

# WHAT IS THE THERMAL DOME?

AND HOW CAN A ZMES OR PSSA PROTECT IT?

It is a oceanographic phenomenon that occurs off the coast of Central America, where a combination of intense winds (known as Papagayo jets) and ocean currents causes the surface waters to shift and, in their place, deep, cold, nutrient-rich water rises from depths of up to 400-500 meters.



This phenomenon occurs because a current known as the North Equatorial Counter-Current (NECC) flows from east to west in the Pacific. When it reaches the height of Central America, combined with the strength of the winds, it generates a cyclonic circulation system that draws deep waters to the surface.

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The volume of water that rises is estimated at 3.5 million cubic meters per second, equivalent to approximately 16 times the flow of the Amazon River. This upwelling brings large quantities of nutrients, including nitrates, phosphates, silicon, and trace elements such as cobalt and iron, which are essential for the growth of phytoplapkton. These micro-

cobalt and iron, which are essential for the growth of phytoplankton. These microalgae form the basis of the marine food chain. Thanks to this wealth of nutrients, the Thermal Dome's primary productivity is up to six times higher than that of the surrounding waters, making it one of the most productive and biodiverse areas of the Pacific Ocean. This attracts a wide variety of marine species, including fish, sharks,

turtles, squid, dolphins, and whales, many of which come to the Dome to feed, reproduce, or migrate through it.

### IS THIS THE ONLY DOME?

No, there are other thermal domes in different parts of the world. Some of the best-known domes, besides the Thermal Dome in Central America, are the Guinea Dome in the northeastern Atlantic, the Angola Dome in the southeastern Atlantic, and the Mindanao Dome in the western Pacific, off the Philippines.

Each of these domes serves a key ecological function by concentrating nutrients and attracting large amounts of marine life. However, the Thermal Dome in Central America is unique because of its high level of productivity and the particular combination of factors that give rise to it.

## WHERE IS THE THERMAL DOME?

The Thermal Dome is located in the Eastern Pacific Ocean, off the coast of Central America. Its exact position varies throughout the year. Most of the time, the Dome is located in the high seas, that is, outside the exclusive economic zones of the countries, in international waters. However, during January to April, when the trade winds are more intense, the Dome develops on the coast and can extend into the exclusive economic zones of several Central American countries. For the rest of the year, especially between May and November, the Dome moves away from the coast and remains in the open sea. For this reason, it is a highly dynamic oceanic zone that changes location and size depending on the time of year and climatic phenomena such as El Niño and La Niña.



### WHAT ECOSYSTEM SERVICES DOES THE THERMAL DOME PROVIDE?

The Thermal Dome is a highly productive marine system that benefits people and coastal communities. Its nutrient richness supports important fisheries and contributes to the economic livelihoods of thousands of families in the region. It is also a potential source of marine genetic resources with future applications in food, medicine, and science.

Additionally, the Dome helps capture carbon dioxide through phytoplankton, making it a natural ally in the fight against climate change. Its role as a feeding ground and migratory passage for species such as whales and turtles also makes it vital for marine conservation. Due to its natural beauty and abundance of wildlife, it is a valuable site for activities such as ecotourism and sport fishing, which generate income and create opportunities for the adjacent coastal communities. All this is possible thanks to the ecological processes it maintains, such as nutrient recycling and support for exceptional biodiversity, which makes the Dome a very important area in the tropical Pacific.

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#### WHY SHOULD CENTRAL AMERICAN COUNTRIES PAY ATTENTION TO WHAT HAPPENS IN THE THERMAL DOME AND TAKE ACTION TO PROTECT IT?

