


## Seasick:

# The Turbulent Impact of Offshore Oil and Gas on Ocean Biodiversity and Coastal Livelihoods



Oil and gas activities pose a significant threat to the world's ocean. From initial exploration, seabed drilling, production waste dumping, and coastal processing to subsea piping, long-distance shipping, end-use combustion, and infrastructure abandonment, every phase of offshore oil and gas production and use threatens the health of the ocean and its biodiversity.


Oil and gas produced, processed, and transported along coastlines and at sea harm local environments and health near power plants and industrial sites while driving climate change through greenhouse gas emissions. Climate change has myriad adverse effects on the environment and human rights, including the health of the ocean and the life that depends on it. The climate impacts of offshore oil and gas compound its localized harms to marine and coastal life.

## Introduction

The offshore sector is rapidly expanding within the oil and gas industry, positioned for its highest growth in a decade.<sup>1</sup> As of early 2025, nearly 29 percent of all oil and gas production is being extracted offshore.<sup>2</sup> In 2024, offshore wells alone comprised 85 percent of new global discoveries.<sup>3</sup> The continued expansion of offshore oil and gas operations poses a significant threat to marine ecosystems, Indigenous Peoples, and the livelihoods of coastal communities. This brief focuses, in particular, on the biodiversity impacts of offshore oil and gas development — one of several critical risks explored in the [Offshore, Off-Limits: Making Oceans Off-Limits to Offshore Oil and Gas](#) series — which also addresses climate, economic, and social impacts in greater depth.



## Global Map of Offshore Oil and Gas Activity

 Operating Sites

**Source:** Data for Global Energy Extraction Tracker, Global Energy Monitor, March 2024, <https://globalenergymonitor.org>.



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## Phase 1: Exploration

During exploration, noise from airgun blasts, ship sonar, and general vessel traffic can significantly adversely harm marine life — big and small. For example, sonar noise pollution can be fatal for dolphins and whales because it impacts their ability to echolocate, disrupting their behavior. This can cause them to feed less and communicate less<sup>4</sup> with sound waves traveling hundreds of kilometers through the ocean.<sup>5</sup> Airgun blasts can also increase the mortality of zooplankton, which are a key component of the aquatic food chain.<sup>6</sup>

### The Great Amazon Reef System

Near the mouth of the Amazon River, companies are attempting to explore for oil and gas.<sup>7</sup> This would threaten the recently discovered Great Amazon Reef System (GARS), which scientists believe may serve as a deep-ocean corridor connecting the Caribbean Sea to the Southwest Atlantic Ocean.<sup>8</sup> Unlike other reefs, the GARS is located hundreds of meters below the surface and is greatly affected by the movement and nutrients from the Amazon River plume. It features a unique mixture of sponges, corals, coralline algae, and rock-like nodules of red algae (i.e., rhodoliths) supporting a complex and rich zooplankton community.<sup>9</sup>

Oil companies have sought an operating license for Block 59 (FZA-M-59), located in the Amazon River mouth maritime sedimentary basin of the Equatorial Margin. However, for more than nine years, Indigenous Peoples were not consulted during the permitting discussions.<sup>10</sup> Communities living in the area report that the daily, low-altitude helicopter flights between the airport in the municipality of Oiapoque and the exploration ship sent by oil and gas companies scare away birds, such as wild ducks and Jabiru storks, as well as the game that the villages need for food, handicrafts, and ritual practices.<sup>11</sup>



## The Amazon Fossil Fuel-Free Zone

The increased activity at the airport due to its usage by oil and gas companies looking to start drilling offshore has already resulted in moving the original landfill next to the territories of Indigenous Peoples to allow for more air traffic, sparking concern about the impact this will have on the quality of their water.<sup>12</sup> Representatives of the Indigenous Peoples of the Oiapoque (i.e., Conselho de Cacique dos Povos Indígenas do Oiapoque [CCPIO]), who represent around 55 villages,<sup>13</sup> are invoking their rights to prior consultation with Brazilian prosecutors.

Oil spill analysis and simulations have shown that oil spills could reach the Brazilian coast,<sup>14</sup> which could threaten coastal mangroves and vast areas rich in fish and plants while disrupting the lives of the 8,000 Indigenous People in Oiapoque, on the far north coast of Brazil.<sup>15</sup>

## Phase 2: Production

The release of wastewater from offshore oil and gas platforms during production causes chemical contamination, which degrades the food web around platforms and can lead to ecosystem collapse and lower species diversity.<sup>16</sup>

Light<sup>17</sup> and noise pollution<sup>18</sup> from offshore rigs can also cause ecosystem disturbances and harmful behavioral and physiological changes in marine and coastal wildlife. Gas flaring contributes to light pollution that disturbs fish, turtles, birds, and other wildlife, impacting marine food webs on which coastal populations depend.



