates from Romania (Botnariuc & Tatole 2005). The conservations status is deteriorating due to continuous population decline and increasing of anthropogenic pressures (https://bd.eionet.europa.eu/article17/

reports2012/species/summary/#). The conservation of *A. gueldenstaedti* deserves a special attention in Romania, considering that the monitoring of the off springs migrating from the Danube River to the Black Sea has shown that nearly no natural reproduction of this species takes place in the Danube River, and hence, the species is heading rapidly towards extinction (Suciu, unpublished data).

Habitat types and their conservation status

The assessment of CS of the habitats types of community interest that occur in the area of the Romanian Black Sea zone led to follow results:

"Favourable" (FV): 20 habitat types (6 STE, 11 BLS, 3 MBLS),

"Unfavourable-inadequate" (U1): 16 habitats (5 STE, 8 BLS, 3 MBLS),

"Unfavourable-bad" (U2): 2 habitats (BLS),

"Unknown" (XX): one habitat (MBLS).

For example, the habitats group of coastal dunes is vulnerable at anthropogenic pressures and natural threats, such as changes in the condition of water level and ecological succession. To effectively improve the conservation status of habitats, one must bear in mind that concerted management measures are needed, especially for habitats which are in "Unfavourable-bad" status, such as *2110 Embryonic shifting dunes* (Mihăilescu et al. 2015). This type of habitat is widespread along the Bulgarian coast where it was assessed as "Unfavourable-inadequate". In Romania it was reported for only two 10 x10 km grid cell and occurs in the Danube Delta. Its conservation status was assessed as "Unfavourable-bad" and has a declining trend (Fig. 2).

In Bulgaria, both parameters "range" and "area" have been assessed as "Favourable" although the trend is not known and The Red Book of the Republic of Bulgaria notes significant loss over the last 100 years (Biserkov 2015). In the mentioned book, the habitat is included as "Endangered" and WWF Bulgaria suggested that the assessment for Bulgaria, and thus the region, should be "Unfavourable-bad" (https://bd.eionet.europa.eu/article17/reports2012/habitat/summary/?period=3&group=Dunes+habitats&subject=2110&region=BLS).

Discussion

The analysis of the distribution and range maps of those the species and habitat types in the MBLS, together with information from the Natura 2000 network, shows that they occur mainly in small areas, both inside and outside of the borders of the region.

The over fishery and especially the construction of large hydropower dams on the Danube River, preventing the access of long distance migrants to historical spawning habitats upstream the Danube Gorge, led to a rapid decline of these some species until dramatic levels: besides *Acipenser sturio, Acipenser nudiventris* is possibly in the Lower Danube (accidental captures being reported in the last 15 years only on the Middle Danube), while the 3 anadromous species (*Acipenser gueldenstaedti, Acipenser stellatus* and *Huso huso*) are all on the brink of extinction.

The international scientific community pulled an alarm signal in 2005, when the Action Plan for the Conservation of the Sturgeons in the Danube River Basin (SAP) was elaborated and adopted in the frame of the Bern Convention (Bloesch et al. 2005), ratified by all Danube countries. Although many protective measures have been taken gradually by Danube countries such as including sturgeons on the Red List of protected species in Ukraine, ban on sturgeon fishery (Romania 2006, Serbia 2009, Bulgaria 2011), supportive stocking programs, they did not yield significant results due to the lack of coordinated measures between the different involved countries. Moreover, considering that local communities were not compensated for the restricted sturgeon fishery, the illegal fishery increased substantially, reducing even more their chances of survival.

The conservation measures of these species are actively promoted under the EU Strategy for the Danube Region by the program Sturgeon 2020 (based on SAP), with the aim to support their revival (Sandu et al. 2013). Recently, all sturgeon species were declared as the flagship species of the Danube Region by the International Commission for the Protection of the Danube River - ICPDR (2016) with the aim to highlight their importance and raise public awareness on the high risk of extinction of this natural heritage.

Conclusion

The Black Sea coastal zone in Romania has a great diversity of species and habitats of Community Interest. The first national assessment and reporting under Article 17 of the HD provided the opportunity to analyze their conservation status. Assessments were performed mainly within the protected areas network, indicating sturgeons as some of the most threatened and vulnerable species, while dunes were identified as the most degraded, threatened and vulnerable habitat types.

