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TODAY'S ANALYSIS

(27 February 2025)

TOPICS TO BE COVERED

- THE SHRINKING CASPIAN SEA
- BLACK PLASTIC & HEALTH CONCERNS
- MCQs

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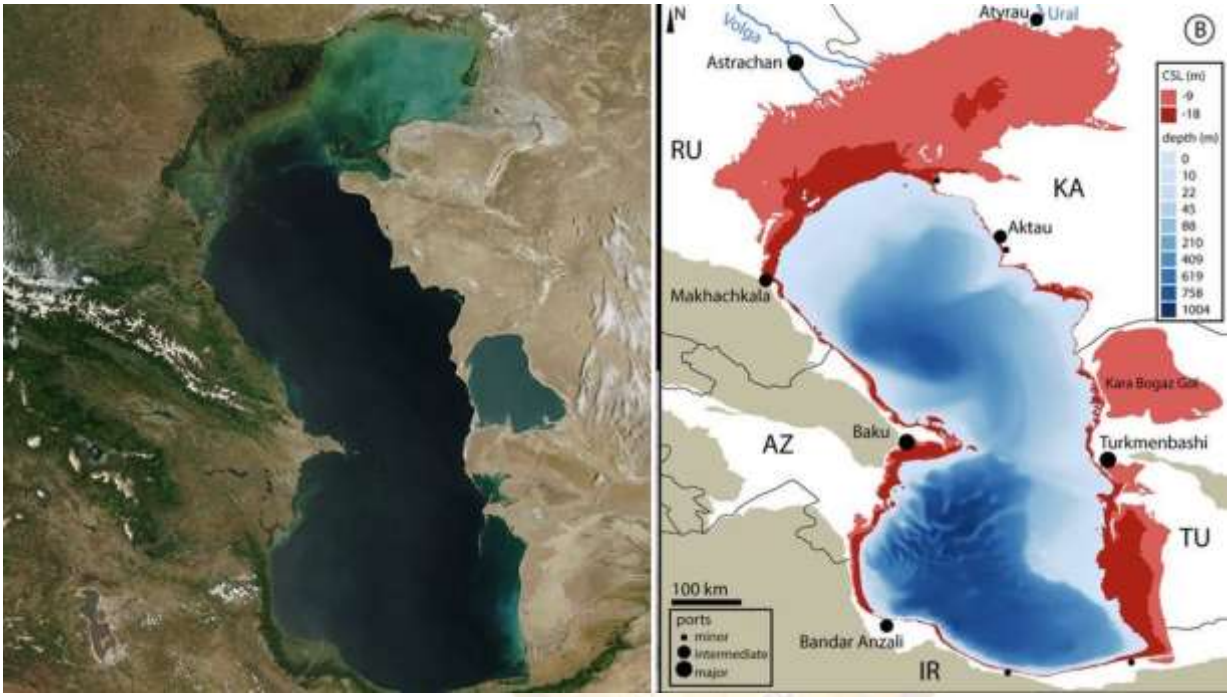
THE SHRINKING CASPIAN SEA



The Caspian Sea is rapidly shrinking, with **nearly 31,000 square kilometers of water area lost since 2005.** Environmental activists are raising alarm over the **dropping water levels,** stressing the urgent need for global action to address climate change and its consequences.

BACKGROUND

The Caspian Sea is the largest enclosed body of water in the world, surrounded by five countries: **Kazakhstan, Azerbaijan, Russia, Turkmenistan, and Iran**. It spans over **370,000 square kilometers** and is fed by around **130 rivers**. The sea has two distinct regions:

- **Northern Caspian**: Characterized by relatively shallow waters and less salinity, with an average depth of no more than 5 meters.
- **Southern Caspian**: Deeper and saltier, with depths reaching up to **1,025 meters**.

CURRENT SITUATION

- The Caspian Sea has lost **7.1%** of its water area in the past 15 years.
- From **2005 to 2023**, the water level has dropped by **185 centimeters**, leading to a massive loss of **31,000 square kilometers** of water.
- The shrinkage is primarily **attributed to climate change**, but **geopolitical and environmental factors** are also contributing.

Environmental Impact:

- **Ecological Changes**: The reduction in water levels is causing significant shifts in the local ecosystem, threatening biodiversity and natural habitats.
- **Economic Consequences**: Vital industries like **fishing, agriculture**, and **tourism** are facing hardships as the sea's receding waters disrupt local economies. Fishing industries could face significant losses due to changing water levels and ecosystems.