### Global Map of Offshore Oil and Gas Activity

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 Oil Slicks from Vessels and Platforms

Spills from oil production can vary in size, severity, frequency, and duration. They can stem from transport vessels, pipelines, refineries, and storage facilities. Oil spill cleanup can be largely ineffective and can exacerbate environmental harm.<sup>19</sup>

The uncontrolled release of oil and gas, known as well blowouts, can occur during offshore oil and gas production, with devastating impacts on rig workers and the environment. The deeper the well, the greater the risk of large-scale disaster in the event of a blowout.<sup>20</sup>

For example, vessel-like, movable, floating platforms are known to create prolonged, slow leaks that have previously gone undetected.<sup>21</sup>

**Source:** Data for Cerulean, SkyTruth, version 1.0, October 2024, <https://skytruth.org/cerulean>.

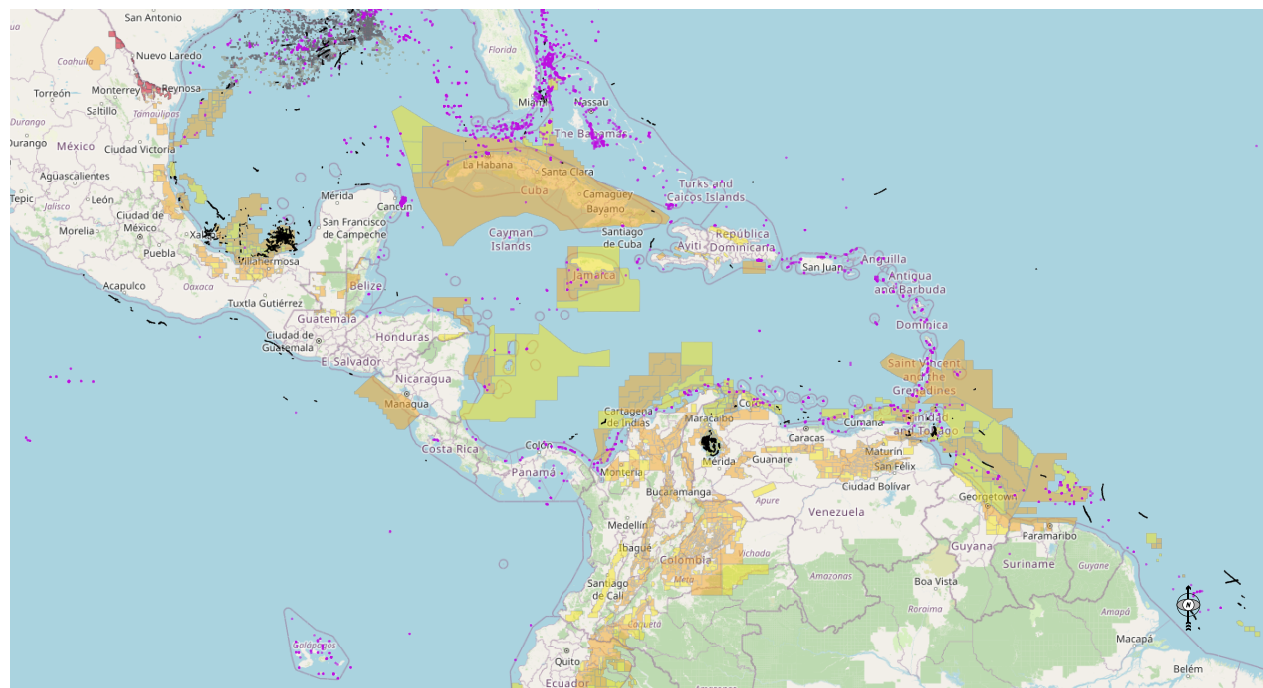
## Deepwater Horizon

In 2010, an explosion occurred at the BP Deepwater Horizon oil rig, resulting in the discharge of more than 134 million gallons (507 million liters) of crude oil into the Gulf of Mexico.<sup>22</sup> Years later, evidence of biological degradation linked to the accident persists, including corals showing abnormally high branch loss.<sup>23</sup>



