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THE RECEEDING SHORELINES OF THE CASPIAN SEA AND IT'S IMPACT ON ECOSYSTEMS

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The biggest inland body of water in the world, the Caspian Sea, is experiencing major environmental changes that are evident in the gradual retreat of its shorelines. The ecosystems and communities that depend on its resources will be significantly impacted by this occurrence, which is thought to be the result of a mix of anthropogenic and natural processes. This article summarizes recent findings to investigate the causes of the Caspian Sea's retreating shorelines and evaluates their complex effects on the nearby ecosystems.

Human activities such as dam development, deforestation, and climate change increase the Caspian Sea's coastline recession, emphasizing the need for long-term management solutions and international cooperation to avoid the negative consequences. Conservation initiatives must emphasize the protection of vital habitats, the restoration of damaged ecosystems, and adaptation strategies to protect vulnerable communities from the consequences of coastal retreat.

The Caspian region's physical landscape is impacted by the retreating shorelines, which causes habitat loss, coastal erosion, and modifications to the hydrology and water quality. The delicate balance of coastal ecosystems is being disrupted by these changes, endangering the productivity and richness of the flora and fauna. Moreover, local businesses reliant on tourism, agriculture, and fishing face difficulties due to habitat displacement and biodiversity loss.

This article emphasizes how crucial it is to resolve the complex relationships between environmental, social, and economic variables that are causing the Caspian Sea's shorelines to recede. Through the promotion of studies and collaboration, stakeholders can create effective strategies to lessen the effects of this ongoing environmental issue on both the environment and society.

The degradation of the world's seas is directly related to the level of industrial growth. According to study results [1], marine ecological degradation began in the 1800s in many European and North American countries. This pattern is consistent with 19th-century industrialization and land clearing for agriculture temporal patterns as well as with earlier meta-analyses of data on fisheries, ecology, history, archaeology, and macrofossils. The sea is crucial as an industrial route that links every country in the world. Regretfully, this is one of the things that is making the marine ecological worse. As a result of this, the ecology of the sea, which surrounds the industrially developed nations, started to deteriorate early. In contrast, no evidence of marine ecological degradation was found in Asian sediments dating back before 1900. Instead, the evidence from microfossils suggested that the degradation in Asia began quickly and spread throughout the early to mid-20th century [1]. This is most likely due to the industrialization of Asia, which began as early as 1900, approximately 100 years after that of Europe and North America, and the economic expansion that followed World War II. One of the seas that is severely degrading as a result of these circumstances is the Caspian Sea.

Measured by surface area, the Caspian Sea is Earth's largest inland water body, spanning about 371,000 square kilometers (143,200 square miles). The Caspian Sea is surrounded by five countries, namely Russia, Kazakhstan, Turkmenistan, Iran, and Azerbaijan, which collectively make it a valuable geopolitical and economic asset. Measured by economic, social, and biodiversity standards, it is priceless.

The Caspian Sea sustains an important commercial fishery, provides water for farming, and gives locals access to jobs and recreational pursuits. Numerous endangered species, including over 90% of the planet's surviving sturgeon, can be found in its waters.

The shallow waters of the northern Caspian are brimming with fish, crabs, mollusks, and birds. Winter ice that typically only forms in this area of the lake is used by seals to raise their pups. And they're all dependent on a healthy water level to survive. However, the Caspian Sea is rapidly shrinking.

The Caspian Sea's retreating shorelines are mostly caused by a confluence of natural phenomena, such as variations in sea level and sediment dynamics, which are made worse by human endeavors like building dams, deforestation, and climate change. The consequences of the shoreline recession transcend beyond the destruction of the ecosystem and include socioeconomic effects on nearby communities and regional economy.

