Uncertainty surrounds mysterious deaths of Caspian seals

On the cusp of extinction

Social Desk

Approximately two centuries ago, there were, in all probability, at least one million Caspian seals – the only marine mammal living in the Caspian Sea and found nowhere else. Considering the sea's 371,000 square-km surface area, it meant about two and a half seals per square km. Today, sadly, their population has drastically fallen to around 10 percent of that number.

The Caspian seal, one of the smallest members of the earless seal family, is an iconic animal for the world's largest inland body of water, and serves as a key indicator of the Caspian Sea's health – an ecosystem that sustains hundreds of thousands of people.

Such a sharp decline in their population in a period of 200 years has one main reason: unsustainable commercial hunting throughout most of the 20th century. According to Caspian Seal Project's website, "The Soviet Union – which included four of the five countries surrounding the Caspian (Russia, Kazakhstan, Turkmenistan and Azerbaijan) – considered the Caspian seal to be a 'harvested species'. Hunting records show both pups and adult seals were killed in their tens of thousands every year on the ice-breeding grounds."

Also, there are records from Azerbaijan from the 1930s, which indicate that tens of thousands of seals were killed on the Azeri islands.

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An alarming announcement recently reverberated through environmental circles of Iran, intensifying concerns about the fate of the Caspian seal. Ten of the species had lost their lives since the beginning of the current Iranian year (starting on March 21, 2023). The cause or causes behind these deaths remained shrouded in mystery, casting a pall over the region's fragile ecosystem.

The head of the Mazandaran Department of Wildlife and Environmental Affairs has reported that 10 dead Caspian seals have been found along the coastal areas of this province. The highest number of casualties was discovered in Juybar and Babolsar, according to IRNA.

In previous years, similar losses of Caspian seals during late spring and summer, coinciding with their migration to Iranian coastal waters, have also been observed. Last year alone, 20 dead Caspian seals were found in Mazandaran's coastal strip.

It is known that Caspian seals travel to northern regions with shallower water and frozen conditions during late autumn for breeding purposes. They then migrate back to Iranian coastal waters when spring and summer arrive. Some carcasses discovered are a few days old, and samples have been taken from these deceased seals for analysis at official laboratories.

Rabiei mentioned several factors that could contribute to the loss of these seals, including lower water levels in the Caspian Sea, climate changes, and potential diseases. Further investigation is needed to understand their impact on seal populations.

The Caspian seal, once a familiar sight among the living organisms inhabiting the vast expanse of the Caspian Sea, now finds itself in an appalling situation. Recent reports revealed that several lifeless bodies had washed up on northern Iranian shores. It sounded the alarm for environmentalists, since it signals a disheartening sign that extinction looms ever closer for these marine creatures.

The Caspian Sea boasts remarkable biodiversity within its expansive boundaries. However, this marine life haven grapples with numerous perils – dwindling aquatic populations and escalating biological pollution posed significant threats to its delicate balance. The most vulnerable among its inhabitants are undoubtedly the Caspian seals. With only 70,000 remaining individuals scattered across their sole habitat in the Caspian Sea, they teeter precariously on the brink of extinction.

International conservation organizations like the International Union for Conservation of Nature (IUCN) highlighted that these unique mammals fell into a vulnerable category and urgently required protection measures to be put in place. Yet such efforts could not be confined to Iran alone; neighboring countries such as Russia, Turkmenistan, Kazakhstan, and Azerbaijan also bear responsibility for safeguarding this population.

Origins of Caspian seal

Scientists have long grappled with unraveling the fascinating origins of the Caspian and Baikal seals. Initially, it was believed that these seals were descendants of Arctic ringed seals (Pusa hispida) that had become trapped in lakes during the last ice age, approximately 11,000 years ago. Lakes Ladoga and Saimaa, alongside Caspian and Baikal, were thought to harbor isolated populations of these landlocked ringed seals. This hypothesis holds true for Ladoga and Saimaa where they are considered subspecies of their Arctic counterparts.

However, recent advancements in mitochondrial DNA analysis have shed new light on this topic. It is now postulated that the roots of both Caspian and Baikal seals run deeper than previously imagined. Evidence suggests that these unique seal populations may share a common ancestry with other members of the Phocina group – a group encompassing present-day harbor and grey seals alongside ringed seal species. This implies that around 2-3 million years ago, during the late Pliocene period, there might have been a migration event across continents leading to their presence in the Caspian Sea and Lake Baikal.

Intriguingly, further genetic studies indicate an unexpected twist: The genetic makeup of Caspian seals might be more closely aligned with grey seals rather than their counterparts from Baikal or Arctic regions. All three species share a common trait as ice-breeding creatures whose pups don a soft white coat known as lanugo (although modern-day harbor seals no longer breed on ice). Notably, this coat is typically shed just before birth.

Spanning nearly 371,000 square kilometers in size, the Caspian Sea stands as the Earth's largest inland sea—a remarkable expanse teeming with life yet characterized by weak salinity levels. Its northern basin, fed by the Volga and Ural rivers, retains an almost freshwater quality. In contrast, the deeper middle and southern basins boast salinity levels roughly one-third that of the ocean. The shallow northern basin provides a vital ice-breeding habitat for seals as it freezes during winter months.

