

THE RECOGNITION OF ALGERIA'S LIGHTHOUSES AS MARITIME HERITAGE: CASE OF TIPAZA'S LIGHTHOUSE

CEZAYİR'DEKİ DENİZ FENERLERİNİN DENİZCİLİK MİRASI OLARAK TANINMASI: TİPAZA DENİZ FENERİ ÖRNEĞİ

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ABSTRACT

With its extensive 1622 kilometres of coastline, Algeria occupies a strategic position in the Mediterranean, endowing it with an invaluable maritime heritage that spans from Antiquity to the Middle Age. Home to 23 lighthouses dating back to the colonial era, many of which are situated on historically significant sites. This study focuses on the Tipaza's lighthouse as a part of the Algerian maritime signalling system. The paper aims to develop an analytical methodology based on historical research to highlight the lighthouses process within the historical context, on-site investigation including graphical surveying to identify and document the architectural and structural richness of these edifices. Located within an archaeological site inscribed as a UNESCO World Heritage since 1982, Tipaza's lighthouse is distinguished by its quadrangular tower integrated with its residential quarters. Its spatial organization achieves a balance between functionality and living spaces while respecting the privacy of its occupant. Although the building is currently in a state of degradation, its rubble masonry and ashlar walls continue to support the lenticular system since 1865, thereby ensuring its role as maritime navigational aid. This study aims to raise awareness of the significance of Tipaza's lighthouse and the utmost importance of its conservation. Furthermore, it will contribute to future documentation and conservation initiatives for Algeria's lighthouses, reinforcing their cultural significance and historical legacy within the Mediterranean maritime landscape.

Keywords: Mediterranean Lighthouses, Conservation and Preservation, Maritime Heritage, Historical Context, Coastal Landscape

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ÖZET

Sömürge döneminden kalma 23 deniz fenerine ev sahipliği yapan Cezayir’de, bu fenerlerin birçoğu tarihi açıdan önemli bölgelerde yer almaktadır. Bu çalışma, Cezayir denizcilik sinyalizasyon sisteminin bir parçası olarak Tipaza deniz fenerine odaklanmaktadır. Amacı, bu yapıların mimari ve yapısal zenginliklerini belgelemek için grafik rölöveyi de içeren yerinde inceleme yöntemini kullanmak ve inşa süreçlerini tarihsel bağlamda vurgulamak için tarihsel araştırmaya dayalı analitik bir metodoloji geliştirmektir. 1982’den beri UNESCO Dünya Mirası Listesi’nde yer alan bir arkeolojik sit alanı içinde bulunan Tipaza Deniz Feneri, konut alanlarıyla bütünleşmiş kare biçimli kulesiyle dikkat çekmektedir. Mekânsal organizasyonu, işlevsellik ile yaşam alanları arasında bir denge kurarken sakinlerinin mahremiyetine saygı göstermektedir. Yapı şu anda bozulma sürecinde olsa da, moloz taş ve kesme taş duvarları, 1865’ten bu yana mercek sistemini desteklemeye devam etmekte ve deniz seyrüseferine yardımcı olarak işlevini sürdürmektedir. Bu çalışma, Tipaza Deniz Feneri’nin önemine ve korunmasının aciliyetine dair farkındalık yaratmayı amaçlamaktadır. Aynı zamanda, Cezayir’in deniz fenerleri için gelecekteki belgeleme ve koruma girişimlerine katkıda bulunarak, bu yapıların Akdeniz deniz peyzajındaki kültürel önemi ve tarihi mirasını güçlendirecektir.

Anahtar Kelimeler: Akdeniz Fenerleri, Koruma ve Muhafaza, Denizcilik Mirası, Tarihsel Bağlam, Kıyı Peyzajı

INTRODUCTION

From the earliest forms of navigation, the history has led to the construction of various buildings, monuments, port infrastructures or even floating elements. Small or large, prestigious or not, they all characterise today's coastal landscapes just like the natural components, particularly in harbours (Mari & Péron, 2009, p.2). They constitute therefore a maritime heritage.

