КОНСУЛТАТИВЕН СЪВЕТ ЗА ЧЕРНО МОРЕ /КСЧМ/

CONSILIUL CONSULTATIV PENTRU MAREA NEAGRA

An association registered in the Register of Legal persons engaged in a non-profit making activity UCI 176964109
Domicile & Head Office:
No.24-26 Ohrid St., Floor 1, Varna
office@blsaceu.eu

Asociatie, inregistrata in Registrul persoanelor juridice fara scop patrimonial al R Bulgaria, CUI 176964109
Sediu si adresa de conducere:
Mun. Varna, str. "Ohrid" N 24-26, etaj 1
office@blsaceu.eu

MINUTES

Of meeting of Work Group 2 at BlSAC

15th March 2022

Topic: " Impact of climate change on fishing & fisheries"

On 15th March 2022, at the Rosslin Dimyat Hotel in Varna, a ZOOM meeting of Work Group 2 of BlSAC was held on the topic of 'Impact of climate change on fisheries'.

The meeting was attended by Mrs. Pinelipi Belecku of EC DG Maritime Affairs & Fisheries, Mrs. Yordanka Chobanova from EC DG Maritime Affairs & Fisheries, Mr. Hristo Panayotov – Managing Director of EAFA Burgas, Assoc. Prof. Dr. Violin Raykov IO Varna, Mr. Ivan Ivanov – EAFA Burgas, Mrs. Miroslava Robinson – Water Directorate, Varna, Mr. Victor Nita – Grigore Antipa Institute, Constanta, Mr. Eduard Diaconeasa - DGP AMPOPAM, Mr. Gabriel Popescu, Director of NAFA Constanta.

The Chairman of BlSAC, Mr. Daniel Buhai, declared the meeting open. Addresses by guests and participants followed.

A presentation by Mr. Violin Raykov on "Influence of environmental and climate factors on fish stocks and populations" followed. The area of the Black Sea is 436,402 km², the maximum depth is 2245 m, and the average - 1253 m., accommodating about 537 thousand km³ water. The Black Sea is unique in that it has the largest inland basin in the world, as well as there is hydrogen sulfide present at a certain depth. Observations on the hydrogen sulfide content in Black Sea waters over the last 50 years show a relative constancy in its concentration and vertical distribution. As for the dynamics of hydrogen sulfide, there is a balance - on the one hand, its production in deep waters and sediments, and on the other - its chemical and biological oxidation. The average quantities established as early as 1891 do not differ significantly from the current ones. All areas where there is hydrogen sulfide are under constant monitoring by various scientific organizations.

The main environmental problems facing the Black Sea are as follows:

- Eutrophication - a process caused by the enrichment of marine waters with nutrients (nitrogen and phosphorus compounds), leading to: increased development, primary production and biomass of algae (phytoplankton); changes in the balance of organisms; deterioration of water quality.
- Overfishing of commercially valuable fish;
- Biodiversity loss and habitat degradation;
- Alien species;
- Marine litter.

The warming of the planet's oceans has many consequences. Changes in ocean temperature can have a wide impact on marine species and biodiversity, as well as on human activities. Higher ocean surface temperatures can increase water vapor in the atmosphere, affecting the weather both at sea and above land. Ocean warming in coastal areas can cause algae and bacterial outbreaks to bloom, which can be dangerous to marine life, human health and industries relying on tourism and fisheries. The average annual sea surface temperature has risen in all European regional seas. Further ocean warming is expected in the future, potentially exceeding 3 ° C by the end of this century in a high-emission scenario, with slightly lower warming for the Atlantic than for other regional seas. The warming of the world's oceans is leading to rising sea levels and shifting coastal boundaries, sinking and emerging islands. During warming, the primary production changes - algae blooms, water pollution, changes in fish growth (this is the most characteristic effect observed) - shortening of individuals, premature spawning, changes in population migrations.

Very interesting is the phenomenon called the effect of oxidative stress (OS), which the Institute of Oceanology has been working on in a current project under the Research Fund, observing 7-8 species of fish of commercial interest. An example is given of the Majid species, with markers found in the gills and liver measuring new oxidative stress. Disturbance of the pro / antioxidant balance in both organs is clearly demonstrated. However, there are differences in oxidative processes in both organs. The pro / antioxidant balance in the liver is more strongly influenced by the background factors of the aquatic environment (ie the presence of pollutants, pH) and no relationship has been found with body size. The mejid is a good example of a demersal species and is indicative of how the environment affects fish. These results, although preliminary, show that OS is induced in the gills and liver of the bear in response to various environmental factors, including the impact of fisheries.

