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**Framework Convention  
for the Protection of the Marine  
Environment of the Caspian Sea**

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**CONFERENCE OF THE PARTIES  
Sixth Meeting  
... 2018, Baku, Azerbaijan**

**2nd State of the Caspian Environment Report  
(Note by the interim Secretariat)**

**Introduction:**

The provision of the State of the Environment reporting of the Caspian Sea is set out by the Tehran Convention and its Protocols: The Protocol on Conservation of Biological Diversity; the Protocol for the Protection of the Caspian Sea against Pollution from Land based Sources and Activities; the Protocol Concerning Regional Preparedness, Response and Cooperation in Combating Oil Pollution Incidents; the Protocol on Environmental Impact Assessment in a Transboundary Context.

According to the Convention, the Parties should regularly review and evaluate the state of the marine environment and, in particular, the state of pollution and its effects. The Protocols envisage reporting procedures relevant to their respective thematic areas. In addition, the Strategic Convention Action Programme (SCAP) – a long-term agenda with mid-term perspectives, developed and adopted by the Parties to implement provisions of the Convention, sets clear reporting items.

**Historic overview:**

At its 5th Meeting in Ashgabat, 30 May 2014, the Conference of the Parties to the Tehran Convention "underlining the importance of regular Reports on the State of the Marine Environment of the Caspian Sea (SOE)", "requested the (interim) Secretariat, resources permitting, to coordinate and oversee the preparation of a second State of the Caspian Sea Environment Report (SOE2), based on the principles and guidelines contained in document TC/COP5/6".

At the 1st Preparatory Committee Meeting (PrepCom1) for the 6th Meeting of the Conference of the Parties to the Tehran Convention (COP6), in Baku, Azerbaijan, 24 – 27 November 2014, the Representatives of the Contracting Parties "emphasizing that the ownership of SOE reporting lies with the Governments of the Caspian States", "requested the (interim) Secretariat, in consultation with GRID-Arendal, to initiate the preparation of an outline for the next SOE Report as well as a procedure, timeline and budget for its preparation to be reviewed at an expert meeting, for consideration and approval by the second PrepCom for COP6.

PrepCom2, Baku, Azerbaijan, 31 May – 3 June 2015, agreed with the proposal for the preparation of the SOE2, prepared by the (interim) Secretariat in consultation with GRID-Arendal, and concluded that the preparations should start once funding has been secured.

The first Caspian Sea State of the Environment report was published in 2011. To serve the regularity in reviewing environmental trends, it was proposed that the SOE2 Report shall be published in 2018. The work was made possible by the generous support of BP Azerbaijan.

## Objective and Tasks

The main objective of the State of Environment Report is to assess the current state of environmental and social conditions of the Sea and the adjoining territories.

The report is to serve the Parties as a decision-making tool provided by and aggregated for the Parties based on:

- the state of environment and identified environmental trends,
- social conditions and trends,
- analysis of compliance to the Convention,

The report aims at describing the situation in the whole Caspian Sea basin and making conclusions about environmental trends, analyses compliance to the Convention, and provides recommendations that could tackle challenges around the environmental situation. The report is meant to serve as a decision-making tool provided by the Parties and aggregated for the Parties.

According to the Convention, the report is covering the marine environment of the Caspian Sea, taking into account its water level fluctuations and pollution from land-based sources. The report aims at describing the situation in the whole Caspian Sea basin, based on national expert inputs from the five Caspian states.

It also provides recommendations to address environmental problems and aims at contributing to better public information in Caspian littoral states.

## Methodology

In 2010, the (interim) Secretariat of the Tehran Convention proposed the Unified Reporting Format for the national reporting in the framework of the Tehran Convention and its Protocols. The Strategic Convention Action Plan (SCAP) sets out a clear scope and scale for regular reporting.

The development of the First State of the Environment Report of the Caspian Sea in 2011 was based on the Drivers-Pressure-State-Impact-Response (DPSIR) framework which shows relationships between human activity and the state and trends of the environment and human well-being. To maintain continuity, it was agreed to use DPSIR for the development of the SOE2 Report as well.

