



REPORT
AUGUST 2022

THE SEA WE IGNORE:

HUMAN RIGHTS AND THE DEGRADATION OF
VENEZUELAN MARINE ECOSYSTEMS



REPORT
AUGUST 2022

THE SEA WE IGNORE:

HUMAN RIGHTS AND THE
DEGRADATION OF VENEZUELAN
MARINE ECOSYSTEMS

CLIMA21. CARACAS

Information: clima21.ddhh@gmail.com
Reproduction of this document for non-commercial use is permitted provided the source is cited.

Citation: Clima21.(2022). The sea we ignore: Human rights and the degradation of Venezuelan marine ecosystems. Caracas. Clima21. <https://clima21.net/> August 2022

Contents



EXECUTIVE SUMMARY	4
INTRODUCTION	6
INFORMATION SOURCES	8
RESULTS	9
Region 1. North-western and central-western coastal region - Castilletes to Puerto Cabello (Zulia, Falcón, Yaracuy and Carabobo states).....	9
Region 2. Central coastal region Puerto Cabello to Cabo Codera (Carabobo, Aragua, La Guaira and part of Miranda states).....	15
Region 3. Coastal region of Miranda and Anzoátegui - Cabo Codera to Puerto La Cruz.....	18
Region 4. North-Eastern Region – Sucre State Coasts (Santa Fe – Güiria).....	20
Region 5. The Gulf of Paria and the Orinoco Delta (Sucre, Monagas and Delta Amacuro states).....	24
Region 6. Insular region (Nueva Esparta state and Francisco de Miranda Insular Territory).....	26
CONCLUSIONS	29
Environmental disturbances	29
Conservation threats	31
Obstacles	33
RECOMMENDATIONS.....	37

Executive Summary

The extensive and heterogeneous continental coast of Venezuela and its islands on the Caribbean Sea present a very diverse natural and cultural heritage that generates a significant number of ecosystemic services and contributions to the country.

Despite this, the coastal marine ecosystems of the country are being subjected to multiple pressures of human origin that are causing their accelerated degradation. This process of deterioration is affecting the well-being and human rights of the Venezuelan population.

Based on this situation, this report seeks to contribute to the knowledge and understanding of the environmental situation of the different regions of the continental and insular coast of Venezuela. For this, 163 bibliographical references were reviewed, including scientific articles, reports, and documents, as well as articles published in the media.

The results obtained for the six zones into which the country's coasts were divided were classified into environmental disturbances, threats to conservation, and obstacles.

The major disturbances include oil spills, contamination by sewage and solid waste, the presence of invasive species, and unsustainable extraction of biological diversity through fishing, hunting, or extraction from its habitat.

Likewise, the main threats are considered to include the effects of climate change on Venezuelan coastal ecosystems; the presence of heavy metals in the coastal areas of at least three areas of the country; the growing presence of microplastics in coastal sediments, and the absence of environmental considerations in the design of fishing and tourism policies.

The obstacles found in this review include the absence of environmental policies with technical criteria, the loss of professionals and specialists with skills to carry out environmental management tasks, the loss of institutional capacity for the management of protected areas, and the serious deterioration of Universities and other marine research centers.



With the information available, it is possible to state with some certainty that some of these disturbances are increasing over time while the damage also seems to increase and begin to affect areas and ecosystems where the disturbances were not previously present. It is also possible to affirm that the Venezuelan State lacks the capacities and the political will to prevent or mitigate these damages and their effects on the population.

All of these issues are major barriers to achieving the United Nations Sustainable Development Goals, including SDGs 1 (no poverty), 2 (zero hunger), 6 (clean water and sanitation), 8 (decent work and economic growth), 12 (responsible consumption and production), 13 (climate action), and 14 (life below water). Likewise, the results indicate that the country is not advancing towards any of the targets established for SDG14.

Based on the foregoing, a series of recommendations were addressed to the national government, including the development of a national policy for the conservation and sustainable use of coastal ecosystems; guarantees of compliance with the constitutional and legal norms for conservation of these areas; the inception of a policy for research on priority issues related to the Venezuelan sea; the design of a policy for the recovery of fishing activity; the promotion and support of marine education and research institutions and the cease of harassment and budgetary

The Venezuelan State lacks the capacities and the political will to prevent or mitigate these damages and their effects on the population.

suffocation of national universities; the promotion of policies for participation and education on the conservation of the Venezuelan seas and coasts, and a call for companies -mainly the oil state-owned company PDVSA- to subscribe to the United Nations Sustainable Ocean Principles.



Introduction

In the 1980s, the Venezuelan State carried out an international campaign to promote tourism to Venezuela by using images of Venezuelan landscapes. Some of them included pristine beaches with crystal clear waters. The slogan of the campaign was: “Venezuela the best kept secret in the Caribbean”. Nearly 40 years later, beaches in much of the country are covered in debris and the waters are polluted, but Venezuela’s coastline remains a secret even to state agencies and many Venezuelans.

This situation is in contrast with the fact that, throughout history, the seas and oceans, particularly their coastal areas, have served humanity as a means of communication, sustenance, and extraction of resources, as well as a space for recreation and cultural development. Additionally, the oceans are closely related to all environmental processes on a global scale, since the dynamics of the seas affect complex processes related to climate and biogeochemical cycles.



Therefore, the health of marine ecosystems is a fundamental element of the human right to a safe, clean, healthy and sustainable environment,¹ among many others.

In the case of Venezuela, a great diversity of marine-coastal ecosystems is present along its entire continental and insular coastline. Most of these support great diversity and biological productivity. Likewise, a very important part of the commercial and industrial activity is concentrated in these areas, as well as large urban concentrations.

Therefore, the protection and conservation of these marine ecosystems and their natural resources, as well as the rights of coastal States and communities, are stipulated in the domestic legislation and international agreements.

Despite this, an increase in the degradation of marine ecosystems is being observed, producing an increasing violation of human rights, both for people in coastal areas and, indirectly, all the citizens of the country.

Unfortunately, the existing information in Venezuela on the current condition of these ecosystems is scattered, outdated and difficult to access. Likewise, part of the information on the management of Venezuelan marine ecosystems is not available for consultation or simply does not exist due to the information opacity of the national government and the deinstitutionalization of environmental management, as well as the increasing destruction of Venezuelan public universities.²

Based on this situation, the objective of this report is to contribute to the knowledge and understanding of the environmental situation of the different regions of the coastal marine ecosystems in Venezuela. For this, the factors that are affecting the ecosystems in each of the regions considered will be described, together with the possible current consequences and the possible future risks to human communities in the affected areas. Finally, an attempt will be made to articulate the information obtained with the United Nations Sustainable Development Goals, mainly SDG14.³

¹ Human Rights Council (2021). The human right to a safe, clean, healthy and sustainable

environment (A/HRC/48/L.23/Rev.1). Available: <https://undocs.org/Home/Mobile?FinalSymbol=a%2Fhrc%2F48%2Fl.23%2Frev.1&Language=E&DeviceType=Desktop&LangRequested=False>

² Scholars at Risk (2020). El declive de la universidad venezolana. FREE TO THINK 2020: Informe del Proyecto de Monitoreo de la Libertad Académica de Scholars at Risk. Available: <https://www.scholarsatrisk.org/wp-content/uploads/2020/12/SAR-Free-to-Think-2020-Venezuela.pdf>

³ United Nations. Goal 14: Conserve and sustainably use the oceans, seas and marine resources. Available: <https://www.un.org/sustainabledevelopment/oceans/>



Information sources

The sources of information used to prepare this report were the following:

- Documentary research conducted through the examination of scientific articles with information on the state of conservation of the marine-coastal ecosystems of Venezuela. For this, searches were made on Google Scholar, online library catalogs of different universities, scientific journals, and the websites of research institutes and Venezuelan public institutions.
- Information published by the media on situations of deterioration of marine ecosystems.
- Consultations with specialists on specific topics.



RESULTS

164 references were reviewed, including 82 academic reports (scientific articles, books, book chapters, and theses), 41 articles published in the media, and 40 technical reports, international documents, and other documentary sources. Most of them (75%) were published between 2015 and 2022.

In order to facilitate the understanding of the results, they will be presented by coastal regions, established from the simultaneous consideration of their geomorphological characteristics, bioregions,⁴ and the current environmental situation.

1. North-western and central-western coastal region - Castilletes to Puerto Cabello (Zulia, Falcón, Yaracuy and Carabobo states)

This region includes the coasts of the Gulf of Venezuela and the estuarine zone of Lake Maracaibo, as well as the coastal areas of Falcón and Golfo Triste, and is made up of extensive shallow-water beaches with sandbars, lagoons and marshes, mangroves, salt flats and reefs⁵ that define an important series of bioregions.^{6 7}

Likewise, these region includes Areas Under a Special Administration Regime such as the Los Olivitos-Ciénaga Wildlife Refuge, the Morrocoy National Park, the Cuare Wildlife Refuge, the Hueque-Sauca Wildlife Reserve, and the San Esteban National Park, all sensitive areas of great environmental importance.

⁴ The concept of bioregion is used according to Miloslavich, P., Klein, E., Yerena, E. & Martin, A., (2003) Marine biodiversity in Venezuela: status and perspectives. *Gayana* 67(2): 275-301, 2003

⁵ Miloslavich, et al. (2003) op. cit.

⁶ A natural ecological community made up of distinctive biological and ecosystemic elements

⁷ Fundación Polar Geo Venezuela. (2007). Unidad Natural 1. Las Costas. Paisaje Natural. Costas de formas cambiantes. Available: https://bibliofep.fundacionempresaspolargeo.org/media/16816/geo_u1_l28_costa_costa_geomorfofologia.pdf



Punta Caimán, Falcón state, Photography Carolina Dávila

On the other hand, this coastal space concentrates a significant number of oil facilities, including production areas, refineries and petrochemical plants, as well as large urban centers such as Maracaibo, Cabimas, Ciudad Ojeda, Punto Fijo, La Vela de Coro, Moron and Puerto Cabello.

The main factor generating environmental degradation in this region has been the contamination derived from the oil industry,^{8 9} which has been affecting the area since the beginning of production in Lake Maracaibo¹⁰.

This situation has been exacerbated in the last six years by the alarming increase

8 Machado-Allison, A. (2017) La conservación de ambientes acuáticos: petróleo y otras actividades mineras en Venezuela. Chapter 9 (p. 189-201) In: Rodríguez-Olarte, D. (Editor). Ríos en riesgo de Venezuela. Vol 1. Colección Recursos hidrobiológicos de Venezuela. Universidad Centroccidental Lisandro Alvarado (UCLA). Barquisimeto, Lara. Venezuela.

9 Tinker Salas. M. (2017) Venezuela: La Mancha del Petróleo, NACLA Report on the Americas, 49:4, 416-420, DOI: 10.1080/10714839.2017.1409012

10 Clima21 (2022) Petróleo en el lago de Maracaibo. La otra historia. Available: <https://clima21.net/sin-categoria/petroleo-en-el-lago-de-maracaibo-la-otra-historia/>

The main factor generating environmental degradation in this region has been the contamination derived from the oil industry.