## Colombia's Key Opportunity to Protect the Caribbean Sea

Oil and gas companies are planning to drill the world's deepest offshore well (3,900 meters) in Colombia's Caribbean waters.<sup>24</sup> The country has two discovered and two operating oil and gas extraction areas in the Caribbean Sea.<sup>25</sup>

These Caribbean offshore blocks are located near some of the country's richest coastal habitats, and any oil and gas activity there would have a tremendous impact on the surrounding biodiversity. Colombia can protect its Caribbean waters and the whole Caribbean Sea by not approving any further activity and revoking approved licenses in these blocks. There are 10 marine protected areas and protected coastal habitats near these blocks, including the Pastos Marinos Sawäirü, the Bahia Portete, and the Tayrona.<sup>26</sup>



## Map of the Caribbean Sea

-  Cold Water Corals
-  Oil Slicks

## Global Lease Block Phases

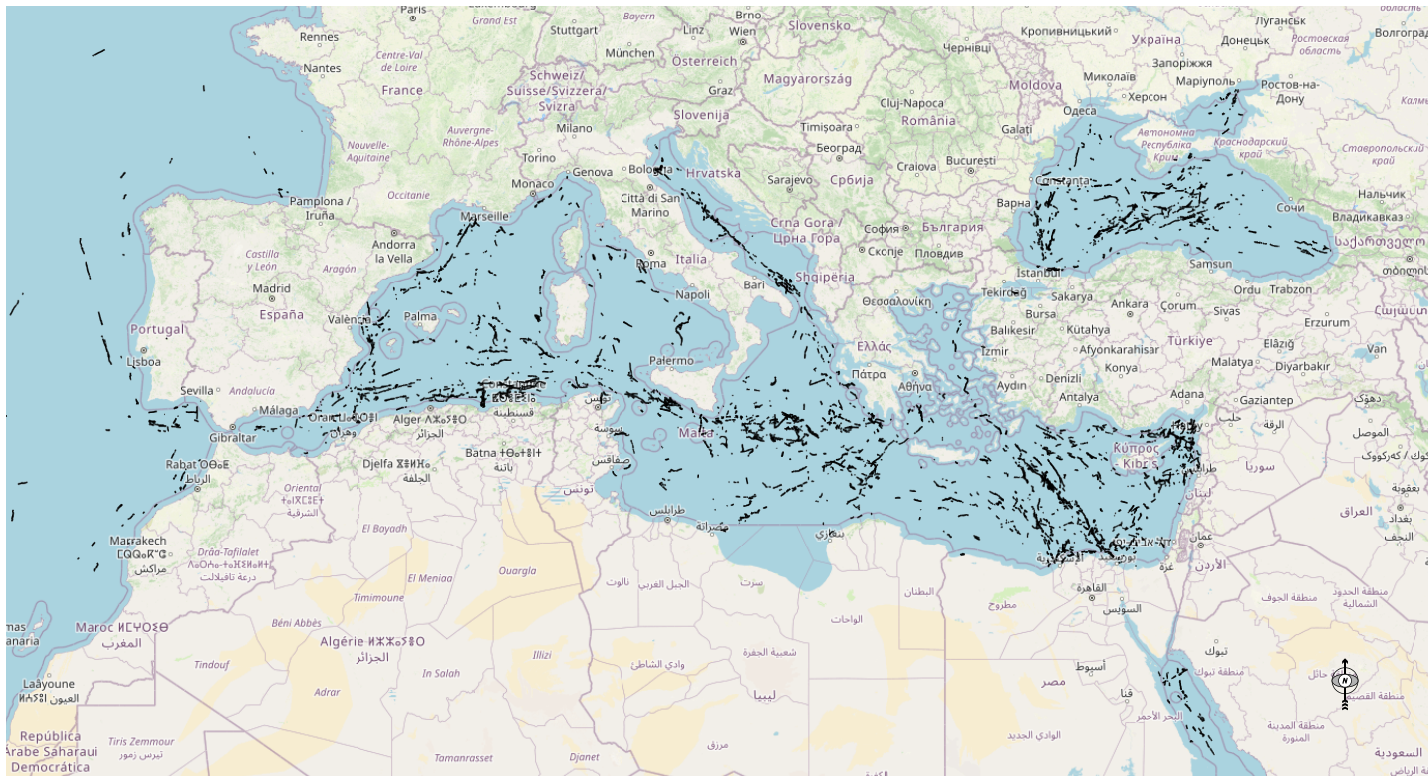
-  Licensing
-  Exploration
-  Production

**Source:** Data for Cerulean, SkyTruth, version 1.0, October 2024, <https://skytruth.org/cerulean>; Data for World Oil Map 2024, <https://www.oilmap.xyz>; Data for Global Distribution of Cold-Water Corals, version 5.1, A. Freiwald et al., UNEP-WCMC, 2021, <http://data.unep-wcmc.org/datasets/3>.

