APPENDIX 6D

Caspian Seal Report

Appendix 6D
Caspian Seal Report

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1 Review of Seal Studies in the Azerbaijan Area of the Caspian Sea

1.1 Introduction

This review has been prepared by Dr. Tariel Eybatov, leader of the Darwin Caspian Seal project Azerbaijan research group, with additional input from Dr. Simon Goodman of the University of Leeds and includes an overview of the following:

- The existing programmes and projects associated with Caspian seal monitoring across the Caspian Sea;
- Current status, trends and survey findings as reported at the International Caspian Seal Seminar 2009;
- Results of surveys undertaken in the Azerbaijan sector of the Caspian Sea between 1971 and 2009;
- Observed seal activity within the Shah Deniz Contract Area; and
- Conclusions.

1.2 Background and Overview of Existing Caspian Seal Programmes and Projects

The Caspian seal (*Phoca Caspica*) is endemic to the Caspian Sea and has been listed on the IUCN red list as 'Endangered' since October 2008 (see http://www.iucnredlist.org/apps/redlist/details/41669/0 for full citation). The Caspian seal population has decreased by more than 90% since the start of the 20th Century and continues to decline, considered to be due to commercial hunting, habitat degradation (through introduction of invasive species), disease, industrial development, pollution and fishing operations using nets. Historically, the population of Caspian seals was estimated to have exceeded one million. In 2005 it was estimated that the total population was approximately 111,000 (Ref. 1). Subsequent surveys (Ref. 2 and 3) of Caspian seal pup numbers carried out on the winter ice-field in Kazakhstan territory (the primary breeding ground for Caspian seals) have reported further reductions in population as a result of reductions in pup production[1].

The Caspian seals distribution throughout the Caspian Sea is dictated by migration patterns. Migration routes are illustrated in Figure 1.

They typically spend the summer months in the Central and Southern Caspian, migrating northeast in the autumn (October – December). Females typically give birth in the early winter (mid-January to late February) on ice at haul out sites in the Northern Caspian and pups enter the water around late March. Migration to the south begins around April to May. It should be noted that the Caspian seal is a transboundary species which migrates throughout the whole of the Caspian over an annual cycle. As such there is no exclusive Azerbaijan population although the species does make use of Azeri waters at different times of the year.

Modern post-Soviet studies of Caspian seals began after 1997 in response to the high mortality of the species observed that year. This event led to the World Bank sponsored ECOTOX Project[2] (2000-2002) (Ref. 4) being established to investigate the causes of seal mortality in the Caspian. The ECOTOX Project established that a further high mortality event in 2000-2001 was the result of the Canine Distemper Virus (CDV) (Ref. 5) although deaths caused by other causes including fishing nets and the commercial hunting of newborn pups were also noted to be contributing to declining seal populations.

The Caspian Seal Conservation Network (CSCN) was established in 1997 as part of the World Bank's developing Bioresources Network and developed further throughout the ECOTOX Project to facilitate communication between seal biologists in the Caspian region and to facilitate inter-country cooperation in research projects relating to Caspian seals. The CSCN was adopted as a working network at the Darwin Project's (see below) initial meeting in 2006.

The Caspian Environmental Programme (CEP) was set up in 1998 with the backing of the five Caspian littoral states (Iran, Azerbaijan, Russia, Kazakhstan and Turkmenistan) to establish procedures for the conservation, management and sustainable development of the Caspian environment. A number of subsequent surveys and projects have been set up specifically in relation to the Caspian seal including:

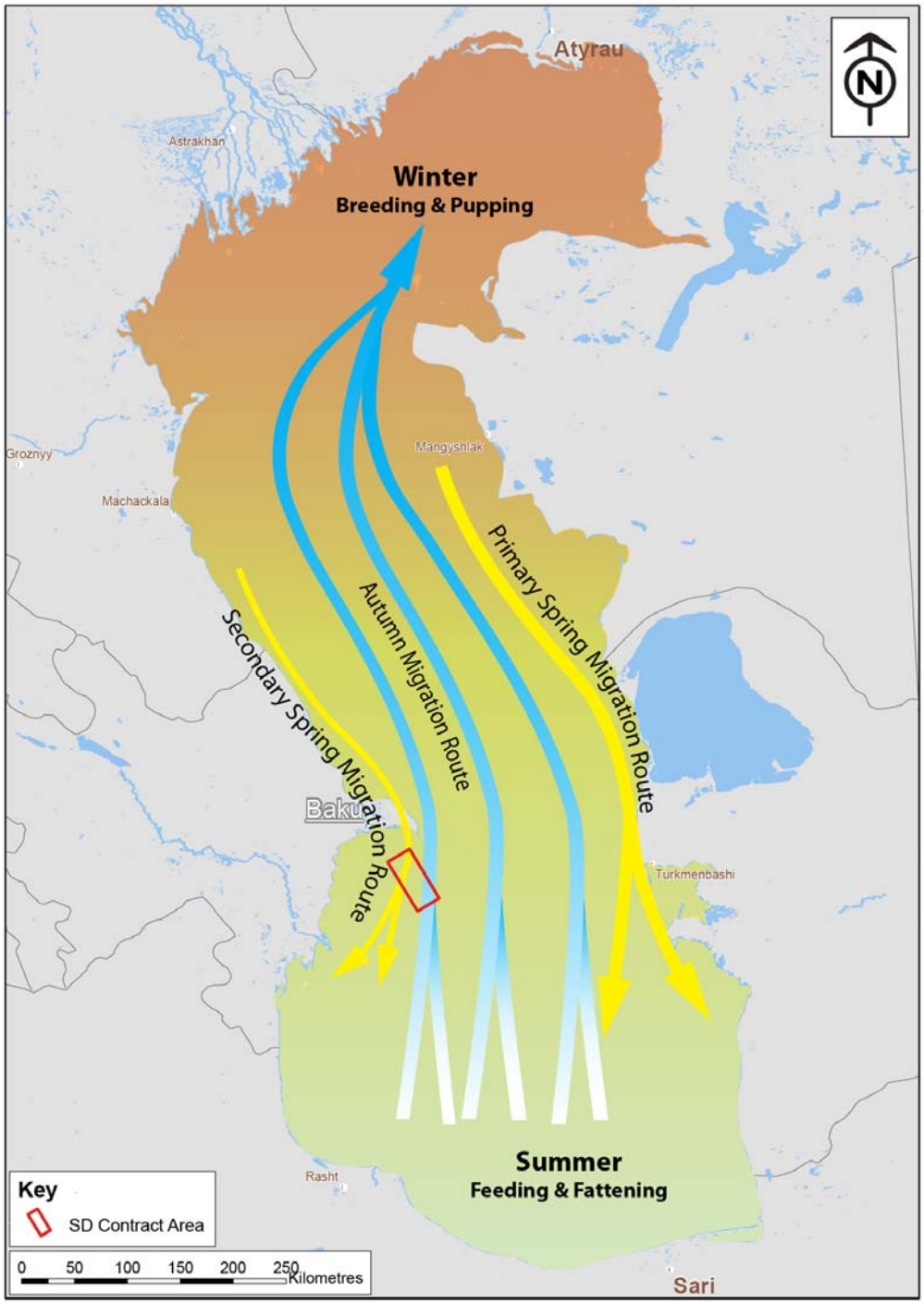
- The (Darwin) Caspian Seal Project - the project aims to establish population monitoring, assess threats,

[1] The reports from the latest surveys do not provide estimates for the total population of Caspian seals.
2 Ecotoxicology Study: Investigation into Toxic Contaminant Accumulation and Related Pathology in the Caspian Sturgeon, Seal and Bony Fish.

develop conservation action plans and educate local communities. In addition to specialists located in the Caspian states, support is also provided from specialists in seal science from the international community, currently from the UK, Sweden, Estonia and Russia. Since 2006 the Caspian Seal Project has received financial support from the UK Government Darwin Initiative and the Kazakh Fisheries Research and Production Centre; and

- The Caspian International Seal Survey (CISS) - the CISS comprises a number of research teams from Iran, Azerbaijan, Russia, Kazakhstan and Turkmenistan who undertake population surveys and carry out related research. The CISS teams work along side and in conjunction with the Darwin Caspian Seal Project. Survey results and findings are held by the CSCN, also working jointly with the Darwin Caspian Seal Project (Ref. 6).