Satellite -El Palito -Eduardo Klein

in the number and frequency of spills and leaks from different oil facilities in the region.¹¹ Between 250 and 1,000 barrels of oil are estimated to be spilled in Lake Maracaibo every day.¹² This situation has been attributed to the serious deterioration of the national oil industry, which has had repercussions on the apparent lack of maintenance of the infrastructure and the lack of operational controls.¹³

On the other hand, the El Palito Refinery (Carabobo state) has shown an apparent increase in the number of spills originating from its facilities. In 2020, at least four major spills were recorded, while five more spills took place in January 2021 alone.¹⁴

15 16 17 18

11 Clima21 (2022b) Derrames petroleros en Venezuela (2016 – 2021). Available: <https://clima21.net/informes/derrames-petroleros-en-venezuela-2016-2021/>

12 Observatorio de Ecología Política de Venezuela (2022) Contaminación petrolera en el Lago de Maracaibo. Available: <https://www.ecopoliticavenezuela.org/georeferencias/contaminacion-petrolera-en-el-lago-de-maracaibo/>

13 Clima21 (2022b) op. cit.

14 Klein, E. 2020. Derrame Golfo Triste, Seguimiento mediante sensoramiento remoto Julio-Agosto 2020. Informe Técnico. Laboratorio de Sensores Remotos, Universidad Simón Bolívar; Sociedad Venezolana de Ecología. 22 pp. Available: <https://svecologia.org/wp-content/uploads/2020/08/InformeDerrameSVE.pdf>

15 Barreto, M. B. (2021). Impactos de los derrames de hidrocarburos sobre los ecosistemas de manglar. Boletín de la Academia de Ciencias Físicas, Matemáticas y Naturales, Vol. LXXXI, n.º 1, 3-57.

16 Sánchez, J. (2021). Afectación de los ecosistemas marino-costeros por los derrames 994 de hidrocarburos. Boletín de la Academia de Ciencias Físicas Matemáticas y Naturales (ACFIMAN): 35-39.

17 Villamizar, E. (2021). Impactos de los derrames de petróleo sobre los arrecifes coralinos y sus bienes y servicios ecosistémicos. Boletín de la Academia de Ciencias Físicas, Matemáticas y Naturales Vol. LXXXI (1): 45-52.

18 Clima21 (2022) op. cit.



Coast - Lake of Maracaibo. Photography Isaac Rubio

There are few studies on the environmental impact produced by spills in this region. However, they are known to affect coastal invertebrates,¹⁹ fish,²⁰ sea turtles,²¹ shorebirds,²² aquatic mammals²³ and different marine ecosystems (coral reefs, seagrass fields, mangroves, etc.).^{24 25 26}

Additionally, as a consequence of the effluents originating from the petrochemical facilities installed along the coast, high levels of heavy metals have been found in sediments along the shores of Lake Maracaibo,^{27 28} areas surrounding the Paraguaná Refining Complex,²⁹ and the shores of Golfo Triste near the Morón Petrochemical

19 Severeyn, H., Delgado, J., Godoy, A. & de Severeyn, Y. (2003). Efecto del derrame de petróleo del buque Nissos Amorgos sobre la fauna macrobentónica del Golfo de Venezuela: Cinco años después. *Ecotrópicos*. 16. 83-90. Available: https://www.researchgate.net/publication/281245693_Efecto_del_derrame_de_petroleo_del_buque_Nissos_Amorgos_sobre_la_fauna_macrobentonica_del_Golfo_de_Venezuela_Cinco_anos_despues

20 Templeton, W.L.; Sutton, E.A., Bean, R.M., Arnett, R.C., Blaylock, J.W., Wildung, R.E., Moore, H.J. (1975) Oil pollution studies on lake Maracaibo. *Venezuela. International Oil Spill Conference Proceedings* (1975) 1975 (1): 489-496. <https://doi.org/10.7901/2169-3358-1975-1-489>.

21 Carrasquero, R., & Barrios-Garrido, H. (2021) Evaluación de riesgos de actividades petroleras en ambientes marinos sobre las tortugas Cardon (*Dermodochelys coriacea*) en el Golfo de Venezuela. In: *Aprender a vivir en un mundo diferente*. Reyes, M.L., Aular de Durán, J., Santana Pérez, Y., & Navarra Perozo, R. (eds) Universidad del Zulia. Maracaibo.

22 Giner, S. (2021). El impacto de los derrames petroleros sobre las aves playeras y sus sitios de 385 parada en Venezuela. *Boletín de la Academia de Ciencias Físicas, Matemáticas y Naturales* Vol. LXXXI, núm. 1, 40-44.

23 Barrios-Garrido, H., Boher-Bentti, S., De Turrís-Morales, K., Espinoza-Rodríguez, N., Ferrer-Pérez, A., Herrera-Trujillo, O. L., et al. (2015). "Tonina costera, Sotalia guianensis," En *Libro Rojo de la Fauna Venezolana*, eds Rodríguez, J. P., García-Rawlins, A., y Rojas-Suarez, F. Provita, Fundación Empresas Polar. Caracas.

24 Sánchez, J.C. (2021) Afectación de los ecosistemas marino-costeros por los derrames de hidrocarburos. *Boletín de la Academia de Ciencias Físicas, Matemáticas y Naturales* Vol. LXXXI, núm. 1, (35-39)

25 Barreto Pittol, M.B. (2021) Impactos de los derrames de hidrocarburos sobre los ecosistemas de manglar. *Boletín de la Academia de Ciencias Físicas, Matemáticas y Naturales* Vol. LXXXI, núm. 1, 53-57.

26 Villamizar, E. (2021) Impactos de los derrames de petróleo sobre los arrecifes coralinos y sus bienes y servicios ecosistémicos. *Boletín de la Academia de Ciencias Físicas, Matemáticas y Naturales* Vol. LXXXI, núm. 1, 45-52.

27 Marín Leal, J.C., Colina, M., Ledo, H. & Gardiner, P. (2022). Ecological risk by potentially toxic elements in surface sediments of the Lake Maracaibo (Venezuela). *Environmental Engineering Research*. 27. 210232. [10.4491/eer.2021.232](https://doi.org/10.4491/eer.2021.232).

28 Ramos, R., Bastidas, C., & García, E. (2012) Ensayos de toxicidad con sedimentos marinos del occidente de Venezuela. *Ciencias Marinas* (2012), 38(1A): 119-127. <http://dx.doi.org/10.7773/cm.v38i1A.1939>

29 Cróquer, A, Bone, D, Bastidas, C, Ramos, R. & García, E. (2016). Monitoring coastal pollution associated with the largest oil refinery complex of Venezuela. *PeerJ*. Available: <https://www.researchgate.net/>

Complex,³⁰ as well as in various marine organisms such as river dolphins,³¹ fish,³² and marine invertebrates,³³ among others.

Added to this situation is the pollution derived from the discharge of untreated domestic and industrial effluents, solid waste, and other pollutants in Lake Maracaibo,³⁴ the Paraguaná Peninsula,³⁵ and tourist areas near Puerto Cabello³⁶ and even the Morrocoy National Park.³⁷

One of the consequences of these continuous pollution processes is the growth of algae and floating plants that cover large areas of the lake,³⁸ ³⁹ which has repercussions on the increase in the environmental deterioration of this body of water.

The degradation caused by oil and petrochemical activity also affects the existing protected natural areas in the region, such as the Los Olivitos Wildlife Refuge⁴⁰ (declared a RAMSAR site) and the Morrocoy and San Esteban national parks.⁴¹

On the other hand, the health of protected areas and other areas of ecological relevance in the region have been affected by different factors. In the case of the Morrocoy National Park, the area has been historically affected by a series of environmental disturbances of anthropogenic origin,⁴² including a high discharge of sediments, contamination by solid waste,⁴³ discharges of untreated sewage,⁴⁴ overfishing, and the invasion of exotic species such as lionfish⁴⁵ and the invasive

publication/304401378_Monitoring_coastal_pollution_associated_with_the_largest_oil_refinery_complex_of_Venezuela

30 Smith, J., Colina, M., Colina, G., Sánchez, J., Montilla, B. (2017) Especiación de mercurio en el caño Alpagatón y en las zonas marino-costeras del Golfo Triste (Venezuela) *Revista Bases de la Ciencia*. Vol 2. Año 2017. N° 3 (17-36)

31 Proyecto Sotalia (2019). Tonina del lago contaminada con mercurio. Available: <https://proyectosotalia.org/tonina-del-lago-contaminada-con-mercurio/#:~:text=Luego%20de%20realizar%20estudios%20en,en%20todos%20los%20individuos%20>

32 Colina de Vargas, M. & Romero, R.A. 1992. Mercury determination by cold vapour atomic absorption spectrometry in several biological indicators from Lake Maracaibo, Venezuela. *Analyst*. March 1992. Vol 117. (645-647)

33 Iglesias, N., & Penchaszadeh, P. E. (1983). Mercury in sea stars from Golfo Triste, Venezuela. *Marine Pollution Bulletin*, 14(10), 396-398. doi:10.1016/0025-326x(83)90607-0

34 Bracho, G., Cuador-Gil, J., & Rodríguez-Fernández, R. (2016). Calidad del agua y sedimento en el lago de Maracaibo, estado Zulia. *Minería y Geología*, vol. 32 (1), 152 pp. 1-14. Available: <https://www.redalyc.org/journal/2235/223544262001/html/>

35 Marin, J.C. y Ferrer, L. (2020). Basura marina en la costa Oeste de la Bahía de Amuay, estado Falcón (Venezuela). *Revista Latinoamericana de Difusión Científica* Vol.2 (2): 6 – 21.

36 Garrido, D. (2017) Evaluación microbiológica de la arena y el agua de las Playas turísticas "Huequito" y "Quizandal" (mun. Puerto Cabello, edo. Carabobo) como herramienta indicadora de la calidad ambiental: Trabajo Especial de Grado. Universidad de Carabobo. Available: <http://mriuc.bc.uc.edu.ve/bitstream/handle/123456789/4567/DGarrido.pdf?sequence=1>

37 Swiss.info (2022) Venezuela recoge casi 69.000 kilos de basura en zonas de ocio en semana santa. Available: https://www.swissinfo.ch/spa/venezuela-medioambiente_venezuela-recoge-casi-69.000-kilos-de-basura-en-zonas-de-ocio-en-semana-santa/47525798

38 Parra-Pardi, G., Sutton, E. & Rincón, E.N. (1985) Effects of petroleum on algal blooms in lake Maracaibo. *International Oil Spill Conference Proceedings* (1985) 1985 (1): 373-377. <https://doi.org/10.7901/2169-3358-1985-1-373>

39 Nava, M. (2021) Algae fed by pollution carpet Venezuela's Lake Maracaibo in green. Reuters. Available: <https://www.reuters.com/business/environment/algae-fed-by-pollution-carpet-venezuelas-lake-maracaibo-green-2021-12-08/>

40 Dávalos, A.L. 2010. Cambios en la Cobertura de manglares en tres sitios de la Costa Caribe de Venezuela. In: *Libro Rojo de los Ecosistemas Terrestres de Venezuela*. (J.P. Rodríguez, Rojas-Suárez F. y D. Giraldo Hernández, Eds.) Provita, Shell Venezuela, Lenovo (Venezuela). p. 293-301.

41 *Clima21* (2022) op cit.

42 Latchinian, A., Dopazo, C., Porras, J. A., Reid, J., & Piñango, A. (2017). Elaboración de un Plan de Gestión Ambiental para el Parque Nacional Morrocoy, Venezuela. *Gestión y Ambiente*, 20(1), 22-37. Available: <https://doi.org/10.15446/ga.v20n1.59318>.

