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RESEARCH ARTICLE

Caspian seal (*Phoca caspica* Gmelin, 1788) and its current status in the Caspian Sea

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Abstract

Life history of the Caspian seal and its current situation was investigated. Three of habitats of the Caspian seal were surveyed for the presence of the Caspian seals in 2010 and 2011 in Kazakhstan's coastal region; Kosa Kenderli, Zmeyiniy Bay and Kosa Tyub Karagan. Kosa Kenderli was found to be a resting place for Caspian seals during seasonal migrations. The investigation and interviews with the fishermen reavealed that Zmeyiniy Bay was not preferred by the seals as a migration habitat due to the human activities near this area and the coastal settlements. During the eight-km survey carried out in the coastal area, six died seals were found in the Kosa Tyub-Karagan region. The specimens were measured and recorded, and the ages of two individuals were determined.

Keywords: Caspian seal, Caspian Sea, population, negative factors.

Introduction

Life History and Population

The Caspian seal has penetrated into the Caspian Sea in the post-glacial period, about 10-12 thousand years ago, through the rivers, possibly from the Arctic Ocean (Zenkevich 1963). The Caspian seal is the only mammal species in the Caspian Sea and belongs to Phocidae familia. Current population of seals is about 100 000 individuals (Baymukanov 2010). Adult body length usually varies between 105 and 142 cm, with both sexes equal. The Caspian seal can live up to about 50 years of age, although females stop reproduction about the age of 30 years (Hadjiev and Eybatov 1995). The main diet of the Caspian seal is kilka (*Clupeonella engrauliformis*) fish. Absence of big eye kilka (*Clupeonella grimmi*) is an indication of food selectivity (Badamshin 1959). According to Badamshin (1950, 1969) the length of a female seal breeding for

the first time is about 120 cm. Female seals become mature around 5 years old and male seals at 6-7 (Randall *et al*. 1992). According to Hadjiev and Eybatov (1995), however, both males and females become sexually mature at 7-8 years of age. In the first days of April, spring migration to the southern part of the Caspian Sea begins with mature female seals and their pups (Figure 1), during this migration hungry seals eat the fish in the nets (Badamshin 1959). Male mature seals stay in the northern Caspian Sea longer and wait until the moulting is completed. In summer, seals find empty places in the western part of Apsheron for resting. In the eastern part, the most crowded place used to be the Ogurchinskiy Island (Badamshin 1965), but by 2001 there were fewer than 10 pups recorded on Ogurchinsky (and some of these were killed by people on the island) (Pavel Erokhin, pers. comm.).

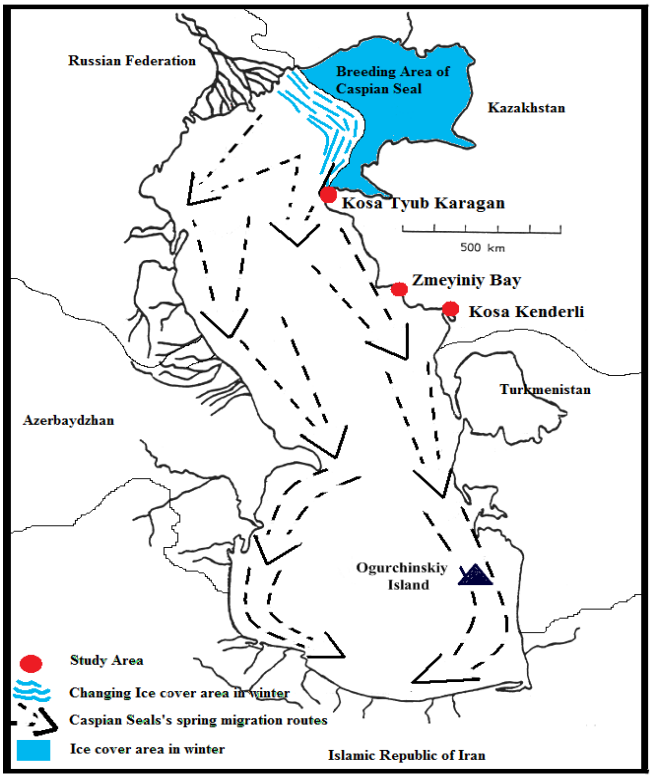

Figure 1. Wintering and breeding places, migration routes of the Caspian seal in spring and the study areas. Modified from: Caspian environment and FAO Country Profile Caspian Sea

Pollution Related Threats

The serious environmental pollution in the Caspian Sea comes from the open oil wells found in the open sea, industry and the human activities (Karpinsky 1992). The pathologic problems in the Caspian seals are the results of the combination of different mechanisms. Organochlorine substances are found in all sampled Caspian seals. DDT and HCH concentrations in the Caspian seals are higher than other seals found in the different parts of the world (Watanabe *et al.* 1999). It is found that even 1-4 weeks old pups are contaminated with pesticide in the blubber and liver. Pesticides present even in the seal milk (Sokolskiy *et al.* 2008a). In 2000 during the mass mortality of the Caspian seals in the northern Caspian Sea, more than 15 thousand individuals died because of Canine Distemper Virus (CEP 2002). Pollution plays an important role in pregnant rate of the seals, according to Khuraskin and Pochtoeva (1997) there was more than 47-71% of non-pregnant females of the population in a year.