Significant knowledge gaps on species and habitats of Community Interest in Romania were
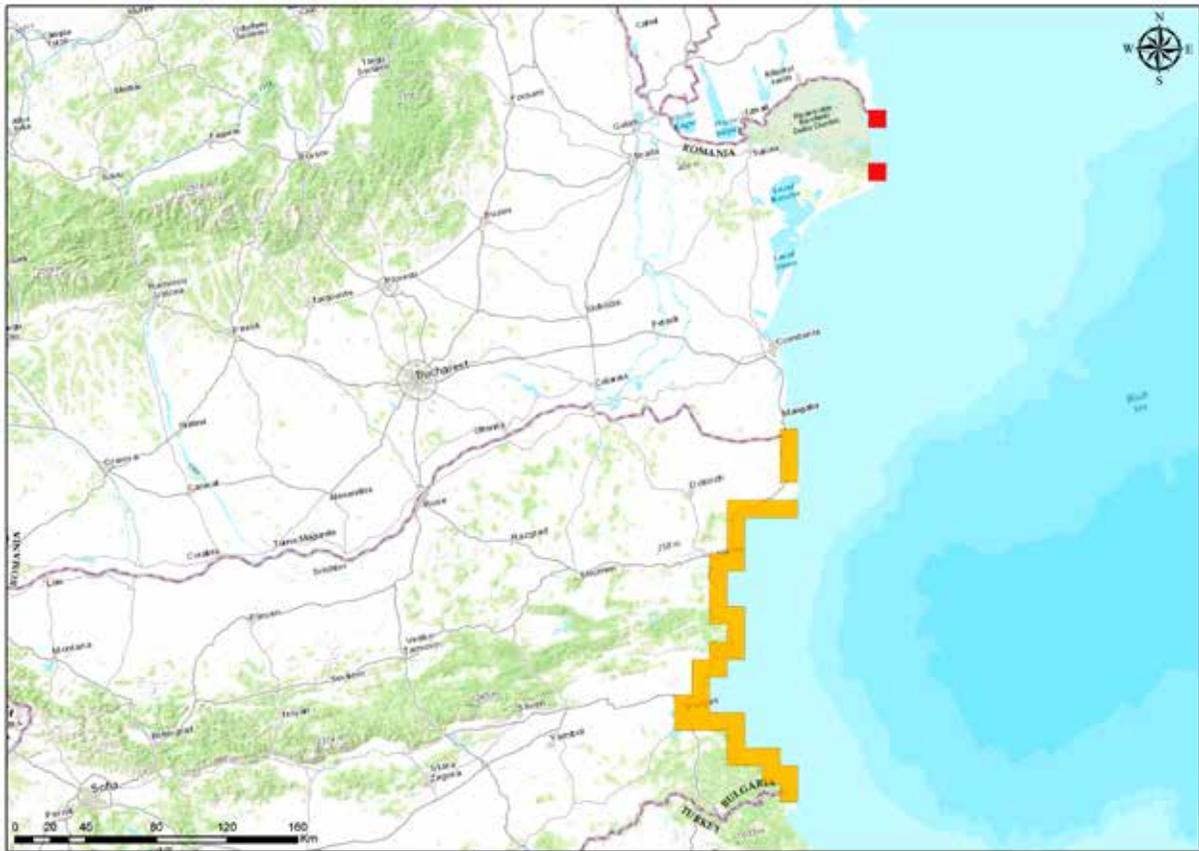
Fig. 2. Distribution map of "*2110 Embryonic shifting dunes*" habitat type along the western Black Sea coast, Romania and Bulgaria, its conservative status: Unfavourable-bad" in Romania and "Unfavourable-inadequate" in Bulgaria (compiled after: Mihăilescu et al. 2015; http://discomap.eea.europa.eu/map/).

identified, including for the Black Sea coastal zone. Appropriate management practices must be applied to maintain the "Favourable Conservation Status" of all species and habitat types and to improve the conservation status of those threatened or in bad condition. However, it should be bear in mind that there are many more types of vegetation and habitats in Romania than those listed in the Annexes of the HD, and more species should be included on the Annex of strictly protected species, given their high risk of extinction.

References

Abaza V., Antofie M., Gheorghe I., Gurzău A., Kelemen M., Mihăilescu S., Munteanu R., Niculescu M., Pop O., Proca M., Stamate S., Vergheleţ M. & Zotta M. 2011. National Biodiversity Strategy and Action Plan in Romania - 2011-2020. Bucharest: Digital Advertising.184 p.

Biserkov V. (Ed.) 2015. Red Data Book of the Republic of Bulgaria. Vol. 3. Natural habitats. Sofia: BAS & MoEW. 422 p.

Bloesch J., Jones T., Reinartz R. & Striebel B. 2005. Action Plan for the Conservation of the Sturgeons (Acipenseridae) in the Danube River Basin. Nature and Environment 144. Strasbourg: Council of Europe Publishing. 128 p.

Botnariuc N. & Tatole V. (Eds.) 2005. Red Book of Vertebrates of Romania. Bucharest: Tipografia Curtea Veche. 260 p. (In Romanian).

Doniţă N., Popescu A., Paucă-Comănescu M., Mihăilescu S. & Biriş I. A. 2005. Habitats of Romania. Bucharest: EdituraTehnică Silvică. 496 p. (In Romanian).

