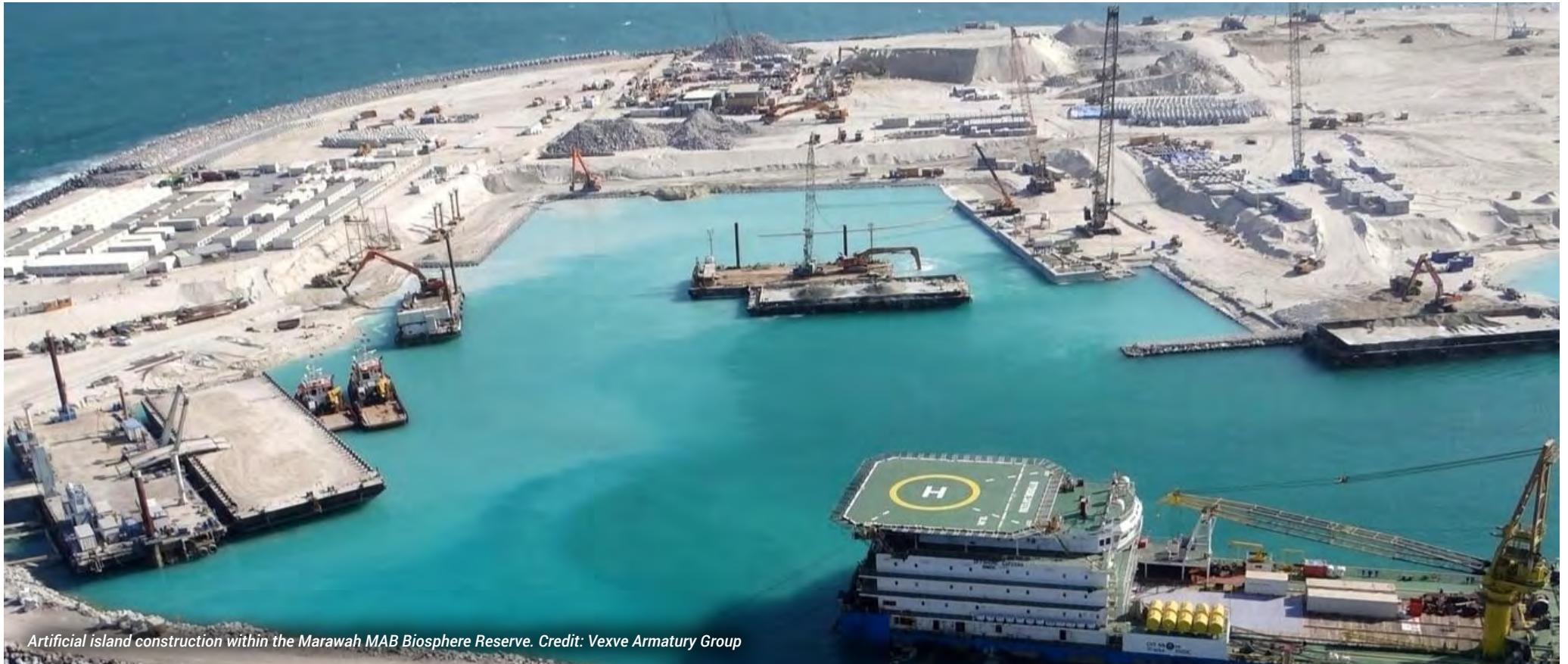




Extraction at Any Cost

Fossil Fuels Threatening UNESCO Protected Areas

Alice McGown with Gayathri Warriar and Kjell Kühne
October 2024



Executive Summary

UNESCO-listed areas include some of humanity's most important natural and cultural treasures. Yet, they are threatened by fossil fuel drilling, mining, and exploration projects, placing a potential 11.9 billion tonnes of climate-disrupting carbon dioxide emissions at risk worldwide. At least 36 World Heritage Sites and

Biosphere Reserves have, or will be, impacted by oil, gas, and coal projects if planned developments and concessions are allowed to continue. UNESCO cannot force an end to unsustainable fossil fuel extraction within these conservation areas. Instead, countries must enact more robust protections. These non-extraction commitments, or "LINGO Measures,"

can support countries' pledges under the Paris Climate Agreement, the Convention on Biological Diversity, and accelerate national decarbonisation policies. Financial and technical tools are available to enable these commitments and to better protect UNESCO-listed conservation sites from fossil fuel extraction projects.

Nice Place

Dirty Project

An Introduction to Fossil Fuel Extraction in UNESCO Areas

It was like most days in the shallows off the Northern shore of the Netherlands in 2007. Flocks of migratory birds darted across the sky while fish wandered through the shallow coastal water when a towering shape appeared on the horizon, surrounded by towboats. While plenty of oil rigs had been set up in other areas of the *Wadden Sea*, the most extensive tidal flats system in the world, this new rig was in a UNESCO-MAB Biosphere Reserve and World Heritage Site.¹ Despite international conservation efforts, as of 2024, the oil field is still fully operational, with remaining resources equivalent to over 10 million tonnes of CO2 emissions.²

Worldwide, fossil fuel extraction threatens many of our most valuable natural and cultural sites, like the *Wadden Sea*. At least 23 UNESCO-MAB Biosphere Reserves and 13 UNESCO World Heritage Sites are currently impacted by oil, gas, or coal projects.

Why is the fossil fuel extraction industry moving into our most valuable and vulnerable protected areas? What are the consequences? How can countries better protect our Biosphere Reserves and World Heritage Sites using tools such as non-extraction commitments, finance, and international mechanisms such as the Paris Climate Agreement and the Convention on Biological Diversity?

Fossil fuel extraction projects within UNESCO-recognized areas contribute to both climate and biodiversity crises. Yet, the fossil fuel industry plans to increase its encroachments over the next several decades,² despite the need to rapidly phase out fossil fuels and protect natural resources. UNESCO-designated conservation areas are ideal for non-extraction policies, preserving irreplaceable world treasures like the *Wadden Sea*.