Other factors affecting marine life are heavy metals. A study conducted under the guidance of Prof. Mona Stancheva "SUSTAINABLE ORGANIC POLLUTANTS AND HEAVY METALS IN BLACK SEA FISH" and shows four important and sustainable organic pollutants - metals. These are lead, cadmium, copper and iron. The study is very accurate and shows that for the observed species all these metals are within acceptable limits.

The conclusions made in the presentation from the preliminary results of antioxidant research are that environmental conditions can cause oxidative stress (OS) from different new and in fish with different lifestyles. Species such as trout and mullet, which are demersal fish, appear to be more vulnerable to OS caused by the state of the marine environment of the habitat than horse mackerel and sprat, which are pelagic species.

Benthic fish species appear to be more informative for monitoring the state of the marine environment and the risk of fish deterioration.

Comments followed:

Mr. Daniel Buhai asks a question to Mr. Raykov: Are the three species of fish mentioned in the presentation - mejit, trout and mullet - all demersal, and does this mean that there is more environmental pressure on demersal species than those on the surface?

Mr. Violin Raykov: the answer is yes - both as changes in enzyme activity and as changes in habitats, which in turn affect all phases of development of benthic organisms.

Mr. Daniel Buhai: Does this mean that pelagic species are more protected from global warming?

Mr. Violin Raykov: Pelagic species are not more protected, but when it comes to enzyme activity, the data show that oxidative stress is lower in pelagic species than in demersal species.

Mr. Daniel Buhai: Has research been done and data have been found to increase the average annual temperature of the Black Sea water, and can we talk about changes in the climate of the Black Sea so that it resembles the Mediterranean?

Mr. Violin Raykov: There are many interesting phenomena observed, for example, in the Mediterranean Sea near Syria and how the Red Sea through the straits affects it. This impact is very significant for new species entering the Mediterranean. Assoc. Prof. Raykov's colleagues from Turkey are constantly asking if these species are already found in the Black Sea.

Mr. Kiril Zheglev: There are already single cases of new species in the Black Sea.

Mr. Violin Raykov: rising water temperatures and changes in salinity are prerequisites for the entry of species from the Mediterranean into the Black Sea. Fishermen often report exotic species in the Mediterranean caught in nets or trawls, but the fact that there are single species, or dozens, does not mean that they can stay and breed in the Black Sea, or survive the winter.

A presentation by Mr. Costin Timofte from 'Mare Nostrum' NGO followed. It was on: "Consequences from the impact of climate change on biodiversity".

Globally, climate change is becoming the biggest and fastest growing threat to marine biodiversity. Ocean biodiversity has developed in the absence of man-made stressors, such as overfishing, pollution, shipping, habitat destruction and fragmentation, and the invasion of new species. The ocean plays a key role in both mitigating climate change and mitigating the impact of climate change on marine biodiversity. Climate change poses a serious threat to marine life and fisheries, and affects marine ecosystems as well as economies and societies, especially those most dependent on natural resources.

The risk of climate change can be reduced by limiting global warming to 1.5 ° C, according to the UN Intergovernmental Panel on Climate Change.

Mobile /migratory/ species, such as fish, can respond to climate change by moving to more favorable regions, with populations moving to poles or deeper waters to find their preferred range of water temperatures or oxygen levels.

An example is given of the Northeast Atlantic mackerel (Scomber scombrus) and how climate change can affect stocks in unexpected ways. Since 2007 there is a rapid change in the distribution and mode of migration, with stocks moving north as sea temperatures rise. At the same time, this change is leading to disputes between coastal states over the distribution of fisheries resources. This process of moving fish across geopolitical borders leads to a lack of agreement among the countries concerned on how best to manage the stock.

Another example of how climate change can affect stocks in unexpected ways is given by cod (Gadus morhua), which corresponds to the bear in the Black Sea. There is a decline in cod populations in the North Sea, which is largely due to climate change, with this change affecting mostly sexually immature individuals. Accordingly, in 2019, the certification of cod fishing in the North Sea will be suspended.