- It is a center of cetacean concentration in the region due to its high primary productivity, which makes human activities associated with these species highly profitable.
- Due to the high marine biodiversity associated with the Thermal Dome, it has been determined that 2,078 species are directly related to its existence. Several economic activities in the region depend on these species, which have a significant monetary value for Central American economies.
- Due to the existence of a vital cobalt crust in the Thermal Dome of very high value.
- Because it is situated in the middle of international maritime routes to and from the Panama Canal, it has negative impacts on marine species and ecosystems, which may lead to a decrease in the economic benefits of activities associated with the Thermal Dome.
- Because it is a very important tuna fishing area in the Eastern Tropical Pacific.
- It is a key high seas site, well-suited for implementing the BBNJ treaty, which aims to protect and conserve biodiversity in areas beyond national jurisdiction.

# **AT THE INTERNATIONAL LEVEL,** HAS ANYONE DECLARED A PROTECTION IN THE DOME?

Central American governments are currently working together to implement protection and management measures in the Thermal Dome. The aim of these measures is to ensure the conservation and sustainability of this important natural resource. At present, the Central American Thermal Dome's only distinction from high-level international organizations is its recognition of its significant ecological and biological value. These distinctions are as follows:

Important Marine Mammal Area (IMMA), by the International Union for Conservation of Nature (IUCN). 2

Area of importance for sharks and rays, by the International Union for Conservation of Nature (IUCN).

Ecologically and
Biologically Significant
Area (EBSA) under the
Convention on Biological
Diversity (CBD).

4 Hope site according to Mission Blue.

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5 It has been recognized in UNESCO scientific publications as a site of outstanding universal value on the high seas.

#### HOW MUCH DO THE ECONOMIC ACTIVITIES ASSOCIATED WITH THE THERMAL DOME CONTRIBUTE TO THE ECONOMIES OF CENTRAL AMERICA?

Estimates of the economic contribution of the Thermal Dome to Central American economies have been possible, despite data gaps and limitations. The Dome had an approximate economic impact of USD 1.580 billion for the period 2017-2022, generated by commercial fishing, sport fishing, and species sightings.

The most caught species were yellowfin tuna, skipjack, mahi-mahi, bigeye tuna, and marlin.



#### WHO FISHES IN THE DOME?

Vessels flying the flags of 16 countries, including Taiwan, China, Fiji, Spain, Mexico, Panama, Venezuela, Nicaragua, and Colombia.

El esfuerzo pesquero en el periodo 2016-2020 fue de **175,512 HOURS**. La mayoría (78%) en altamar realizada en un **59.1% CARRIED OUT BY DRIFT LONGLINE** y un **39.8% BY PURSE SEINERS.** 

FORTY-SEVEN PERCENT OF THE SPECIES CAUGHT in the EEZ of the coastal countries are found in the HIGH SEAS PORTION OF THE DOME, indicating that the Thermal Dome is a critical habitat for maintaining fisheries in Central American coastal regions.

#### HOW MUCH MARITIME TRAFFIC IS THERE IN THE DOME?

By the year 2023, a total of **14,080 VESSELS** were registered to pass through and navigate in the Thermal Dome area, distributed as follows:



# WHAT CAN BE DONE NOW TO **PROTECT THE DOME?**

The primary tool for protecting and conserving species and ecosystem services in the Thermal Dome is the United Nations High Seas Treaty & Biodiversity Beyond National Jurisdiction (BBNJ). However, this treaty has not yet entered into force and is therefore not yet operational.

Until it enters into force, the Central American countries can resort to another tool that already exists and is in force: requesting the International Maritime Organization (IMO) to declare a Particularly Sensitive Sea Area (PSSA) in the Thermal Dome, which is a tool that allows protecting the Dome from the negative impacts generated by maritime traffic in this area.

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#### WHAT ARE THESE **NEGATIVE IMPACTS GENERATED** BY MARITIME TRAFFIC IN THE DOME?

#### 6% OF WORLD TRADE PASSES

through the Thermal Dome, generating:

Accidental risks	Operational risks	Physical damage to marine habitats or organisms
Grounding, collisions, vessel failures	Oil spills, harmful liquid substances, sewage, garbage, anti-corrosive paints, harmful aquatic organisms	Vessel collisions with whales and turtles, vessel noise interfering with communication, mating, location outside habitat, and interference with feeding patterns

IMO has developed various treaties and conventions to prevent and minimize these risks:



#### WHAT IS A ZMES OR PSSA?

A PSSA or ZMES (Spanish acronym) is an area recognized by the IMO as requiring special protection due to its ecological, socioeconomic and scientific relevance and vulnerability to damage from international shipping.