The term "Pharo", commonly and generally stands for any lighthouse, in the past was the first name of the lighthouse of Alexandria (Magnani & Pistocchi, 2017, p. 131). As part of a large ensemble of maritime heritage, it is defined in *Pharology*,¹ as a fully or partially enclosed built structure bearing a light that is used as a navigational aid. It must be sufficiently spacious to accommodate at least one person to operate or keep the light from inside. (Basagac & Bilgin Altinoz, 2018, p. 146). The lighthouse also exemplify economic history because they show the routes taken by the rapidly expanding international commerce of the 19th century (Lewis, 2012, p. 24).

The recognition of the lighthouse as maritime heritage was introduced at the beginning of the 20th century, after using the new technologies for localization and the modernization of lighting systems. This led to the creation of management and maintenance programs to preserve these buildings as cultural and historical monuments (Marie & Penon, 2009, p. 7). Several projects have been initiated accordingly:

a. In the early 2000s, collaborative and systematic effort has raised to protect the lighthouses along the French maritime coast, as part of an overarching initiative focused on preserving historical monuments. The implication of regional direction services in cultural concerns and the interregional directions of the sea, led to an interdisciplinary study of an entire heritage category to identify elements that merit to be declared as heritage assets (Guigueno & Goven, 2013). More than 90 lighthouses, old lighthouses and lights are now protected as historical monuments in all French departments and coastal territories.

b. In Greece, the European Project EC-PHAROS entitled "A Holistic strategy for the Preservation, Restoration and Integration in the life of modern societies of Old European Masonry Lighthouses" (2004-2007), was coordinated by the Laboratory of Building Materials in Aristotle University of Thessaloniki. During this project, a holistic methodology, including historic and architectural survey, was applied for the study of old European Lighthouses considered as monuments of industrial heritage (Papayianni & Pachta, 2011, p. 2).

Four other countries-members participated in the project: Norway, Great Britain, Italy and Cyprus, with the aim of carrying out a holistic analysis of the typical Lighthouses of each region. For example, the Greek researcher examined carefully, as representative case studies, four historic Greek Lighthouses, through literature and other sources, the total number of Greek Masonry Lighthouses is 120 Lighthouses (Materiels, 2007, p. 4).

c. The MED-Phares project called "Integrated management strategies for the enhancement of the heritage lighthouses, semaphores and beacons in the Mediterranean" is a cross-border cooperation project, supported by the European Union through the European Neighborhood and Partnership Instrument for the Mediterranean Sea Basin (Med-Phares, 2016, p. 9).

The MED-PHARES project aims to develop a model, applicable in all the Mediterranean countries, not only to promote the singularity of tangible and intangible heritage of coastal sites equipped with maritime structures, but also, in a broader vision, to promote and contribute to the development of these unique territories.

Algeria has 26 functional lighthouses along its 1622 km of coastline. They were built between 1845 and 1930, mainly using stones, earth mortar, or materials found on site. Today, these lighthouses suffer significant damage due to poor conservation. Although they can be considered as historical monuments, Algeria's lighthouses have not been the subject of a national conservation program, except from the Dellys lighthouse, which has been classified since 2010 (Amari et al., 2020, p. 6), but is at risk of destruction due to lack of resources.

Through this article, we aim to identify the existing maritime heritage along the coast of Algeria, spanning from the earliest forms of navigation and trade in the Mediterranean to the present day. Our objective is to incorporate 19th century lighthouses into a historical heritage complexe that will highlight this maritime heritage. The case of the Tipaza lighthouse, demonstrate the application of methodology based on architectural and structural identification that lead to reveal the richness of this maritime heritage. However, the lighthouse is rapidly deteriorating and lacks on preservation or protection programs due to huge financial constraints.

¹ *Pharology* is the study of lighthouses; the word 'pharology' is derived from pharos, the Greek word for lighthouse.

THE CONSTRUCTION OF MARITIME HERITAGE THROUGH HISTORY

The Algerian coastline has been for a long time a focus of strategic interest of different invaders and colonizers. Its geographical position in the Mediterranean makes of it an important maritime transit and trading hub (Khelifa, 2007, p. 5-8). For this purpose, the coastal landscape has evolved from Phoenician trading post to a whole lighthouse system built during the French colonization.