The following combination of the three methods was suggested to be used for the State of the Environment assessments:

- Indicator-based assessments
- Literature-based assessments
- Expert elicitation-based assessments

According to the decisions, taken at the PrepCom5 meeting in February 2018 in Geneva, the SOE2 Report should be a country-driven report mainly based on the government nominated expert contributions from all five Caspian countries. The PrepCom5 has adopted the Table of Contents of the SOE2 Report.

## Process

SOE National Experts were appointed by the relevant ministries, agencies, and institutions to collect and process data necessary and for the production of the National Contributions for the SOE2 Report. The national expert teams were backed by the designated National Environmental Information Officers. The activities were funded by BP Azerbaijan through its contract with GRID-Arendal which also provided technical assistance and guidance to the editorial team that, headed by the contracted chief editor (Anatoly Krutov) who was made responsible for merging the National Contributions into a cohesive text. Inputs were also provided by the Working Group on Monitoring and Assessment.

The editorial team, while noting that the national contributions in majority lacked proper referencing of the national sources, developed and presented the draft SOE2 Report to the expert group at their meeting in Baku on June 21, 2018 for review and verification of conformity by the Caspian countries, with the deadline of July 15, 2018 to submit the final edits and comments. All five countries submitted their edits and the final draft of the SOE2 report, cleared by the national experts through the national approval mechanisms, before PrepCom6 for its review and recommendation to COP6.

An executive summary of the final draft SOE2 Report is attached for information.

**Suggested action:**

The Meeting may wish to review and clear the final draft of the SOE2 Report for submission to COP6 with the recommendation that COP6 welcomes the Report and requests the Secretariat to ensure proper publication and dissemination.

**Annex 1****The Report**

The Report of 100 pages contains the Preamble, Executive Summary, Introduction, Methodology, chapters on Drivers, Pressures, State, Impact and Response, Monitoring and Compliance, Participation and Outreach and Measures to address followed by Conclusion and References.

It begins with an introductory brief describing the Caspian Sea's geographical location, climate conditions, morphology as well as general characteristics of hydrology, water quality, biological resources, population, industry and agriculture.

**Drivers**

The socio-economic situation was assessed and the following direct drivers (sectors of economics of the Caspian Sea states) were considered in the chapter: population growth, tourism, fisheries, agriculture, climate change as well as extractive industries such as oil and gas. In addition, attention was paid to shipping, coastal development and sea level fluctuation.

**Population**

The five littoral states have highly uneven population densities surrounding the Caspian Sea. Some regions have high population levels such as big urban centres like Baku whereas other regions are sparsely populated.

In general, there is an increase in the population and its density in the region for the subsequent years and, most rapidly growing population of urban centres with a simultaneous decline in the population of agricultural and rural regions. The biggest increase in the population was recorded on the North-Eastern part of the Caspian coast. The population grew by almost 20 percent from 2009 to 2016. National Contributions report that the changes in the population are due to both the increase of the population growth rate and population migration from rural to urban areas. The population also fluctuates following the seasons. Starting from April to September visitors occupy touristic centres on the West and South coasts. In general, the population growth reflects and coincides with the growth of its well-being in the five littoral countries. However, due to the vast area which is roughly the size of Western Europe, the density of population here is one of the lowest in the world.

**Tourism**

The riparian countries heavily rely on the export of natural resources. They are all currently involved in the development of oil or gas fields or extracting oil or gas in the Caspian Sea. However, they are all acknowledging the need to focus on the diversification of their exports and economy. They diversify their economies by investing in non-oil sectors like agriculture and processing industries and expanding tourism sector. Nowadays, tourism becomes an importance to the economies of the Caspian littoral states. The travel and tourism industry contribute a few percent to GDP in each nation and the total contribution to each country is estimated above 5 percent in all countries.

**Fisheries**

The fisheries sector in the Caspian littoral states remains important for many rural communities living alongside the Caspian shore or rivers flowing into the sea. It contributes to the overall

economy providing employment and food for the local population. In comparison with the preceding period, the total catch decreased. This forced countries to find ways to compensate the losses. Therefore, acceleration of the development of aquaculture is noted and the increase in the catch in other water bodies.

### **Agriculture**

Agriculture is also an important sector impacting the state of the Caspian environment, as well as national food security and employment, especially in rural areas. The National Contributions report that the aggregate volume of agricultural products and the sector's contributions to GDP increased during last years.