In the Black Sea basin, the temperature is rising relatively slowly. Long-term data related to the average winter temperature in the Black Sea show synchronous fluctuations with a periodicity of 8 to 10 years, but there is a long-term upward trend of 0.25 ° C. The coastal waters of the Black Sea warmed in the twentieth century and, according to various reports, average annual temperatures could rise by another 2-3 ° C by 2100. Compared to other seas, the biodiversity of the Black Sea is slightly different. Most species (85%) come from the Mediterranean via the Bosphorus.

The following are emphasized in the presentation as major threats to the biodiversity in the Black Sea:

- eutrophication (hypoxia, anoxia);
- damage along the coast;
- non-native species;
- fishing and exploitation of living resources;
- climate change.

As in the presentation of Assoc. Prof. Raykov, a finding was reported that benthic (bottom) organisms are the best indicators of environmental pressure in marine ecosystems (indicators of environmental stress).

Changes in water temperature, pH, circulation and salinity related to climate change will have a direct impact on the biological processes and biota of the Black Sea, affecting species, their distribution and interaction.

The possible effects that would result from rising temperatures in the Black Sea and declining salinity will have a direct impact on the distribution pattern of many native benthic species and thus on their functional role. They can facilitate a more successful chance of more thermally tolerant non-native species. On the other hand, the time of reproduction and distribution of larvae is likely to change in two ways: positive and negative. On the positive side, many benthic species need temperature to rise to a certain size before spawning, and on the negative side, rising sea temperatures are likely to have a negative effect on the reproduction of species that require low breeding temperatures. All these

changes will also affect fishing, because in order to find more favorable conditions, the species will retreat to greater depths.

In the conclusion of the presentation, some recommendations to BlSAC are made, namely:

- Active participation in marine monitoring programs in order to identify ongoing climate change (especially on species of molluscs and fish of economic interest);
- Report any changes immediately;
- Raising awareness of adapting biota to the effects of climate change;
- Active and continuous cooperation between fishermen, research institutes and the administration.

Comments followed:

Mr. Daniel Buhai: Regarding the change in salinity mentioned in the presentation, on what basis is it determined - that the glaciers at the poles are melting and this leads to more fresh water entering the oceans and seas, is this scientifically proven? It is known that there is sufficient mineralization in the Black Sea and for this reason the salinity of the water will not change.

Mr. Costin Timofte: It has been proven, but for the Black Sea this factor will not change the salinity. Even if it is not for the whole world ocean, there will definitely be areas where the salinity of the water will be reduced.

Mr. Yordan Gospodinov: confirms that since the beginning of its activity BlSAC has been constantly cooperating with the scientific community. Sometimes it is very difficult to change the mentality and mindset of ordinary fishermen, but they themselves observe the sea and see some changes and ask scientists what is happening. For example, there was a recent conversation with fishermen about why anchovy catches have been declared in recent years, which were not common on the Bulgarian Black Sea coast before. Ie this migration has been affected by climate change. There are also years when more bonito and lefer are found on the Bulgarian coast.

Mrs. Yordanka Chobanova: The Directorate-General for Maritime Affairs and Fisheries welcomes the work of the BlSAC on the impact of climate on fisheries and the fact that the BlSAC closely monitors the issue and contributes its experience and knowledge to mitigating this impact. The GFCM strategy until 2030 includes climate change in its main objectives. At the 44th session in 2021. A recommendation was adopted to establish measures for the management of sprat at regional level with a view to a future full multi-annual management plan. At the suggestion of the EU, the Working Group on the Black Sea within the GFCM in 2022 is expected to study, analyze and report on the possible climate effects on sprats. The report of the Working Group also includes advice on how to include possible climate impacts on the assessment and advice on the management of sprat stocks. This is the first attempt to gather experts and knowledge on the specific effects of climate on small pelagic stocks in a specific area such as the Black Sea.

Mr. Daniel Buhai: Thank you for the assessment given by DG Maritime Affairs and Fisheries and for the information shared. I would like the BlSAC to participate in the meeting of the Working Group on Black of the GFCM in the meeting on climate change.

Mrs. Mihaela Mirea: The group in question is the Black Sea Group within the GFCM. The program of this Working Group has been announced on the website of the GFCM, and in recent years the BlSAC has been actively involved in its work.

Mr. Yordan Gospodinov: The BlSAC can write a statement of opinion referring to the two presentations made today on the impact of climate change on fisheries and make it available to all fisheries organizations, even non-members.

As there were no other items on the agenda, the meeting was declared closed.

Minutes taken by: Mrs. Elena Peneva

Chairman of BlSAC: Mr. Daniel Buhai