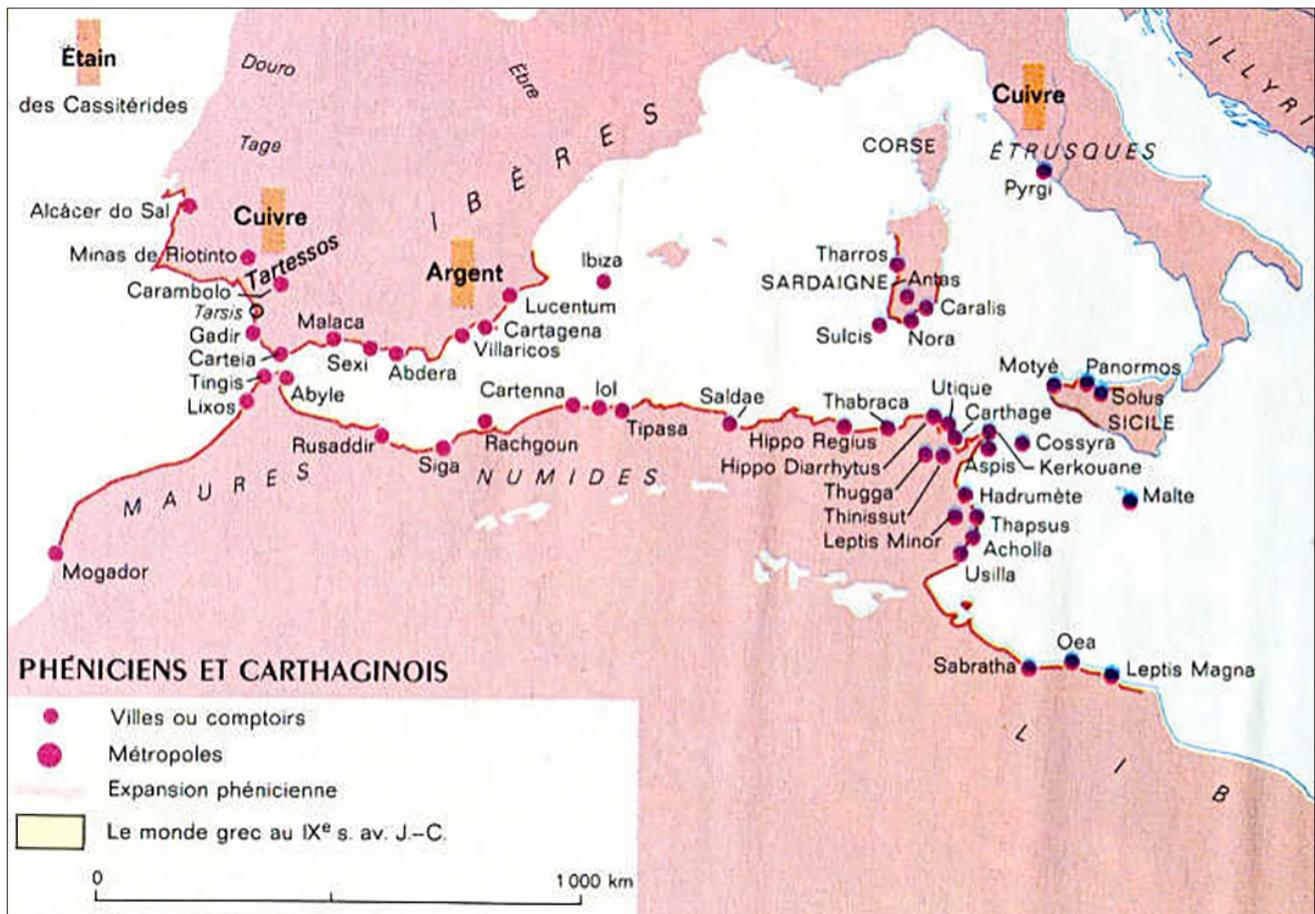
The study of these settlements' location has shown that there was a maritime urban superposition, which extended horizontally without any delocalization. The city of Tipaza, is an example of maritime stratification; whose vestiges are still apparent and bear witness to an important architectural and archaeological heritage (Lancel, 2003, p. 53-58)

The North Africa navigation hub entered history in the 1st century before the Christian era with the arrival of the Phoenician civilization in Numidia² in (Fig.