Figure 1: Caspian Seal Migration Routes



Through the CEP, the Caspian Seal Project team has worked in conjunction with the CISS group to produce a Caspian Seal Conservation Action Plan (CSCAP) (Ref. 7). The CSCAP, which details the activities required to halt the decline of the population and begin its recovery, was ratified by the five littoral States in 2007, and is designed to implement Article 14 of the 2003 Tehran Convention with respect to Caspian seals.

A development as a result of the CSCAP is a new CaspEco programme which started in 2010 for Caspian governments to develop a network of Seal Special Protected Areas (SSPAs) for the Caspian seal throughout the Caspian. The objectives of this programme are to safeguard sufficient habitat of all types which are vital for all stages of the seals life cycle – breeding, moulting, feeding, resting, nursery etc, corridors of access to such locations, and to make allowances for the shift of such locations in response to future environmental changes. In addition habitat areas important for seals, but which currently are not used by them, should be maintained or restored to facilitate recovery of the population. The identification of potential SSPAs is currently the subject of a consultation exercise (Ref. 8).

1.3 Overview of International Caspian Seal Seminar 2009

An international Caspian seal seminar entitled "*The Threat to Existence of Caspian Seals. Obtained Data, Required Studies and Mitigation Measures*" was held between 17th and 19th September 2009 in Atyrau, Kazakhstan. The seminar was organised by:

- The CISS;
- Agip KCO jointly with the Darwin Caspian Seal Project research groups; and
- Representatives of the Caspian states involved in Caspian seal monitoring.

Results of the seal monitoring studies in the Azerbaijan sector of the Caspian Sea were presented at the seminar by Dr Tariel Eybatov as leader of the Darwin Caspian Seal project Azerbaijan research group.

The studies, which form part of the wider, Darwin Caspian Seal Project, began on 1st July 2006 and will be finalised on 1st July 2010. Final project results are expected to be published at the end of 2010.

Key points highlighted at the seminar are outlined below:

- Systematic fixed wing aerial surveys of the breeding population of Caspian seals on the winter ice-field from 2005-2009 showed that pup production declined from 21,000 pups in 2005 to around 7000 in 2008. The represents a ~60% collapse in the reproductive output of the population over this period. The causes are presently unknown, but potentially food availability might be one of the main drivers. Research is ongoing to test this hypothesis (Ref. 9);
- It was established via aerial surveys and satellite data that in recent years there has been a steady reduction of ice areas where seals are breeding which has reportedly led to reduction of seals number (Ref. 10 and 11);
- It was agreed by the seminar working group that bycatch from fishing (both legal and illegal) was currently the single most important threat to the Caspian seal population since the bycatch may exceed at least 10% of current population size per year. Commercial hunting, habitat loss, ecosystem changes and industrial disturbance were also identified as important factors;
- Anecdotal evidence of illegal seal fishing taking place in practically all Caspian littoral states was discussed. For the first time it was reported at the seminar by the Russian research group led by A. Kondakov, that in the Russian sector of the Caspian Sea (off the coast of the Dagestan republic) in addition to licensed commercial fishing, illegal fishing and commercial processing of seals also takes place (Ref. 12). In 2009, the Russian research group also initiated monitoring of dead seal bodies found on the Russian coast of the Caspian Sea as part of their seal survey programme, enabling comparison of similar data collected within Azerbaijan and Iran; and
- A group of Iranian researchers presented the results of their project associated with measures promoted in Iran to minimise seal mortality due to fishing nets. The project was focused on educating and raising awareness of fisherman and the local population on the issue. The experience in European countries where nets are designed to be safe for seals was also discussed at the seminar.

2 Caspian Seals in the Azerbaijan Sector of the Caspian Sea

Caspian seal monitoring has been undertaken in the Azerbaijan sector of the Caspian Sea since 1971. The most recent surveys for which the data collected that has been analysed was in 2009.