Food Shortage

In 1958 with a regulation of the Volga River, the primer productivity of the northern Caspian Sea decreased to its half (Sokolskiy *et al.* 2008b). In 1990, zooplankton, the main food of the kilka (*C. engrauliformis*), decreased in 14 times in the middle part, and in 24 times in the southern Caspian Sea. After the regulation of the Volga and invasion of the comb-jelly *Mnemiopsis leidyi,* the production of the Caspian Sea rapidly decreased, which is the main reason for the food shortage of the Caspian seals (Sokolskiy *et al.* 2008a).

Fishery and Bycatch

According to Dmitrieva *et al.* (in preparation), the minimum annual by-catch in the whole northern Caspian sturgeon fishery may exceed 12,000 seals for 2008, from a total seal population of approximately 100,000 and is likely to be a driver of ongoing population decline. At the same time, hunting on the pups in the breeding period by the Russian fishermen creates a serious threat to the pup population. Unlike all the other littoral states, Russia continues to benefit from the seal pup hunting quota which is 8.13 thousands for 2011 (Fisheries Federal Agency 2010). Moreover, as in other mammalian species, mortality in pinnipeds is high in the very young stages. Generally, between 10 to 20 percent of pups die before they are weaned, and 20 to 50 percent of all newborns may not survive the first year (Geraci and Loundsbury 1993).

Habitat Loss and Climate Change

The Caspian Sea has about 50 islands with a total area of 350 km² and total coast line of 774 km (Leonov 1960; Kaplin 1995). Zhemchuzhniy Island is the only island which can be used as a habitat for seals in the northern Caspian Sea. The industry and human population along the coasts have made some habitats not preferred by seals anymore. The oil extraction operations in the northern Caspian is going to be more intensive and disturbing breeding seals. The ice

cover is getting smaller in winter recently. Reduction of the ice cover, thus, the breeding area for seals, is going to be a serious problem for the seals (Vital Caspian 2006). However, the satellite photos in February between 2002 and 2011 taken and using the MapSend Lite programme estimated that the area of ice cover was changing but, actually, seems stable.

In last 10 years the routes of the ice-breakers go through the breeding area of the Caspian seal. The potential benefits to breeding Caspian seals of exploiting the icebreaker channel habitat and also the potential costs due to disturbance from industrial shipping warrant a separate study (Harkonen *et al.* 2008).

The aim of this study is to evaluate the usage of three regions of the Caspian coast in Kazakhstan by the Caspian seals, so that more appropriate conservation measures can be elaborated in the region.

Materials and Methods

The coastal surveys were made in Kosa Kenderli, Zmeiniy Bay and Kosa Tyub Karagan on the coast of Kazakhstan in the Caspain Sea in 2010 and 2011. All three habitats were investigated on the presence of live and stranded seals. Sex and decomposition stages were determined using the MEDACES Stages (Tonay *et al*. 2010), measurements were taken according to Geraci and Loundsbury (1993), age determination was made by using the method of Klevezal and Kleinenberg (1967). The local fishermen were interviewed. Population estimations in relevant articles were evaluated.

Results and Discussion

Kosa Kenderli

In the first day (02.08.2010) of investigation of Malaya Kosa about 70 seals were observed. On the second day (03.08.2010) the number of seals increased to around 100. The majority (about 60-70%) of the seals were young. One dead seal was found near the group of resting seals. The seal did not show any mark by the net or some fishing gear. Its standard length was 108 cm, axillary girth was 94 cm, blubber thickness was 4.5 cm. No food remain was found in the stomach. The reason for the death was not determined.

Zmeyiniy Bay

This bay has a half sandy and a half rocky coast structure. No alive or stranded seal was found during the investigation. According to the local fishermen, seals were seen there at least 10 years ago. The reason for the absence of seals may be due to human activities along that coast. The village of Yeraliev is located nearby and the port construction was also continuing.

Kosa Tyub Karagan

Kosa Tyub Karagan has sandy coast structure. During the coast monitoring, six stranded seals were determined (Figure 3).

Figure 3. Stranded Caspian seals found in the coast of Kosa Tyub-Karagan (Information on a-f is shown in Table 1)

Body lengths were recorded, age determination was done for two of them and decomposition stages were determined (Table 1). One seal had no head and the net marks were seen on the body, showing that it died as a by catch (Figure 3 c).

Table 1. Body length, gender, age and decomposition stages of the stranded Caspian seals found in the coast of Tyub Karagan

Seal	Standard length (cm)	Gender	Age (years)	Decomposition Stage*
a	95	-	-	4
b	97	Female	2+	4
c	-	-	-	4
d	56	-	0+	4
e	66	-	-	5
f	60	-	-	5

*MEDACES Stages: 1 alive, 2 freshly dead, 3 decomposed but organs basically intact, 4 organs not recognizable, 5 mummified or skeletal remains.