1); attested by the presence of Phoenician materials discovered during archaeological excavations³ (Gsell, 1903). These archaeological evidences bear witness to commercial maritime exchanges with Andalusia, especially in the region of Oran, western Algeria. The largest share of these archaeological discoveries was found on the islet of Rashgoun (Fig. 2) (Laporte, 2006, p. 2531), located in front of Takembrit at the entrance of the Oued Tafna, and can be dated to the second half of the 7th century B.C (Yahiaoui, 2003, p. 37).

In central and eastern region of Algeria, mainly in Algiers and Constantine, the archaeological affiliation is rather Phoenician. Trading posts have been established at regular distances, calculated based on the distance that a ship can travel during one coastal trade day, all along the Algerian coast, from Algiers to Annaba (Briquel-Chatonnet, 2003, p. 167).

Figure 1
North Africa during the Phoenician and Carthaginian Occupation / *Fenike ve Kartaca İşgali Sırasında Kuzey Afrika* (URL 1)



2 During the Phoenician era, North Africa was divided into the territories of the Moors (Morocco) and Numidia (Algeria).

3 From 1891 to 1901, various archaeological research are made in North Africa by Stephan Gsell to document and highlight the pre-antique and Roman period.

Figure 2Vestige of Rashgoun in the Ouest of Algeria / *Cezayir'in En Doğusundaki Rashgoun Vestiji*

In order to expand its power over the territories around the Mediterranean, the Roman Empire encountered an established and powerful civilisation in North Africa, the Carthaginians. After three difficult wars, the fall of Punic power was eventually observed, ending with the destruction of Carthage and effective installation of Rome in Africa in 146 B.C (Barette, 2021). The Roman occupation (Fig. 3), lasted six centuries and during that period, important coastal trading cities have been built.

In order to strengthen commercial and economic exchanges between these Roman Provinces (Fig. 4) and Rome, an elaborate maritime signalling system was established, particularly in the cities of Caesarea, Bône and Icosim. These harbours, conceived as commercial exchange zones and mooring areas, were located outside the city's walls to avoid the intrusion of foreigners and were conceived with all protective harbour structures (breakwaters, moles, jetties, dikes), forming a closed and protected space (Laporte, 2011, p. 122).

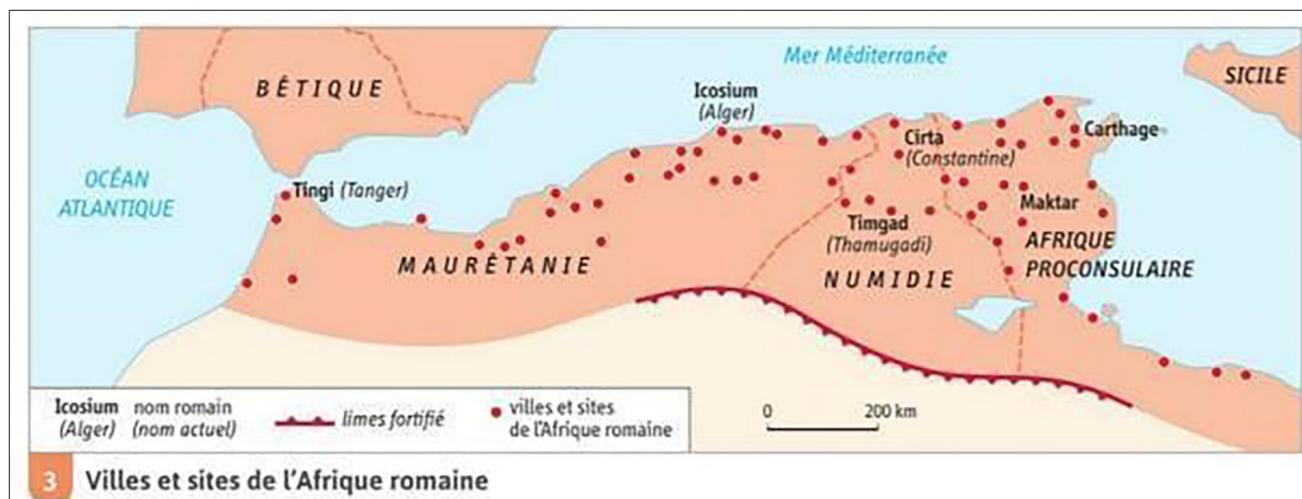
Figure 3North Africa during the Roman Period / *Roma Döneminde Kuzey Afrika* (URL 2)