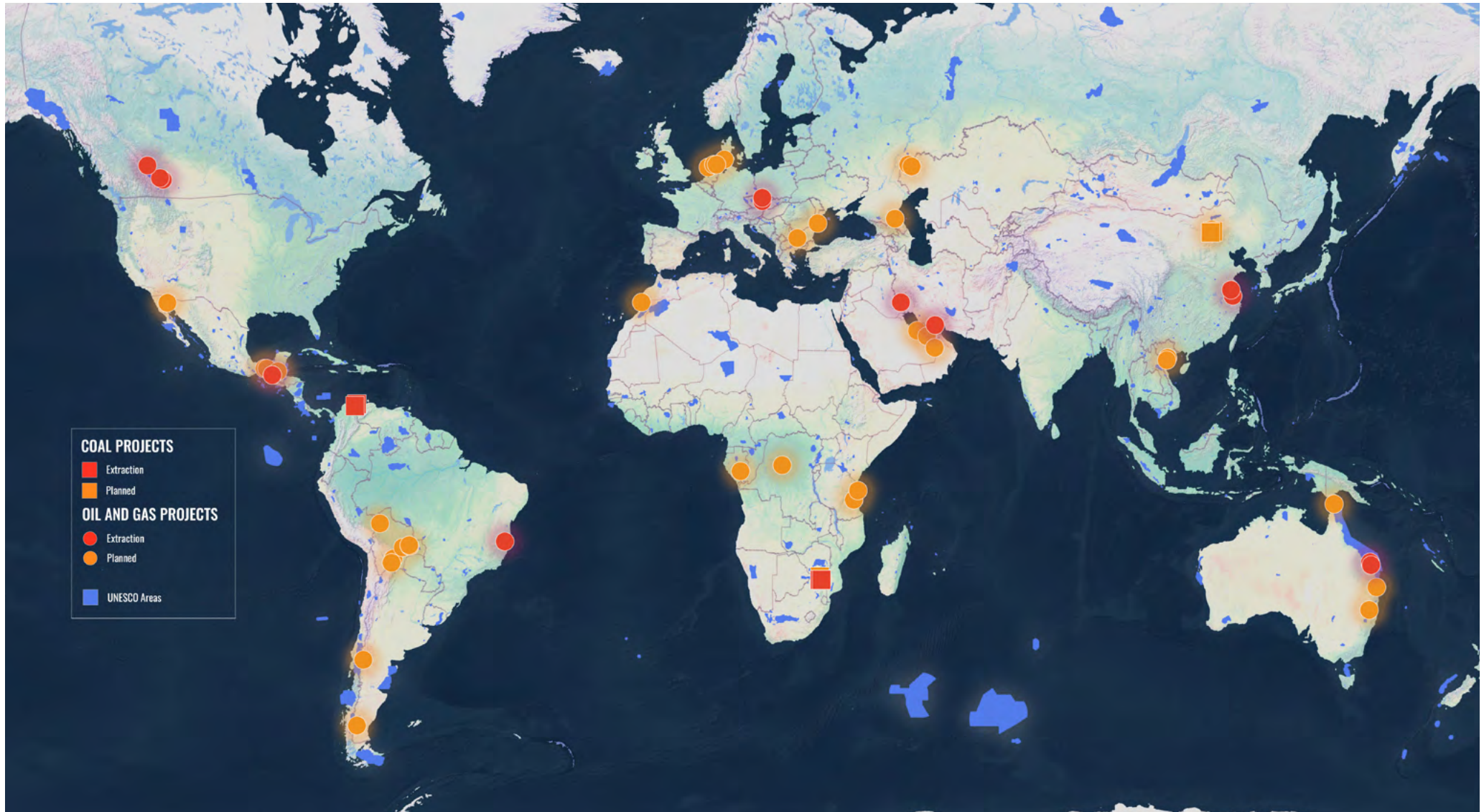
At least 23 UNESCO-MAB Biosphere Reserves and 13 UNESCO World Heritage Sites are currently impacted by oil, gas, or coal projects.

The Wadden Sea. Credit: Ralf Roletschek

1. UNESCO, "Wadden Sea and Hallig Islands of Schleswig-Holstein," <https://www.unesco.org/en/mab/wadden-sea-and-hallig-islands-schleswig-holstein>

2. LINGO, "Protected Carbon: Extraction Stats v10," 2024, <https://protected-carbon.org/paxstats>

Map of Fossil Fuel Extraction Projects in UNESCO Areas



The Need for Biosphere Reserves

In 1971, the United Nations Educational, Scientific and Cultural Organization (UNESCO) created an intergovernmental scientific project, the Man and the Biosphere Programme (MAB). With a mission to enhance the relationship between humans and their environments, the Programme combines natural and social sciences to improve communities' livelihoods, promote sustainable resource management, and safeguard natural and managed ecosystems.³ While the UNESCO World Heritage Convention focuses on protecting and preserving natural and cultural landmarks, the MAB Programme uses a complementary, holistic approach to fostering sustainable management practices that meet human and environmental needs.⁴ Fossil fuel extraction is, by its very nature, unsustainable. It threatens both human life and the environment. The effects are local (toxic fumes, wildlife disruption, hazardous materials, water and land contamination⁵) and global (contributing emissions to the climate emergency, delaying the transition to renewable energy).

Recognising the context in which the MAB Programme was created is essential. The decade prior to its creation had seen a growing awareness of the environmental effects of unsustainable development. During this time, the landmark environmentalist book *Silent Spring* was published, Earth Day was established, and a growing consensus arose that action needed to be taken on an international level.⁶ 1971 also saw the establishment of the Ramsar Convention on Wetlands of International Importance,⁷ along with other important national and international conservation policies. The environmental movement that led to the creation of the Programme evolved into the coalition today arguing for an energy transition from fossil fuels to 100% renewables and conservation efforts such as the "30x30" campaign.

The MAB Programme denotes specific areas known as Biosphere Reserves. These internationally recognised ecosystems must fulfil three essential, equal, and mutually complementary functions:

1. Conservation (of natural and bio-cultural diversity)
2. Development (of sustainable economic, social, and cultural systems); and
3. Logistic support (for community decision-making regarding conservation and resource use through research, monitoring, and education).⁸

Fossil fuel extraction is, by its very nature, unsustainable and threatens both human life and the environment.

Each biosphere reserve consists of three zones:

1. A legally constituted and strictly protected core area devoted to the long-term protection of the ecosystem.
2. A buffer zone in which only activities compatible with the conservation objectives may take place.
3. An outer transition area where sustainable resource management practices are promoted and developed.^{9,10}

Since its inception, the MAB Programme has flourished as the first global programme to study the relationship between humans and their environment in an interdisciplinary manner. It is also first to promote models that reconcile biodiversity conservation with sustainable use, while allowing for development at the regional level.^{11,12} As of July 2024, the World Network of Biosphere Reserves spans 759 sites in 136 countries. It covers 37,400 km², an area equivalent to that of the Netherlands.¹³

3. UNESCO, "Man and the Biosphere Programme (MAB)," [UNESCO.org](https://www.unesco.org/en/mab) (UNESCO), accessed August 27, 2024, <https://www.unesco.org/en/mab>.

4. Bundesamt für Naturschutz, "UNESCO Biosphere Reserves," www.bfn.de (Bundesamt für Naturschutz), accessed August 27, 2024, <https://www.bfn.de/en/unesco-biosphere-reserves>.

5. Africa Institute for Energy Governance (AFIEGO), "Murchison Falls National Park is Dying", <https://www.afiego.org/wp-content/uploads/2024/07/Research-brief-Impact-of-Tilenga-oil-activities-on-Murchison-Falls-NP-July-2024.pdf>.

6. Cary Coglianese, "Social Movements, Law, and Society: The Institutionalization of the Environmental Movement," 2001. <https://www.jstor.org/stable/3312913>.

7. REFERENCE TO RAMSAR DATE

8. UNESCO, "Statutory Framework of the World Network of Biosphere Reserves," [Unesco.org](https://unesdoc.unesco.org/ark:/48223/pf0000373378), 2020, 3, <https://unesdoc.unesco.org/ark:/48223/pf0000373378>.

9. Ibid., 4.

10. Benno Böer, Srishti Kumar, and Stephanie Murr, "Biosphere Reserves Are Evolving as Pockets of Hope," [Unesco.org](https://www.unesco.org/en/articles/biosphere-reserves-are-evolving-pockets-hope) (UNESCO, November 6, 2023), <https://www.unesco.org/en/articles/biosphere-reserves-are-evolving-pockets-hope>.

11. Bundesamt für Naturschutz, "UNESCO Biosphere Reserves," www.bfn.de (Bundesamt für Naturschutz), accessed August 27, 2024, <https://www.bfn.de/en/unesco-biosphere-reserves>.

12. UNESCO, "Man and the Biosphere (MAB) Programme Strategy for the Period 2015-2025" (UNESCO 38th General Conference, Paris: UNESCO, 2015), Annex - page 3, <https://unesdoc.unesco.org/ark:/48223/pf0000234624?posInSet=3&queryId=153cd586-5610-4035-8678-449b4a2bdf7>.

13. François Wibaux, "UNESCO Designates 11 New Biosphere Reserves," [Unesco.org](https://www.unesco.org/en/articles/unesco-designates-11-new-biosphere-reserves-1) (UNESCO, July 5, 2024), <https://www.unesco.org/en/articles/unesco-designates-11-new-biosphere-reserves-1>.