43 Cesarini, D. (2022) Desechos plásticos siguen amenazando la vida de tortugas marinas de Choroní. Available: <https://elaragueno.com.ve/desechos-plasticos-siguen-amenazando-la-vida-de-tortugas-marinas-de-choroni/>

44 Latchinian, A., Dopazo, C. & Porras, J.A. (2017) Elaboración de un Plan de Gestión Ambiental para el Parque Nacional Morrocoy, Venezuela. *Gestión y Ambiente*. Tomo 20, N.º 1, (2017): 22-37.

45 Figueroa-López, N.N. Rodríguez-Quintal, J.G., & Brante, A. (2021) Abundancia y ecología trófica del pez león, *Pterois volitans*, en el Parque Nacional Morrocoy, Venezuela, mar Caribe Sur. *Rev. biol. mar. oceanogr.* vol.56 no.2



octocoral *Unomia stolonifera*,⁴⁶ as well as climate change.⁴⁷

Likewise, these areas have been subjected to activities contrary to the objectives of their designation, including the promotion of mass tourism without any consideration of the carrying capacity of the affected areas or the impact of this type of tourism,^{48 49} and the development of tourism infrastructure, among others.^{50 51}



Unomia stolonifera Bryan Alexander, taken from iNaturalist

An additional issue is the consumption or sale of wildlife, including species that were not common in the traditional diet of the residents.^{52 53 54}

2. Central coastal region - Puerto Cabello to Cabo Codera (Carabobo, Aragua, La Guaira and part of Miranda states).

This region is characterized by rocky coasts with cliffs, narrow beaches, and small bays. It is the seat of the port and city of La Guaira, capital of the state of La Guaira (formerly Vargas state) and home to the country's main seaport, as well as several urban and tourist centers, such as Cata, Ocumare de la Costa, Chuao, Chichiriviche de la Costa, Choroní, Catia La Mar, Caraballeda and Naguayatá, among others.

According to the information available, the most important problems in this area are related to contamination by solid waste, untreated water, and the absence of criteria for coastal management.

46 López, J. (2022) El coral invasor *Unomia Stolonifera* se ha propagado por el Parque Nacional Morrocoy y pone en riesgo su ecosistema. Available: <https://cronica.uno/el-coral-invasor-unomia-stolonifera-se-ha-propagado-por-el-parque-nacional-morrocoy-y-pone-en-riesgo-su-ecosistema/>

47 Villamizar, A. (2020). Medidas de Adaptación al Aumento del Nivel del Mar considerando las Trayectorias de Concentración Representativa. Boletín de la Academia de Ciencias Físicas, Matemáticas y Naturales LXXX (2, p). 41-77.

48 El Nacional. (2018) Fiesta en Los Juanes podría traer daños irreversibles para el ecosistema. Available: https://www.elnacional.com/sociedad/fiesta-los-juan-podria-traer-danos-irreversibles-para-ecosistema_229364/

49 Swiss.info (2022) op. cit.

50 Espinoza, F. (2019) Canal de navegación amenaza la integridad ecológica del Refugio de Fauna Silvestre Cuare, costa oriental del estado Falcón, Venezuela. Available: <https://desarrollosustentableve.com/wp-content/uploads/CANAL-DE-NAVEGACION-EN-CUARE-IMPACTA-DOS-AREAS-PROTEGIDAS-MARINO-COSTERAS-CUARE-FRANK-ESPINOZA-2019.pdf>

51 Observatorio de Ecología Política de Venezuela. (2019). Falcón: Canal de navegación en Cuare impacta dos áreas protegidas marino costeras. Available: <https://www.ecopoliticavenezuela.org/2019/12/17/falcon-canal-de-navegacion-en-cuare-impacta-dos-areas-protegidas-marino-costeras/>

52 Clima21 (2022b) Emergencia Humanitaria en Venezuela y la Fauna Silvestre: Diversidad biológica asediada por la crisis. Available: <https://clima21.net/informes/informe-emergencia-humanitaria-en-venezuela-y-la-fauna-silvestre-diversidad-biologica-asediada-por-la-crisis-version-en-ingles-y-espanol/>

53 Nava, M. (2020) Zulianos cazan animales silvestres para sobrevivir en medio de la pandemia. Available: <https://cronica.uno/zulianos-cazan-animales-silvestres-para-sobrevivir-en-medio-de-la-pandemia/>

54 Paz, J. (2020). Yurasi Briceño: "En el Lago de Maracaibo estarían muriendo cerca de 150 delfines al año". Mongabay. Available: <https://es.mongabay.com/2020/03/delfin-costero-caceria-y-pesca-en-lago-maracaibo-venezuela/>



Regarding contamination by solid waste, little information is available on the magnitude of the problem, but estimates by local environmental groups indicate that two tons of garbage pile up along the Central Coast every weekend.⁵⁵ There are also reports of trucks unloading household waste and rubble without any control in different areas along the Central Coast.⁵⁶

For its part, the wastewater disposal and treatment system, which was considered deficient in this region, was mostly destroyed as a result of the landslides and catastrophic floods that occurred in Vargas state (now La Guaira state) in December 1999.⁵⁷ To date, there is no public information to assert the recovery of any of these systems; Consequently, the wastewater from the entire region is discharged directly into the sea without any type of treatment.⁵⁸ Despite this, the national government has reported that 63 beaches in the state of La Guaira are suitable for recreational use.⁵⁹

55 Cárdenas, L., Díaz, G. & Lastra Veracierto, L. (2021) Derrames petroleros y acumulación de basura atentan contra ecosistemas marinos del centro del país (II). Available: <https://cronica.uno/playas-del-centro-estan-amenazadas-por-basura-y-derrames-de-crudo/>

56 Provea. (2012) Informe Anual. Derechos a un ambiente sano. Available: <https://provea.org/wp-content/uploads/2016/11/05AmbienteSano-1.pdf>

57 Genatios, C., & Lafuente, M. Lluvias torrenciales en Vargas, Venezuela, en diciembre de 1999. Protección ambiental y recuperación urbana. Boletín Técnico IMME v.41 n.2-3 Caracas nov. 2003.

58 López Medeiros, A.E. (2017) Contaminación De Las Playas del Litoral. https://easucabdm.fandom.com/es/wiki/Contaminaci%C3%B3n_De_Las_Playas_del_Litoral

59 VTV (2019) Estas son las playas aptas en el estado Vargas (+DETALLES). Available: <https://www.vtv.gob.ve/playas-aptas-vargas/>



Wastewater in Macuto-Vargas state, taken from Crónica Uno

Another topic of interest in the region is the degradation of habitats of high socio-environmental and cultural value such as La Ciénaga de Ocumare (Aragua state) and the Chichiriviche cove (La Guaira state). The first of them is a nesting area for sea turtles and home to coral communities, seagrass beds, and mangroves. This area is being affected by the uncontrolled growth of tourism and the lack of environmental regulations. This is causing damage such as deforestation of mangroves and large accumulations of solid waste that endangers the turtle nesting area.⁶⁰ In the case of the Chichiriviche de la Costa cove, its reef communities are being affected by the sedimentation caused by deforestation at the headwaters and inappropriate diving.^{61 62 63}

⁶⁰ anonymous testimony

⁶¹ Ochoa, O. (2020). Estructura de la comunidad de peces loro (Labridae: Scarinae) y su asociación a la complejidad estructural del hábitat en la ensenada de Chichiriviche de la Costa, Edo. Vargas. Trabajo Especial de Grado, Escuela de Biología, Universidad Central de Venezuela.

⁶² Gil, N. (2006). El buceo recreativo como actividad ambientalmente sostenible. Caso: Chichiriviche de la Costa, Edo. Vargas. Trabajo Especial de Grado. Universidad Simón Bolívar. Caracas, Venezuela.

⁶³ Ortiz, J. C. (2002). Estructura de la comunidad de corales pétreos de la ensenada de Chichiriviche de La Costa y efecto de un período intenso de precipitación. Trabajo especial de grado. Universidad Central de Venezuela. Caracas, Venezuela.

There is no public information on the impact on marine ecosystems of socio-natural disasters such as the “Vargas tragedy” that produced major changes in the coastline of the state.⁶⁴

3. Coastal region of Miranda and Anzoátegui - Cabo Codera to Puerto La Cruz

The region is made up of wide coastlines of shallow and sandy beaches, and shallow coastal lagoons with a high load of sediments from the Tuy and Unare rivers.

Two very marked sub-regions can be found in this area:

The coastal strip of Barlovento (Miranda state), between Cape Codera and Píritu, is characterized by the presence of shallow beaches and a significant number of coastal lagoons and other wetlands of ecological relevance. This sub-region is affected by large-scale tourism development and the presence of important urban centers, such as Carenero, Higuerote, and Tacarigua de Mamporal.

For its part, the coast of Anzoátegui state has seen great urban and industrial development in the last 80 years, including the conurbation of the cities of Barcelona, Puerto La Cruz, and Guanta, and the construction of important oil, petrochemical, and port facilities, such as the Petrochemical Complex José Antonio Anzoátegui, the Puerto La Cruz Refinery, the port of Guanta, and the Guaraguao Maritime Terminal.

In the Barlovento area, the transformation from an agricultural economy to a tourism-oriented one that began in the mid-20th century was totally disorderly and unsustainable despite some attempts at planning.⁶⁵ Even though tourism has considerably decreased in recent years due to criminal violence,⁶⁶ “development” in this area has caused serious damage to local ecosystems.

The main environmental issues in this subregion are related to the inadequate and illegitimate management of local coastal wetlands.⁶⁷ The most important damages

⁶⁴ ACFIMAN-SACC. (2018) Primer reporte académico de cambio climático. Ecosistemas marino-costeros. (see p. 233). Available: <https://acfiman.org/wp-content/uploads/2020/10/PRACC-con-correcciones-ISBN-DL-10052018.pdf>

⁶⁵ Lemus, J., & Díaz. M.A. (2018) Zonificación turística en la subregión Barlovento del Estado Miranda. Una aproximación metodológica para la conformación de áreas turísticas. Terra, Nueva Etapa. vol. XXXIV, núm. 55. pp.16-33.

⁶⁶ D Olmo, G. (2021) El paradisiaco lugar de Venezuela en el que nadie quiere vivir pese a que las casas son casi gratis. Available: <https://www.bbc.com/mundo/noticias-america-latina-56473255>

⁶⁷ Suarez, C. (2016) Uso y abuso de las lagunas costeras venezolanas. Revista de Investigación N° 87 Vol. 40, enero-abril, 2016 Pp. 63-94



to these bodies of water include pollution from untreated sewage; solid waste and heavy metals; destruction of mangroves; deforestation in the river basins that feed the wetlands; engineering works that fail to follow environmental criteria; urban and tourism development without control or environmental criteria; the installation of shrimp farms, and the hunting of wild animals, including protected species.^{68 69 70 71 72 73 74 75 76 77 78 79}

Likewise, it is important to consider the serious contamination produced by the water and solid waste transported by the Tuy River. This river is affected by the waters of the Guaire River, which acts as a drain for both residual water and solid waste from Caracas. For this reason, the river mouth near the town of Paparo (Miranda state) has become an area of high contamination that includes a long coastal sector covered with solid waste.⁸⁰

This process of deterioration has continued for at least the last sixty years, without any effective government action to achieve the long-term conservation of these important coastal ecosystems, including those protected by law.⁸¹

A serious threat to the wetlands and low-lying coastlines in this area is the increased risk of flooding due to rising sea levels caused by climate change.^{82 83}

For its part, the main environmental problems of the Anzoátegui state coast include the pollution derived from the discharge of sewage, industrial and petrochemical waste, and oil spills; the accumulation of solid waste along the coast; the pollution from port activities and the deterioration of local river basins, and the alterations of

68 Lentino, M., & Bruni, A. (1994). Humedales costeros de Venezuela: Situación ambiental. Caracas: Sociedad Conservacionista Audubon de Venezuela

69 Suárez (2002) op. cit.

70 Conde, J. E., & Carmona-Suárez, C. (2003). Ecosistemas marino-costeros. p. 862-883. In: Aguilera, M., Azócar, A. & González Jiménez, E. Biodiversidad en Venezuela. Tomo II. Fundación Polar, Ministerio de Ciencia y Tecnología. Caracas.