Eionet - European Topic Centre on Biological Diversity. 2013. Reporting under Article 17 of the Habitats Directive (period 2007-2012). Member States Deliveries. https://bd.eionet.europa.eu/activities/Reporting/Article_17/Reports_2013/Member_State_Deliveries (last assessed 18.05.2017)

EEA Report 6/2006. The changing faces of Europe's coastal areas. Luxembourg: Office for Official Publications of the European Communities. https://www.eea.europa.eu/publications/eea_report_2006_6 (last assessed 18.05.2017)

ETC/BD 2012. Draft detailed conclusions of the representativity of habitats and species in the p SCI's Romania. http://www.mmediu.ro/articol/natura-2000/435 (last assessed 18.05.2017)

European Commission 2011. Assessment and Reporting Under Article 17 Reporting Formats for the Period 2007–2012 of the Habitats Directive. European Commission, Brussels. http://bd.eionet.europa.eu/activities/ Reporting/Article_17/reference_portal (last assessed 22.10.2017)

European Commission, DG Environment 2013. Interpretation manual of European Union habitats - EUR 28. Nature ENV B. 3, 144 p.

European Commission 2015. Commission Implementing Decision (EU) 2015/2370 of 26 November 2015 adopting a ninth update of the list of sites of Community Importance for the Alpine biogeographical region (notified under document C (2015) 8206). Official Journal of the European Union 50: 338-432.

EU 2016/2328. Commission Implementing Decision (EU) 2016/2330 of 9 December 2016 adopting a sixth update of list of sites of Community importance for the Black Sea biogeographical region (notified under document C (2016) 8182). Official Journal of the European Union 353: 90-93.

Evans D. & Arvela M. 2011. Assessment and Reporting Under Article 17 of the Habitats Directive. - Explanatory Notes & Guidelines for the period 2007-2012. http://bd.eionet.europa.eu/activities/Reporting/Article_17/reference_portal (last assessed 22.05.2017)

Fenu G., Bacchetta G., Giacanelli V., Gargano D., Montagnani C., Orsenigo S., Cogoni D., Rossi G., Conti F., Santangelo A., Pinna M. S., Bartolucci F., Domina G., Oriolo G., Blasi C., Genovesi P., Abeli T. & Ercole S. 2016. Conserving plant diversity in Europe: outcomes, criticisms and perspectives of the Habitats Directive application in Italy. Biodiversity Conservation. Online first, 1-20. doi: 10.1007/s10531-016-1244-1.

Gafta D. & Mountford O. 2008. Interpretation manual of Natura 2000 habitats of Romania. Cluj Napoca: Editura RISOPRINT. 180 p. (In Romanian).

Gesner J., Freyhof J. & Kottelat M. 2010a. *Acipenser nudiventris*. The IUCN Red List of Threatened Species 2010. http://dx.doi.org/10.2305/IUCN.UK.2010-1.RLTS.T225A13038215.en (last assessed 15.05.2017)

Gesner J., Chebanov M. & Freyhof J. 2010b. *Huso huso*. The IUCN Red List of Threatened Species 2010. http://dx.doi.org/10.2305/IUCN.UK.2010-1.RLTS.T10269A3187455.en (last assessed 15.05.2017)

Golemansky V. (Ed.) 2015. Red Data Book of the Republic of Bulgaria. Volume 2. Animals. Sofia: BAS & MoEW. 372 p.

MEA (Millennium Ecosystem Assessment) 2005. Ecosystems and Human Well-being: Synthesis. Washington DC: Island Press. 155 p.

Mihăilescu S., Strat D., Cristea I. & Honciuc V. 2015. The syntetic report of conservation status of species and habitats of the community interest from Romania. Constanța: Editura Dobrogea. 280 p. (In Romanian)

Moss D. & Wyatt B. K. 1994. The CORINE biotopes project: a database for conservation of nature and wildlife in the European community. Applied Geography 14 (4): 327-349.

Qiwei W. 2010. *Acipenser stellatus*. The IUCN Red List of Threatened Species 2010: e.T229A13040387. http://dx.doi.org/10.2305/IUCN.UK.2010-1.RLTS.T229A13040387.en (last assessed 15.05.2017)

Panin N. 2008. General Oceanographic Properties: Geography, Geology and Geochemistry. In: State of the Environment of the Black Sea (2001 - 2006/7). Istanbul, Turkey: Publications of the Commission on the Protection of the Black Sea Against Pollution (BSC) 2008-3. Retrieved June 23, 2017, from http://www.blacksea-commission.org/_publ-SOE2009.asp

Pereira H. M., Ferrier S., Walters M., Geller G. N., Jongman R. H., Coops N. C. & Wegmann M. 2013. Essential Biodiversity Variables. Science 339 (6117): 277-278.

Sandu C., Reinartz R. & Bloesch J. (Eds) 2013. "Sturgeon 2020": A program for the protection and rehabilitation of Danube sturgeons. Danube Sturgeon Task Force (DSTF) & EU Strategy for the Danube Region (EUSDR) Priority Area (PA) 6 – Biodiversity. 24 pp.