Biodiversity of the North East Caspian Region
variations, long-term sea level change, short-term surges and retreats, high levels of turbidity and sediment movement, ice cover in winter and scouring of the seabed by moving ice. This dynamic environment presents challenges for those who live and work in the area, as well as means that the fauna and flora on land and at sea are adapted to a significant level of environmental stress from continually changing physical conditions. The widely varying conditions in the North East Caspian, including several species that are classified as endangered, are recognized for their national and international importance. The concession area lies in a region of rich biodiversity, including several species that are classified as endangered, including several species that are classified as endangered. This brochure has been produced on behalf of the consortium developing the hydrocarbon deposits beneath the North East Caspian defined under the North Caspian Sea Production Sharing Agreement of 1997.
The Caspian Sea is the largest enclosed body of water in the world. Bordered by Iran, Russia, Kazakhstan, Turkmenistan, and Azerbaijan, the Caspian Sea can be divided into three distinct physical regions: shallow northern, medium middle, and deep southern. The northern Caspian, covering a quarter of the sea's total surface area, is the shallowest, with an average water depth of 3-6 meters, accounting for less than one percent of the sea's total volume. The middle sector, averaging 190 meters in depth, and the southern sector exceeding 1,000 meters are much deeper. Over 130 rivers flow into the Caspian, with the Volga River, the largest in Europe, draining 20% of the European land area and 80% of its freshwater inflow. As a result of its low salinity, shallow waters, and subarctic temperatures, the northern part of the Caspian Sea freezes in winter. The Caspian region is climatically diverse, encompassing the Volga and Ural rivers in the north, the hot and arid plains of northern Kazakhstan and Turkmenistan in the east, and the humid Caucasus and Elburz mountains in the south-west. In recent years, contrasting rainfall trends have been observed in the surrounding regions. While rainfall over Russia has increased, already dry areas such as the coasts of Turkmenistan and Iran have become even drier. Scientists have noted variations in Caspian Sea water levels, suggesting that recent changes may be a result of seismic activity.
Biodiversity

The Caspian Sea and its environs are rich in biological diversity. A mosaic of unique ecosystems and habitats support many endemic species, a number of which are protected or endangered. The biodiversity of the Caspian's unique aquatic environment is a result of millions of years of isolation from the world's oceans and the lower salinity properties of the sea, in which both fresh water and salt water species have evolved. The northern Caspian and the lower salinity properties of the sea, in which both fresh water and salt water species have evolved. The northern Caspian and the lower salinity properties of the sea, in which both fresh

The Caspian is home to many unique species, including the Caspian seal and the rare beluga sturgeon. The region includes two important wetlands, the Volga and Ural deltas, which provide habitats for migrating birds and endemic species. The Caspian Sea and its environs are rich in biological diversity.
Flora and fauna (number of species/species in the RoK Red Data Book):
• Plants: 229 (54)
• Mammals: 125 (41)
• Reptiles: 20 (9)
• Birds: 466 (63)
• Fish: 133 (27)
As well as being rich in biodiversity, the Caspian Sea lies above some of the largest oil and gas deposits in the world.

The North Caspian Sea Production Sharing Agreement (NCPSA) provides a framework for the exploration and production of oil and gas within a 5,600 square kilometres area in the Kazakhian sector of the Caspian Sea.

Developed by a consortium comprising several of the world's biggest energy companies, the combined safety, engineering, logistics and environmental challenges make this the most complex project in Kazakhstan - one of the largest and most prestigious field developments worldwide. The combined safety, engineering, logistics and environmental challenges make this the first offshore project in Kazakhstan - one of the largest and most complex industrial projects being undertaken anywhere in the world.

As well as the giant Kashagan field, currently under development, other discoveries within the contract area and currently under other discoveries within the contract area and currently under development include the Kalamkas, Aktote and Kairan fields.

The North Caspian Sea Project
The company pursues a policy of environmentally responsible operations that includes monitoring stations in the Atyrau region, where the oil is to be produced and re-cycled, to ensure that the process is efficient and cost-effective. All discharges produced by the drilling process are in line with a policy of zero discharge into the Caspian. In order to minimize environmental impacts, impact assessments are carried out during offshore and onshore development, identifying the best solutions to adopt. The company's policies are guided by Regulators and Standards, and its agents and contractors are required to maintain high environmental standards. The environmental protection activities are guided by an environmental protection plan that is approved annually by the Ministry of Environmental Protection. Since the establishment of the original consortium in 1993, extensive onshore and offshore environmental monitoring programmes have been carried out. These include a number of extensive surveys and offshore environmental monitoring programmes, providing critical information to inform and improve coastal ecosystems in the Caspian region. The company pursues a policy of no routine flaring.
Between 1993 and 2010 the consortium completed 36 separate offshore environmental monitoring surveys. The surveys were carried out at 900 individual offshore locations.