Strategic Importance:

- The Caspian Sea holds valuable **oil reserves**, with estimates placing its total reserves at **48 billion barrels**. This makes it crucial for energy importing nations.
- However, the **environmental degradation presents a dual challenge**:
    - Protecting valuable resources
    - Addressing ecological and climate-related crises.

Quotes from Experts:

- **Vadim Ni**, founder of the **Save The Caspian Sea Ecological Movement**, emphasized the severity of the crisis, stating: ***"We are on the verge of a great crisis in the Caspian Sea. Everyone understands this, but each side is defending its own interests."***

Call for Urgent Action:

- **Climate Change**: The shrinking of the Caspian Sea is an alarming example of how climate change is having a tangible impact on the planet. It is causing a series of interconnected crises, not just in the region but globally.

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- **International Cooperation**: The issue requires coordinated action from the five Caspian Sea bordering countries to mitigate environmental damage, safeguard resources, and adapt to the changing conditions.

CONCLUSION

The environmental and economic consequences of the Caspian Sea's shrinking water levels should not be underestimated. It is vital for global leaders, regional countries, and environmental organizations to come together to address the interconnected issues of climate change, resource management, and sustainable development in the region.

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BLACK PLASTIC & HEALTH CONCERNS

Recent studies have raised concerns about the safety of **black plastic**, particularly its potential to release harmful **flame retardants** into food.

This issue has triggered debates on whether everyday items like kitchen utensils and takeout containers made from black plastic pose a health risk.

BACKGROUND

- **Black Plastic and Health Risks**: Black plastic products, often made from **recycled electronics**, may contain toxic chemicals. Researchers initially suggested that these

plastics could release harmful substances, particularly a flame retardant called **BDE-209**, into food.

- **Revised Study and Correction**: After the study's initial findings, researchers corrected their calculations, specifically regarding the chemical **BDE-209**. This correction raised further questions about the actual safety of black plastic, as doubts lingered over the potential health risks posed by these materials.

WHAT IS BDE-209 aka DecaBDE?

- **Chemical Description**: **BDE-209**, also known as **Decabromodiphenyl Ether** (DecaBDE), is a **brominated flame retardant**. It consists of a **biphenyl structure** with 10 bromine atoms.
- **Usage**: It is commonly used in **electronics, fabrics, plastics**, and other materials to reduce flammability.
- **Environmental and Health Concerns**:
    - BDE-209 is **persistent** (does not break down easily in the environment) and **bioaccumulates** (builds up in organisms over time).

- These properties have led to **environmental** and **health concerns**, as BDE-209 can enter the food chain, affecting both ecosystems and human health.
- Due to these concerns, its use has been **restricted** or **phased out** in many countries.

WHAT IS BIOACCUMULATION?

Bioaccumulation is the gradual build-up of chemicals in an organism over time. It occurs when chemicals are absorbed at a faster rate than they can be broken down or excreted by the organism.

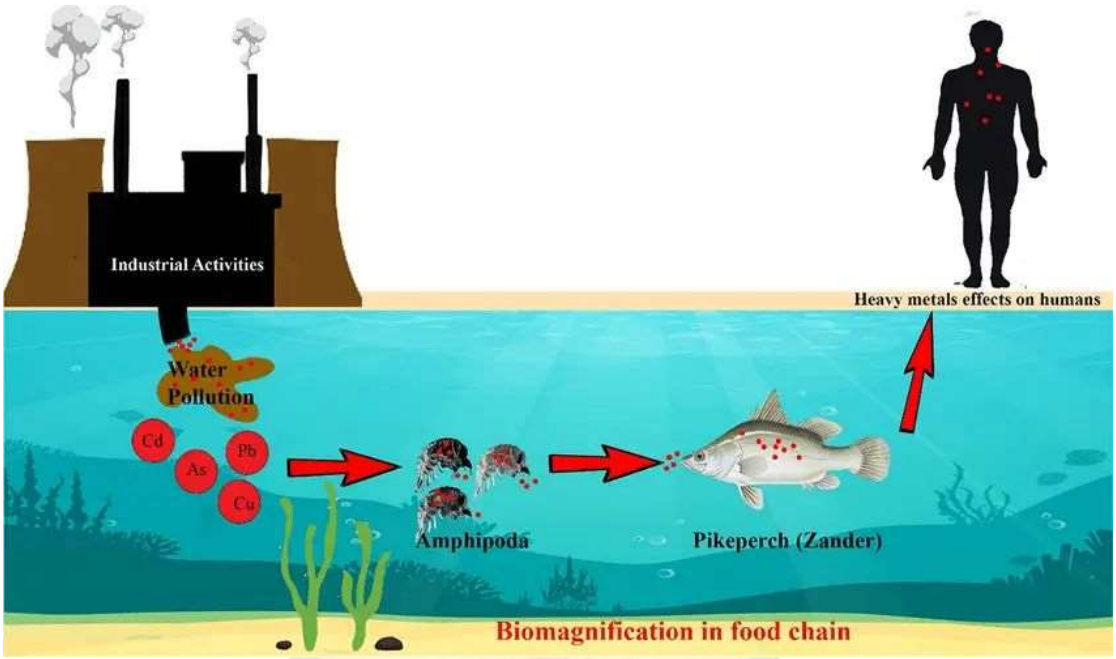
How It Occurs:

- **Exposure**: Chemicals enter the organism through **air**, **water**, **soil**, or **food**.
- **Storage**: These chemicals accumulate in the organism's **fatty tissues** and organs.

  Examples of Bioaccumulation:

  - **Toxic chemicals** like **PCBs**, **DDT**, **dioxins**, and **mercury** accumulate in **fish** and other marine organisms.
  - **Vitamin A** can build up in the livers of **carnivores** like **polar bears**, causing toxicity (**hypervitaminosis A**).

- **Effects of Bioaccumulation**:



  - **Biomagnification**: Chemicals can **increase** in concentration as they move up the food chain, impacting **higher-level predators**.
  - **Chronic Poisoning**: Over time, the build-up of chemicals can reach harmful levels, causing **toxicity** and adverse health effects.

RELATED TERMS:

- **Bioconcentration**: The accumulation of chemicals from **water** into an organism.
- **Bioaccumulative**: Describes chemicals that persist in the environment and organisms, making them prone to bioaccumulation.

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WHAT IS BLACK PLASTIC?

- **Composition**: Black plastic is often made from **recycled materials**, especially from **electronic waste** like computers, TVs, and household appliances.
- **Harmful Chemicals in Black Plastic**:
    - **Flame Retardants**: Such as **bromine** and **antimony**, which are used to reduce flammability.
    - **Heavy Metals**: Like **lead**, **cadmium**, and **mercury**, which are toxic at high levels.
- **Health Risks**:
    - While these chemicals are beneficial in electronics, they can be **harmful** if they leach into everyday items like **kitchen tools** or **food containers**, potentially contaminating food or being absorbed through the skin.

INDIA'S REGULATORY RESPONSE TO PLASTIC POLLUTION

India has implemented several measures to combat plastic pollution and its health impacts:

- **Single-Use Plastic Ban**:
    - India has banned the use of identified **single-use plastic items** to reduce the environmental burden of plastic waste.

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- **Plastic Waste Management Rules (2016)**:
    - These rules outline a framework for the **segregation**, **collection**, **recycling**, and **disposal** of plastic waste. They aim to minimize plastic waste and promote sustainability.
- **Extended Producer Responsibility (EPR)**:
    - EPR mandates that **producers, importers**, and **brand owners** are responsible for the collection and management of plastic waste generated by their products. This shifts the burden of waste management from local authorities to the producers.

CONCLUSION

The concerns over black plastic highlight the ongoing challenges in managing plastic waste, especially when it involves harmful chemicals like BDE-209. While further studies and corrections are ongoing, the broader issue of **bioaccumulation**, **plastic pollution**, and **health risks** remains a critical global concern.

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MCQs

1. Which of these countries do not touch a coastline of Caspian Sea?

   (A) Kazakhstan

   (B) Russia

   (C) Georgia

   (D) Turkmenistan

   Ans. (C)

2. Consider the following statements wrt Caspian Sea and mark the correct one:

   1. The Caspian Sea is the largest enclosed body of water in the world.

   2. The Northern Caspian Sea has relatively shallow waters and more salinity.

   (A) Only 1

   (B) Only 2

   (C) Both 1 & 2

   (D) Neither 1 nor 2

   Ans. (A)

3. Which of these are the effects of Bioaccumulation?

1. Chemicals can increase in concentration as they move up the food chain.
2. Over time, the build-up of chemicals can reach harmful levels, causing toxicity and adverse health effects.

(A) Only 1

(B) Only 2

(C) Both 1 & 2

(D) Neither 1 nor 2

Ans. (C)

4. Which of these harmful chemicals are found in Black Plastics?

1. Bromine
2. Cadmium
3. Lead
4. Mercury

(A) Only 1 & 2

(B) Only 3

(C) 1,2 & 4

(D) All of the above

Ans. (D)