71 Camargo, E. (2021) En Peligro Laguna La Reina en Higuero (Miranda). Available: <https://www.ecopoliticavenezuela.org/2021/05/17/en-peligro-laguna-la-reina-en-higuero/>

72 Carrero de Blanco, A. & García Tovar, M. (2009). Caracterización ambiental del sector Los Totumos-Bahía de Buche ubicado en el Humedal Laguna Grande Zona Costera del Estado Miranda: Opciones de Solución para los problemas detectados. Revista de Investigación, vol.33, núm. 66.

73 Camargo, E. (2022) Laguna de Píritu sufre proceso de degradación ambiental. Available: <https://www.ecopoliticavenezuela.org/2022/02/18/laguna-de-piritu-sufre-proceso-de-degradacion-ambiental/#:~:text=Localizada%20cerca%20de%20Barcelona%20en,la%20misma%20se%20est%C3%A1%20secando>

74 Suárez (2016) op. cit.

75 Márquez, A., Senior, W., Fermín, I., Martínez, G., Castañeda, J., & González, A. (2008). Cuantificación de las concentraciones de metales pesados en tejidos de peces y crustáceos de la laguna de Unare, estado Anzoátegui, Venezuela. Revista Científica FCV-LUZ, XVIII (1), 73-86

76 Malaver, N., Rodríguez, M., Montero, R., Aguilar, V.H. Salas, M. (2014) Cambios espaciales y temporales en las características fisicoquímicas y microbiológicas del agua de la laguna de Tacarigua, estado Miranda, Venezuela. Acta Biol. Venez., Vol. 34(1):117-151

77 Díaz, H., & Zelwer, M. (1985). ¿Inconsciencia, ignorancia o indolencia? réquiem para una laguna. Acta Científica Venezolana, 36 (2), 123-130.

78 Naveda, J. (2011) Informe retrospectivo sobre los problemas que presenta el Parque Nacional Laguna de Tacarigua, Venezuela. Informe técnico desarrollado para la Dirección Sectorial de Parques Nacionales del Instituto Nacional de Parques, Caracas, 28 p.

79 Redacción Carabobo (2013) Liberan a caimán de 3 metros y medio en la Laguna de Tacarigua. Available: <https://noticias24carabobo.com/liberan-caiman-3-metros-medio-laguna-tacarigua/>

80 La Patilla (2022) ¡Alarmante! Así es la desembocadura del Guaire (Aló Jacqueline). Available: <https://www.lapatilla.com/2013/12/20/alarmando-asi-es-la-desembocadura-del-guaire-fotos/>

81 MINAMB (2013). Informe Nacional sobre Planes de Ordenamiento y Reglamentos de Uso de las Áreas Bajo Régimen de Administración Especial Marinas y Costeras de Venezuela. Despacho del Viceministro de Ordenación y Administración Ambiental - Dirección General de Planificación y Ordenación Ambiental - Dirección Técnica de las Zonas Costeras. Caracas, Venezuela. 40 p. Available: https://www.researchgate.net/publication/342509718_Informe_Nacional_sobre_Planes_de_Ordenamiento_y_Reglamentos_de_Uso_de_las_Areas_Bajo_Regimen_de_Administracion_Especial_Marinas_y_Costeras_de_Venezuela_National_Report_on_Planning_Plans_and_Regulation

82 Olivo Garrido, M.L., Sáez-Sáez, V., Martín Zazo, A. & Soto Olivo, A. (2010). Vulnerabilidad al incremento del nivel del mar: usos de la tierra y valor capital en el área Cabo Codera-Laguna de Tacarigua, estado Miranda, Venezuela. Terra, 26(40), 99-120.

83 Marrero C. & Rodríguez-Olarte, D. (2017). Los humedales costeros venezolanos en los escenarios de cambios climáticos: vulnerabilidad, perspectivas y tendencias. 461-476. In: Botello A.V., S. Villanueva, J. Gutiérrez & J.L. Rojas Galaviz (eds.). Vulnerabilidad de las zonas costeras de Latinoamérica al cambio climático. 476 p.

the coastline due to the construction of tourism and residential projects that fail to follow environmental criteria.^{84 85 86 87}

Due to its proximity to the urban and industrial centers of the Anzoátegui state, the western coastal section of the Mochima National Park is threatened by contamination from sewage discharged directly into the sea⁸⁸ and other contaminants. Likewise, the construction of a “luxury resort” on Borracha Island, which is part of this National Park, has been announced.⁸⁹

4. North-Eastern Region – Sucre State Coasts (Santa Fe – Güiria)

Rocky, abrupt, and narrow coasts dotted with cliffs and gulfs predominate in this region. One of their most notorious characteristics is their high primary productivity and fish production, associated with the phenomenon of coastal upwelling and the contribution of discharges from the Orinoco River.^{90 91}

The region has been affected by environmental problems, some of them long-standing and others more recent. To some extent, these problems have lately been left out of the public eye by the deliberate destruction of the Universidad de Oriente and, in particular, its Oceanographic Institute;^{92 93} as well as the decrease in research activities by the La Salle Foundation (especially its Margarita campus). These institutions used to provide very important contributions to the creation, dissemination and transfer of the necessary knowledge for the sustainable management of seas and coasts in the region.

The case of the invasive octocoral originating from the Indo-Pacific, *Unomia stolonifera*, stands out among the main problems in the sub-region. This species was possibly introduced in the area between 2000 and 2005, as a consequence

84 Senior Galindo, W.J. (2001) Planificación y manejo ambiental de la zona costera del estado Anzoátegui, Venezuela. Trabajo presentado como requisito parcial para ascender a la categoría de Profesor Titular. Universidad de Oriente, Cumaná.

85 Senior, J. (2016) Informe Final Costas Jose. Estado Anzoátegui, Venezuela. Available: https://www.researchgate.net/publication/326117522_Informe_Final_Costas_Jose_Estado_Anzoategui_Venezuela/citation/download

86 Environmental Justice Atlas (2016) Complejo Industrial Petrolero José A. Anzoátegui, Venezuela. Available: <https://ejatlas.org/conflict/los-impactos-socioambientales-del-complejo-industrial-petrolero-jose-antonio-anzoategui>

87 TalCual (2022) 7.5 kilómetros de costa fueron afectadas por derrame de crudo en Anzoátegui. Available: <https://talcualdigital.com/7-5-kilometros-de-costa-fueron-afectadas-por-derrame-de-crudo-en-anzoategui/>

88 Parkwatch. Venezuela (2002) Mochima National Park. Available: https://www.parkswatch.org/parkprofiles/pdf/monp_eng.pdf

89 TierradeGracia.net (2022) Seven Resorts, un paraíso que pronto disfrutarás en Mochima. Available: <https://tierradegracia.net/noticias-turismo/venezuela/seven-resorts-un-paraiso-que-pronto-disfrutaras-en-mochima>

90 Muller-Karger, F., Varela, R., Thunell, R., Scranton, M., Taylor, G., Capelo, J., Astor, Y., Tappa, E., Akl, J. & Ho, T.-Y. (2005) Características de la fosa de Cariaco y su importancia desde el punto de vista oceanográfico. Memoria de la Fundación La Salle de Ciencias Naturales 2005 (“2004”), 161-162: 215-234

91 Miloslavich, y colaboradores (2003) op. cit.

92 Aula Abierta (2021) Situación de los espacios universitarios de conservación ambiental en Venezuela (Enero 2019 – Agosto 2020). Available: <http://aulaabiartavenezuela.org/wp-content/uploads/2021/04/Informe-Preliminar-Situaci%C3%B3n-de-los-espacios-universitarios-de-conservaci%C3%B3n-ambiental-en-Venezuela-VOL-2.pdf>

93 Aula Abierta (2021) Afectaciones a la educación ambiental de calidad y a la biodiversidad en las universidades públicas venezolanas. Available: <http://aulaabiartavenezuela.org/wp-content/uploads/2021/03/2DO-INFORME-PRELIMINAR-AMBIENTE.pdf>



of the illegal trade of marine species for aquariums.⁹⁴ Recently, its presence has been registered in a large swath of the coastal area in the Mochima National Park,⁹⁵ ⁹⁶ and there are reports of its presence in other coastal areas across the country.⁹⁷ This species has become a serious threat to underwater life in the park and affects local biodiversity by occupying a large amount of substrate and displacing native species.

On the other hand, in the context of an estimated drop in the country's overall fish production of 80%,^{98 99 100 101} it is worth noting the specific case of the sardine (*Sardinella aurita*), the most important fishing resource in Venezuela, whose catches have suffered very large drops. According to the authors consulted, this situation may have been the consequence of a combination of circumstances that include environmental factors, overfishing,



94 Ruíz-Allais, J.P., Amaro, M.E., MaccFaden, C.S., Halasz, A. & Benayahu, Y. (2014). The first incidence of an alien soft coral of the family Xenidiidae in the Caribbean, an invasion in eastern Venezuelan coral communities. *Coral reef* 33 (2): 287-287.

95 Ruiz-Allais, J., Benayahu, Y. & Lasso-Alcalá, O. (2021). The invasive octocoral *Unomia stolonifera* (Alcyonacea, Xenidiidae) is dominating the benthos in the Southeastern Caribbean Sea. *Memoria de la Fundación La Salle de Ciencias Naturales*, 79(187): 63-80.

96 Ruiz-Allais, pers. comm.

97 As of the date of writing this report, the presence of *Unomia stolonifera* has also been reported on the central coast (Valle Seco, Edo. Aragua) and Cayo Sur (Cuare Wildlife Refuge, Edo. Falcón).

98 Tavares, R. (2019) Estado actual de los tiburones y rayas (Pisces: Elasmobranchii) en el mar Caribe venezolano: biodiversidad, pesca y conservación. *Ciencia Pesquera* (2019) 27(2): 33-52.