### **Climate change**

According to the Coordinating Committee for Hydrometeorology and Monitoring of Caspian Sea Pollution (CASPCOM), the global warming has also affected the region of the Caspian Sea. The average air temperature has increased over the last 30 years (1987-2016) compared to the average temperature in 1961-1990 (CASPCOM). Water temperature of the Caspian Sea rose followed the air temperature increase. The increase in the temperature of the surface layer of water contributed to the weakening of winter convection. Thus, the warming generally negatively affected the mixing of water and in its turn decreased the feeding of the upper layer of marine waters with biogenic elements (IPCC 2013).

Alternation of dry and cold years with moist and warm is the optimum for maintenance of high bio-productivity of the Caspian Sea. However, global warming has disrupted the natural optimum. During preceding period dry years coincided with warm years. This combination of heat and dry was particularly unfavourable for the bio-productivity of the sea was the period 2006-2015.

Previously unseen combinations of factors will cause serious problems in the future. This highlights the necessity for reducing human made pressures on ecosystems, increasing adaptation capacities in all countries, and sustainable bio-resource management.

### **Pressures**

Fishing, non-living resources, agriculture, run-off, air emission, solid waste, tourism

Dependence on natural resources in the Caspian Sea for livelihoods is common among coastal communities throughout the Caspian region. Fishing is of great importance to these communities and the ecosystem upon which the fisheries industry relies have been influenced by a variety of factors over the years. Sustainable management of fisheries requires an understanding nexus of multiple factors, including natural conditions such as hydrological regime, sea level fluctuations, and direct human actions such as pollution, invasive species, construction of dams and various fishery policies.

Overfishing has been a persistent problem for many years, causing the depletion of several types of fish stocks in the Caspian Sea. On top of this, National Contributions report unanimously that overfishing and illegal fishing in particular exacerbates existing vulnerabilities from natural and anthropogenic influences.

The Caspian basin contains a significant amount of oil and gas resources. Future growth in the oil and gas sector is expected to come from offshore fields in the Caspian Sea. Significant reserves of oil and gas are concentrated on the western, northern and eastern seaside. The oil and gas sector has paid particular attention to sound management practices, including operational standards and safety measures. However, increased transport of petroleum resources and associated extraction materials, due to investments in current and future oil and gas projects, continues to be of concern as potential risks to the environment.

Natural factors also contribute to increased risk in oil and gas extraction and transportation in the Caspian Sea. These can be storms, the ice conditions in the Northern Caspian, sea level change, surges, extreme waves, flooding of coastal zones, and earthquakes. Additional challenges are mud volcanoes, frequently difficult weather conditions, high-pressure reservoirs, minimal pore pressure ranges, drill-hole instability problems, unstable sediments and shallow-depth drilling hazards. There are also considerable risks and challenges posed by anthropogenic activities such as: accidents from tankers or oil platforms, damages to offshore pipelines, enforcement of rules and regulations related to construction, repair or manufacturing of equipment, possible mistakes by operational and maintenance personnel, and various criminal activities including terrorism and sabotage among others.

The specific characteristics of the Caspian Sea make it vulnerable to external shocks, including oil and gas production, ports rehabilitation and construction, offshore pipeline lay, dredging, and etc. These conditions pose special challenges to confidently assess the risks of various developments. The benefits of oil and gas extraction and pipeline construction will always have to be weighed against the detrimental consequences for ecosystems and biological life in case of contamination from this industry.

Agriculture is one of the most important sources of pollution worldwide and this is also the case in the Caspian littoral states. Issues related to harmful pesticides, fertilizer use and poorly treated livestock waste are widespread. According to the National Contributions, the latter two might have contributed to eutrophication in the Caspian Sea.

Almost 90 percent of the total pollutants enter the Caspian Sea with river runoff. The runoff polluted by industrial, communal and agricultural wastes. And more than 85% of surface freshwater runoff flows into the Northern Caspian. A large number of chemical compounds, including anthropogenic origin, enter the sea with river runoff, including toxicants. However, hydrocarbons (crude oil and petroleum products) remain the main pollutants. The main sources of hydrocarbons are oil transportation and water transport, seepage from the seabed, industrial discharges as well as leaks from coastal oil developments and operations of oil and gas wells .