Population Trends

According to the available published data, the population of the Caspian seals is sharply decreasing (Figure 4).

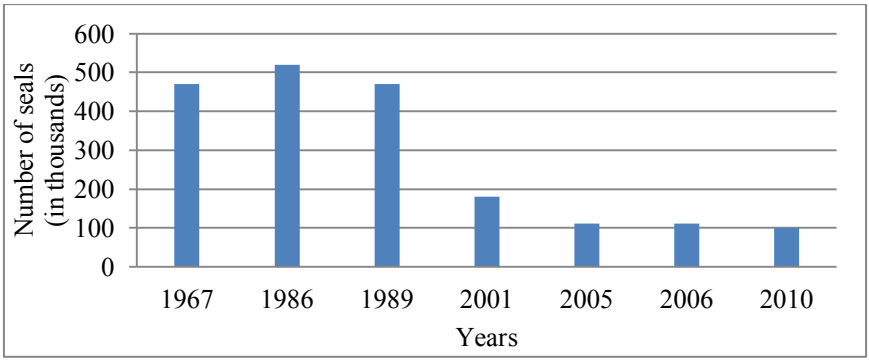

Figure 4. Caspian seal population estimates (in thousands) in winter time between 1967-2010 according to previous studies (CISS Report 2005; Sokolskiy *et al.* 2008a,b; Sokolskiy and Zaharova 2008; Mitrofanov 2007; Baymukanov 2010).

In order to save this bioindicator or a 'flag' species of the Caspian Sea, it is necessary to establish a special conservation area(s). According to Seal Special Protected Network (Caspian Seal Profile, 2012), there are projects of the littoral states of establishing protected areas in their regions.

Kosa Kenderli

High density seal aggregations were recorded in November 2009 and 2010 CISS helicopter surveys in Kenderli Bay (Caspian Seal Profile, 2012 But the integrity of seal habitat in Kenderli Bay is currently threatened by an imminent large-scale coastal resort development. This resort development can be a serious disturbance for seals. The local authorities have been advised about the need to preserve the seal habitats in the bay, but it is not yet clear what steps are planned to achieve this (Caspian Seal Profile, 2012), According to the present study, Kosa Kenderli plays an important role for the seasonal migration of the Caspian seals and is recommended to be a protection area.

Zmeyiniy Bay

There is no any records on the usage of Zmeyiniy Bay by seals, thus, it is not important for seals as a habitat.

Kosa Tyub Karagan

Kosa Tyub Karagan is located near the oil extraction area and human settlement area, which can be a reason for the absence of resting seals. Establishment of special conservation areas should be realized as soon as possible. Since 2008, the Caspian seal has an ''Endangered'' status in the IUCN Red List (IUCN

2008), but it is not effective unless this status is not present in all Caspian coastal states.

Conclusion

The Caspian seal is the flag species of the Caspian Sea, which means that it represents the current situation of the whole Caspian Sea. This is one of the main reasons to protect Caspian seals.

Kazakhstan's part of the Caspian Sea plays a vital role during the breeding period and if no protection measure is implemented in the near future, there serious disturbance for pregnant seals and newborns.

To take control of all negative factors, complete, reliable and independent investigations are needed. All littoral governments should provide grants to such studies as well as capacity building projects to continuously collect new and independent data on the current situation of the Caspian Sea. As a matter of fact, some of current investigations of the Caspian Sea are not independent and financed by the petroleum companies operating in the region.

Public awareness needs to be raised on the conservation of the Caspian Sea. For new generations specially living in the coastal areas, the educational environmental book should be prepared with a topic 'how the Caspian Sea can be saved'. For children, a cartoon film can be made about the Caspian Sea with the Caspian seal as a main character.

Discharging of the ballast water taken in the Azov Sea by ships coming through the Volga-Don Canal should be more carefully controlled by all littoral states to minimize the possible introduction of invasive species and also heavy metals.

At the same time, it can be investigated if it is possible to translocate the Caspian seals within the Caspian Sea to provide them a chance to live in better habitats.

In order to protect not only this endemic species, but all the ecosystem of the Caspian Sea, all the littoral countries should discuss this issue and find a solution. Seal Conservation Action and Management Plan (SCAMP) was formally accepted by the governments of the region through the Caspian Environment Programme in 2007. The immediate priorities are to reduce mortality from human sources such as hunting and by-catch, and to establish protected areas covering critical habitat areas (http://www.caspianseal.org/info/scamp). At the moment this issue seems to be postponed. Oil production makes very good economical profit to these countries, but all the littoral countries should also realize once again what is more important not only at the moment but also for the future generations. Everyone should understand that if such an ecological catastrophe as in the Gulf of Mexico happens in the Caspian Sea the ecology and all living organisms in this locked water reserve will die and there

will be no chance to retrieve them. Will all these countries take responsibility for that or the foreign petrol companies operating there?

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