99 García, A. (2019) Sardina, la proteína más barata en Venezuela amenazada con desaparecer. Available: <https://cronica.uno/sardina-la-proteina-mas-barata-en-venezuela-amenazada-con-desaparecer/>

100 Cárdenas, J.J. (2017) La Pesca en Venezuela: ¿Qué ha pasado en estos últimos 10 años?. Available: <http://pescandoelcambiove.blogspot.com/2017/07/la-pesca-en-venezuela-que-ha-pasado-en.html>

101 Molina, M. & Mejías Yedra, D. (2019) Evidencias de sobrepesca y mal manejo del *Callinectes sapidus* (Rathbun, 1896) en el lago de Maracaibo, Venezuela. *Rev. Mar. Cost.* 11 (1): 81-100.

and inadequate fishing policies.^{102 103 104 105 106 107 108 109} The collapse of sardine fishing in the east of the country has generated serious social impacts, including the loss of more than 20,000 direct jobs and an average reduction of 40% in family income among the communities involved in the exploitation of this resource.¹¹⁰

On the other hand, warnings have been given about the extraction of sea cucumbers and starfish for sale to Asian countries through practices that fail to consider the existing knowledge about these species or the impacts on the ecosystems to which they belong.^{111 112 113 114}

In addition to the problems derived from invasive species, several coastal sections of the Mochima National Park present processes of environmental deterioration derived from contamination by solid waste, sewage, unsustainable tourism, and conflicts with the residents, all of which have led the National Park to be considered critically endangered.^{115 116}

In addition to these situations, large swaths of the coasts of the region present significant environmental deterioration as a result of pollution due to the discharge into the sea of untreated sewage from the cities and rivers of the area, as well

102 Gómez Gaspar, A. (2018) Análisis del manejo de la crisis de sardina *Sardinella aurita* en Venezuela y comentario sobre artes de pesca y estadísticas. Bol. Invest. Mar. Cost. vol.47 no.1. pp.85-106.

103 Freón, P. & Mendoza, J.(eds.) (2003) La sardina (*Sardinella aurita*), su medio ambiente y explotación en el Oriente de Venezuela: una síntesis. IRD, Paris. Available: https://horizon.documentation.ird.fr/exl-doc/pleins_textes/divers10-07/010031235.pdf

104 Taylor, G. T., Muller-Karger, F. E., Thunell, R. C., Scranton, M. I., Astor, Y., Varela, R., Troccoli Ghinagliae, L., Lorenzoni, L., Fanning, K.A., Hameeda, S. & Doherty, O. (2012). Ecosystem responses in the southern Caribbean Sea to global climate change. *Proceedings of the National Academy of Sciences*, 109(47), 19315–19320.

105 Quintero, A. Terejova, G., Vicent, G., Padrón, A. & Bonilla, J. 2002. Los pescadores del Golfo de Cariaco. *Interciencia*, vol. 27 (6): 286-292.

106 Rueda-Roa, D.T (2012) On the spatial and temporal variability of upwelling in the southern Caribbean Sea and its influence on the ecology of phytoplankton and of the Spanish sardine (*Sardinella aurita*) Tesis Doctoral. Universidad de Florida.

107 Villamizar, E. y Cervigón, F. (2017). Variability and sustainability of the Southern Subarea of the Caribbean Sea large marine ecosystem. *Environmental Development*, 22: 30–41.

108 González, L.W., Eslava, N., Troccoli, L. y Guevara, F. (2016). Análisis de la pesquería artesanal de sardina (*Sardinella aurita*) en Venezuela. *Tecnociencia*, Vol. X, Núm. 2: 81-89.

109 Nass, P., Torres-Sorando, L. & Benítez, B. (2010). Introducción al conocimiento de las pesquerías marinas en Venezuela. Universidad Bolivariana de Venezuela. Caracas.

110 Cárdenas, J.J. (2017) op. cit.

111 Bruckner, A.W., Johnson, K.A. & J.D. Field (2003) Conservation strategies for sea cucumbers: Can a CITES Appendix II listing promote sustainable international trade? *SPC Beche-de-mer Information Bulletin #18 – May 2003*.

112 Tagliafico A., Rangel M.S., Rago, N. (2011). Distribución y densidad de dos especies de holoturoideos en la Isla de Cubagua, Venezuela. *Rev. Biol. Trop.* 59(2):843-852.

113 Peralta, C. & Betancourt, D. (2018). Aspectos ecológicos y situación actual de las capturas de holotúridos (Echinodermata: Holothuroidea) en el noreste de la península de Araya, Venezuela. *Saber, Universidad de Oriente, Venezuela*. Vol. 30:452-460.

114 Márquez, M. (2022) Biólogo asegura que ha disminuido densidad de las estrellas de mar en Mochima. Available: <https://cronica.uno/biologo-asegura-que-ha-disminuido-densidad-de-las-estrellas-de-mar-en-mochima/>

115 Aponte, C., Osio, A. & Salas, V. (2002) Estado de Conservación del Parque Nacional Mochima. In: *BioParques: Asociación Civil para la Conservación de los Parques Nacionales*. Programa Observadores de Parques.

116 Pestana Dalponte. S.C. (2005) Propuesta para la disposición de excretas en el poblado de Petare-Petarito ubicado en el Parque Nacional Mochima. Trabajo Especial de Grado, Facultad de Ingeniería, Universidad Central de Venezuela. Caracas.



Orinoco Delta, Photography Carolina Dávila

as inadequate solid waste management.^{117 118 119 120 121 122} An emerging issue is the increase in microplastics (eroded plastic particles) both on the coast of Anzoátegui and Sucre. In the latter, a recent study found 31.53 plastic particles per kilogram along a beach.¹²³

On the other hand, a source of constant concern in the region is the large engineering projects that have been proposed by the National Executive branch. They include a deepwater port in the town of Guacarapo and the Gran Mariscal de Ayacucho Industrial Complex Project (Cigma).^{124 125} These projects would be carried out in areas of high environmental sensitivity and fish productivity, and no information has been provided as to whether any environmental consideration has been taken in their planning. Even though these projects seem to have been postponed indefinitely, they are part of a political narrative that may resume in the future.

117 Salazar, M. (2020) Aguas residuales y plantas de tratamiento inactivas comprometen playas del litoral de Cumaná. Available: <https://cronica.uno/aguas-residuales-y-plantas-de-tratamiento-inactivas-comprometen-playas-del-litoral-de-cumana/>

118 Motta Salinas, F. (2009) Estado Sucre. GeoVenezuela. Tomo 7. Capítulo 54. Fundación Empresas Polar.

119 Senior, W., Fermín, I., & Mata, F.J. (2004) Diagnóstico ambiental y participación comunitaria para el control de la contaminación del río Manzanares, estado Sucre, Venezuela. Fundación Río Manzanares. Available: https://www.researchgate.net/publication/277304707_Diagnostico_Ambiental_y_Participacion_Comunitaria_para_el_Control_de_LA_Contaminacion_del_Rio_Manzanares_Estado_Sucre_Venezuela

120 Martínez, G., Castañeda, J., Senior, W., Márquez, A. & González, A. (2012) Caracterización ambiental de la ensenada de Playa Grande, estado Sucre, Venezuela. Bol. Inst. Oceanogr. Venezuela, 51 (2): 193-206.

121 Márquez, M. (2022) Aguas residuales y una larga deuda en materia ambiental contribuyen al deterioro del ecosistema marino de Sucre. Available: <https://cronica.uno/organismos-hacen-poco-o-nada-para-conservacion-de-la-costa-sucrense/>

122 Lemus, J. (2014) Análisis espacial para el ordenamiento de la zona costera del Golfo de Cariaco, estado Sucre. Venezuela. Terra Nueva Etapa, vol. XXX, núm. 47, enero-junio, 2014, pp. 33-53.

123 López, M. (2022) Playas venezolanas, amenazadas por el plástico y los derrames petroleros. Available: <https://efectococuyo.com/cambio-climatico/playas-venezolanas-microplasticos/>

124 Lemus (2014) op. cit.

125 Motta Salinas (2009) op. cit.

5. The Gulf of Paria and the Orinoco Delta (Sucre, Monagas and Delta Amacuro states)

This region encompasses two different geographical areas: the Gulf of Paria and the coastal area of the Orinoco delta. This region is characterized by low coasts formed by the accumulation of sediments. For its part, The coast of the Gulf of Paria is conformed by mangrove formations and wetlands interconnected through small canals. Likewise, the edge of the deltaic fan is characterized by swampy plains, estuary banks islands, and marshes that are continuously modified by the contribution of sediments from the Orinoco.¹²⁶ The marine dynamics of this region are controlled by the flow of freshwater from the Orinoco and other rivers, giving an estuarine character to its waters.¹²⁷

This marine-coastal area is considered one of the most productive in the tropics,¹²⁸ as well as one of the best preserved wetland regions in South America.¹²⁹

Despite the above, several environmental situations affect this sub-region, including the exploitation of oil both in the territory of Venezuela and on the nearby island of Trinidad; the growing deforestation in the delta; the lack of control over fishing and shrimp farming; the illegal extraction of species from their habitats, and the contamination of sediments with heavy metals.

The intense oil production along the shores of the Gulf of Paria dates back many years, which is why a high concentration of tar aggregates has been reported on local beaches since the 1980s, whose characteristics suggest that this area is subjected to chronically high levels of hydrocarbons.¹³⁰ The origin of these hydrocarbons has not been clearly determined, but it has been suggested that they may come from facilities and oil fields located in the upper course of the rivers that drain into the gulf and ballast water illegally dumped by tankers.

Likewise, a significant number of oil spills have affected these coasts in the last 10 years. The largest of them affected the Guarapiche River in 2012, causing damage

126 Castillo, D (1994). Estudio integral del Delta del Orinoco. El Geógrafo. Año XIX N° 20. DIGECAFA. Available: <https://geografiasicaupelipc.es.tl/Estudio-integral-del-Delta-del-Orinoco---Castillo-D-.-.htm>

127 Rincón, F., Astor, Y., Muller-Karger, F., Varela, R. & Lucía Odriozola, A. (2008) Características oceanográficas del flujo en Boca de Dragón, Venezuela. Memoria de la Fundación La Salle de Ciencias Naturales 2008 ("2007"), 168: 7-24.

128 Lasso, C.A. & Sánchez-Duarte, P. (2011) Los peces del delta del Orinoco. Diversidad, bioecología, uso y conservación. Fundación La Salle de Ciencias Naturales y Chevron C. A. Venezuela. Caracas 500 pp.

129 Miloslavich, P., Martín, A. Klein, E., Díaz, Y., Lasso C.A., Cárdenas, J.J. & Lasso-Alcalá, O.M. (2011) Biodiversity and Conservation of the Estuarine and Marine Ecosystems of the Venezuelan Orinoco Delta. In Grillo, O. & Venora, G. (eds.). Ecosystems Biodiversity, Intech. pp. 67-90.

130 Buitrago, J. & Monente, J.A. (1999) Evaluación puntual de niveles de agregados de alquitrán en las costas del Golfo de Paria, Venezuela. Memoria. Fundación La Salle de Ciencias Naturales. Tomo LIX, número 151, enero/junio 1999.



to the coast of the Gulf of Paria surrounding the mouth of the San Juan River.¹³¹ ¹³² Six years later, a new spill occurred in the same area.

Also, there have been significant spills originating in the island of Trinidad and its territorial waters, including the 2017 fuel oil spill that began at the facilities of the state-owned oil company Petrotrin, in the southwest of the island, and whose visible effects were documented on the Gulf coast,¹³³ as well as along the coast of Venezuela, Aruba, Curacao, and Bonaire.¹³⁴ Another spill occurred in 2018 on the Couva oil platform, in the waters of Trinidad and Tobago.¹³⁵ Additionally, a non-governmental organization on the island recorded 498 spills between January and August 2018.¹³⁶

No research has been carried out on the environmental and social effects of any of these incidents.