## Phase 3: Transportation

Companies transport oil and gas produced offshore to onshore facilities where it can be processed and used. Routine discharges from transport vessels contaminate the ocean with hydrocarbons, toxic metals, and dangerous chemicals that can bioaccumulate in the tissues of marine life and harm fishing communities.<sup>27</sup> Undersea pipelines can also create safety hazards for fisherfolk by entangling fishing equipment and vessels, endangering life and property.<sup>28</sup> Moreover, transport-related oil spills are just as damaging as spills during production.<sup>29</sup> More oil and gas tankers moving between offshore sites and markets means a greater risk of accidents.

The global boom in liquefied natural gas (LNG) production is reshaping coastlines. By the end of 2023, 772 LNG vessels were operating worldwide, with an additional 359 under construction as of February 2024.<sup>30</sup> This rapid expansion has led to a proliferation of import and export terminals along coastlines.<sup>31</sup> The surge in shipping traffic poses growing risks to marine and coastal ecosystems, contributing to ecological disruption and contamination risks.<sup>32</sup>



## Map of the Mediterranean Sea

Oil Slicks from Vessels and Platforms

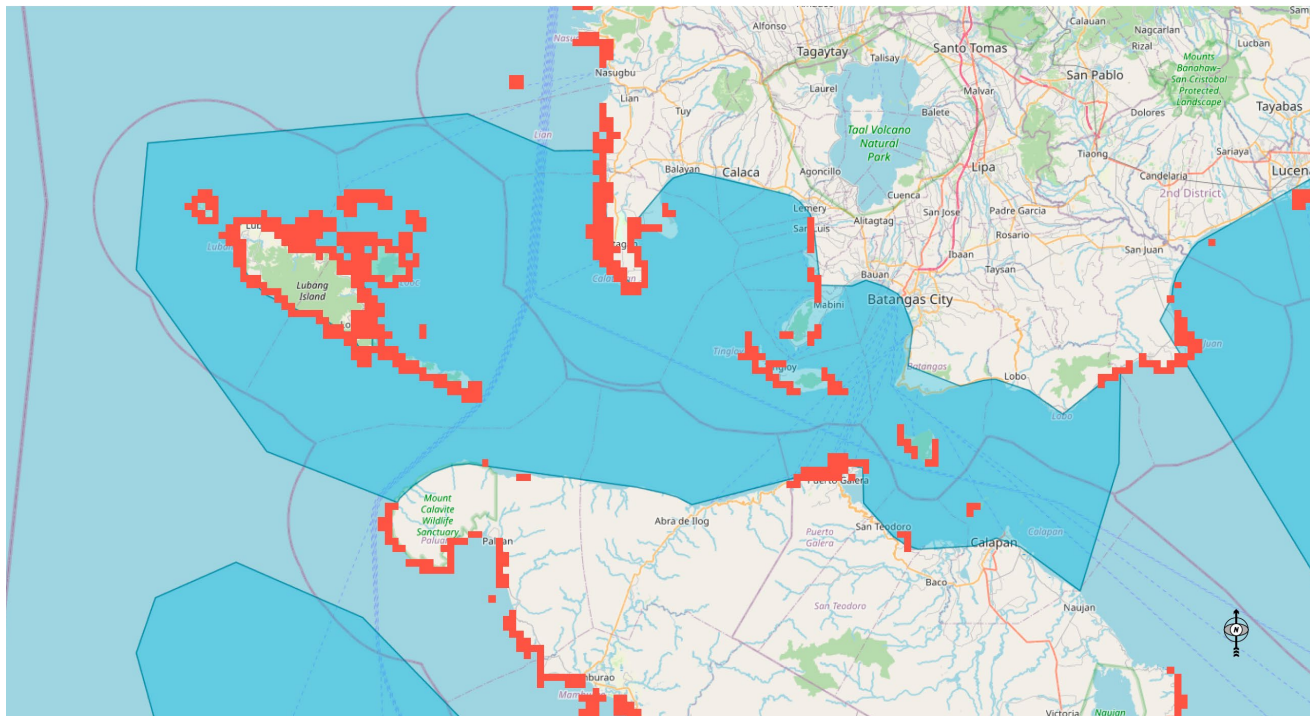
Source: Data for Cerulean, SkyTruth, version 1.0, October 2024, <https://skytruth.org/cerulean>.