Water levels

It appears that there have been at least seven meters (23 feet) of variations in the Caspian's water level since the first century BCE [2]. Climate variations that establish a balance between water gains (river influx and precipitation) and losses (evaporation) are the primary causes of the long-term fluctuations. The Caspian Sea was approximately 26 meters (86 feet) below sea level in the first three decades of the 20th century, but in 1977 it sank to 29 meters (96 feet), the lowest level recorded in the previous 400 to 500 years. The sea level started to rise rapidly in 1978 and peaked at 26.5 meters (87 feet) below sea level in the mid-1990s. However, following 1995, the sea level gradually decreased before rising once more in the early 21st century. The construction of reservoirs on the Volga to supply river water for farming and industry, coupled with climate changes that increased evaporation and decreased river intake, was blamed for the lowering that occurred between 1929 and 1977. The increase in the inflow from the Volga, which in certain years was significantly higher than average, was another effect of climate change that contributed to the rise in water levels after 1978. The event was also influenced by a decrease in evaporation and an increase in precipitation over the sea. Sand barriers were built between the Caspian and the lagoon in 1980 by Soviet hydrologists to stop the outflow into the Kara-Bogaz-Gol. The viability of alternative strategies for maintaining the Caspian's water level stability has received careful consideration by planners. The Caspian Sea's water level has reportedly dropped by one meter recently, and by the end of the twenty-first century, it could drop by 9 to 18 meters (30 to 59 feet) [3].

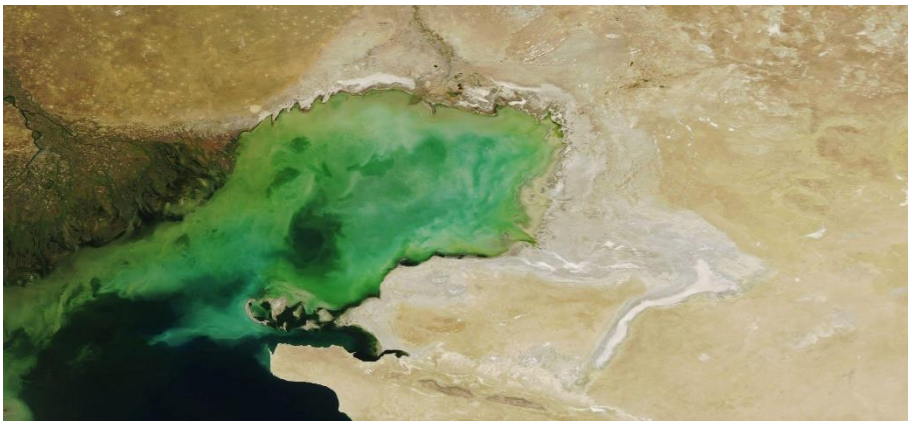
Marine life

The Caspian is home to over 500 plant and 850 animal species [2]. For a body of water that big, there are very few species, but a large proportion of them are endemic, meaning they can only be found there. There are various types of red and brown algae, but the highest biomass concentrations are seen in diatoms and blue-green algae (cyanobacteria). Changes in salinity have a significant impact on the animal kingdom, which includes sponges and a range of other organisms as well as fish species like sturgeon, herring, pike, perch, and sprat. The core fauna is complemented by about 15 species of Arctic (like the Caspian seal) and Mediterranean types. A few organisms have recently migrated to the Caspian sea: gray mullets were purposefully introduced by humans, while barnacles, crabs, and clams were brought there by sea vessels.

Methodology

I utilized the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA’s Aqua satellite images to compare Caspian Sea shorelines over the years. With its high temporal resolution, although low spatial resolution, MODIS data are useful to track changes in the landscape over time [4]. Examples of such applications are the monitoring of long term land cover changes, water inundation from pluvial, riverine, or sea level rise flooding in coastal areas, and the monitoring of water levels in major lakes such as the Aral Sea, Caspian Sea. Comparison of these images (picture 1, 2) showed the drastic change in the Caspian Sea northern shoreline shrinkage [5].