A R PSSA CAN BE ESTABLISHED ANYWHERE, WHETHER IN THE TERRITORIAL SEA, EEZS, OR EVEN AREAS BEYOND NATIONAL JURISDICTION. Currently, there are no declarations on the high seas, and it is entirely possible to do so.

The objective of a MESZ or PSSA is to be able to apply certain special protection measures to a specific area that has been recognized for its sensitivity and possible impacts from international maritime traffic. The PSSA or ZMES functions as an "umbrella" figure, which, once approved by the IMO, allows for the application of specific measures to prevent and mitigate the damage and negative impacts of maritime navigation in a particular area.

#### WHAT ARE THE IMO REQUIREMENTS FOR THE IDENTIFICATION OF A ZMES OR PSSA?

To apply to the IMO to declare a PSSA in the Thermal Dome, it is necessary to demonstrate that at least one of the following three criteria is met in the Dome:



Once it has been verified that the area to be declared as a ZMES or PSSA meets at least one of these requirements, the vulnerability of the zone, as well as the risks and threats associated with maritime navigation, must be identified to determine and designate the appropriate special protection measures.



anbar/Depositpl

#### WHAT SPECIAL PROTECTION MEASURES CAN BE DECLARED IN A ZMES OR PSSA?

These measures can be any measure that is within the IMO regulatory measures, which, for example, can be:

Traffic separation schemes	Areas to avoided
IMO Pilotage Regimes	Notification systems, e.g., for heavy oil transportation
Anchorage prohibition zones	Discharge prohibitions
Speed reduction	Others that have a legal basis in IMO regulations

It is very important to demonstrate to the IMO that the proposed measure does reduce the risk from maritime navigation or eliminate the identified threat, and that it can be implemented under the domestic law of the proposing State(s).

#### SOME PROTECTIVE MEASURES ARE MANDATORY, AND OTHERS ARE RECOMMENDED.

#### WHAT IS THE PROCESS FOR SUBMITTING A ZMES ORPSSA PROPOSAL TO IMO?

The process for designating the a PSSA consists of two stages: a first phase that involves elaborating the proposal, and a second phase that involves the formal stage before the IMO.

**DURING THE FIRST PHASE**, a State or several States jointly identify the area, its vulnerability, fragility, and the threats or damages arising from maritime navigation in any of the three criteria (ecological, scientific, or socioeconomic).

Once it has been demonstrated that these criteria are met in the area, it is necessary to show that the area requires protection. This entails identifying the threats posed by maritime traffic activities and ensuring that the measures to be taken are adequate to mitigate these threats and potential damage in the area. In the process it is necessary to show the characteristics of the maritime traffic in that area, what types of vessels move through the area, what kind of cargo ships pass through the area, the frequency, the natural or hydrographic factors that could influence those threats, and state if there have been any, past incidents in the area.

At the time of the designation of the PSSA, at least one specific security measure must be proposed that has a legal basis in one of the IMO's normative instruments and demonstrates that this measure reduces the risk from maritime navigation or eliminates the identified threat, and that it can be implemented under domestic law.

IN THE SECOND PHASE, the final proposal document is submitted to the Marine Environment Protection Committee (MEPC) who reviews it internally in an interdisciplinary technical committee created for this purpose; if no objections to the proposal are found, the MEPC declares the zone "in principle" and forwards the proposed measures to the relevant subcommittees or the Assembly for review of the proposal. Once the proposed measure(s) have been reviewed and approved by the respective subcommittees, the MEPC is notified and will finally designate the zone as a ZMES or PSSA.

#### WHO MAY SUBMIT THE PROPOSAL, AND TO WHOM IS IT SUBMITTED?

I suggest the following wording: The proposal for an ZMES or PSSA can only be submitted by one or more IMO Member States, as it is the only international authority with the power to make the declaration.