The Caspian region is a large contributor to air emissions, including greenhouse gas emissions which are particularly linked to the energy sector and oil and gas extraction, but also the transportation and housing sectors.

Waste generation varies across the region. Although some countries may experience stagnant levels of waste generation there are others with increasing levels due to higher consumption patterns and increased urbanization as more people move to the cities. Most of the littoral states inherited a relatively well-organized household waste collection system, which serves as a basis to prevent littering the local marine and terrestrial ecosystems. However, the common practice of solid waste management is landfills which provide limited options for recycling valuable secondary materials.

The tourism industry has both positive and negative environmental impacts. Loss or degradation of cultivatable land, solid waste and waste-water discharges are a few possible negative impacts on environment. Tourism can negatively affect purchasing power of locals and increase pressures on society through intensive visitation causing stress on local resources and people. At the same time, tourism might contribute to preservation if the quality and sustainability of the natural environment is pivotal for the existence of the industry. It might also increase employment and business opportunities, upgrade infrastructure, attract investment, increase awareness and attract funding for environmental or social purposes.

## **State**

The Caspian biodiversity serves as indicator of overall environmental quality and impacts of anthropogenic pressures. In this respect, the measured indicators can be the trends in the number and species composition of biocenosis. National Contributions report that the number and biomass of zooplankton have decreased in the Middle and in the Southern parts of the Caspian Sea. This

adversely affected the formation of hunting resources of fishes feeding zooplankton and zoobenthos.

In 2015, the biomass and number of *Mnemiopsis leidyi* on the western coast of the Southern and Central Caspian region has been the highest in all observed years. This adversely affects the formation of hunting resources of fishes feeding zooplankton and zoobenthos.

The interannual dynamics of the taxonomic composition and quantitative indicators of macro-zoobenthos in the north-eastern part of the Caspian Sea is subject to slight fluctuations and the qualitative and quantitative indicators of macro-zoobenthos in recent years are within the limits of fluctuations of long-term values

Unsustainable seal hunting, even prohibited by law is the main reason for the Caspian seal decline coupled with loss in breeding ground, loss in habitats and decline of primarily food resources. It is also believed that climate change, sea level raise and industrial pollution are contributing to extended pressures.

There is a steady decline in commercial stocks of valuable fish species in the Northern Caspian over the period from 2010 to 2016. Fisheries and the fishing industry are both in decline in the Caspian Sea. This was confirmed by upward trend observed in fishing in all the Caspian states (National Contribution).

The main sources of information on of the state of the water and bottom sediments quality in the basin of the Caspian Sea are the national Hydromet Services. National Hydromet Services work according to their guidelines and methodologies conducting observations and producing hydrochemical analysis. In most of the cases the methodologies as well as the instrumentation, and the list of indicators are not harmonised, and it is difficult if impossible to compare them. Another source of information is reports by companies and enterprises, such as oil producing, oil refining, chemical industry, and etc.

All of the National Contributions indicates the deterioration of the seawater quality. They report that one of the main sources of pollution entering in the Western sector of the Caspian Sea is the river flows. Many of rivers receive communal, agricultural, and industrial waste waters. A significant cause of the decline in quality of the seawaters is the increasing domestic discharge from developing coastal cities and settlements with an almost complete absence of sewage treatment facilities.

Analysis of the monitoring results in 2016 - 2017 showed an increase in the concentration of pollutants in both the Northern as well as in the North-Eastern parts of the Caspian Sea. According to national Hydromet Services, the amount of pollutants in the river runoff increased, in particularly this is true for the Volga River (National Contribution). An increase in the concentration of oil products was also observed in the areas of deposits.

According to the national Hydromet Services, seawater of the South-East sector of the Caspian Sea contains high concentrations of petroleum hydrocarbons and phenols, ions of heavy metals, and at the same time a lower content of dissolved oxygen.

Various agencies involved in air pollution monitoring in the Caspian Sea littoral states. However, there is no a unified system of the air quality monitoring in the region. Monitoring is fragmented, and data collected by the countries in most of the cases is disparate.