Picture 1 Caspian Sea northern shoreline, September 20, 2006

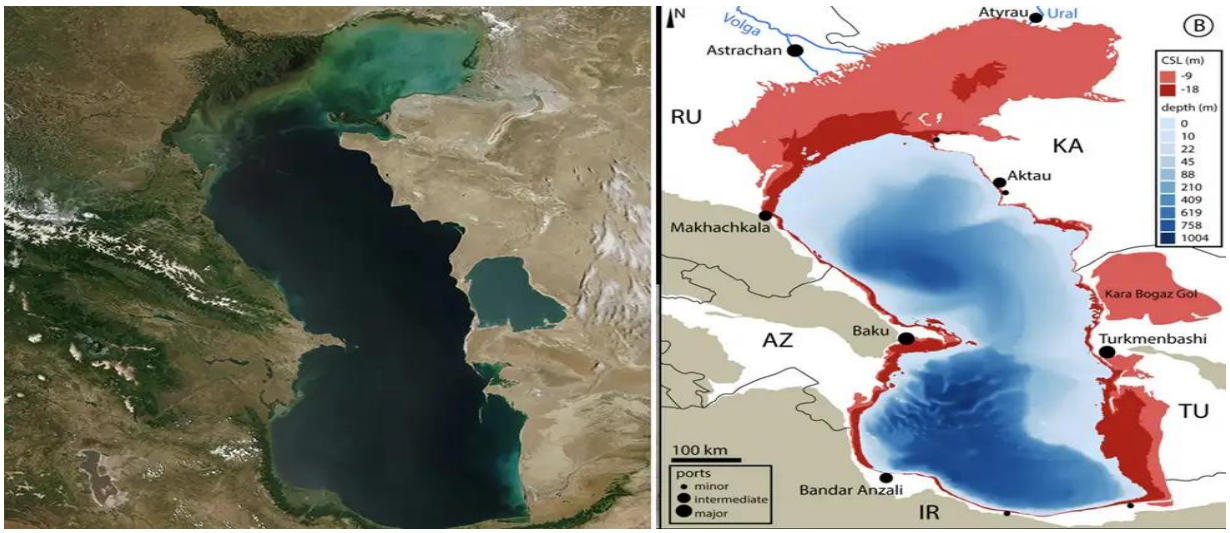


Picture 2 Caspian Sea Northern shoreline, September 19, 2022

The world's largest lake has been shrinking over the last few decades as a result of rising surface temperatures, according to a recent study [6] on the Caspian Sea's sea level rise. The investigation came to the conclusion that evaporation was responsible for half of the drop in water level, with the remaining half coming from the inflowing rivers' discharge and lack of precipitation. Thus, the region's rising temperatures, which are mostly brought on by climate change, are the primary causes of the water level reduction and recession of the shorelines.

Caspian Sea fluctuation future

Nowadays, the global warming impact on Caspian Sea level change has been accepted, and it has been predicted that if the atmospheric temperature rises, the Caspian Sea level will drop by about three meters by 2100 years [7]. So more marginal basins like estuaries, lagoons, swamps, and bays will be submerged, and environmental vulnerability and crises threaten human societies along the iparian countries. The unique ecosystem of the Caspian Sea, which is already under extreme stress from pollution, overexploitation, and the introduction of invasive species, will be significantly impacted by the expected shrinkage in Caspian sea shorelines as well as the loss of the extremely productive and seasonally ice-covered northern Caspian shelf. Pupping habitats for the critically endangered Caspian seal will be impacted by the shrinkage of the winter sea-ice area. The vast shelf's removal also deprives the Caspian Sea of shallow-water habitats, which are important sources of food for fish, migratory birds, and the seal. These habitats also serve as spawning grounds for local and endemic fish species, including the critically endangered sturgeon.



Picture 3 Impact of Caspian Sea Level projections of −9 m and −18 m at the end of the twenty-first century. Red regions fall dry

The surrounding regions are at risk due to the Caspian Sea's fluctuating water level [3]. The water body's unique biodiversity is in threat if the water level drops further. It's also important to note that rising ocean temperatures have triggered eutrophication, or algae blooms, which lower oxygen levels and have a negative impact on marine life. Overall, significant fluctuations in the Caspian Sea's water level would have negative socioeconomic as well as environmental effects, including harm to coastal businesses, job losses, migration, and deterioration of infrastructure. These effects would get worse with an increased oscillation rate. Consequently, in order to prevent any damage, research must be done to identify the primary factors influencing the Caspian Sea levels and shorelines and to develop models that would produce accurate forecasts.

Based on the issues discussed in our article, we came to the following conclusion. More than 50 years have passed since scientists began to actively observe the environmental condition of the Caspian Sea. There were studies before that, but the fact that the current situation is getting worse has started to worry scientists. Scientists drew attention to the need for special action on the condition of the Caspian Sea. It is strongly advised that the states bordering the Caspian Sea implement efficient pollution control and monitoring systems. Potential avenues for further research include quantifying the relative contributions of each littoral state to the rising nutrient levels in the Caspian Sea [8]. Therefore, plans were made to establish a state scientific institute for the study of the Caspian Sea in the Mangystau region of Kazakhstan. The establishment of the institute makes it possible to examine the problem comprehensively and find large-scale solutions. The Institute will offer unbiased, independent data regarding the Caspian Sea ecosystem. The information gathered will provide the foundation for state and municipal executive bodies' implementation of comprehensive measures. The establishment of a scientific organization will also enable the complete fulfillment of national and international commitments for the conservation of the Caspian Sea [9].