Man VERSUS the Biosphere

The Fossil Fuel Industry in UNESCO Areas

While 15 UNESCO-MAB Biosphere Reserves have already been impacted, 8 additional reserves face planned fossil fuel extraction over the next decades. This is a more than 50% increase in reserves compared to today.

A gas-condensate drilling project is planned within this section of the Great Barrier Reef World Heritage Site. Credit: Maxar

The world's relatively easy-to-extract oil, gas, and coal reserves are diminishing... As a result, deposits once considered too hard to extract or refine, in locations once regarded as off-limits and protected, are increasingly under threat. While 15 UNESCO-MAB Biosphere Reserves have already been impacted, 8 additional reserves face planned fossil fuel extraction over the following decades. This is a more than 50% increase in reserves compared to today.

World Heritage Sites face oil and gas extraction despite their landmark status. Brazil's Corrego Dourado oil field has been operating within the *Discovery Coast Atlantic Forest Reserves* since 1996, while the *Great Barrier Reef's* UNESCO-recognised area is occupied by multiple infrastructures extracting fossil gas, with further concession sales planned. This indicates that the Australian Government plans to more than double the impact on this World Heritage Site. Over the next several decades, planned oil and gas projects threaten to more than double the number of impacted World Heritage Sites from 6 to 13.

Overview: Fossil Fuel Extraction Projects in MAB and World Heritage Sites - By the Numbers

Rank	Country	Potential CO2, million tonnes	Impacted MAB Reserves	Impacted World Heritage Sites	Rank	Country	Potential CO2, million tonnes	Impacted MAB Reserves	Impacted World Heritage Sites
1	South Africa	6,216.0	1	0	15	Australia	17.2	0	3
2	China	1,460.5	2	0	16	Guatemala	11.9	1	0
3	Colombia	1,376.0	1	0	17	Vietnam	5.6	1	0
4	Canada	932.9	0	1	18	Romania	3.6	0	1
5	Tanzania	615.1	0	1	19	Morocco	1.4	1	0
6	UAE	446.2	0	1	20	Congo	1.1	1	0
7	Iraq	294.1	0	1	21	Bolivia	0.8	1	0
8	Qatar	201.6	1	0	22	Paraguay	0.3	1	0
9	Argentina	169.4	2	0	23	Congo, DRC	0.2	0	1
10	Netherlands	34.5	1	1	24	Bulgaria	0.2	0	1
11	Mexico	32.9	2	0	25	Brazil	<0.1	0	1
12	Chile	27.1	1	0	26	Czech Republic	<0.1	1	0
13	Russia	25.1	2	0	27	Iran	<0.1	1	0
14	Germany	20.9	2	1	Totals	27 Countries	12	13	23

These current and planned projects exist across diverse socio-economic, political and geographic conditions, from the Republic of Congo's *Réserve de Biosphère de la Dimonika* to Europe's *Wadden Sea*. Beyond damaging biosphere reserves locally, emissions from burning these projects' oil, gas, and coal are projected to reach almost a dozen Gigatonnes of carbon dioxide, further fueling the climate crisis.

27

Countries

12

Billion Tonnes
Potential CO2 Emitted

13

Impacted
World Heritage Sites

23

Impacted
MAB Reserves

Focus on the Americas

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
ARGENTINA					
Andino Norpatagónica	Los Molles Shale	Oil & Gas	167.2	2060	(Not Yet Licensed)
Las Yungas	Agua Blanca	Oil & Gas	No Data	1934	Pluspetrol
	Caimancito	Oil & Gas	0.08	1969	Jujuy Province govt
	CNO-3 M (Caimancito)	Oil & Gas	0.6	2041	Jujuy Province govt
	Libertador Gral San Martin	Oil & Gas	0.89	2039	Other partner(s), Petro AP
	Rio Pescado	Oil & Gas	No Data	1940	CGC (Southern Star), Pampa Energia, Ledesma SAAI, Techint (Tecpetrol), YPF
	Valle Morado	Oil & Gas	0.6	2040	Hinton Production Co, Centaurus Energy

Argentina's *Las Yungas Biosphere Reserve* has endured oil drilling since the 1930s, and three future extraction fields are already in the licensing stages. The Los Molles shale project plans to begin fracking in *Andino Norpatagónica*, turning this biosphere reserve into a source of up to 167 million tonnes of CO2 emissions (scope 3). Beyond extraction projects, other UNESCO areas are threatened by associated infrastructure, such as a planned crude oil pipeline through the San Matías Gulf.



Las Yungas MAB Biosphere Reserve. Credit: Incacity

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
COLOMBIA					
Reserva de la Biosfera Sierra Nevada de Santa Marta	Papayal Coal Mine	Coal	32.0	No Date Yet	Yildirim Holding
	San Juan Coal Mine	Coal	1,344.0	No Date Yet	Yildirim Holding
BOLIVIA					
Parque Nacional Pílon-Lajas	El Pelado	Oil & Gas	0.82	2045	Yacimientos Petroliferos Fiscales Bolivianos
CHILE					
Torres del Paine	Estratos con Favrella Shale	Oil & Gas	27.1	2063	(Not Yet Licensed)
PARAGUAY					
Gran Chaco	116/98 (Fortin Gabino Mendoza)	Oil & Gas	0.1	2038	Dahava Oil
	Block 1	Oil & Gas	0.1	2039	ZEUS Oil
	Lagerenza	Oil & Gas	0.1	2039	Pure Oil

The two proposed coal mines in Colombia's *Reserva de la Biosfera Sierra Nevada de Santa Marta* threaten to produce almost 1.4 billion tonnes of CO2 emissions. They are currently going through permitting stages, and construction is estimated to start within the next decade.

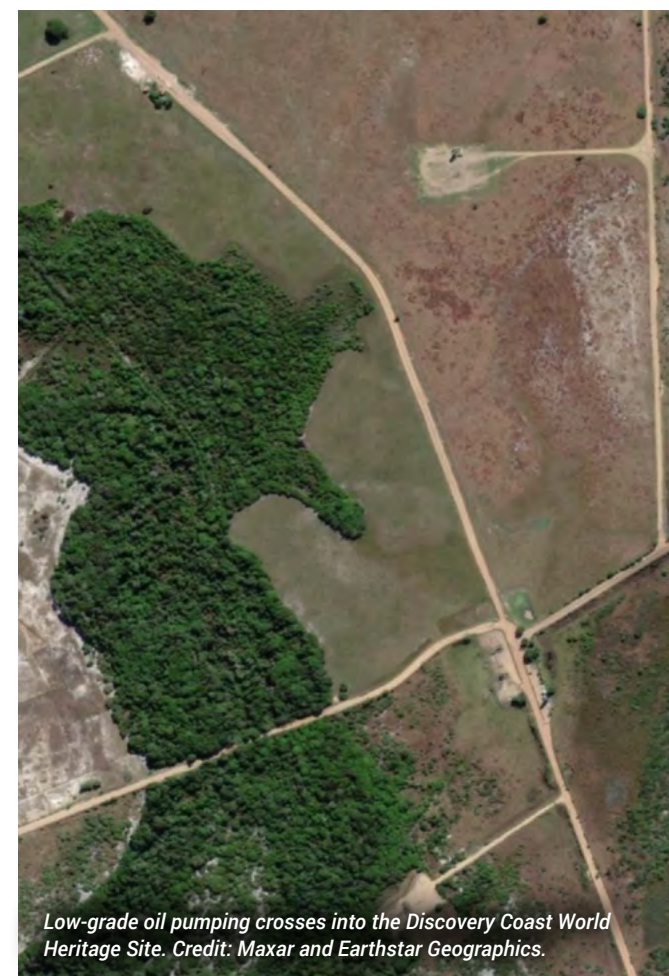
Bolivia, Chile, and Paraguay have yet to break ground in their biosphere reserves, but they have planned oil fields due to begin commercial extraction in 2038. These distant dates represent an opportunity to cancel these projects and licence sales before any damage is caused. Such non-extraction commitments align with guidance from the IPCC and pledges made under the Paris Climate Agreement to phase out fossil fuels.



UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
BRAZIL					
Discovery Coast Atlantic Forest Reserves (World Heritage Site)	Corrego Dourado	Oil & Gas	<0.1	1996	Karavan SPE
	Rio Ibiribas	Oil & Gas	No Data	1988	Petrobras
CANADA					
Rocky Mountain Parks (World Heritage Site)	Alberta Foothills	Oil & Gas	909.8	1900 - 2010	Prairie Provident Resources, Pieridae Energy, and others
	Central Alberta AB5	Oil & Gas	0.1	1981	Yanchang Petroleum International Limited
	Nikanassin	Oil & Gas	24.4	2008	Unknown Owner
MEXICO					
Alto Golfo de California y El Pinacate	Extremeno	Oil & Gas	No Data	2035	Pemex
Pantanos de Centla	Cuenca de Macuspana	Oil & Gas	0.1	1961 - 2005	Pemex
	Macuspana-Muspac	Oil & Gas	No Data	2002	Pemex
	Mascupana Shale	Oil & Gas	32.8	2058	(Not Yet Licensed)

Brazil and Canada have allowed oil and gas extraction to continue within their World Heritage Sites despite UNESCO's ban on extractive industries within these areas.

Brazil's Corrego Dourado project extracts extra-heavy crude oil (a low-value, difficult-to-process fossil fuel) in the *Discovery Coast Atlantic Forest World Heritage Site*. Owned and operated by Karavan SPE, this project was allowed to continue drilling despite its UNESCO listing.



Low-grade oil pumping crosses into the Discovery Coast World Heritage Site. Credit: Maxar and Earthstar Geographics.

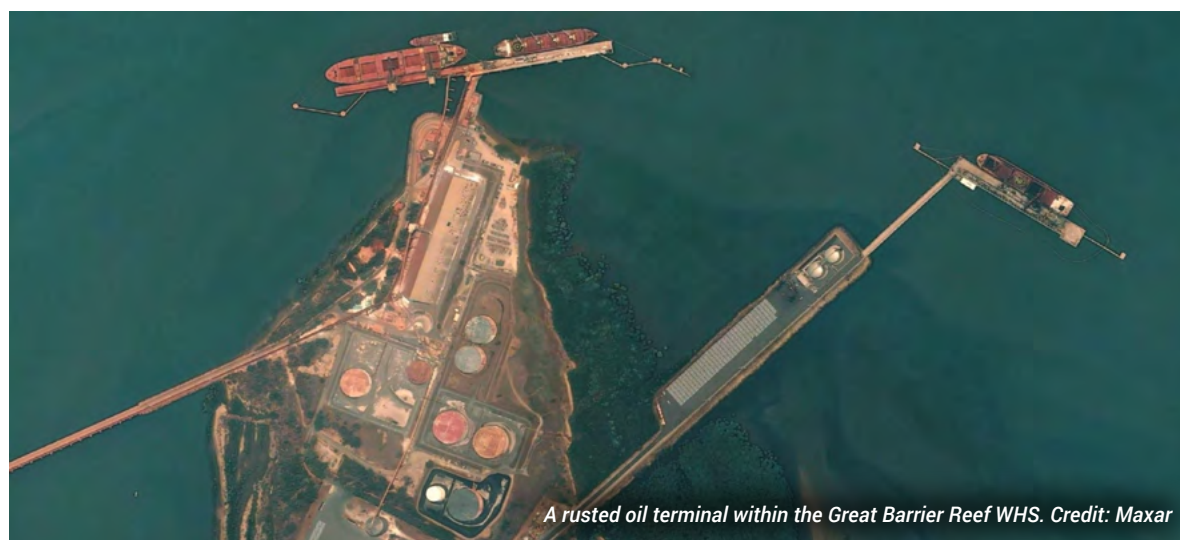
The *Canadian Rocky Mountain Parks* hosts oil and gas condensate extraction projects in three areas. The Alberta Foothills project accounts for over 900 million tonnes of potential CO2 emissions, making it the largest extraction project in a North American UNESCO area.

Focus on Asia and Oceania

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
AUSTRALIA					
Gondwana Rainforests (World Heritage Site)	Clarence-Moreton Basin CBM	Oil & Gas	0.2	2045	(Not Yet Licensed)
Great Barrier Reef (World Heritage Site)	APLNG	Oil & Gas	No Data	2016	Sinopec Group (parent), Origin Energy, ConocoPhillips
	GLNG	Oil & Gas	No Data	2015 - 2016	TotalEnergies, Korea Gas, Petronas, Santos
	Narrows	Oil & Gas	No Data	1986	Chelsea Oil & Gas
	Papua New Guinea Fold Belt Offshore	Oil & Gas	16.7	2046 - 2069	(Not Yet Licensed)
	QCLNG	Oil & Gas	No Data	2015	CNOOC, Shell, Tokyo Gas
Greater Blue Mountains Area (World Heritage Site)	Sydney Basin CBM	Oil & Gas	0.4	2042 - 2047	(Not Yet Licensed)

The Great Barrier Reef World Heritage Site already hosts fossil gas projects, and the Australian government plans to expand extraction with the “Papua New Guinea Fold Belt” offshore gas-condensate project. This is due to begin exploratory drilling and seismic blast testing as early as 2027.

Two other Australian World Heritage Sites face planned oil and gas exploration concessions. If developed, the country would host three World Heritage Sites with fossil fuel extraction projects, the most of any nation.



A rusted oil terminal within the Great Barrier Reef WHS. Credit: Maxar

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
CHINA					
Xilin Gol Natural Steppe Protected Area	Huabei-CNPC	Oil & Gas	10.7	1994 - 2039	PetroChina
	Huabei-SINOPEC	Oil & Gas	0.1	2043	Sinopec
	Liaohe	Oil & Gas	0.1	2039	PetroChina
	Shengli East No.2 Coal Mine	Coal	No Data	2010 (and planned expansions)	China Datang, HKSCC Nominees Limited, Tianjin Energy Investment Group, Hebei Construction & Investment Group, Beijing Energy
	Shengli No.1 OpenPit Coal Mine	Coal	No Data	2013	China Energy, China Huaneng, Others
	Shengli West No.2 Coal Mine		850.0	2021	China Energy, Chaoyang Hongwen Investment Company
	West No. 3 Surface Coal Mine	Coal	598.0	2022	Inner Mongolia Energy Power Generation Investment Group
Yancheng	Huadong	Oil & Gas	0.5	2009	Sinopec
	Jiangsu	Oil & Gas	0.6	2003	Sinopec

China's *Xilin Gol Natural Steppes* is heavily impacted by multiple open-pit coal mines, with planned expansions that will cause further harm to China's first grassland biosphere reserve.¹⁴



An open-pit coal mining complex in the Xilin Gol MAB Biosphere Reserve. Credit: Maxar

14. UNESCO, "Silk Roads Programme: Xilin Gol", <https://en.unesco.org/silkroad/silk-road-themes/biosphere-reserve/xilin-gol>

