Journal of Environmental Health and Sustainable Development

Ecological Problems of Gorgan Bay in the Southeast Corner of the Caspian Sea (Iran) and Ways of Improvement

Rahim Aali [1], Ali Shahryari [2*]

[1] *Research Center for Environmental Pollutants, Department of Environmental Health Engineering, Faculty of Health, Qom University of Medical Sciences, Qom, Iran.*
[2] *Environmental Health Research Center, Department of Environmental Health Engineering, Faculty of Health, Golestan University of medical science, Gorgan, Iran.*

ARTICLE INFO

LETTER TO EDITOR

Article History:
Received: 18 December 2021
Accepted: 20 February 2022

***Corresponding Author:**
Ali Shahryari

Email:
Dr.shahryari@goums.ac.ir

Tel:
+989113759941

Citation: Aali R, Shahryari A. ***Ecological Problems of Gorgan Bay in the Southeast Corner of the Caspian Sea (Iran) and Ways of Improvement.*** J Environ Health Sustain Dev. 2021; 7(1): 1522-4.

Gorgan Bay, with an area of about 40 to 50 thousand hectares, is located in the southeast corner of the Caspian Sea in Iran (Figure 1) as a valuable biological reserve. In 1975, Gorgan Bay along with Miankaleh peninsula and surrounding wetlands were registered as international wetlands in the Ramsar Convention and its conservation degree was promoted to the "wildlife refuge" in the same year. In 1976, the UNESCO considered it a "natural biosphere reserve" [1]. In this geographical area, there are about 200 species of migrating and breeding water birds such as flamingos, white and gray pelicans, various types of swan species (small, mute, whooper), white-headed ducks, Lesser and Greater white fronted gooses, Mergus mergansers, Western marsh harriers, and White-tailed eagles that come there to spend the winter [2, 3]. In addition, the relatively low depth, low current intensity, suitable temperature, biogenic materials, and abundant feed have made Gorgan Bay to be a suitable place for marine fish such as sturgeons, carps, mullets, Rutilus caspicus, and Caspian kutum [4, 5].

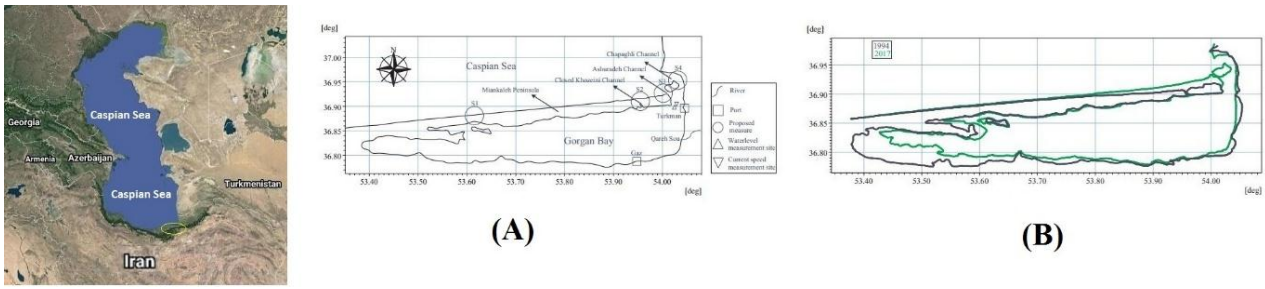

Figure 1: (A) The locations of Gorgan Bay, and (B) fluctuations of area from 1994 to 2017 [6]

[Downloaded from jehsd.ssu.ac.ir on 2026-09-11]
[DOR: 20.1001.1.24766267.2022.7.1.1.0]
[DOI: 10.18502/jehsd.v7i1.8962]

In recent years, the Gorgan Bay ecosystem has been seriously injured due to the development of agricultural, industrial, and tourism activities, along with the decrease in water area [1]. According to research and governmental reports, about 8 thousand hectares of the Gorgan Bay area have been reduced during the last two decades, and its depth has decreased from 4 to 1.5 meters in some places (figure 1(B)) [6, 7]. Microbiological and physicochemical quality, heavy metals, agricultural pollutants, poisons, and oil compounds researches have demonstrated the presence of some pollutants in the Gorgan Bay. In our study, the water sample were quantified for a series of indicators microorganisms included *total bacteria*, *total coliform*, *fecal coliform*, *fecal streptococcus*, *Escherichia coli*, *Clostridium perfringens*, and *Pseudomonas*., which were above the acceptable limit as suggested by WHO for recreational activities [8-11]. The analysis of chemical pollutants also showed that heavy metals (arsenic, cadmium, chromium, lead and etc.), pesticide's (Alderine, Delderine, Lindane, DDT and etc.), petroleum and detergent compounds were present in the samples of water, sediments and fishes [4, 12-14].