References

1. Moriaki Yasuhara,1,2,3 Gene Hunt,4 Denise Breitburg,5 Akira Tsujimoto,6 and Kota Katsuki7. Human-induced marine ecological degradation: micropaleontological perspectives. Ecol Evol. 2012 Dec; 2(12): 3242–3268. Published online 2012 Nov 15. doi: 10.1002/ece3.425. Journal List Ecol Evol v.2(12); 2012 Dec PMC3539015 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3539015/

2. Kosarev, Aleksey Nilovich , Leontiev, Oleg Konstantinovich and Owen, Lewis. "Caspian Sea". Encyclopedia Britannica, 27 Dec. 2023, https://www.britannica.com/place/Caspian-Sea. Accessed 14 February 2024.

3. Vali Kaleji. Decreasing Water Levels in the Caspian Sea: Causes and Implications. https://www.cacianalyst.org/publications/analytical-articles/item/13769-decreasing-water-levels-in-the-caspian-sea-causes-and-implications.html (October 13, 2023).

4. https://modis.gsfc.nasa.gov/about/index.php

5. Igor Klein, Ursula Gessner, Claudia Kuenzer, Regional land cover mapping and change detection in Central Asia using MODIS time-series, Applied Geography, Volume 35, 2012, Pages 219-234, ISSN 0143-6228, https://doi.org/10.1016/j.apgeog.2012.06.016.

6. Chen, J. L., T. Pekker, C. R. Wilson, B. D. Tapley, A. G. Kostianoy, J.-F. Cretaux, and E. S. Safarov (2017), Long-term Caspian Sea level change, Geophys. Res. Lett., 44, 6993–7001, doi:10.1002/2017GL073958.)

7. Prange, M., Wilke, T. & Wesselingh, F.P. The other side of sea level change. Commun Earth Environ 1, 69 (2020). https://doi.org/10.1038/s43247-020-00075-6

8. Anahita Modabberi1,7, Roohollah Noori2,7, Kaveh Madani3,4,7, Amir Houshang Ehsani1, Ali Danandeh Mehr5, Farhad Hooshyaripor6 and Bjørn Kløve2. Caspian Sea is eutrophying: the alarming message of satellite data. Published 14 December 2020 • DOI 10.1088/1748-9326/abc6d3 Environmental Research Letters, Volume 15, Number 12. https://iopscience.iop.org/article/10.1088/1748-9326/abc6d3.

9. https://www.kt.kz/rus/state/pravitelstvo_rk_utverdilo_sozdanie_1377960384.html (26.01.2024).

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MAPPING THE NOTORIOUS: EXPLORING SERIAL KILLERS' GEOGRAPHICALLY-INSPIRED NICKNAMES

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The public has always been intrigued by killers, fascinated by their crimes and sinister nicknames that often become legendary tales. One interesting aspect of these criminals is the connection, between their nicknames and the locations where they committed their atrocities. Whether its the "Green River Killer" or the "Boston Strangler " these monikers not reference the places of their crimes. Also offer valuable insights into the spatial dynamics of criminal behavior.

It is crucial to understand the elements embedded in killers nicknames to conduct a comprehensive analysis of crime scenes. By studying the patterns of killer activities, law enforcement agencies and researchers can gain valuable knowledge about what influences where these criminals operate and how they choose their victims. This understanding can guide approaches pinpoint potential crime hotspots and contribute significantly to efforts aimed at preventing and combating murders.

This article delves into the realm of killers geographically inspired aliases exploring how they are linked to geography and what they reveal about criminal conduct. By emphasizing the significance of comprehending trends, in behavior our goal is to illuminate this complex and captivating phenomenon.

1.Serial murderers don't randomly choose who to target or where to commit their crimes; instead their actions show spatial trends. Grasping the aspect of killer behavior is crucial, for untangling the intricacies of criminal conduct and creating successful approaches, for stopping and intervening.

The spatial distribution is an essential procedure in geography since it helps to identify features and patterns and reveal spatial connections.