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
IRAN					
Hara	Gavarzin	Oil & Gas	<0.1	1983	NIOC (Iran)
IRAQ					
The Ahwar of Southern Iraq (World Heritage Site)	Halfayah	Oil & Gas	294.1	2012	Missan Oil Company (Iraq NOC), TotalEnergies, Petronas, PetroChina
QATAR					
Al Reem	Jubailah Shale	Oil & Gas	201.6	2056	(Not Yet Licensed)
UAE					
Marawah	Al Bateel	Oil & Gas	No Data	2027	ADNOC, OMV, TotalEnergies
	Hail & Ghasha-East	Oil & Gas	381.1	2025*	ADNOC, Eni, Lukoil, OMV, PTTEP
	Hail	Oil & Gas	59.1	2017	Cosmo Energy E&P, JERA, JX Nippon Oil and Gas, Kansai Electric, TotalEnergies
	Neewat Al Ghalan	Oil & Gas	5.5	1995	Cosmo Energy E&P, JERA, JX Nippon Oil and Gas, Kansai Electric, TotalEnergies
	Umm Al Anbar	Oil & Gas	0.2	1989	Cosmo Energy E&P, JERA, JX Nippon Oil and Gas, Kansai Electric, TotalEnergies
VIETNAM					
Red River Delta	Song Tra Ly, VN	Oil & Gas	2.0	2043	(Not Yet Licensed)
	Quang Yen Basin CBM	Gas	3.6	2047	(Not Yet Licensed)

Qatar and Vietnam both have oil blocks in biosphere reserves that are not due to begin for decades and have yet to be licensed. Cancelling these planned extraction fields will keep over 200 million tonnes of CO2 emissions in the ground while preserving these biosphere reserves for future generations.



The Ahwar of Southern Iraq World Heritage Site is heavily impacted by oil extraction.
Credit: Maxar



Oil & gas extraction infrastructure recently built inside Marawah Biosphere Reserve, UAE

* Startup year based on ADNOC claims.

Russia's already impacted Middle Volga Biosphere Reserve is further threatened by shale fracking projects due to begin at the end of this decade. Their Chernyje Zemli Biosphere Reserve has hosted fossil fuel extraction since the sixties, with planned expansions stretching throughout the rest of the century.

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
RUSSIA					
Chernyje Zemli	RITEK	Oil & Gas	No Data	1964 - 1964	Lukoil
	Tengutinskoye	Oil & Gas	0.1	1966 - 2100	EvrosibOil
Middle Volga	Askulskoye	Oil & Gas	No Data	2079	Russian Government
	Domanik Shale	Oil & Gas	24.9	2030 - 2044	BP, Rosneft
	Kuybyshevskoye	Oil & Gas	No Data	2072	Russian Government
	Samaraneftegaz	Oil & Gas	< 0.1	1938-1949	BP, Rosneft



The Samaraneftegaz oil extraction project inside the Middle Volga MAB Biosphere Reserve. Credit: Maxar

Focus on Africa

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
SOUTH AFRICA					
Vhembe Biosphere Reserve	Berenice Cygnus Coal Mine	Coal	2,700.0	No Date Yet	Bono Lithihi Investments
	Greater Soutpansberg Coal Project	Coal	2,102.0	No Date Yet	Alliance Resource Partners, Rothe Investments
	Makhado Coal Mine	Coal	690.0	No Date Yet	Alliance Resource Partners
	Vele Colliery (Coal Mine)	Coal	724.0	2023	Alliance Resource Partners

South Africa's *Vhembe Biosphere Reserve* is home to a cluster of four extensive coal mines. Combined, these threaten to turn the park into a "carbon bomb" with 6.2 billion tonnes of potential CO2 emissions from burning bituminous coal deposits underneath. This is the largest in any UNESCO area. One coal mine has already begun extraction (Vele Colliery). The other three (the Berenice-Cygnus Mine, Greater Soutpansberg Coal Project, and the Makhado Coal Mine) are in development but plans call for vast open-pit extraction sites. This potentially adds hundreds or thousands of millions of tonnes of CO2 to the atmosphere over the lifetimes of these mines.



UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
CONGO					
Réserve de biosphère de la Dimonika	Congo Basin Onshore	Oil & Gas	1.1	2033	(Not Yet Licensed)
DRC					
Salonga National Park (World Heritage Site)	Zaire Onshore	Oil & Gas	0.2	2065	(Not Yet Licensed)
MOROCCO					
Réserve de Biosphère de l'Arganeraie (RBA)	Meskala	Oil & Gas	1.3	1987	ONHYM (Morocco)
	Sidi Moktar	Oil & Gas	No Data Yet	2033	Culebra Petroleum Ltd., ONHYM, Sound Energy
	Sidi Rhalem	Oil & Gas	No Data (Idled)	1961	Corral Holdings
	Toukimt	Oil & Gas	0.1	1985	ONHYM (Morocco)
TANZANIA					
Selous Game Reserve (World Heritage Site)	Tanzanian Coastal Onshore, TZ	Oil & Gas	615.1	2040 - 2085	(Not Yet Licensed)

Canceling future exploration leases in Congo, the Democratic Republic of Congo, and Tanzania will ensure both countries remain free of extraction projects in their Biosphere Reserves and World Heritage Sites.



Wildlife in the Selous Game Reserve WHS. Credit: Kevin Harber

Focus on Europe

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
BULGARIA					
Ancient and Primeval Beech Forests of the Carpathians (World Heritage Site)	Vardar - Balkans Onshore	Oil & Gas	0.1	2043 - 2069	(Not Yet Licensed)
CZECH REPUBLIC					
Dolní Morava	Lanzhot	Oil & Gas	<0.1	1994	MND a.s.
	Lednice 12	Oil & Gas	No Data	1985	MND a.s.
	Lednice-Valtice	Oil & Gas	No Data	1990	MND a.s.
	Postorna 15	Oil & Gas	No Data	1981	MND a.s.
	Postorna 4	Oil & Gas	< 0.01	2001	MND a.s.
	Postorna 8b	Oil & Gas	No Data	1995	MND a.s.
	Postorna IV	Oil & Gas	No Data	2002	MND a.s.
	Tynec	Oil & Gas	No Data	1951	MND a.s.
	Valtice VII	Oil & Gas	No Data	1993	MND a.s.

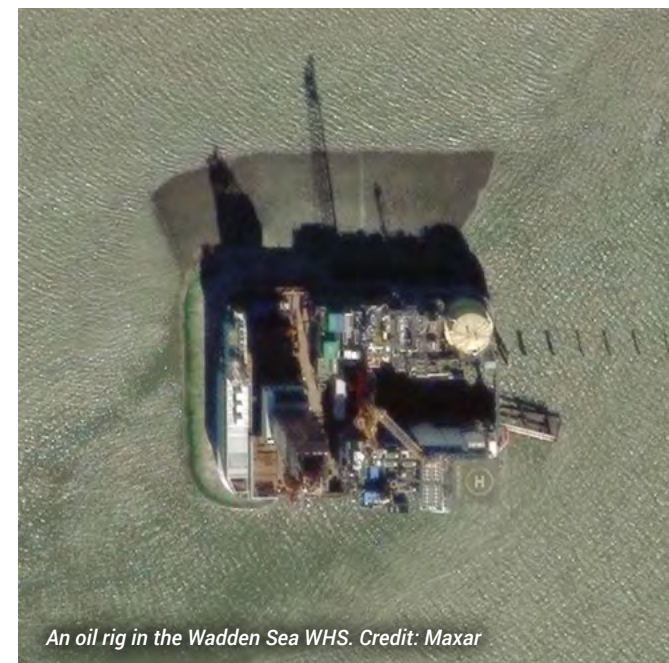
The “Ancient and Primeval Beech Forests of the Carpathians” World Heritage Site is scheduled to begin commercial extraction in the early 2040s. Expansions are also planned for a further two decades, although it only hosts minor quantities of oil and gas (equivalent to less than a week of Bulgarian oil demand in 2023).¹⁵