Life and times of Caspian seals

Caspian seals have a unique way of giving birth and raising their young. Most of them are born on the winter ice-field in the shallow northern part of the Caspian Sea, between January and March. Unlike other seal species, these pups don't hide in dens because there isn't enough snow to make them. Instead, they stay exposed on the surface of the ice with their mothers nearby.

Newborn pups have a special long white coat called "lanugo" that keeps them warm. It's important for them to stay dry because if their coat gets wet, they can freeze to death on the icy surface. The ice is usually about 20-30 centimeters thick, and mothers create small holes in it to access water but keep their white-coated pups away from those holes.

While most pups are born on the ice-field, there are a few exceptions. Some pups are born on sandy beaches of islands like Ogurchinsky Island in Turkmenistan. These pups usually don't go into the water until they lose their lanugo coat at around six weeks old. At this stage, some may still be with their mothers for a while before becoming independent.

Adult males also gather near the mothers on the ice during this time as they prepare for mating once again after weaning is complete. After mating, all adult seals start shedding their old fur and grow new shiny grey coats over about a month-long period. When spring arrives and the ice begins to melt, seals disperse to different islands where they continue molting while spending more time ashore than usual. During this period, seals become thinner since breeding season and molting leave little time for feeding. However, newly-weaned pups don't molt again until the following year; thus they use this time to swim, dive and learn how to feed on small fish and shrimp.

From late spring through late autumn, seals spend most of their time at sea, feeding. They occasionally rest on islands and form dense groups at the ends of peninsulas or sandbars. During this time, the personal space between individuals seen on the ice-breeding grounds is less evident as seals rest close together on beaches.

In late autumn, adult seals start returning to the northern Caspian Sea in preparation for breeding once again when the ice forms in January. Female seals begin giving birth later in January as this cycle repeats itself year after year.

Other threats

The Caspian seal faces several significant threats – besides commercial hunting still practiced by Russia – that put its survival at risk. These include intentional killing by fishermen near fishing areas, accidental drowning in fishing nets, diseases, contamination from harmful chemicals like DDT which can make older female seals infertile, disruption of the food chain due to overfishing and invasion by a comb jelly called Mnemiopsis leidyi, and loss of habitat.

Fishing activities often result in the unintended capture and death of around 500 seals each year along Iran's coast alone. Similar incidents likely occur in other parts of the Caspian Sea but are not as well-documented. In 2000, thousands of seals died due to an outbreak of canine distemper virus (CDV). There are concerns that such outbreaks could happen again and continue to pose a threat to the population.

High levels of DDT contamination have been found in Caspian seal blubber. This chemical is believed to be responsible for low fertility rates among female seals, with some experiencing rates as low as 20-30 percent over the past decade.

An invasive species called Mnemiopsis leidyi has also become a problem for the Caspian seal. Originally from the northwest Atlantic Ocean, it spreads through ship ballast water. This carnivorous creature feeds on zooplankton and disrupts the local food chain when introduced into new environments. By the late 1990s, it had made its way into the Caspian Sea via ships traveling through canals. The south region seems most affected by this invader since it combines with intense fisheries leading to reductions in small pelagic fish populations like kilka (sprat).

Loss of habitat primarily stems from human interference such as coastal development for housing or industry or disturbances caused by poachers or fishermen frequently disrupting haul-out sites where seals rest on land.

Considering historical population declines, ongoing threats faced by these animals, and their current downward trajectory, the Caspian seal is now listed as endangered on the IUCN Red List of threatened species. Urgent conservation efforts are needed to prevent their extinction.

Conservation

The most important step in conserving the Caspian seals is to stop all intentional killings. Currently, efforts are being made to convince the Russian authorities that the population size is still declining and cannot support any form of hunting. The annual hunting quotas set by regional authorities exceed the number of seal pups born each year as documented by international surveys. To address this, a team called CISS is working with the Darwin project to ensure that these population figures are recognized and acknowledged by regional governments.

Scientists from the Darwin project are leading by example in promoting non-lethal methods for studying seals. They have replaced traditional scientific hunts with techniques that involve capturing, tranquilizing, sampling, treating with antibiotics, and releasing seals unharmed. Other samples are collected from already deceased seals found due to interactions with fisheries or natural causes.

In Iran, efforts have been made through the Darwin project to tackle seal deaths caused during fishing operations. Workshops were organized with local fishing associations and game wardens to implement a new system where fishermen who catch a seal in their nets no longer kill it but instead keep it in a holding tank until experts arrive to record data and take samples before releasing it unharmed.

By-catch (accidental capture) of seals remains an issue throughout much of the Caspian Sea in both legal and illegal fishing activities; thus quantifying its extent is an important research priority. Habitat loss has been observed on Zhilhov Island and Shakhova Kosa on the Asheron Peninsula in Azerbaijan. These areas used to be regular resting spots for seals but have become deserted recently. The Darwin monitoring program led by Tariel Eybatov aims to understand why this habitat loss occurred so that steps can be taken towards its reversal.

A comprehensive plan known as SCAMP (Seal Conservation Action and Management Plan) has been developed by the Darwin team based on similar plans implemented elsewhere, like HELCOM in the Baltic region and the Wadden Sea agreement. This plan has been accepted as a working plan by government representatives in the Caspian Sea region since late 2006, providing a framework for conservation efforts moving forward.