Figure 4
Roman Province of Julia Hippo Regius / *Julia Hippo Regius'un Roma Eyaleti* (URL 3)



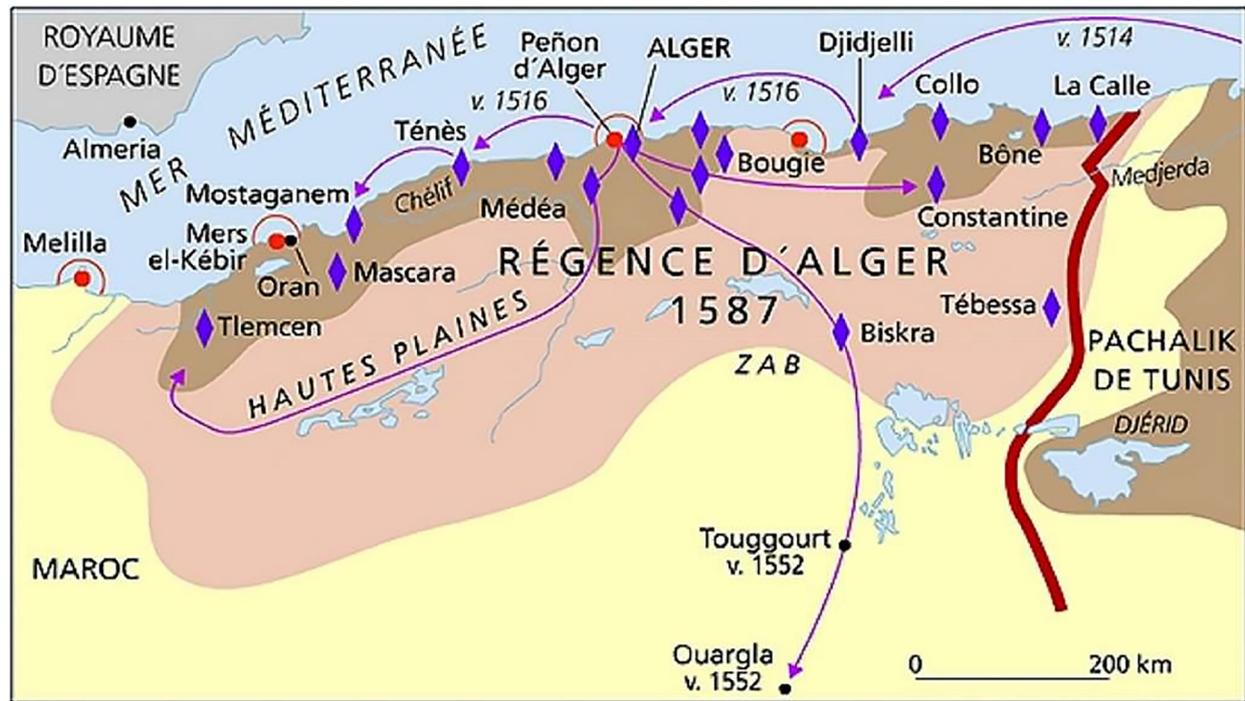
The decline of the Roman Empire in North Africa is reflected by the arrival of the Vandals in 423, a northern Europe nation known for their naval prowess and a strong presence in the Mediterranean Sea, also as builders of

several maritime structures, including shipyards and harbors (Vitalien, 1959, p. 287). Many of these structures were likely made of wood and did not survive to our day.

The Byzantines, followed by the Arab-Muslim conquest of North Africa in the 7th century (Fig. 5), stopped the Vandals invasion. Arab troops led by the general Uqba ibn Nafi invaded El Djazair⁴, and built cities and fortresses to expand their influence in the region (Khelifa, 2007). These cities were often built near trade routes and oases to facilitate commerce. Most of these cities were fortified and built around a Casbah, or citadel, which also served as a refuge in case of enemy attack.

Regarding maritime works, the arrival of the Ottomans in the 15th century allowed an effective management of harbors and coasts of Algeria. One of the major preoccupations of the ottoman corsair, in El Djazair, was to reinforce the medina's fortifications, continuously threatened by Spanish attacks, which aimed to expand their control over this region of the Mediterranean since the end of the 15th century (Missoum, 2003, p. 124).