The Ancient and Primeval Beech Forests of the Carpathians WHS.
Credit: Maxar

15. <https://www.ceicdata.com/en/indicator/bulgaria/oil-consumption>

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
GERMANY					
The Wadden Sea (World Heritage Site)	Emshoern	Oil & Gas	No Data	1981	Shell, ExxonMobil
	Leybucht	Oil & Gas	No Data	1978	Neptune Energy
Waddensea and Hallig Islands of Schleswig-Holstein	Heide 233	Oil & Gas	0.2	2063	Wintershall Dea
	Mittelplate/Dieksand	Oil & Gas	20.7	1987	Wintershall Dea
Waddensea of Lower Saxony	Manslagt	Oil & Gas	No Data	1993	Shell, ExxonMobil
NETHERLANDS					
The Wadden Sea (World Heritage Site)	Moddergat	Oil & Gas	7.3	2007	EBN, ExxonMobil, Shell
Waddensea Area	Lauwersoog 3	Oil & Gas	No Data	2035	EBN, ExxonMobil, Shell
	Lauwersoog Central	Oil & Gas	No Data	2031	EBN, ExxonMobil, Shell
	Lauwersoog	Oil & Gas	6.4	2008	EBN, ExxonMobil, Shell
	Nes	Oil & Gas	18.2	2007	EBN, ExxonMobil, Shell
	Noord Friesland	Oil & Gas	0.3	2039	EBN, ExxonMobil, Shell
	Schiermonnikoog-Wad	Oil & Gas	2.1	2035	EBN, ExxonMobil, Shell
	Ternaard	Oil & Gas	No Data	2025	EBN, ExxonMobil, Shell
	Zuidwal	Oil & Gas	0.2	1988 - 2040	EBN, Vermilion Energy



The oil rig above is not alone in the **Netherlands'** and **Germany's Wadden Sea** UNESCO areas. Eight fields are actively extracting oil within the protected areas. A further six blocks are under exploration and development licenses to fossil fuel companies. This indicates that extraction activities within *Wadden Sea* protected areas will dramatically expand in the coming decades.

Romania’s UNESCO areas are currently free of fossil fuel extraction, but that may change with planned oil concessions in the Danube Delta Biosphere Reserve.

UNESCO Area	Fossil Fuel Project	Fuel	Potential CO2, million tonnes	Startup Year	Companies
ROMANIA					
Danube Delta (World Heritage Site)	Predobrogea Onshore	Oil & Gas	3.7	2041 - 2065	(Not Yet Licensed)



Waterfowl in the Danube Delta WHS. Credit: Dan Cristian Pădureț

Spotlight on the Marawah Marine Biosphere Reserve

The *Marawah Marine Biosphere Reserve*, located offshore Abu Dhabi (UAE), gained notable recognition in 2007 as the first and largest site in the region to be included in the UNESCO World Network of Biosphere Reserves.¹⁶ The site comprises numerous islands and a 120-kilometre-long coastline, which house important seagrass, coral, macroalgae, and mangrove habitats. The reserve is a shelter and feeding ground for dugongs, along with cultural and archaeological sites.^{17,18}

Although the area is also a recognised protected area within the Environment Agency of Abu Dhabi's *Sheikh Zayed Protected Areas Network*,¹⁹ this idyllic and vital UNESCO-MAB biosphere reserve has become subject to a fast-approaching ultra-sour gas extraction project.²⁰ The fossil fuel industry has historically avoided "ultra-sour" gas projects like this due to their corrosive nature and associated processing costs. However, the industry is now turning to sour gas as an alternative resource with the depletion of easily extracted natural gas.²¹

To sustain this massive industrial operation, 17 billion dollars, 11 artificial islands, oil and gas wells, a network of pipelines, shipping infrastructure, and power lines are required. Once completed, the project, advertised as the first gas project to operate with "net zero emissions,"²³ has plans to extract 42 million cubic metres of fossil gas and 120,000 barrels of oil per day. This amounts to emissions of over 49.6 million tonnes of CO₂ per year, similar to emissions of the city of Dubai.²⁴



Construction equipment building an artificial island near Bu Tina Island. Credit: Maxar

16. United Arab Emirates Ministry of Climate Change & Environment, "Marawah Marine Biosphere Reserve," www.moccae.gov.ae, December 11, 2018, <https://www.moccae.gov.ae/en/open-data/ecotourism/marawah-marine-biosphere-reserve.aspx>

17. UNESCO, "Marawah," [Unesco.org](http://unesco.org), accessed August 27, 2024, <https://www.unesco.org/en/mab/marawah>.

18. Environment Agency - Abu Dhabi, "Sheikh Zayed Protected Areas Network," <https://www.ead.gov.ae/en/discover-our-biodiversity/sheikh-zayed-protected-areas-network>

19. Ibid.

20. ADNOC, "Supporting Biodiversity" (ADNOC, n.d.), <https://www.adnoc.ae/en/our-projects/hail-ghasha/supporting-biodiversity>.

21. W. F. J. Burgers et al., "Worldwide Development Potential for Sour Gas," *Energy Procedia* 4 (January 1, 2011): 2178–84, <https://doi.org/10.1016/j.egypro.2011.02.104>

22. Reuters, "UAE's ADNOC Awards \$17 Billion of Contracts for Gas Project," Reuters, October 5, 2023, sec. Climate & Energy, <https://www.reuters.com/sustainability/climate-energy/adnoc-awards-contracts-gas-project-aiming-net-zero-co2-emissions-2023-10-05/>.

23. ADNOC, "Hail & Ghasha Project," [adnoc.ae, https://www.adnoc.ae/en/our-projects/hail-ghasha](https://www.adnoc.ae/en/our-projects/hail-ghasha), accessed August 29, 2024. Note that the emissions from burning the fossil gas are not included in ADNOC's calculation of what makes it a "net zero" project.

24. While the UAE government does not publish emissions data per city, multiplying per capita emissions from <https://ourworldindata.org/co2-emissions> with population figures puts Dubai's emissions in the 50-100 million tonnes per year range

While any extraction project within a protected area is cause for concern, Marawah serves as a salient spotlight due to its immense ecological significance and its unfortunate role in controversial development practices. Known as the “Hail and Ghasha Megaproject,”²⁵ the operation’s location not only places it within the most extensive marine protected area in the Persian Gulf and the largest UNESCO Biosphere Reserve in the region, but its staggering scale has secured its place as one of the most significant oil and gas projects within a UNESCO-designated site.

Additionally, the company behind the project, the Abu Dhabi National Oil Company (ADNOC), is led by COP28 president Sultan Al-Jaber,²⁶ and the project was greenlit by the Environment Agency Abu Dhabi (EAD), which is managed by IUCN President Razan Al-Mubarak.^{27,28} This situation raises serious questions about the commitment of key climate and conservation leaders to safeguarding UNESCO areas from industrial exploitation. Moreover, the reserve’s proximity to Abu Dhabi, which will host the 2025 World Conservation Congress,²⁹ further amplifies its significance in the ongoing tension between environmental protection, resource extraction, and economic development.

The project has also seen some turmoil concerning international support. Initially supported by Italy’s Eni (25%), Germany’s Wintershall Dea (10%), Austria’s OMV (5%), and Russia’s Lukoil (5%), the concession has undergone various shifts, with Wintershall Dea pulling out and Eni reportedly reducing theirs by more than half.^{30,31}

The site’s most recent MAB Programme periodic review (2018) expressed concern about future oil and gas schemes in the area and advised that the MAB secretariat be informed of potential impacts.³² However, the project’s Environmental Impact Assessment (EIA) has not been made publicly accessible, nor is there evidence that UNESCO has been informed of these proceedings, indicating a shortfall in transparency surrounding the project’s impact on the Marawah Marine Biosphere Reserve.