Data collected during surveys covers water quality (salinity, nutrients, metals), bottom sediments quality (metals, total hydrocarbons and biological data (micro-organisms, phytoplankton, zooplankton).

Surveys performed between 2003 and 2010 showed that seawater quality at monitoring locations was relatively constant. However, scientists did note a very low pesticide presence which was attributed to inflow from the Volga and Ural rivers, around which significant agricultural activities occur.

The surveys demonstrated that the quality of sediment in all areas in the northern part of the Caspian is positive, ranging from the designation ‘fair’ to ‘excellent’.
Between 2001 and 2010 the consortium completed 30 separate onshore environmental monitoring surveys. The Caspian onshore area has a long history of oil production, so the scope of the onshore surveys also takes into account historic activities/data as well as current activities of nearby oil and gas developments.

The main parameters for soil analysis were heavy metals and organics. The results show a general improvement in soil quality since 2005.

For groundwater surveys, in addition to heavy metals and organics, scientists monitor chemical-physical characteristics as well as the concentration of nutrients. The groundwater quality in the area from 2005 to 2010 was considered to be poor, mostly due to the concentration of nutrients. The groundwater quality was also impacted by local salinity of the water.

Environmental data collected since 1993 is stored by the consortium in a central database linked to a geographical information system. This system allows for mapping exercises and various types of scientific analysis. The collected information has been incorporated into an Environmental Sensitivity Map covering all of the North Caspian. The map is used to promote effective coastal zone management and regional development policy where applicable.

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Environmental Sensitivity Maps 1999 – 2010

Groundwater monitoring
• Sampling points: 78
• Chemical analyses: 7,419
• Long-term reference points: 25

Soil monitoring
• Sampling points: 226
• Chemical analyses: 30,061
• Long-term reference points: 15
• Soil monitoring points: 78

The map is used to promote effective coastal zone management and regional development policy where applicable.
The consortium seeks to improve its knowledge of the environment in which it operates and thus limit its impact on the Caspian Sea bi-resources. Its annual Environmental Protection Plan identifies a variety of projects.

The Caspian Sea is situated on major migratory routes for many birds, the majority of which are from the Siberian-Asian region. In autumn the birds concentrate on the north-east and northern coasts of the Caspian. Gradually, they move along the western coast towards the south. The Ural and Emba rivers are also important migratory paths. During spring, the migration routes move back in the opposite direction.

When migrating birds rest and look for food in the coastal reed beds. Swans, geese, ducks, sandpipers and other water and marsh birds also nest and brood in these areas. This coastal area is considered to be the most sensitive.

In Kazakhstan, 31 species of birds living along the coast or coastal areas of the Caspian Sea are included into the Red Data Book. Most of them live in aquatic and coastal ecosystems, such as the pink pelican, the Dalmatian pelican and white-tail eagle.

Starting in the year 2000, the consortium has made annual observations of bird species in the Mangistau and Atyrau regions in order to better understand wintering activities, seasonal migration and the impact of oil production on the environment.

In 2004, the consortium conducted surveys to identify the most sensitive bird species and areas in these regions. The coastal area is being monitored to discover new species and to map their distribution. The use of thermal imaging provides real-time data, which can be recorded and analyzed for future reference.

In 2009, the consortium organized an international scientific symposium in Atyrau dedicated to the Caspian seal, the only marine mammal in the Caspian Sea. The symposium was the first of its kind in Kazakhstan and featured experts from around the world.

In 2010, the consortium conducted the sixth annual seal survey to determine the number of pups born and the distribution of the breeding population. Satellite tracking was also used to record the movement of adult and juvenile seals.

The Caspian seal population has been declining over time, from an estimated number of 1.1 million in 1975 to a mere 11,000 in 2005. The Caspian Sea is the only marine mammal in the Caspian Sea and its conservation is of utmost importance.

The consortium has supported yearly scientific programmes since 2000, which are intended to increase understanding of the Caspian seal. These programmes have improved knowledge of the species and its habitat, providing valuable information on the population size and distribution.

The symposium was first of its kind in Kazakhstan and featured experts from around the world. Conservation experts have attributed the decline in seal numbers to a combination of factors. The most important factor is commercial hunting, which has been ongoing for over a century. Other factors include habitat degradation, pollution, diet changes and declining fish stocks.

Ice breaker traffic through winter breeding grounds can disrupt mother-pup interactions. Mitigation measures being pursued by the consortium include trained seal watchers on board every vessel, the use of thermal imaging at night, and avoiding known breeding areas.