Figure 5
North Africa during the Ottoman Period / *Osmanlı Döneminde Kuzey Afrika* (URL 4)



-  Présides espagnols début XVI^e siècle
-  Avance des corsaires turcs Arudj, Khayr al-Din et leurs successeurs 1516
-  Forts turcs
-  Territoires sous contrôle Turc permanent
-  Régions tributaires

4 EL Djazair beni Mezghana, was the given name to Algiers in the Islamic Period.

Figure 6
Defensive Fort of Tamenfoust in the Est of Algiers / *Cezayir*
Est'teki Tamenfoust Savunma Kalesi (L. Amroun, 2022)



The Ottoman administration built, on the strategic sites, barracks and forts (Fig. 6) as part of a global defensive system (Assari, 2007). Following the example of Algiers, the Ottomans built a fort at each cape of the Algerian coast. Their lights traversed those of the preceding and the following, which made the city invulnerable, and the coast easily practicable.

CONSTRUCTION OF AN IMPORTANT SYSTEM OF LIGHTHOUSES

After declaring a blockade on the coasts of Algeria to weaken it, France sought to compete with England in the Mediterranean by establishing strongholds on the Maghreb coast. The goal was to defeat an aging Ottoman Empire in the region (Bouchene et al., 2014, p. 8). On June 14th 1830, French troops landed on the coast of Sidi Ferruche, west of Algiers, marking the beginning of the French colonization.

During the colonial expansion, lighthouses were built on the initiative of civil engineers under The French lighthouse organization. The “Commission des Phares”, was part of the civil administration, staffed mainly by engineers and at least one scientist (Schiffer, 2005, p. 280). The establishment of these lighthouses in Algeria responded to two major needs: to make the maritime routes between the Metropolis (France) and the major harbors of Algeria safer; to guide the ships passing along the coast between Gibraltar and Suez (Guigueno & Goven, 2013).

The first official document presenting the improvement of coasts lighting is a report of the Nautical Commission released in 1844 (General, 1947, p. 3). At that time, the coasts had three important lights⁵:

Algiers, Oran and Bejaia. The French government decided to complete the signalling maritime system, but the political instability in Algeria has hindered the beginning of the program until 1860.

The establishment of these light points followed a geographical study on the hydrography of Algeria to choose the most appropriate location for each port, as well as an economic study which regulated the major routes open to European trade.

The topography, in agreement with the Nautical Administration recommendation, designates Algiers, Bougie, Djidjelli, Collo, Philippeville and Bone as the most important natural merchant ports of Algeria. Tefna and Tenes ports were designated as artificial ports.

Nemours, Mostaganem, Cherchell, Dellys, and Lacalle are annexed to the large neighbouring ports to serve for navigation and international, a series of works followed the establishment of these ports:

- 1860- 1900: a circular from Public Works Minister, was adapted to the improvement of the different lighting systems used: substitution from mineral oil to vegetable oil, then the adoption of the constant level lamplights.
- 1902: a special nautical commission, in charge of studying the enhancement projects and improvement the lighting system of the coasts, were instituted by order of the governor general on April 26, 1902.