In addition to oil activity, it has been determined that the aquatic biodiversity of the Orinoco delta and the Gulf of Paria is threatened by circumstances that include the dredging of the beds and increased sedimentation; the deforestation of mangroves; the absence or lack of enforcement of fishing regulations; the illegal extraction of wildlife from its habitat, and the presence of invasive exotic species.¹³⁷

138 139 140 141

Likewise, the Turuépano and Mariusa-Delta del Orinoco National Parks are threatened by activities contrary to the objectives of their designation, including mangrove logging, the intensive exploitation of fishery resources, the illegal extraction of wildlife from its habitat, and drug trafficking.¹⁴² ¹⁴³

131 Machado Allison, A. (2012) Una visión científica al problema del derrame en la cuenca del Guarapiche. Available: <https://nucleocdcht.wordpress.com/2012/02/25/una-vision-cientifica-al-problema-del-derrame-en-la-cuenca-del-guarapiche-por-antonio-machado-allison/>

132 Gutiérrez Torres, J. (2018) Derrames de petróleo en Venezuela aumentan y gobierno no revela el impacto real. Available: <https://es.mongabay.com/2018/08/derrames-de-petroleo-rios-contaminacion-venezuela/#:~:text=El%20informe%20tambi%C3%A9n%20destaca%20que,de%20pobladores%20de%20estas%20zonas.%E2%80%9D>

133 Gutiérrez Torres, J. (2017) Venezuela: el derrame de petróleo ocurrido en Trinidad y Tobago afecta a la Península de Paria. Available: https://es.mongabay.com/2017/05/derrame-petrolero-biodiversidad-contaminacion-areas_naturales_protegidas/

134 Núñez, M. (2017) Alerta en Mar Caribe por derrame de petróleo. <https://www.scidev.net/americas-latina/news/alerta-en-mar-caribe-por-derrame-de-petroleo/>

135 Efecto Cocuyo (2018) Durante 72 horas, un derrame de petróleo afecta el Golfo de Paria. Available: <https://efectococuyo.com/la-humanidad/desde-hace-72-horas-un-derrame-de-crudo-afecta-al-golfo-de-paria/>

136 RT (2018) "No fue tan indignante como lo que ahora hacen": pescadores denuncian un derrame de petróleo en el mar, pero aún más su precaria limpieza. Available: <https://actualidad.rt.com/actualidad/400732-pescadores-denunciar-derrame-petroleo>

137 Lasso, C.A. & Sánchez-Duarte, P. (2011) Los peces del delta del Orinoco. Diversidad, bioecología, uso y conservación. Fundación La Salle de Ciencias Naturales y Chevron C. A. Venezuela. Caracas 500 pp.

138 Lasso, C.A., Lasso-Alcalá, O.M. Pombo, C. & Smith, M. (2004) Ictiofauna de las aguas estuarinas del delta del río Orinoco (Caños Pedernales, Mánamo, Manamito) y golfo de Paria (río Guanipa): Diversidad, distribución, amenazas y criterios para su conservación. In: Evaluación rápida de la biodiversidad y aspectos sociales de los ecosistemas acuáticos del delta del río Orinoco y golfo de Paria, Venezuela. Lasso, C.A., Alonso, L.E., Flores, A.L. & Love, G. (eds.) Boletín RAP de Evaluación Biológica 37. Conservation International. Washington DC, USA.

139 Balladares, C. & Dubois, E. (2015) Saqueo y depredación de nidadas de tortugas marinas, durante las temporadas 2003 a 2012, en seis playas del Golfo de Paria, Venezuela. UNED Research Journal / Cuadernos de Investigación UNED, vol. 6, núm. 2, enero-junio, 2015, pp. 239-243

140 Gutiérrez Torres, J. (2021) ¿Por qué los manatíes corren peligro en las zonas costeras de Venezuela? Available: <https://es.mongabay.com/2021/03/caza-illegal-de-manati-en-costas-de-venezuela/>

141 Altuve, D.E., Marcano, L.A., Alió, J.J. & Blanco-Rambla, J.P. (2008) Presencia del camarón tigre *Penaeus monodon* (Fabricius, 1798) en la costa del delta del río Orinoco y golfo de Paria, Venezuela. Memoria de la Fundación La Salle de Ciencias Naturales 2008, 169: 83-91.

142 Colonnello, G., Oliveira-Miranda, M.A., Álvarez, H. & Fedón, C. (2010) Parque Nacional Turuépano, Estado Sucre, Venezuela: unidades de vegetación y estado de conservación. Memoria de la Fundación La Salle de Ciencias Naturales 2010 ("2009"), 172: 5-35.

143 Key Biodiversity Areas Partnership (2022) Key Biodiversity Areas factsheet: Parque Nacional Mariusa-Delta del Orinoco. Extracted from the World Database of Key Biodiversity Areas. Developed by the Key Biodiversity Areas Partnership: BirdLife International, IUCN, American Bird Conservancy, Amphibian Survival Alliance, Conservation International, Critical Ecosystem Partnership Fund, Global Environment Facility, Global Wildlife Conservation, NatureServe, Rainforest Trust, Royal Society for the Protection of Birds, World Wildlife Fund and Wildlife Conservation Society.

Both the Orinoco Delta and the Gulf of Paria act as drainages for the basins of the Orinoco River and the tributaries of the Gulf of Paria; in consequence, they receive metal contaminants such as chromium, copper, mercury, and nickel from mining and industrial activities, which are deposited in sediments and tissues of different marine species, both on the coast of Venezuela and Trinidad.^{144 145 146}

A major threat to the Orinoco Delta is the loss of territory due to rising sea levels as a result of climate change. In this sense, a loss of 10,803 km² in the Delta's surface is estimated for 2090.¹⁴⁷

6. Insular region (Nueva Esparta state and Francisco de Miranda Insular Territory)

Article 11 of the Constitution of the Bolivarian Republic of Venezuela establishes that the insular space of Venezuela includes the Los Monjes Archipelago, Las Aves archipelago, Los Roques archipelago, La Orchila Island, La Tortuga Island, La Blanquilla Island, Los Hermanos Archipelago, Margarita, Cubagua and Coche, Los Frailes Archipelago, La Sola island, Los Testigos archipelago, Patos island, and Aves island; among other emerged territories. They represent an enormous diversity of geomorphological and ecological features.

Due to the low availability of information on the islands that make up this sub-region, only the situation of the coasts of Margarita Island, the Los Roques archipelago, and La Tortuga Island will be considered.

Margarita Island has seen a very important development of infrastructure and tourism services since the 1970s, which was oriented towards the international tourism market in the early 21st century with the construction of large hotels aimed at luxury tourism. Although the growth was cut short by the Venezuelan crisis,¹⁴⁸ it had environmental consequences through the expansion of tourism and urban areas without the increase of environmental services and adequate controls over the environmental damage that may have occurred.

In this sense, Margarita island has seen an increase in pollution due to the discharge of wastewater into the sea without any treatment and the stoppage of the existing

144 Lemus, M., Castañeda, J. & Chung, K. (2014) Heavy metals in fish and invertebrates from the Gulf of Paria, Venezuela. *Rev. Int. Contam. Ambient* [online]. 2014, vol.30, n.2, pp.137-142.

145 Rojas de Astudillo, L.; Chang Yen, I.; Bekele, I. (2005) Heavy metals in sediments, mussels and oysters from Trinidad and Venezuela. *Revista de Biología Tropical*, vol. 53, núm. 1, mayo, 2005, pp. 41-53.

146 Klekowski, E., Temple, S., Siung-Chang, A., & Kumarsingh, K. (1999). An association of mangrove mutation, scarlet ibis, and mercury contamination in Trinidad, West Indies. *Environmental Pollution*, 105(2), 185–189.

147 República Bolivariana de Venezuela (2017) Segunda Comunicación Nacional ante la Convención Marco de las Naciones Unidas sobre Cambio Climático. Available: <http://www.inameh.gob.ve/web/PDF/Segunda-Comunicaci%C3%B3n-sobre-Cambio-Clim%C3%A1tico-I.pdf>

148 Singer, F. (2011) Isla Margarita, el paraíso turístico que desoló la crisis venezolana. Available: https://elpais.com/internacional/2018/09/09/america/1536529780_949296.html



treatment plants.¹⁴⁹ ¹⁵⁰ Likewise, the coasts are contaminated by solid waste. One of the news articles under review speaks of 6,000 tons of garbage being removed from two beaches on the island during a cleanup.¹⁵¹ ¹⁵²

On the other hand, the coasts of Margarita island have been affected by an oil spill that originated in Trinidad in 2017.¹⁵³ Even though the government assured that the concerned areas had been completely cleaned up, this affirmation is not based on studies of environmental impact.¹⁵⁴

In the case of the Laguna de la Restinga National Park, incorporated by the Ramsar Convention to the list of wetlands of international relevance, the area is affected by hunting; illegal extraction of species from their habitats; use of prohibited fishing gear; logging; contamination of water bodies by sewage, oil and gasoline; modification of the sandbar area; solid waste pollution; lack of controls over tourism, and the impacts of climate change.¹⁵⁵ Likewise, the construction of the second bridge over Laguna de la Restinga has caused serious damage to the protected area, including deforestation of mangroves, increased sedimentation, and drying of coasts.¹⁵⁶

Furthermore, the Los Roques Archipelago is of enormous environmental relevance for the country because it is home to the main reef system of the country and an exceptional abundance of species,¹⁵⁷ in addition to its status as a national park.

The main threats to this park are the administrative weakness of the National Institute for Parks (INPARQUES); the lack of personnel and infrastructure for conservation work; the accumulation of solid waste both on the island of Gran Roque and on the keys most visited by tourists; the absence of mechanisms for

149 Guillén, M. (2021) Aguas servidas de Nueva Esparta son descargadas al mar sin tratamiento alguno. Available: <https://elsoldemargarita.com.ve/posts/post/id:238752/Aguas-servidas-de-Nueva-Esparta-son-descargadas-al-mar-sin-tratamiento-alguno>

150 PORLAVISION (2021) Playas de Margarita y Coche en peligro por paralización de las plantas de tratamiento. Available: <https://porlavision.com/playas-de-margarita-y-coche-en-peligro-por-paralizacion-de-las-plantas-de-tratamiento/>

151 Arias, A.C. (2018) Toneladas de basura vuelven a salir de las playas en Nueva Esparta. Available: <https://www.eluniversal.com/venezuela/20992/toneladas-de-basura-vuelven-a-salir-de-las-playas-en-nueva-esparta>

152 Notiactual. (2013) Sólo en dos playas de Margarita había 6 mil toneladas de basura. Available: <https://www.notiactual.com/solo-en-dos-playas-de-margarita-habia-6-mil-toneladas-de-basura/>

153 Avance 24. (2017) Reportan más de 8 playas de Margarita afectadas por derrame petrolero. Available: <https://diarioavance.com/reportan-mas-8-playas-margarita-afectadas-derrame-petrolero/>

154 PDVSA. (2017) Saneadas costas afectadas por derrame proveniente de Trinidad y Tobago. Available: http://www.pdvsa.com/index.php?option=com_content&view=article&id=7130:saneadas-costas-afectadas-por-derrame-proveniente-de-trinidad-y-tobago&catid=10&Itemid=589&lang=es

155 Aponte, C., Oslo, A. & Salas, V. (2003). Estado de Conservación del Parque Nacional Laguna de La Restinga In: BioParques, Asociación Civil para la Conservación de los Parques Nacionales. Programa Observadores de Parques (www.bioparques.org/www.parkswatch.org).