Air monitoring activities and its frequency are unevenly distributed across the region. Therefore, it remains difficult to assess air quality in the coastal zone of the Caspian Sea. However, all countries confidently note that transport and industrial emissions are the main sources of air pollution. The major concerns of the countries about air quality are attributed to the industrial areas and urban centres. One of the bigger challenges for the region is the change from stationary to mobile sources

– where over the last decade mobile sources have had a much bigger percentage of the total air pollution.

Air pollution makes major impacts on human and environment health as well as contributes to increasing climate change. It is clear that the littoral states recognize the importance of air quality monitoring. However, understanding the effects of air pollution on human health and climate change and attempts to improve monitoring systems has not yet led to the development of air quality policies, strategies and action plans.

The complexity of hydrochemical processes in the water column is become greater with the presence of sediments deposited on the bottom. Moreover, the impact of adsorbed pollutants of various nature, including hydrocarbons, ions of heavy metals and organic matters has not yet been sufficiently studied to make conclusions or assess the quality of bottom sediments. Due to this reason, there is no single approach to the regulation of toxicity of bottom sediments pollutants.

Until now, most often evaluation of trends and assumptions about the possible impact of pollutants in bottom sediments on biotic community were made when it comes to the pollution of bottom sediments. In various countries, attempts are being made to reach agreement on the magnitude of the toxic effects of sediments but there is no single approach to such an assessment to this day.

The information available to the countries was disparate because different pollutants were analysed and the series of observations are too short to reveal statistically significant trends. It only allowed for assumptions about pollution trends of the bottom sediments in the Caspian Sea. The ranges of the concentration of pollutants in the samples were sufficiently wide and practically independent of the sampling sites.

National Contributions indicate that the pollution of bottom sediments in the North-Western sector of the Caspian Sea is determined by lithodynamic processes due to which suspended solids are being transported from the mouth of the rivers to the deep-water basin of the Middle sector of the Caspian Sea. The adsorbed pollutants are transported together with the suspended solids.

According to the National Contributions, concentration of organic pollutants in the North-Western part of the Caspian Sea is insignificant. Comparison of ranges of variability of the main indicators of bottom sediment contamination in areas of oil and gas deposits with the background showed that the values of most indicators do not go beyond the background.

According to the National Contributions, environmental measures taken recently have significantly reduced the concentration of pollutants, including petroleum hydrocarbons in bottom sediments in the Eastern sector of the Sea. A somewhat different picture of pollution of bottom sediments is formed in the South-Western part of the Caspian Sea. There is an increase in the concentration of ions of metals in this sector of the Sea. This leads to the degradation of wetlands.

### **Impact**

The Caspian region, due to its heavy reliance on oil and gas exports, is susceptible to changes in global energy prices and natural conditions such as climate change. The Caspian Sea has already experienced pollution caused by the oil and gas sector and continues to experience a deteriorating environment caused by contaminated river runoff as well as by refining, transport, agriculture, and communal services which put pressure on the environment by contaminating water and air. Abandoned wells are another potential threat for the environment which should be taken into consideration.

According to National Contributions, there has been a decline in legal fishing activities due to a combination of depleted resources and complicated attempts to privatize the sector. Overfishing in the Caspian region, low pay in the legal sector and high payoff from poaching has resulted in many artisanal fishers moving to poaching and the lucrative black market. Although the rate of illegal fishing is reported differently in the littoral states and the rate of illegal fishing differs it is undeniable



that the changing pattern of fish stocks has an effect economically on the fishing industry for communities surrounding the Caspian as well as the livelihoods of fishers. This can be seen throughout all the Caspian coastal regions surrounding the Caspian Sea.

Sea level fluctuations have been occurring in the Caspian Sea continuously. These changes threatened existing settlements, industrial, cultural and household objects. The regulation of rivers also played a negative role in the fact that the runoff of nutrients and mineral salts, especially phosphates, sharply decreased, without which the primary production of the sea and, together with it, the food base cannot be significantly increased. National Contributions highlighted that a rise in the Caspian Sea level would have a negative impact on human settlements, industry, and infrastructure as well as on the unique coastal biomes.