This lack of openness hinders a comprehensive understanding of the extent of the damage, leaving concerned parties in the dark regarding the specific details of the project’s existing and potential future environmental consequences. The gas extraction project also appears to contradict critical principles of the MAB Programme, as it introduces a polluting industry into the transition zone, contradicts

international best practices by preventing public accessibility of the EIA, and, therefore, undermines the fundamental tenets of biodiversity conservation and sustainable development.

Ultimately, as the largest oil and gas development in a MAB Reserve on a global scale, the Hail-Ghasha megaproject symbolises a growing threat to UNESCO’s mission to “safeguard natural and managed ecosystems.”³⁴ Unfortunately, in accordance with the MAB Programme, which conducts a review every ten years, the next review is unlikely to be scheduled before 2027, two years after the Hail and Gasha Megaproject is planning to start extracting sour gas from the MAB Reserve.

Despite developing extensive infrastructure to support the extraction of this highly toxic fossil gas, the U.A.E. government has applied to include the reserve in the IUCN’s “Green List” of exceptionally managed conservation areas.³⁵ With dredging and artificial island construction already underway, whether the IUCN will consent to these contradictory plans for the Marawah Marine Biosphere Reserve remains to be seen.

25. ADNOC, “Supporting Biodiversity” (ADNOC, n.d.), <https://www.adnoc.ae/en/our-projects/hail-ghasha/supporting-biodiversity>

26. BBC, “Sultan Al-Jaber: A Quick Guide to the COP28 President,” [www.bbc.com](https://www.bbc.com/news/science-environment-67591804), December 1, 2023, <https://www.bbc.com/news/science-environment-67591804>

27. “ADNOC Awards AED 5 Billion Contract for Construction of Ghasha Concession Artificial Islands,” [adnoc.ae](https://www.adnoc.ae/en/news-and-media/press-releases/2019/adnoc-awards-aed-5-billion-contract-for-construction-of-ghasha-concession-artificial-islands), February 6, 2019, <https://www.adnoc.ae/en/news-and-media/press-releases/2019/adnoc-awards-aed-5-billion-contract-for-construction-of-ghasha-concession-artificial-islands>

28. Razan Al Mubarak, “About Razan al Mubarak: Experience & Impact,” <https://www.razanalmubarak.com/about/>

29. IUCN, “IUCN World Conservation Congress,” [iucn.org](https://iucn.org/our-union/iucn-world-conservation-congress#:~:text=The%20next%20World%20Conservation%20Congress.between%20April%20and%20October%202024), accessed September 25, 2024, <https://iucn.org/our-union/iucn-world-conservation-congress#:~:text=The%20next%20World%20Conservation%20Congress.between%20April%20and%20October%202024>

30. Wintershall DEA, “Wintershall Dea Sells Interest in Abu Dhabi’s Ghasha Concession,” Wintershall Dea AG,

June 11, 2024, https://wintershalldea.com/en/investor-relations/pi-24-12_

31. MEOG - Middle East Oil & Gas, “MEOG: Eni Farms down Ghasha Stake,” [Newsbase.com](https://newsbase.com/story/meog-eni-farms-down-ghasha-stake-321962_) (Newsbase, April 21, 2024), https://newsbase.com/story/meog-eni-farms-down-ghasha-stake-321962_

32. UNESCO, “Periodic Review Reports and Follow-up Information Received since the Last MAB International Coordinating Council (MAB ICC) Meeting,” UNESDOC Digital Library (UNESCO, 2018), <https://unesdoc.unesco.org/ark:/48223/pf0000380568?posinSet=2&queryId=0f7b9ea2-6f87-4c87-b1a0-91090a6a6fc3>

33. Wafaa Amer, Sheila Ashong, and Djafarou Tiomoko, “Management Manual for UNESCO Biosphere Reserves in Africa,” ed. German Commission for UNESCO and Lutz Möller, UNESCO (Bonn: German Commission for UNESCO, June 2015), https://www.unesco.de/sites/default/files/2018-01/Manual_BR_Africa_en-1.pdf

34. UNESCO-MAB, “Our Mission,” <https://www.unesco.org/en/mab/about?hub=66369>

35. IUCN Green List, “United Arab Emirates”, <https://iucngreenlist.org/country/united-arab-emirates/>

Man AND the Biosphere

Non-extraction Commitments



Low-tide in the Wadden Sea WHS. Credit: David Kracht

Fossil fuel extraction projects inside the UNESCO areas have not gone unnoticed by UNESCO. As early as 1993, the organisation began working on the issue of extractive industries in World Heritage Sites,³⁵ reaching a “no-go” agreement with the International Council on Mining and Metals.³⁶ No such agreement has been achieved with the oil and gas industry. As a participatory UN organisation, UNESCO cannot “force” a country to stop oil, gas, and coal projects. Instead, they are limited to notifying countries of their obligations and, in extraordinary cases, delisting sites. This places the onus on individual countries and companies to end ongoing

projects, clean idle or abandoned extraction sites, and cancel future concessions within their UNESCO protected areas.

The first ever site to be deleted from the World Heritage list was, in fact, due to fossil fuel extractive activities. The *Arabian Oryx Sanctuary's* pivotal role in housing the first free-ranging herd of Arabian oryx – a species that was reintroduced in 1982, following its global extinction in the wild in 1972 – as well as various other species, earned it a place on the World Heritage list in 1994. Oman’s unilateral decision to reduce the size of the

protected area by 90% for hydrocarbon prospecting, however, resulted in the World Heritage Committee’s unprecedented decision to delist the site in 2007.³⁷

In the context of Nationally Determined Contributions (NDCs) to the Paris Agreement currently being updated, countries have a significant opportunity to enhance their climate commitments following the Global Stocktake at COP28 in Dubai in 2023. They can do this by pledging the non-extraction of fossil fuels within protected areas, especially in UNESCO areas. Such a proactive stance would protect globally significant ecosystems while advancing climate goals, including the mandate of COP28 to “move away from fossil fuels.” Using LINGO’s carbon dioxide emissions factors based on oil barrel equivalence or coal tonnage values,³⁸ countries can estimate the tons of CO2 emissions avoided, usually in the millions, which can then be incorporated into a country’s NDC. This would demonstrate a solid alignment with global climate objectives and would position the nation as a leader in both environmental conservation and climate action, while also making progress towards other international treaties, such as the Convention on Biological Diversity.

Adequate financial support may enable this. While the environmental and climate benefits of leaving fossil fuels in the ground are well-documented, the economic implications for countries, particularly those in the Global South, can be substantial. This challenge must be addressed to ensure countries can make and sustain such commitments over the long term. Some Global South governments have already indicated a willingness to consider the LINGO path, often contingent on receiving external financial support. Notable examples include Ecuador with the Yasuní-ITT Initiative, Kenya and Timor-Leste.