2.1 Azerbaijan Caspian Seal Monitoring 2009

In 2009 monitoring studies were undertaken along the coast of the Absheron Peninsular and on the islands of the Absheron and Baku archipelago. The monitoring demonstrated that since 2005 there are no longer any permanent seal rookeries in these locations. Temporary seasonal rookeries (haul-outs) were observed only during the spring migration from a north to south direction in April-May and during the autumn migration, which occurs in a south to the north direction in October-December. These temporary rookeries were found on the Southern spit and Urunos on Chilov island, and on the small islands between Pirallakhi and Chilov islands (Malaya Plita, Bolshaya Plita, Podplitochny and Dardanella). These were observed by the Azerbaijan seal research group for the last time in 2002. No permanent or temporary seal rookeries at Shakhova spit have been observed since this time.

Throughout 2009 observations were been made by fishermen, helicopter pilots and oil field workers (on vessels and platforms) in the Azerbaijan sector of the Caspian Sea and reported to the Azerbaijan seal survey group. Details of these observations are provided in Appendix A of this document. In summary:

- The 1st sighting of a shoal of migrating seals was in early April, much earlier than in all previous years;
- Regular sighting throughout late spring, summer and autumn on Chilov Island (between the Southern spit and Urunos), in open sea (including a large group moving across the Shah Deniz Contract Area in mid May) and on the Shakhova spit; and
- Observations indicated that the autumn seal migration was much later than in previous years, towards late November/December.

2.2 Monitoring of Mortality in the Azerbaijan Waters of Caspian Sea

In 2009 a reduction in the number of dead seals was recorded on the northern shore of the Abershon Peninsular; the lowest number since long term monitoring began in 1971. The total number of dead seals in 2009 was the lowest annual number recorded across the 2000 to 2009 period. Table 1 presents the number recorded on the northern shore of the Absheron Peninsular since 2000.

Table 1: Number of Dead Seals Recorded on the Northern Shore of the Absheron Peninsular 2000 - 2009 (100km Zone)

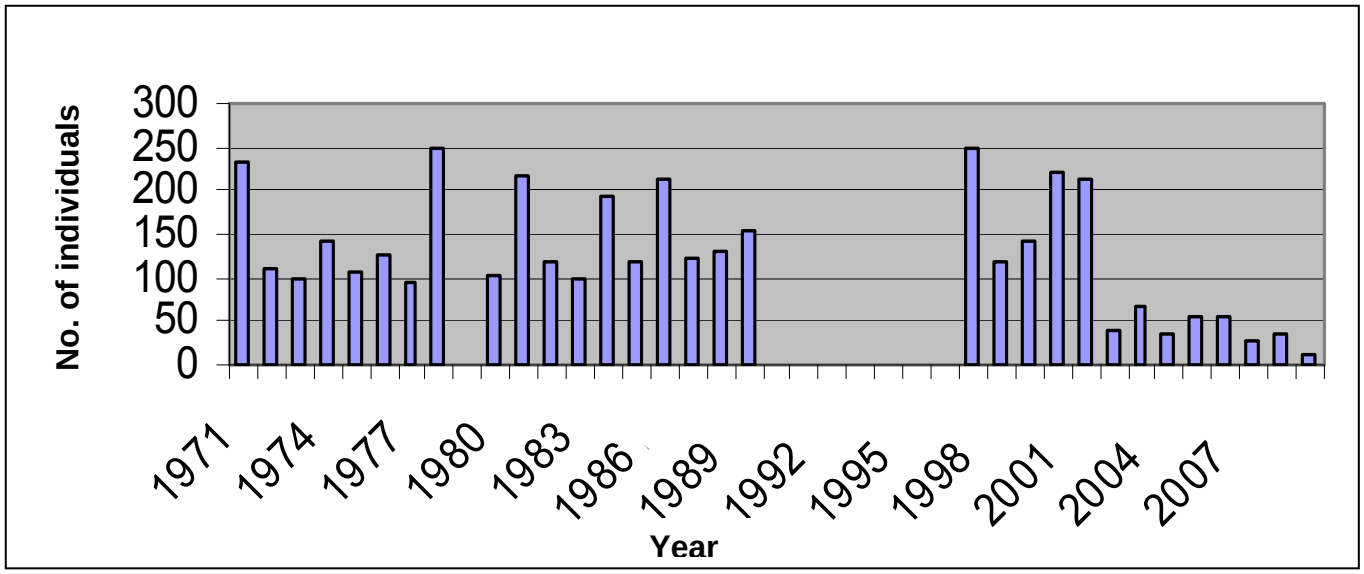
Year	Number of individuals	% Males	% Females	Embryos within Females (as % of individuals)
2000	2210	57.5	42.5	2.7
2001	2140	63.5	36.5	0.5
2002	410	41.5	58.5	2.4
2003	670	31.3	68.7	6
2004	350	42.8	57.2	2.8
2005	540	51.5	48.5	3.7
2006	560	32	68	8.9
2007	270	40.7	59.3	11.1
2008	360	38.9	61.1	16.6
2009	130	38.5	61.5	7.7