The climate of the Caspian Sea has an obvious impact on the biodiversity and bioresources of the entire region. However, it is rather difficult to foresee the impact of climate change on the bioresources of the Caspian Sea due to the lack of specific tools for prediction. If the climate of the region becomes hotter and drier this will lead to an increase in water salinity and changes in the food chain.

The impact of climate change on agriculture is increasing and has the potential to negatively affect the major part of the population of riparian countries that relies on the agricultural industry for their livelihood.

The Caspian Sea is positioned between two large trading areas with the Asian market to the East and the European to the West. The geographical location, oil and gas resources and current political situation are all influencing the current growth in the shipping industries connected to the Caspian Sea. Ports on the Western coast have been important ones for a long time. All five riparian countries are increasing their focus on the potentials of the sea and currently are paying particular attention to the expanding their transport infrastructures, shipping industries and related ports and to the development of pipelines.

Oil and gas as well as transportation sectors have particular attention for sound management practices, including operational standards and safety measures. However, increased transport of petroleum resources and associated extraction materials due to investments in current and future oil and gas projects continues to be a particular concern due potential risks to the environment. Pipeline projects stretching between the Eastern and Western coasts and have significant environmental impacts. The fact that accidents of various sizes occur on a regular basis is a significant challenge for protection of the environment in the area largely because details are often unknown.

## **Response**

There is the visual progress in implementation of the Tehran Convention during the preceding period. The Protocol concerning Regional Preparedness, Response and Co-operation in Combating Oil Pollution Incidents was adopted signed in Aktau, Kazakhstan on August 12, 2011. It was ratified by all Parties and entered into force on 25 July 2016. The Protocol for the Protection of the Caspian Sea against Pollution from Land-based Sources and Activities was signed in Moscow, Russian Federation on December 12, 2012. The Protocol for the Conservation of Biological Diversity was adopted and signed in Ashgabat, Turkmenistan, on 30 May 2014. The Protocol on Environmental Impact Assessment in a Trans boundary context was adopted and signed at the extra-ordinary Meeting of the Conference of Parties to the Convention, in Moscow, 20 July 2018. A Program for Monitoring the Environment of the Caspian Sea was developed, and a Working Group on Monitoring and Assessment was created to oversee and coordinate its implementation.

The formation and formulation of priorities of the regional governance is in progress. It is in the stage of forming the basis and paving the way towards institutionalization of the governance. In this respect, the most important achievement is the signing and ratification of the Convention and protocols as well as adaptation of the national regulations.

Regional governance implies the institutionalization of the process including the establishment of a management structure and consolidation of the basic rules of its operations. The progress in establishing a structure, the formulation of functions and determining tasks, development of functioning rules largely depend on the intentions, aims, and targets set by the parties of the Convention.

With regard to governance at the national level, the countries of the former Soviet Union inherited a fairly well-formed institutional structure, including legislative and regulatory framework, as well as governance institutions which in the course of time continue to improve. Thus, new laws have been amended or adopted in countries in recent years, and the process of optimization of managing structures continues.

### **Monitoring and compliance**

It is widely recognized that environmental protection, understanding of pressures, state, impact and response of ecosystems and the development of measures to prevent or mitigate undesirable changes should be based on a properly arranged monitoring and compliance system. The required institutional structures, including legal base and management systems are in place in all five riparian countries. Monitoring and compliance systems have been established and operationalised.

### **Participation and outreach**

There are a large number of active non-governmental organizations, universities, environmental associations and societies (geographic, bird conservation, nature protection), local student organizations, and environmentally oriented children's educational institutions, volunteers as well as public organizations are engaged in a variety of environmental activities in the riparian countries. In most of the cases, their activities are closely linked with the activities of the relevant governmental organizations.

Nongovernmental organizations are mainly focused on education, scientific research and awareness rising and rarely participate in the public monitoring and control. Their role and participation in EIA procedures, sociological studies, etc. is rising but still insignificant.

### **Measures to address**

Measures to be address were formulated by Iran and Turkmenistan. It was suggested to conduct EIA for all projects which could potentially impact the Caspian Sea environment and or distort the ecological balance. It was also proposed to develop very concrete and coordinate national strategies and precise and detailed action plans to address local problems, including those related to the waste water treatment, development of conservative agriculture free of harmful chemicals to crop organic products, introduce of harmonised national standards for quality control of agricultural products.