156 Guerra Castro, E., Lazo, R. & Herrera, K. (2017). Construcción del segundo puente sobre la laguna de la Restinga, isla de Margarita, Venezuela: conflictos socio-ambientales y primeros impactos ecosistémicos. *Saber, Universidad de Oriente, Venezuela*. Vol. 29:400-409.

157 Villamizar E., A. Yranzo, M. González, A.T. Herrera, J. Pérez & H. Camisotti. (2014). Diversidad y condición de salud de corales pétreos en algunos arrecifes del Parque Nacional Archipiélago Los Roques, Venezuela. *Acta Biol. Venez.*, Vol. 34(2): 257-279.

wastewater management; illegal fishing; the expansion of tourism infrastructure without environmental controls and in some cases against the law, and the effects of oil spills on the island's ecosystems.^{158 159 160 161 162 163}

A permanent threat to several of Venezuela's islands is the recurrent announcements of the start of large tourism projects that involve the construction of large infrastructures aimed at luxury tourism, without information on the existence of the environmental impact assessments required by law, or guidelines for their environmental sustainability.^{164 165 166}

158 Parkwatch (2002) Venezuela: Los Roques Archipelago National Park. Available: https://parkswatch.org/parkprofiles/pdf/ronp_eng.pdf

159 Ecoticias.com (2011) Venezuela: Archipiélago Los Roques está amenazado por la contaminación. https://www.ecoticias.com/eco-america/54723_noticias-informacion-medio-ambiente-medioambiente-medioambiental-ambiental-contaminacion-climatico-ecologia-sostenible-co2-energias-renovables-eolica-solar-termosolar-eficiencia-energetica-hibri

160 Urdaneta, N. (2017) Derrame de petróleo en Trinidad y Tobago llegó a los Roques y Margarita. Available: <https://www.elcorreodelorinoco.com/derrame-de-petroleo-en-trinidad-roques-margarita/>

161 Gutiérrez Torres, J. (2018) Derrame petrolero de Trinidad y Tobago impacta de nuevo al Archipiélago de Los Roques. Available: <https://efectococuyo.com/la-humanidad/derrame-petrolero-de-trinidad-y-tobago-impacta-de-nuevo-al-archipelago-de-los-roques/>

162 Meléndez, G.L., Noriega, N. & Maya, M.J. (2021) Los Roques: a la orilla de un desastre ambiental. Available: <https://alianza.shorthandstories.com/los-roques-a-la-orilla-de-un-desastre-ambiental/index.html>

163 Segovia, M.A. (2020) Los nuevos amos de Los Roques. Available: <https://armando.info/los-nuevos-amos-de-los-roques/>

164 Guerrero, I. (2021) Un elefante blanco agoniza en la isla de La Tortuga. Available: <https://armando.info/un-elefante-blanco-agoniza-en-la-isla-de-la-tortuga/>

165 Inojosa, J. (2021) Maduro anuncia proyecto turístico «poderoso» para la isla de La Tortuga. Available: <http://vicepresidencia.gob.ve/presidente-maduro-invita-a-la-inversion-turistica-en-venezuela/https://ultimasnoticias.com.ve/noticias/general/maduro-anuncia-proyecto-turistico-poderoso-para-la-isla-de-la-tortuga/>

166 Clima21 (2022) Pronunciamentol Clima21 – Ambiente y Derechos Humanos hace un llamado urgente a defender los Parques Nacionales de Venezuela.





CONCLUSIONS

The results obtained in the previous review make it possible to identify different categories of environmental problems. The delimitation of these categories is not completely precise, so there may be ambiguity and overlapping between them. Despite this, they can help to understand the extreme complexity of the environmental situation of the Venezuelan coasts today.

The selected categories are:

Environmental disturbances: Environmental events and changes that are causing impacts on ecosystems, populations, or communities.

Conservation threats: Factors that may limit the long-term capacity to preserve a species, community, or ecosystem.

Obstacles: Gaps left by the reduction of internal capacities that can limit or prevent the capacity of institutions to carry out actions aimed at environmental conservation.

Disturbances

The main disturbances found are:

- Oil spills
- Sewage pollution
- Solid waste pollution
- Presence of invasive species
- Unsustainable extraction of biological diversity (by fishing, hunting, or extraction from natural habitats)
- Construction of tourism, urban and road infrastructure that fail to follow environmental criteria.



Coast Falcon state, Photography Carolina Dávila

The specific importance of each of these disturbances varies between the regions into which the Venezuelan coast was divided; also, some of these factors are chronic disturbances in some ecosystems (e.g. oil spills in Lake Maracaibo, the Gulf of Venezuela, and the Gulf of Paria; contamination by sewage); or its emergence is relatively recent (appearance of invasive species such as the lionfish or the octocoral *Unomia stolonifera*)

On the other hand, it is practically impossible to determine the impact of each of these disturbances on the different coastal ecosystems, since it depends on the specific sensitivity of each one, the frequency, severity and intensity of the disturbances, and the synergies between them.

Despite the above, and based on the existing information, it is possible to affirm with some degree of certainty that some of these disturbances are increasing over time, while the damage also seems to increase and begin to affect areas and ecosystems where the disturbances were not previously present. (e.g. the presence of invasive species or oil spills in Los Roques).

Likewise, the Complex Humanitarian Emergency¹⁶⁷ that affects the country seems to be driving the population to increase the extraction of biological resources, potentially reaching in some cases the limits of no return or costly restoration (e.g., the unsustainable extraction of mollusks, fish, sea cucumbers, and other marine species).

¹⁶⁷ Cartaya Febres, V, Reyna Ganteaume, F. & Ramsay, G. (2020) Venezuela emergencia humanitaria compleja: Respuesta Humanitaria, Desafíos para la Sociedad Civil. WOLA /Acción Solidaria. In: <https://www.wola.org/wpcontent/uploads/2020/11/Informe-de-Vanessa-Cartaya.pdf>



It is not possible to accurately measure the magnitude of the impact of these disturbances on the human population, but it is clear that local communities, fishermen's associations, and residents in tourist areas are suffering serious damage as a result of disturbances such as oil spills, the collapse of fisheries, and the deterioration of coastal landscapes of great value for tourism, the latter as a consequence of the accumulation of solid waste and the construction of tourism, road or other infrastructure that fail to follow environmental criteria or considerations on the human rights of the local population.

Likewise, some of these situations are generating serious losses in the family income of the fishing communities, an increase in the labor informality among artisanal fishermen, and a serious decrease in the intake of proteins derived from fishing, among other issues.

Threats

For their part, the threats to conservation include the following issues:

- The growing and ongoing effects of climate change on Venezuelan coastal ecosystems;
- The presence of heavy metals in the coastal areas of at least four regions of the country;
- The absence of systemic environmental considerations in the design of policies and management of the fishing activity;
- Tourism and industrial projects presented by the government without environmental criteria.
- The growing presence of microplastics on many coasts of Venezuela.



Climate change is a global threat that is beginning to have significant impacts on marine ecosystems.¹⁶⁸ Correspondingly, important changes and damages are expected in the Venezuelan coastal ecosystems.¹⁶⁹ Likewise, the effects of climate change are already being registered on the coasts of the country. For example, the loss of coastal areas and their ecosystems due to the rise in sea level and the accelerated and generalized loss of coral cover in the country's reefs. Despite this, there are still few and insufficient studies on the impact of climate change on coastal ecosystems and their biological components, as well as on coastal infrastructure and the livelihoods of the inhabitants of local communities. In the absence of knowledge about the changes generated by climate change, as well as policies to prevent them, these impacts will multiply, generating chain damage in many ecosystems with serious social and economic effects in the short, medium, and long term

Regarding the issue of the presence of heavy metals in sediments and other environmental components, there are no conclusive studies on the possible effects on human health associated with this type of contamination, but they clearly represent

¹⁶⁸ Doney, S. C., Ruckelshaus, M., Emmett Duffy, J., Barry, J. P., Chan, F., English, C. A., Galindo, H.M., Grebmeier, J.M., Hollowed, A.B., Knowlton, N., Polovina, J., Rabalais, N.N., Sydeman, W.J. Talley, L. D. (2012). Climate Change Impacts on Marine Ecosystems. *Annual Review of Marine Science*, 4(1), 11–37.

¹⁶⁹ ACFIMAN-SACC. (2018) op. cit.



a very high risk for different populations, especially unborn babies,¹⁷⁰ as well as for biological diversity.¹⁷¹

For its part, the growing presence of microplastics in sediments and water is an important threat that must be evaluated for its possible impact on human and environmental health.

A significant number of the authors consulted consider that the recovery and development of the fishing industry, as well as the protection of artisanal fishermen and coastal ecosystems, requires public institutions with technical knowledge, trained professionals, adequate financial and material resources, mechanisms of effective participation, and international cooperation. Without these resources, any policy for the fishing industry will be inadequate, insufficient, and in some cases counterproductive.

Finally, establishing tourism projects without environmental criteria is in itself a contradiction given the environmental deterioration that it generates, both in their construction stage and their operation, which will have as a consequence the deterioration of the tourist attraction and the long-term failure of the project.

Obstacles:

The absence of environmental policies with adequate technical criteria for the complex challenges of environmental management in the current context of environmental, social, political, and economic crisis.

- The loss of professionals and specialists with skills to carry out environmental management tasks.
- The loss of institutional capacity for the management of protected areas.
- The serious deterioration and destruction of universities and other research centers specialized in marine sciences

The four obstacles mentioned by the different authors show different sides of the same situation, an apparently deliberate process of destruction of the country's

170 Tahán, J.E., Barrios, L.C., Marcano, L., Granadillo, V.A., Cubillán, H.S., Rodríguez, M.C., De Salazar, F.G., & Romero, R.A. (1996) Levels of Hg, Pb and V in brain, kidney, liver and lung of anencephalic fetuses from the eastern coast from Lake Maracaibo, Venezuela. Trace Elements and Electrolytes. Vol 13, N° 1-1996 (7-13).

171 Machado-Allison, A. (2017). La conservación de ambientes acuáticos: petróleo y otras actividades mineras en Venezuela. In: Rodríguez-Olarte, D. (Editor). Ríos en riesgo de Venezuela. Volumen 1. Colección Recursos hidrobiológicos de Venezuela. (pp: 189-201). Universidad Centroccidental Lisandro Alvarado (UCLA). Barquisimeto, Lara. Venezuela.

environmental institutions. For several authors, these obstacles are well outlined in the discussion of the causes of the drop in fishery production in the country^{172 173 174} and are further expanded in a report by the national government on the management of areas under the regime of special marine and coastal administration.¹⁷⁵ The authors of this report cite six “barriers” to managing these areas. Among them, four are very relevant for this report: The deficient political will to support the management of said areas; the financial weakness of the environmental management agencies; an inadequate legal regime that hampers management tasks, and the scarce participation of civil society in the management processes of these protected areas.

In summary, the results obtained from the study of the environmental problems in the three categories show a growing deterioration of the marine coastal ecosystems of Venezuela, the increased threat to their long-term conservation, and the existence of significant obstacles to the environmental management of these ecosystems. This process of deterioration is affecting the well-being of the human population in all aspects of their lives.