The Caspian Seal is the only marine mammal in the Caspian Sea, and its conservation is of utmost importance. The consortium seeks to improve its knowledge of the environment and thus limit its impact on the Caspian Sea bi-resources.

Biodiversity management

Bird Monitoring

Between 2000 and 2009, the consortium conducted 31 separate surveys to better understand wintering activities, seasonal migration and the impact of oil production on the environment.
There are 25 different types of sturgeon in the world mainly in the Black Sea, Sea of Azov, Lake Baikal, the Mississippi River and the Caspian Sea.

The Caspian Sea is home to five of them: beluga, Russian sturgeon, Persian sturgeon, starry sturgeon and fringebarbel sturgeon. They are all classified as 'endangered' by the International Union for Conservation of Nature.

Just like salmon, all sturgeons reproduce in freshwater. The construction of large dams on the Kura (1950s) and Volga (1960s) blocked up to 90% of the natural spawning grounds. This soon led to depletion in fish numbers.

The Ural River is now the only river with no dams and therefore suitable for sturgeon reproduction. The beluga sturgeon normally reproduces 500 to 800 kilometres from the river mouth. Once fertilised, eggs transform into very small sturgeons and in a few months, as they grow, drift and swim towards the river mouth. After some time they grow large enough to enter the river mouth. Once they reach the river's mouth, they undergo metamorphosis into large sturgeons suitable for reproduction. The beluga sturgeon is the only sturgeon with no cannibalism.

Overfishing and illegal fishing throughout the Caspian have had a dramatic impact on sturgeon population. Since the 19th century sturgeon stocks have been overfished for their eggs which are processed into caviar. In response to this threat, the Convention on International Trade in Endangered Species (CITES) and the United Nations Development Programme (UNDP) initiated a project with the United Nations Development Programme and CaspEco, the RoK and Russian Federation Spawning Grounds Working Groups and local and international experts to assess the status of the Caspian sturgeon stocks and to develop strategies to restore the population.

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Integrated Coastal Zone Management

In collaboration with both national and international scientific experts and organizations, Phase I agent company Agip KCO has developed a management masterplan for Kazakhstan’s North Caspian coastal zone.

The masterplan is based on extensive environmental monitoring carried out in the North Caspian. Its main objectives are:

1. To create the baseline ('zero' scenario) of the environmental and socio-economic context
2. To develop coastal zone future scenarios at short-term and long-term scale
3. To assess environmental criticalities
4. To develop guidelines towards biodiversity protection
5. To develop economic and socio-economic cost-benefit analyses
6. To develop adaptive management strategies
7. To develop an innovative governance framework
8. To develop a management strategy for coastal ecosystems
9. To develop environmental monitoring
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The letter received from the United Nations Environment Programme states:

"We would like to express our appreciation for the extensive work undertaken by the Caspian International Seal Survey in the region. The Caspian seal is an important indicator species for the health of the ecosystem. The survey provides valuable data on the distribution and abundance of seals, which is crucial for understanding the impacts of human activities on the Caspian Sea. We support the efforts of the Caspian International Seal Survey in raising awareness of the importance of conserving marine biodiversity and promoting sustainable practices in the region.

Frits Schlingemann, Interim Secretary of the Tehran Convention
Parvin Farshchi, Caspian ECO Project

The Caspian International Seal Survey has contributed to our understanding of the population dynamics of the Caspian seal. This information is essential for effective conservation and management strategies. We look forward to continued collaboration with the Caspian International Seal Survey to ensure the long-term survival of this unique species.

Karen Koopman, Executive Director of the United Nations Environment Programme"
Seismicity

Earthquakes in the Caspian area are directly related to the subduction of the South Caspian plate which belongs to the Arabic plate and “plunges” below the North Caspian plate.

Historically, seismic activity in the Caspian is largely concentrated in its southern and middle parts and in the area of the Apsheron peninsula, where the two plates meet.

The northern part of the Caspian Sea is considered a tectonically stable region, and one of the Earth’s least active earthquake areas.

Nevertheless, the consortium is aware of the risk of earthquakes, and facilities are designed to minimize associated risks to ‘as low as reasonably practicable’, the internationally recognized framework for deciding on the level of investment needed for safety programs.

Issues from the past: abandoned wells

The history of oil exploration in the Caspian Sea dates back to the late 19th century and it is inevitable that there are certain issues from the past.

While estimates vary, it is acknowledged that there are several hundreds of abandoned wells in the coastal area of the Caspian. A significant number of old wells have been abandoned due to the rising water levels of the Caspian. The current condition of these wells is uncertain and it is expected that some are leaking.

The consortium appreciates ongoing government efforts to manage this legacy issue.

From the past: abandoned wells

From North East Caspian Marine Study 1994-2006

From North East Caspian Marine Study 1994-