35. World Heritage Committee, “World Heritage and Extractive Industries” <https://whc.unesco.org/en/extractive-industries/>

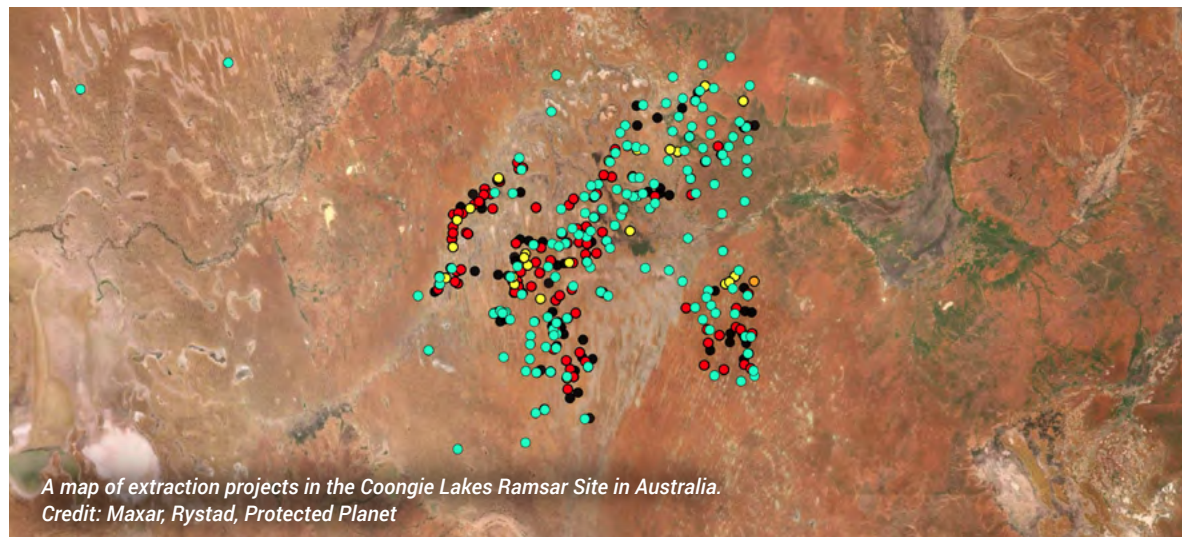
36. ICMM, “World Heritage Sites and Legally Designated Protected Areas”, <https://www.icmm.com/en-gb/our-work/environmental-resilience/nature/world-heritage-sites>

37. UNESCO World Heritage Centre, “Arabian Oryx Sanctuary,” UNESCO World Heritage Centre, accessed August 29, 2024, <https://whc.unesco.org/en/list/654/>, <https://www.leave-it-in-the-ground.org/resources/king-metrics/>

38. UNESCO World Heritage Centre, “Arabian Oryx Sanctuary,” UNESCO World Heritage Centre, accessed August 29, 2024, <https://whc.unesco.org/en/list/654/>



The signing of the Yasuni-ITT Agreement at the 67th UNGA. Credit: Fernanda LeMarie



A map of extraction projects in the Coongie Lakes Ramsar Site in Australia. Credit: Maxar, Rystad, Protected Planet

Various financial mechanisms have been proposed to incentivise countries to adopt and uphold non-extraction commitments. These mechanisms are crucial components of the broader effort to transition away from fossil fuels. While demand-side policies to reduce fossil fuel consumption are becoming more mainstream, supply-side policies, especially those focused on limiting extraction, are lagging. Governments must commit to leaving fossil fuels in the ground on a large scale to achieve a fair and rapid decline of coal, oil, and gas. Financial incentive mechanisms that could be used to incentivise LINGO measures include Just Energy Transition Partnerships, Coal Asset Transition Mechanisms, Debt-for-Climate Swaps, repurposing IMF Special Drawing Rights, a Climate Bailout, etc.³⁹

The issue of fossil fuel extraction in protected conservation areas extends beyond World Heritage Sites and Biosphere Reserves. While not under UNESCO's purview, other international conservation programs can provide additional context to the broader issue of oil, gas, and coal projects within the world's designated conservation areas. The United Kingdom's network of offshore fields in the North Sea's OSPAR-protected areas has already received media attention,³⁶ and planned expansions are estimated to extend into the next century. Australia's pervasive gas extraction in the *Coongie Lakes Ramsar wetlands* site is already intense, and expansion plans have been extended for decades.

Widening one's view beyond internationally recognised conservation zones reveals over 2,300 current, idled, or planned fossil fuel extraction projects across hundreds of national and provincial parks, wildlife reserves, and

other protected conservation areas. These projects have a combined potential to emit over 66 billion tonnes of CO₂ during their lifetimes.

Considering the above, it is clear that industry and permitting countries intend to grow their footprint in the world's conservation sites dramatically rather than phase out the extraction of fossil fuels.

Back in the *Wadden Sea*, UNESCO has begun investigations and is proceeding to potentially add the Biosphere Reserve and World Heritage Site to its "in danger" list, a step toward removing the coastal habitat's designation. Delisting is not inevitable - ending fossil fuel extraction projects (in addition to other conservation measures) will help to ensure that natural wonders remain for future generations, while strengthening international cooperation and moving towards the end of the fossil fuel age.

39. LINGO (forthcoming). Toolbox of Financial Incentives to Leave Fossil Fuels in the Ground. Brief. This publication establishes a comprehensive baseline of existing options and mechanisms and aims to make these tools more accessible to policymakers.

40. The Guardian, "UK tops list for fossil fuel sites in nature protected areas", 2023, <https://www.theguardian.com/environment/2023/may/10/uk-tops-list-for-fossil-fuel-sites-in-nature-protected-areas>

The Protected Carbon Project

Tracking Fossil Fuel Extraction in the World's Protected Areas

About the Project

Our Analysis has identified 2310 protected areas worldwide with current, planned, or idled fossil fuel extraction projects within their borders. These projects are located in 101 countries, demonstrating that the issue is widespread and not confined to a few countries or regions.

Many identified oil, gas, and coal projects are marginal or have projected start-up dates decades in the future, indicating that they will not meaningfully contribute to near-term profitability or energy supply while threatening protected areas.

In aggregate, identified extraction projects within the world's protected areas are on track to emit over 66 billion tonnes of climate-affecting carbon dioxide gas from burning fossil fuels (scope three emissions). 651 private, public, and state-owned companies are investing in these projects.

Read our reports, browse interactive maps, and dive into the data at protected-carbon.org.

Our Data and Methodology

Data sources include proprietary industry information as well as high-quality open data providers. An April 2024 snapshot of the World Database of Protected Areas (WDPA), developed by the IUCN, WCPA, and UN Environmental Program, provides the locations and boundaries of protected areas. Oil and gas extraction project data is sourced from Rystad Energy via the

project's partnership with Oil Change International (October 2023). Global Energy Monitor's April 2024 dataset provides coal mining information.

Protected Carbon relies on geographical information systems (ArcGIS Pro) to process and calculate the data presented in this report. Other data handling tools include Open Refine, plus Microsoft and Google's spreadsheet solutions.

Fossil fuel asset centroid locations were geolocated and overlaid with polygons representing protected areas with defined borders. Fossil fuel asset data was added to each protected area map feature, and protected area data was added to each overlapping extraction feature. The resulting datasets were exported from ArcGIS Pro as Excel files. Data consolidation, deduplication, and cleanup were performed using the above data-handling tools before re-importing the data to ArcGIS Pro to create map images. Please visit the [project's site](#) to learn more about our sources and methodology.

Shortcomings include potential omissions or errors in our sources and temporal errors due to differing datasets. Startup dates become more speculative the farther in the future they are. All CO2 estimates are rounded to the nearest 100,000 tonnes of carbon dioxide emissions based on [LINGO's KING Metrics](#). Some partially overlapping extraction assets may be excluded if their centre is outside a UNESCO-listed area. Protected areas without defined boundaries (in

the WDPA dataset) have been excluded. Due to these limitations, this report's estimates and projections should be taken as minimal values.

Funding

Protected Carbon is a project of the Leave it in the Ground Initiative (LINGO), which is focused on high-impact initiatives to keep fossil fuels in the ground and speed up the transition to a fully renewable energy system. This project is made possible by the Swedish Postcode Lottery Foundation and core funding from LINGO's supporters. To learn more about LINGO's work, visit www.leave-it-in-the-ground.org.

Legal Notices

Although the data, information, and maps represented in the report have been obtained from government and industry sources believed to be reliable, we do not guarantee their accuracy. Maps, tables, and text are provided "as is." We and our data providers disclaim all expressed and implied warranties, including implied warranties of merchantability and fitness for a particular use. In no event shall we or our data providers have any monetary liability of any kind whatsoever to the recipient or any user of the contents of this report.

Report design by Annabelle Aispuro.

Cover and map graphics by Karla Paola Vazquez Mendoza.