As shown in Table 1, both the total number of dead seals (recorded throughout the year) and the number of dead pregnant females (recorded during spring) were reduced during the 2008- 2009 period. In previous years, it was indicated in the first report (2009) (Ref. 13) that a reduction from 2008 to 2009 in the number of seal corpses correlated with a reduction in the population of the Caspian seals across the Caspian Sea. In early 2010, during the period of whelping in the Northern Caspian (i.e. when new pups are born), participants of the Darwin Caspian Seal Project undertook an aerial photography exercise to survey the seals and pups. Results of the survey are not yet available.

Figures 1 and 2 present the number of dead seals recorded on the northern shore of Absheron Peninsular since 1971 and at the monitoring zone Buzovna - Severnaya GRES (see Figure 1) since 2000, respectively. While there is some fluctuation, Figure 2 shows that, during the last 8 years, the number of dead seals recorded has gradually reduced. As discussed within Sections 1.3 and 2.1 above this has been accompanied by a reduction in seal populations and births. The causes of the population decrease are complex but thought to include the following (Ref. 6):

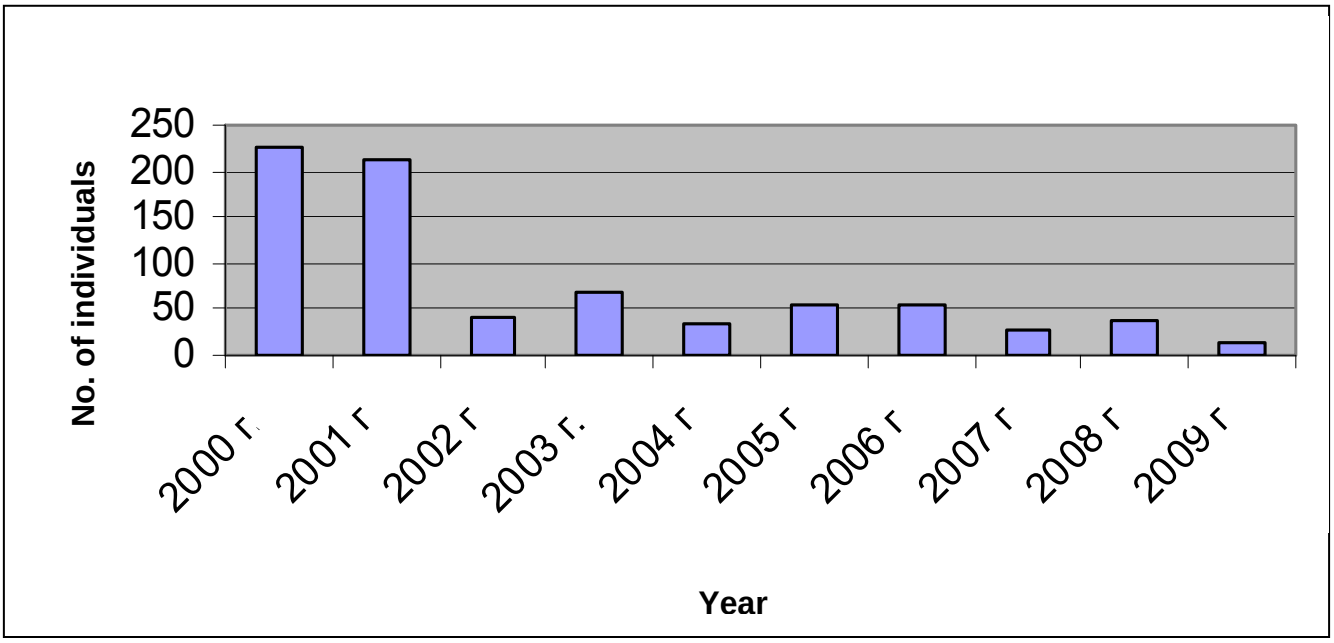
- CDV;
- The impact of invasive species such as the comb jellyfish which feeds on the same main food sources (Zooplankton) as the fishes that the Caspian seals feed on;
- Natural predation of pups;
- Pollution (mainly organochlorides e.g.DDT);`
- Fishing, particularly fishing using nets;
- Disturbance from vessel activities;
- Commercial seal hunting (both historic and present day hunting)[3]; and
- Global warming.