All of these studies indicated that the Gorgan Bay ecosystem is exposed to a variety of environmental challenges mostly due to rapid urbanization growth, agricultural development, fishing, and ecotourism industry as well as climate change. Therefore, it is indispensible for both government organizations and environmental NGOs to plan a precise program in order to improve the quality of this unique ecosystem. The most important solutions that can be proposed are as follows: (A) dredging of all water river leading to Gorgan Bay include Qarasou, Kordkuy, Karkonde, Bagho, Gaz, Nokandeh, Galuga, Behshahr and Zagh-Marz (B) dredging channel of Khozeini, Ashuradeh and Chapaghli (C) increasing water discharge rate from the Caspian Sea to Gorgan Bay (D) ceasing all new projects and vulnerability assessment of existing projects on the regional ecosystem and human health, (E) stopping the entry of wastewater of domestic, agricultural and industrial into Gorgan Bay. Inattention to current problems and recommendations set out above can lead to more problems for both environment and human health.

It is an Open-Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) license, which permits others to distribute, remix, adapt, and build upon this work for commercial use.

References

1. Khoshravan H, Naqinezhad A, Alinejad-Tabrizi T, et al. Gorgan Bay environmental consequences due to the Caspian Sea rapid water level change. Caspian Journal of Environmental Sciences. 2019;17(3):213-26.
2. Aliakbarian A, Ghorbani R, Fazli H, et al. Diversity and spatial distribution patterns of the benthic macrofauna communities in the southeast of the Caspian Sea (Golestan Province–Iran) in relation to environmental conditions. Iran J Fish Sci. 2020;19(2): 525-40.
3. Patimar R. Some biological aspects of the sharpnose mullet Liza saliens (Risso, 1810) in Gorgan Bay-Miankaleh wildlife refuge (the southeast Caspian Sea). Turk J Fish Aquat Sci. 2008;8(2):225-32.
4. Shahryari A, Golfirozy K, Noshin S. Muscular concentration of cadmium and lead in carp, mullet and kutum of the Gorgan Bay, Caspian Sea. Iranian Scientific Fisheries Journal. 2010;19(2):95-100.
5. Rodionov S. Global and regional climate interaction: the Caspian Sea experience: Springer Science; 2012.
6. Ranjbar MH, Alaee MJ, Nazarali M. A modeling study of the impact of increasing water exchange rate on water quality of a semi-enclosed bay. Ecological Engineering. 2019;1(36):177-84.
7. Rodionov S. Global and regional climate interaction: the Caspian Sea experience, Springer Science & Business Media. 1994
8. Shahryari A, Kabir MJ, Golfirozy K. Evaluation of microbial pollution of Caspian

[Downloaded from jehsd.ssu.ac.ir on 2026-09-11]
[DOR: 20.1001.1.24766267.2022.7.1.1.0]
[DOI: 10.18502/jehsd.v7i1.8962]

Sea at the Gorgan Gulf. J Gorgan Univ Med Sc. 2008;10(2):69-73.
9. Naddafi K, Younesuan M, Nabizadeh R, et al. Microbial quality of swimming water in Caspian Sea coasts in Golestan province. Journal of Health System Research. 2010:6(2):10-18
10. Shahryari A, Safari H, pahlavanzade B. Assessment of the microbiological quality of caspian seawater and the role of physicochemical factors on microbial load. J Environ Health Sustain Dev. 2020;5(1):962-70.
11. World Health Organization. Guidelines for safe recreational water environments: Coastal and fresh waters: World Health Organization; 2003.
12. Hosseini S, Sobhanardakani S, Tahergorabi R, et al. Selected heavy metals analysis of Persian sturgeon's (Acipenser persicus) caviar from Southern Caspian Sea. Biol Trace Elem Res. 2013;154(3):357-62.
13. Gholizadeh M, Patimar R. Ecological risk assessment of heavy metals in surface sediments from the Gorgan Bay, Caspian Sea. Mar Pollut Bull. 2018;137:662-7.
14. Omidi F, Jafaryan H, Patimar R, et al. Biochemical biomarkers of skin mucus in Neogobius melanostomus for assessing lead pollution in the Gulf of Gorgan (Iran). Toxicol Rep. 2020;7:109-17.

[Downloaded from jehsd.ssu.ac.ir on 2026-09-11]
[DOR: 20.1001.1.24766267.2022.7.1.1.0]
[DOI: 10.18502/jehsd.v7i1.8962]