## The Amazon of the Ocean



The Verde Island Passage (VIP), part of the Coral Triangle in the Philippines, is one of the world's most biodiverse marine regions, home to a large concentration of marine shore fish biodiversity.<sup>33</sup> In addition to its ecological importance, the VIP is also a key maritime corridor, linking the South China Sea with Tayabas Bay and the Sibuyan Sea, serving as a hub for intense shipping and trade activity.<sup>34</sup>

Already home to five gas power plants and two LNG import terminals in the VIP, 10 new gas power plants and three new terminals are being proposed. If all gas plants are built and run at full capacity, LNG tanker traffic could increase by as many as 387 tankers annually.<sup>35</sup>

The VIP already suffered one transportation accident in 2023 when the MT *Princess Empress* sank, spilling 800,000 liters of oil off the island of Mindoro near the VIP.<sup>36</sup> Now, the region faces even more danger as the VIP becomes a hotspot for LNG. Increasing LNG imports is a misguided approach, as the Philippines has ample renewable energy potential for a complete transition away from fossil fuels without relying on LNG.<sup>37</sup>



## Map of the Verde Island Passage

-  Sulu-Sulawesi Ecoregion EBSA
-  Presence of Coral Reefs

**Source:** Data for EBSAs, CBD Secretariat, <https://www.cbd.int/ebsa/ebsas>; Data for Global Distribution of Warm-Water Coral Reefs, version 4.1, UNEP-WCMC et al., 2021, <https://doi.org/10.34892/t2wk-5t34>.



## Phase 4: Decommissioning/Abandonment

It is an all-too-common practice for oil and gas operators to abandon wells and infrastructure without proper dismantling and closure — known as decommissioning. Although shutting down and cleaning up oil and gas production sites can be disruptive and damaging to host ecosystems, it is far preferable to leaving behind the eyesores and environmental hazards of leaking wells or discarded equipment.<sup>38</sup>

### Enabled Invasive Species

Oil and gas infrastructure are also vectors for invasive species. Sun corals, native to the Indo-Pacific region, have been introduced in all other continents. They take reef space from several other macroalgae and invertebrates and significantly reduce species diversity in a reef.<sup>39</sup>

The spread of sun corals in the South Atlantic has been linked to oil and gas infrastructure, with offshore platforms acting as stepping stones for these invasive species.<sup>40</sup> The construction of such platforms facilitates their initial dispersal, while failure to decommission them further compounds the problem by allowing invasive species to persist and spread.