Figure 2: Number of Dead Seals Recorded on the Northern Shore of the Abershon Peninsular Since 1971



[3] Licenses to hunt seals are administered by the Commission on Aquatic Bioresources of the Caspian Sea.

Figure 3: Number of Dead Seals Recorded in the Buzovna - Severnaya GRES Monitoring Zone since 2000



2.3 Estimated Caspian Seal Population in the Azerbaijan Waters of Caspian Sea

Analysis of data available in 2009 (predominantly observations including those recorded in Appendix A) suggests that the population of seals visiting the Azerbaijani sector of the Caspian Sea includes approximately 10-15,000 individuals. The maximum concentration of seals is observed during spring around the islands of the Absheron archipelago, based on observations reported by fishermen and helicopter pilots. Their number in this region is estimated to be a minimum of 5,000 individuals (Ref. 14). Since 2000, seals have not been observed near the islands of the Baku archipelago.

Small groups of seals, one to three individuals on the two to three kilometre (km) line, have been observed along the shoreline, from Yalama seashore to the Lenkoran coast, during the spring-summer-autumn season (Ref. 14). Most often these seals have been observed becoming caught in the nets at a distance of 10-20km from the coast.

Evidence from Krylov (Ref. 15) has indicated that there remained approximately 10-15,000 seals in the Southern Caspian - at the rookeries and in the open sea towards the end of the 20th century. However, within Turkmenistan waters seal numbers have dropped by more than ten fold during the 21st century (Ref. 15).

2.4 Caspian Seal Population in the Shah Deniz Contract Area

The number of seals found in the Shah Deniz Contract Area varies throughout the year. Table 2 provides a breakdown by season (Ref. 14).

Table 2: Estimate of the Caspian Seal Population within the Shah Deniz Contract Area per Season

Season	Estimated Number of Caspian Seals	Comment
Spring	3,000-4,000	During spring, seals are known to migrate through the Contract Area towards Iranian waters.
Summer	500-550	-
Autumn	1,000- 2,000	The number of individuals found in the Contract Area will increase during the autumn migration in a northward direction. This migration usually begins at the end of October and ends at the end of November; however in 2009 migration continued till 20th December. During the period of autumn migration the seals are less concentrated than in spring, and do not form large shoals.
Winter	Only individuals	Recently during winter months in Azerbaijan, only individual seals could be found and hence, it can be concluded that in winter there will be very few or no seals in the Contract Area.

With regard to the seals' main food source, it should be noted that before 1990, with particular reference to the Soviet era, studies of the numbers of fish, the character of their migration, and fishing were centralised and all littoral Caspian states, with the exception of Iran, had access to this information. Unfortunately, this information now remains confidential in each country or region and it is difficult to relate the migration of Caspian seals with the migration of their food sources and fish populations.

Consequently, the diet of Caspian seals is poorly understood, particularly in relation to patterns of spatial and temporal data. There are no up to date comprehensive studies of seal diet at present although there are presently studies underway. However, a literature review carried out in 1995 (Ref. 16) suggests a large percentage of the total seal population migrates to the middle and southern Caspian between May and June to feed in areas rich in pelagic fish species. During late summer and early autumn, many seals move offshore to feed in deeper waters, which include the Shah Deniz Contract Area. It is thought they feed here until September when the majority of them migrate to the north. While commercially important species such as herring and kilka are probably eaten by seals, there is little quantitative information about this. It is considered likely that there has been a shift in seal diets compared to previous decades because of the fall in fish numbers from over fishing which is reflected by the collapse of the commercial fishing industry.