#### WHAT HAPPENS IF THE PROPOSAL IS **REJECTED?**

If the proposal is rejected, the MEPC will notify the proponent State of its reasons and, if applicable, request that it provide further information or submit a new proposal.

#### HOW IS IT ENSURED THAT THE ASSOCIATED IMO **SECURITY MEASURES ARE COMPLIED WITH?**

Following the designation of a PSSA or MSSA and its associated security measures, the IMO must ensure that the effective date of implementation is as soon as possible, per IMO rules and international law. Thus, it is the IMO legal

framework and international law that provide the tools and basis for enforcing compliance with the associated protective measures within a PSSA or ZMES, as well as monitoring and enforcing compliance with any other IMO measures.

#### WILL THE DECLARATION OF THE ZMES OR PSSA IN THE DOME AFFECT THE NATIONAL SOVEREIGNTY **AND ECONOMIC** ACTIVITIES OF CENTRAL **AMERICAN COUNTRIES IN THEIR JURISDICTIONAL** WATERS?

No, the regional initiative to declare an ZMES or PSSA in the Thermal Dome will cover only the offshore portion of the Dome. The ZMES or PSSA of the Thermal Dome will not include any portion of the jurisdictional waters of the Central American countries; to that extent, the exercise of sovereignty over their Exclusive Economic Zones and territorial sea will not be affected.



#### WHAT IMPLICATIONS OR OBLIGATIONS WILL THE PROPONENT STATES OF AN ZMES OR PSSA IN THE THERMAL DOME HAVE TO ASSUME?

- Undertake political and technical efforts to work as a region and, together with the other States, agree on the proposed protection measures.
- Initiate dialogue at the regional and global level with the other States for the presentation of the proposal.
- Be part of and contribute to a regional and inter-institutional working team for the joint and coordinated development of the proposal, including participation in several working sessions and technical workshops.
- Make the presentation of the proposal at the MEPC session (through representatives of the government in the capital or the permanent representative of each country to the IMO) and at the sessions of the Sub-Committees or the IMO Assembly, as appropriate according to the nature of the proposed measure.
- Request technical assistance from the IMO in the proposal development process if necessary.
- Provide additional information required by the IMO on the proposal and the proposed security measures.

#### WILL THE BBNJ TREATY'S ENTRY INTO FORCE AFFECT THE SPECIAL PROTECTION MEASURES DECLARED IN AN ZMES OR PSSA?

No, IMO has always regulated maritime navigation, including on the high seas. The rules that apply to ships apply wherever they are, which is why the concept of ZMES or PSSA also applies in these areas.

#### **IF, IN THIS PARTICULAR CASE, WE ARE TALKING ABOUT AN ZMES OR PSSA** IN WATERS BEYOND NATIONAL JURISDICTION, WHICH NATIONAL LAWS ARE TO BE APPLIED WHEN IMPLEMENTING THE ZMES OR PSSA MEASURES?

The proposed measures should be implementable in international law through IMO regulations, so they can even be applied beyond the Exclusive Economic Zones. It is essential to note that, to date, no PSSA has been completely established on the high seas. With this proposal for the Dome, we would be breaking new ground, and therefore, we should consider measures recommended for the high seas and mandatory in the EEZs. It is possible to have a mix of these types of measures.

#### HOW IS THE IMPLEMENTATION OF A ZMES OR PSSA AND ITS ASSOCIATED PROTECTION MEASURES CARRIED OUT?

When a PSSA or MCZ receives its final designation, all associated protective measures should be identified on nautical charts in accordance with the symbols and methodology of the International Hydrographic Organization.

IMO Member States should take all necessary actions to ensure that all ships flying their flag comply with the protective measures adopted to protect the designated Particularly Sensitive Sea Area. States that have received information about an alleged breach of one of the security measures adopted by a ship flying their flag should provide

> the State that reported the violation with full details of the appropriate action taken.

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