It is clear that the ecosystemic services and contributions provided by marine environments are priority elements for the achievement of the United Nations Sustainable Development Goals (SDGs). In particular, the ecosystemic health of coastal environments is key to achieving SDGs 1 (no poverty), 2 (zero hunger), 6 (clean water and sanitation), 8 (decent work and economic growth), 12 (responsible consumption and production), 13 (climate action) and of course 14 (life below water).¹⁷⁶ With the current situation in Venezuela, it is painful to see how the deterioration of marine ecosystems in the country is a major obstacle to achieving these objectives.

On the other hand, when reviewing the targets established for SDG14, it is clear that the country is not advancing in any of them and possibly none of them will be achieved in the proposed time (see annex).

Likewise, these goals are articulated with a significant number of Agreements and Conventions, including the International Covenant on Economic, Social and Cultural Rights, the Convention on Biological Diversity, the United Nations Convention on the

172 Tavares (2019) op. cit.

173 Cárdenas (2017) op. cit.

174 Nass et al (2010) op. cit.

175 República Bolivariana de Venezuela - Ministerio del Poder Popular para el Ambiente (2013) Informe Nacional sobre Planes de Ordenamiento y Reglamentos de Uso de las Áreas Bajo Régimen de Administración Especial Marinas y Costeras de Venezuela. In seminar: Planes de Manejo de Áreas Marinas y Costeras Protegidas como Instrumento de la Conservación y Uso Sostenible de la Biodiversidad. Paisaje Protegido Laguna de Rocha, Departamento de Rocha, Uruguay. November, 19 to 23, 2012. https://www.researchgate.net/publication/342509718_Informe_Nacional_sobre_Planes_de_Ordenamiento_y_Reglamentos_de_Uso_de_las_Areas_Bajo_Regimen_de_Administracion_Especial_Marinas_y_Costras_de_Venezuela_National_Report_on_Planning_Plans_and_Regulation

176 Claudet, J., L. Bopp, W.W.L. Cheung, R. Devillers, E. Escobar-Briones, P. Haugan, J.J. Heymans, V. Masson-Delmotte, N. Matz-Lück, P. Miloslavich, L. Mullineaux, M. Visbeck, R. Watson, A.M. Zivian, I. Ansoorge, M. Araujo, S. Aricò, D. Bailly, J. Barbière, C. Barnerias, C. Bowler, V. Brun, A. Cazenave, C. Diver, A. Euzen, A.T. Gaye, N. Hilmi, F. Ménard, C. Moulin, N.P. Muñoz, R. Parmentier, A. Pebayle, H.-O. Pörtner, S. Osvaldina, P. Ricard, R.S. Santos, M.-A. Sicre, S. Thiébaud, T. Thiele, R. Troublé, A. Turra, J. Uku & F. Gaill, (2020): A roadmap for using the UN Decade of Ocean Science for Sustainable Development in support of science, policy, and action. *One Earth*, 2. <https://doi.org/10.1016/j.oneear.2019.10.012>



Coast Falcon state, Photography Carolina Dávila

Law of the Sea, the Ramsar Convention, and the Protocol of San Salvador.^{177 178} Under these instruments, the Venezuelan State is obliged to act to defend the human rights associated with the conservation of the environment -including the marine environment-¹⁷⁹ and its reluctance or inability to do so results in a breach of these obligations.

A final element to highlight is that this situation occurs in a context of a policy of opacity and concealment of environmental information and the refusal of the participation of civil society in environmental management tasks, as has been demonstrated in the recent cases of oil spills.¹⁸⁰

It is clear that, at least for the national political leadership, the Venezuelan sea and coasts are ignored topics.

177 The Danish Institute for Human Rights. The Human Rights Guide to the Sustainable Development Goals. Available: https://sdg.humanrights.dk/en/targets2?combine_1=xxx&goal=83&target=&instrument=All&title_1=&field_country_tid=All&field_instrument_group_tid=All&combine=

178 Clima21 (2022) Obligaciones internacionales de Venezuela relacionadas con derrames petroleros. Tratados internacionales y ODS <https://clima21.net/referencias/documentos/obligaciones-internacionales-de-venezuela-relacionadas-con-derrames-petroleros-tratados-internacionales-y-ods/>

179 IACHR (2018) Advisory Opinion OC-23/17 of November 15, 2017 requested by the Republic of Colombia. Guarantee the rights to public participation, access to information regarding potential environmental damage, and access to justice in decision-making processes that may affect the environment. Available: https://www.corteidh.or.cr/docs/opiniones/seriea_23_ing.pdf

180 Clima21 (2022b) op. cit.



The sea we ignore



RECOMMENDATIONS

Due to the enormous strategic value that coastal marine ecosystems bear for Venezuelan society, economy, and culture, and their impact on the human rights of the Venezuelan people, the Venezuelan State should urgently assume the following proposals:

- Initiate an open, pluralistic, and democratic discussion on the development of a comprehensive national policy for the conservation and sustainable use of marine ecosystems and resources as fundamental components of national development and the overcoming of the current humanitarian crisis;
- Guarantee compliance with the constitutional and legal norms aimed at the conservation of the seas of Venezuela and their biodiversity;
- Establish a process of environmental re-institutionalization in the country, including the technical, political, and economic strengthening of the institutions that guide and implement the environmental policies of the country;
- Restore and update the policies, technical standards, and procedures aimed at the prevention, control, and mitigation of oil spills and other forms of marine pollution with a human rights approach;
- Establish a national policy for research funding that supports scientific studies on the state of the country's marine ecosystems and possible solutions to their problems. Funding must reach all researchers in the country without any kind of discrimination. The axes of this policy must consider:

- The impact of climate change on ecosystems and coastal communities in such a way as to establish specific climate change adaptation policies.
 - The Update of knowledge regarding the environmental condition of the country's marine-coastal and wetland areas, with an emphasis on i) Protected Areas, ii) areas close to oil facilities, and iii) areas in the vicinity of urban centers with high population density.
 - An assessment of the medium- and long-term impacts of oil spills and heavy metal contamination on marine ecosystems.
 - An Assessment of the impact of the introduction of exotic species such as *Unomia stolonifera* under the guidelines of the Convention on Biological Diversity.
- Establish a policy for the recovery of fishing activity based on solid principles of environmental, economic, and social sustainability; with controls, continuous monitoring, and the full participation of the social actors involved in this activity without exclusions of an ideological nature or any other.
 - Abandon the policy of harassment and suffocation of national public universities and assume its recovery based on their autonomy and democratic values, while supporting the strengthening of research and training programs in marine sciences;
 - Encourage effective participation and cooperation mechanisms to articulate the different social actors: Universities, civil society, indigenous communities, companies, and the government in all the constituent elements of the conservation of the Venezuelan coasts;
 - Establish policies framed in the Escazú Agreement to facilitate public access to all information, as well as all-level educational programs on the situation of the Venezuelan coasts and their conservation.

Companies that operate in Venezuela, mainly state-owned companies such as PDVSA, are further urged to subscribe to the Sustainable Ocean Principles,¹⁸¹ part of the UN Global Compact for the contribution of companies to the well-being of the oceans.

¹⁸¹ Principios para un océano sostenible. Available: <https://www.pactomundial.org/biblioteca/principios-para-un-oceano-sostenible/>






SDG14 LIFE BELOW WATER




Conserve and sustainably use the oceans, sea and marine resources for sustainable development



Trends in the progress of the targets of SDG14 in Venezuela according to the information collected

The following table presents an approximation of the situation of compliance with the targets of SDG14 according to the information collected for the report "The sea that we ignore: Human rights and the degradation of Venezuelan marine ecosystems" compiled by Clima21.

TARGET	TREND	CURRENT SITUATION ACCORDING TO THE INFORMATION COLLECTED
<p>14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution</p>		<p>Reports from universities and civil society organizations (in no case from official sources) show a high number of oil spills taking place regularly and without control. All coastal cities and tourist areas discharge their wastewater directly into the sea without any treatment. In all coastal areas, the accumulation of solid waste along the coast has been reported. There is also evidence of the presence of significant concentrations of heavy metals in sediments and marine organisms in at least four regions of the country. In none of these situations is there information on effective and permanent policies and actions to mitigate or control the processes responsible for pollution.</p>
<p>14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p>		<p>There is no official information about actions aimed at managing and protecting marine and coastal ecosystems. On the contrary, multiple reports from researchers and civil society organizations warn of damage to coastal ecosystems throughout the country, including those in Protected Natural Areas. These damages include engineering works and tourism projects that fail to follow environmental criteria, deforestation of mangroves, unsustainable fishing, illegal extraction of species for their natural habitat, inadequate management of wetlands and coastal areas, and the effects of pollution mentioned above. No information is available regarding actions to restore the degraded ecosystems.</p>





TARGET	TREND	CURRENT SITUATION ACCORDING TO THE INFORMATION COLLECTED
<p>14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels</p>		<p>No information is available regarding actions related to this target.</p>
<p>14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</p>		<p>Available reports indicate the existence of serious structural problems at all levels of fishing activity in the country. The unplanned elimination of industrial trawling led to the overexploitation of coastal fishery resources and the introduction of mechanical jigging in these sensitive areas, which equally affected demersal systems. Additionally, due to the lack of control and surveillance capacity from the authorities, trawling is now being practiced illegally and unregulated. No formal statistical data for other fisheries is available, nor independent time series that allows the objective assessment of the state of the resources and their habitats. Available information suggests a decline in fishery yields and a production deficit in relation to the needs of the population.</p>
<p>14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information</p>		<p>No progress has been made in recent years in the protection of new marine and coastal areas. Official proposals for the designation of new protected areas have been known for several years (at least since 2019) but they have not materialized. There is also information about serious damage to coastal marine ecosystems in Natural Protected Areas due to oil spills, contamination by sewage discharges and solid waste, unsustainable fishing, illegal extraction of wildlife from its habitat, engineering works that fail to follow environmental criteria, and tourism activities and projects inconsistent with the objectives of designation of these areas. Tourism facilities are currently being built in coastal Protected Natural Areas without information on the existence of Environmental Impact Studies or legal authorizations compliance with the Plans and Regulations that govern these areas.</p>

TARGET	TREND	CURRENT SITUATION ACCORDING TO THE INFORMATION COLLECTED
<p>14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation</p>		<p>Not applicable</p>
<p>14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism</p>		<p>Not applicable</p>
<p>14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries</p>		<p>There has been a serious process of destruction of education and scientific institutions in the field of marine sciences, including their budgetary suffocation and the deliberate destruction of their facilities. Also, the country currently lacks an operational oceanographic fleet as a tool to carry out oceanographic studies. A significant number of specialists in government environmental management agencies have resigned due to poor working conditions, political harassment or general conditions in the country</p>

<p>14.b Provide access for small-scale artisanal fishers to marine resources and markets</p>		<p>Some actions have been taken in this sense, but there are no structural improvements in the sector, associated with the construction of fish markets, access to supplies and fuel, or the implementation of livelihood alternatives for fishermen in fisheries that show clear signs of depletion. Therefore, the community of artisanal fishermen remains socially and economically vulnerable..</p>
<p>14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of “The future we want”</p>		<p>There is no public information that the national government is cooperating with other nations in the framework of the Conventions relating to the conservation of the marine environment. There are specific reports that Venezuela has refused to provide information on oil spills to other affected countries.</p>

Source: References cited in report

TENDENCIAS

	<p>Positive trend towards the target</p>		<p>Negative trend with respect to the proposed target</p>
	<p>Some positive aspects point to the target, but obstacles persist</p>		<p>Target not applicable to the case of Venezuela or insufficient information for assessment</p>