It should be noted that information regarding the Shah Deniz Contract Area is mainly provided by helicopter pilots, as helicopters transport personnel to individual platforms. Information on seal sightings are also received from fishing boats and support vessels, oil workers, in particular those working on Oil Rocks, as well as from military personnel safeguarding this territory. With the exception of limited surveys undertaken under the Darwin Initiative, no specific surveys within the Contract Area are undertaken. Usually the information about the appearance of seals in the Shah Deniz Contract Area coincides with their appearance in the area of Chilov Island, where large groups of seals are registered during the spring migration prior to moving south.

Prior to 1997, during spring, seals swam very close to the shoreline and occasionally got out of the water to rest on shore. However, in recent years this appears to have changed as fishermen have observed small groups of seals in the open water. One of the potential reasons for this is because of a suspected increase in illegal fishing using nets close to the shoreline (based on anecdotal evidence). During interviews undertaken with local people (including beach patrol staff, local fisherman and local residents) following the discovery of a dead seal on the shoreline there have been very few reports from these sources of seeing live seals in the sea.

At the end of the 20th century there was approximately one seal per square kilometre (km^2) of the Caspian Sea and numbers are now estimated to have reduced by approximately four fold. Based on this estimate, the total number of seals within the Caspian Sea would be approximately one individual per $4km^2$. As the number of seals in the Caspian Sea has reduced, this implies, assuming seal migration routes are unchanged, that there has also been a reduction in seals present in the Shah Deniz Contract Area.

Table 3 below sets out the most sensitive time of the year for the Caspian seals in the Southern Caspian with particular reference to the Shah Deniz Contract Area.

Table 3: Caspian Seal Sensitivity per Season within Shah Deniz Contract Area

J	F	M	A	M	J	J	A	S	O	N	D
	Most sensitive period/expected presence										
	Moderately sensitive period/some presence										
	Least sensitive period/not present										

Key oil and gas development activities in the Caspian Sea to which seals are sensitive include:

- Vessel movements and platform operations – seals may be attracted to fish which are attracted to lights associated with vessels and platform operations but appear to be sensitive to noise and vessel movements;
- Seismic surveys and other similar activities in the Caspian or on the seabed – seals may be sensitive to the methods employed for various surveys and activities that involve disturbance to the marine environment; and
- Installation activities involving disturbance of the seabed sediment – seals orientate with their eyes and could be disoriented by plumes of sediment in their path.

2.5 Summary of the Status of Caspian Seals in Azerbaijan

It can be seen from the mortality graphs (Figures 1 and 2) that there had been four fold reduction in seal numbers since 1990, but from 2003 to 2008 the population appeared to stabilise. However, in 2009 a further reduction in the number of seals was recorded. This was established from the number of dead seal bodies found on the northern shore of the Absheron Peninsular and also corresponds to an observed reduction in the number of seals migrating along the Azerbaijan shoreline (Ref. 14).

Although seal numbers in Azerbaijan appear to be falling, one of the objectives of the CaspEco protected area programme is to maintain and restore habitats to facilitate recovery of the seal population. Therefore degradation of habitat in areas of decreasing seal numbers should be avoided.

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Appendix A
Caspian Seal Observations

In 2009 helicopter pilots detected early migration of Caspian seals to the Azerbaijan water of the Caspian Sea. The first large shoal of seals: 300 – 500 individuals were found on 1st April in the area of Southern spit and islands between Pirallakhi and Chilov islands (Malaya Plita, Bolshaya Plita, Podplitochny and Dardanella). According to fishermen, at that time in this area a mass migration of sprat was observed, and migration of seals was related to the presence of these shoals of fish.

At the end of April – beginning of May the seals moved to the water area between Chilov Island and Shakhova spit. At that time helicopter pilots observed an accumulation of seals around Shakhova spit. Small groups of seals were also observed by oilmen on the Oil Rocks. According to the observations of fisherman, large groups of seals were observed in mid-May moving southwards, across the Shah Deniz Contract Area towards the Iranian waters. Iranian colleagues who came to the International Caspian Seal Seminar in Atyrau in 2009 informed that the first seals appeared in Iranian waters in the beginning of June.