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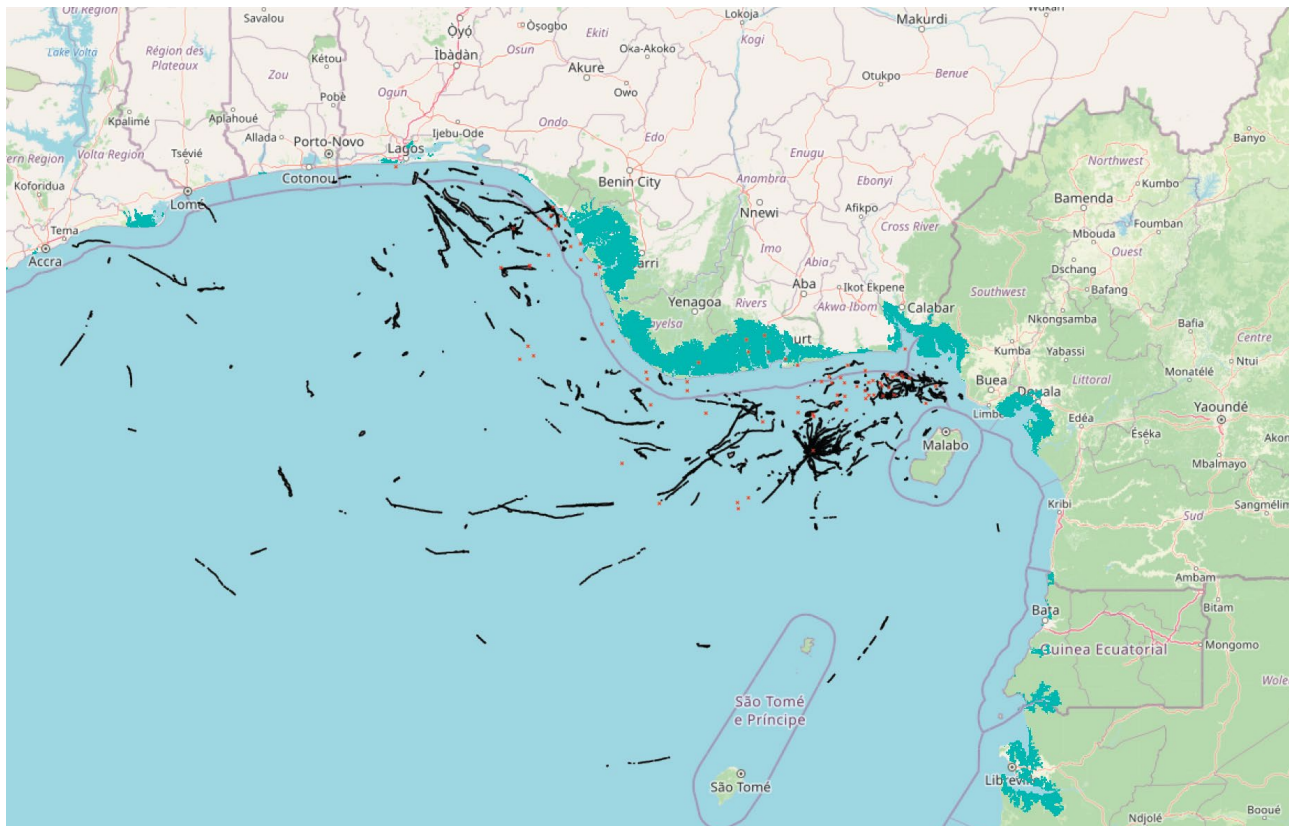
## The Degraded Nigerian Coast

Nigeria is the fifteenth largest oil producer in the world,<sup>41</sup> with most of its crude oil extracted from fields in the Niger Delta<sup>42</sup> — a region that contains Africa’s largest wetland. Rich in biodiversity and home to more than 30 million people, the Delta’s ecosystem supports numerous rare and endemic species.<sup>43</sup>




For decades, Nigeria has suffered from oil spills and leaks from operations in the Niger Delta, offshore and onshore.<sup>44</sup> Much of the existing oil infrastructure is now well beyond or reaching its usable life, and without proper regulation and enforcement, international oil companies may exit the region without decommissioning their degrading equipment or cleaning up and restoring the environment.<sup>45</sup>

Widespread oil contamination of soil and freshwater in the Delta stems predominantly from pipeline leakage (due to aging pipelines and vandalism), well blowouts, spills from abandoned wells, spills from oil tankers, and artisanal refining of oil.<sup>46</sup>

This widespread contamination has tremendously affected the region’s freshwater supply. It has also depleted the fish populations, which traditionally serve as a food source for the local population, such as the Awoye community of Ondo State.<sup>47</sup> The polluted waters have decimated local fisheries, which has had adverse consequences on food security in the Niger Delta, affecting not only nutritional aspects but also cultural and social traditions.<sup>48</sup>



## Map of the Niger Delta

-  Oil slicks from Vessels and Platforms
-  Presence of Mangroves
-  Offshore Oil and Gas Operations

**Source:** Data for Ceruleaun, SkyTruth, version 1.0, October 2024, <https://skytruth.org/cerulean/>; Data for Global Mangrove Watch, Global Mangrove Alliance, <https://www.globalmangrovetwatch.org/>; Data for Global Energy Extraction Tracker, Global Energy Monitor, March 2024, <https://globalenergymonitor.org/>.

## Conclusion

Marine and coastal ecosystems sustain abundant life and uphold the lives and livelihoods of millions of people who depend on them for essential human rights, including access to food, a decent standard of living, health, employment, a clean, healthy, and sustainable environment, and preservation of cultural heritage. Yet, each phase of offshore oil and gas activities poses a serious threat to these vital marine and coastal ecosystems and the rights they support.

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# Endnotes

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## Seasick: The Turbulent Impact of Offshore Oil and Gas on Ocean Biodiversity and Coastal Livelihoods

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