



Toxic impact of war on Iran

One of planet's most unique seas in danger



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OPINION

The war of aggression in the Middle East is shaping up to be yet another US war with a toxic legacy. Bombs and missiles have released heavy metals and harmful chemicals into the atmosphere. US-Israeli and Iranian strikes have hit oil facilities, igniting fires that covered Tehran in thick black smoke and oil-saturated rain, exposing millions to pollution which could have long-lasting health impacts. And these strikes are also affecting the Persian Gulf. Attacks on ships and oil infrastructure in the waterway have produced oil spills visible from space. A spill from a tanker has temporarily closed beaches in the Emirate of Umm Al Quwain with authorities working to contain the environmental impacts, according to an announcement on October 22 by the United Arab Emirates Ministry of Climate Change and Environment. It's not been confirmed whether the spill is linked to Iranian attacks but it's yet another sign of the huge risks faced by the Persian Gulf, one of the world's most delicate and unique marine systems. As the war continues, experts are warning of a broader contamination crisis.

A surge in oil pollution

For months, cargo ships and oil tankers have been targeted in the Strait of Hormuz, the vital shipping route for oil and gas between the Persian Gulf and the Gulf of Oman. The progression from vessel impact to environmental damage is clear to see in many cases, said Brian Barnes, who is part of a

group of satellite oceanographers at the University of South Florida analyzing the effects of this war from afar.

"Some of the major ships that have been targeted, we see prolonged plumes, stretching for hundreds of kilometers away from the impact site," Barnes said.

The Persian Gulf has long suffered from oil pollution, but research by Barnes and other scientists comparing March 2026, when fighting was intense, with the same period last year shows a sharp increase.

"What we're seeing is twice the amount of surface oil in the Persian Gulf area relative to what we would expect in the absence



A satellite image shows oil in the Persian Gulf on April 2, 2026.

● SENTINEL-2/
EUROPEAN SPACE AGENCY



of a major [war]," Barnes said. Although, he noted, satellite imagery can only show what is on the surface of the water and not the thickness of the oil, which would give a more accurate picture of the extent of the contamination.

What is harder to assess with limited physical access to the war-riddled waterway is the impact on marine wildlife.

One of the planet's most unique ecosystems

The Persian Gulf hosts an ecosystem teeming with life. It is home to several species of sea turtles, hundreds of species of fish and the world's second-largest population of dugongs, or sea cows.

"One of the world's largest whale shark congregations occurs close to the South Pars oil field where Qatar and Iran meet," said Bernhard Riegl, a professor at Nova Southeastern



The photo shows an oil slick along the southern coast of Iran's Qeshm Island, Persian Gulf, on August 13, 2026.

● AMIRHOSSEIN KHORGOOI/ISNA

University who has studied the Persian Gulf for decades. Sandy offshore islands and expansive seagrass beds make the Persian Gulf an ideal habitat for nesting and breeding. Extensive mangrove forests and coral reef structures create protected nurseries for dolphins, seabirds, and whale sharks. Yet in springtime, traditionally the season for breeding, the war was raging.

Only the hardiest marine life survives in these waters. Not only is the Persian Gulf one of the world's hottest seas, but it also experiences sharp temperature changes throughout the year.

The water near Kuwait City, for

example, goes from highs of around 36 degrees Celsius (97 Fahrenheit) in the height of summer to lows of around 16 degrees Celsius (60 Fahrenheit).

Razan Khalifa Al Mubarak, the UAE's special envoy of the Minister of Foreign Affairs for Nature, called for an end to attacks on the Persian Gulf in an editorial earlier this year.

"While the financial costs of damage can be calculated, the loss of ecosystems and species cannot. Once degraded, these systems may not recover," she wrote.

A looming catastrophe

Contamination in the Persian Gulf brings unique challenges as the body of water is relatively shallow — the deepest areas are only around 360 feet — and it is small, at 93,000 square miles. It also has only one entry and exit point connecting it to the open ocean: the Strait of Hormuz, which leads into the Gulf of Oman and the Indian Ocean beyond. This all means pollutants tend not to disperse or dilute easily.

No matter which country or vessel may be a target during this war, the repercussions will have wide impacts, Riegl said: "If we take a drop of oil and put it into the water on the Iranian side of the inflow into the [Persian] Gulf, a year later it will be in Kuwait, two years later it will be on the Omani side of the [Persian] Gulf and float out there."

The 1991 Persian Gulf War should be a cautionary tale, Riegl said. Retreating Iraqi forces set fire to hundreds of oil wells in Kuwait creating an environmental catastrophe felt throughout the Persian Gulf.

"The shorelines were devastatingly affected," Riegl said. "In fact, in many areas of Saudi (Arabia), if you go and dig in the sand, there's still old oil in there. It's just very hard to get rid of."

An additional concern is the fact that tens of millions of Persian Gulf residents rely on desalination plants, which convert seawater into drinking water.

The six countries which form the Persian Gulf Cooperation Council produce around a third of the world's desalinated water. Bahrain and Kuwait are almost entirely dependent on desalination for all drinking water. Oil pollution in the Persian Gulf could damage these facilities, imperiling water supply. When hundreds of millions of gallons were intentionally released into the Persian Gulf during the Iraq war, Kuwait had to rely on Saudi Arabia, Turkey and others to provide hundreds of water tankers and trucks to deliver bottled water.

A natural laboratory

One perhaps unexpected repercussion of environmental damage in the Persian Gulf is that it could undermine scientists' understanding of the impacts climate change will have on the world's seas.

The Persian Gulf's high temperatures are roughly where marine tropics are expected to be around the year 2100, Riegl said.

The Persian Gulf has "some of the most... valuable genetics of any sea on Earth because a lot of the adaptation that will need to be done has already been achieved in the [Persian] Gulf."

"If we want to know what the ocean at large will look like at the end of the century," he added, "the [Persian] Gulf is the area to look at."

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