Never, during the more than 35-year monitoring studies had the spring migration began as early as it did in 2009. Seals usually appeared in the Azerbaijan waters towards the end of April, beginning of May, occasionally towards the end of May, while large numbers of dead bodies of seals on the Northern coast were usually observed in May and June.

One more interesting feature of 2009, whilst earlier autumn migration of seals to the Northern Caspian for breeding ended in November, in 2009 this tendency changed. On 20th of December large groups of seals (over 300 individuals) were observed for the first time in the area between Pirallakhi and Chilov Island. Namely, this year northward migration of seals was also delayed.

On 17th April fishermen observed thousands of seals (up to 5,000) on Chilov Island, between the Southern (Yuzhnaya) spit and Urunos. Fishermen stated that shoals of herring were accompanied by seals. Almost all fish in the nets had been eaten or partially eaten by the seals. Large shoals of herring first appeared in the area of Chilov Island, closer to the Southern spit, and islands between Pirallakhi and Chilov. This was at the beginning of April, afterwards almost all seals moved to Urunos. Towards the end of April, fish disappeared from Chilov Island and shoals of seals moved southwards to Shakhova spit. In the beginning of May, military helicopter pilots observed, over two to three days, these shoals in the open sea and at Shakhova spit. By mid May the seals had practically disappeared in this area, with large groups moving southwards, across the Shah Deniz Contract Area, migrating and distributing in Iranian waters.

The Shah Deniz Contract Area is a zone of active migrations of anchovy kilka and historically an area of seal growing (fattening) although there are no up to date published studies to confirm the diets or numbers of seals in the area.. Main shoals of seals appear at night when kilka ascends from the depth to the surface. During daytime seals are found in this area as small groups. This was observed during a previous survey carried out by an international group of researchers (including S.Goodman, S.Wilson, T.Eybatov, L.Dmitriyeva, S.Eybatov, P.Yerokhin) on 29th May, 2007. Using a motor boat from Shikhovo beach the researchers crossed the northern part of Shah Deniz Contract Area and at 10am several groups of seals were observed: three to four individuals were observed in each group, at a distance 500-600m from each other (photos were taken, and GPS coordinates registered (Ref. 14). At night large groups of seals were concentrated around the vessels, which were fishing for kilka with light.

During the summer of 2009, one or two seals were observed periodically on the Southern spit of Chilov Island by fishermen and helicopter pilots. One more interesting fact for 2009 is that the shrimp population (another food source for the Caspian seal) in waters around the Absheron Peninsular reduced sharply. This commodity became scarce and prices rose sharply. However, there was still no dead bodies of seals found on the northern coast of Absheron during the summer. This is unusual for that time of the year given that the seals have or are in the process of migrating south at this time. In spring researchers managed to find and take photos of just two very old deposited corpses of seals within the 10km zone (Buzovna-Severnaya GRES/ Northern hydroelectric power plant).

To mid-May seals from the area of Shakhova spit began moving southwards across Shah Deniz Contract Area to Iranian waters of the Caspian Sea. In previous years during the spring most seals from Chilov Island moved towards Oil Rocks and further to the east towards Turkmenistan. However, this was not the case in 2009.

According to reports from oil workers in the area there were practically no seals observed on Oil Rocks in spring and only small groups of seals: 1-2 individuals were registered 2-3 times.

Until the end of May only individual seals were registered on Chilov Island. One seal was observed on the Southern spit on the 20th of May. On 29th of May fishermen saw two seals on Urunos. On the 14th of June fisherman saw a single seal on the Southern spit.

On the 6th of June two seals were observed on the Southern spit. One seal was observed lying on the shore and another swam nearby. In the second half of summer, seals were absent around the islands of Absheron and Baku archipelagos and in the adjoining aqueous area.

On the 17th September at 3pm helicopter pilots called from Chilov Island and informed that fishermen saw 20-30 seals on the small islands between the Southern spit and Urunos. Black sea roach (kutum) appeared in the nets and seals were seen.

On 20th December at 8:30am, a helicopter pilot called from Chilov Island and stated that he had a fisherman with him who, while sailing from Chilov to Pirallakhi Island for fuelling on 19th December, saw about 300 seals at the intermediate islands. Prior to that, this fisherman observed one or two seals in this region.