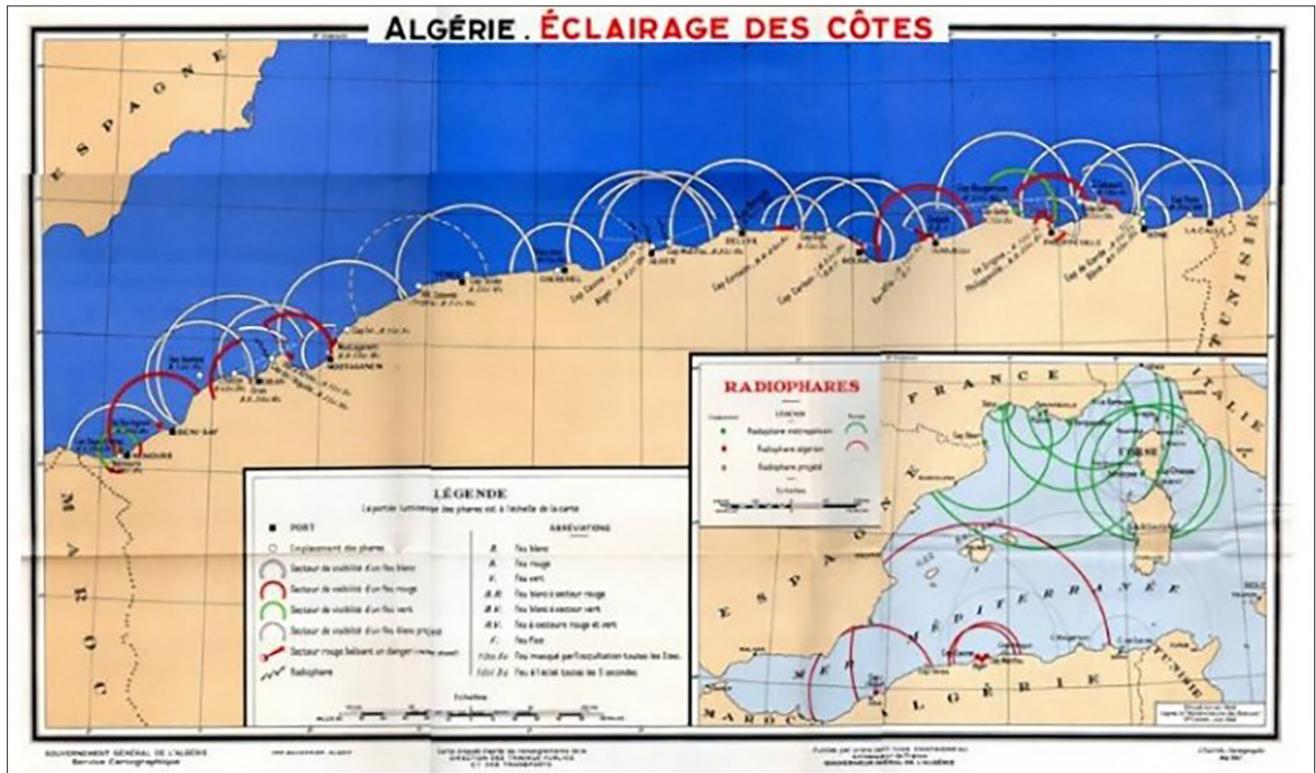
The lighting program of the Algerian coasts was spread out until the establishment of the last lighthouse in 1947 (Fig. 7), totalling 20 coast or port lights, 12 lighthouses with a light range between 20 and 30 miles and 8 lighthouses with a range greater than 30 miles along the Algerian coast.

The concept of the “Commission des Phares” is based on the fact that the architectural typology of lighthouses must obey to a spatial standard in orders to guarantee their form, whose purpose is to carry the light of the fire, store materials and fuels, and house the keepers and their families (Guigueno, 2012, p. 3).

Despite being a repetitive and planned architecture (Renard, 1867, p. 80), lighthouse design remains a style that varies from one country to another, particularly in Algeria, where there is a wide variety of styles specific to each region. The typological classification of Algeria lighthouses (Table 1), based on the shape of tower and its spatial relationship to adjoining building (whether poisoned along the shore, at the center, or in isolation), identifies three distinct types:

⁵ According to the three harbours established during Ottoman period.

Figure 7
The Final Distribution of Lighthouses in the Coast of Algeria / *Cezayir Kıyılarındaki Deniz Fenerlerinin Nihai Dağılımı* (URL 5)



- Typology A: lighthouses featuring a tower located on the side of the building, with or without an enclosed interior courtyard.
- Typology B: lighthouses with a centrally positioned tower integrated into the main building.
- Typology C: lighthouses with a tower that is structurally independent of the main building.

The materials and techniques used to build lighthouses are closely linked to the utilization of locally available materials (Reynaud, 1803, p. 19-34), leading occasionally, to the destruction and loss of a significant archaeological heritage.

Table 1
Typological Classification of Algeria’s Lighthouse / *Cezayir’deki Deniz Fenerlerinin Tipolojik Sınıflandırması* (L. Amroun, 2024)

Position shape	In center on one side		In the center of building	Isolated	Total Number
	With courtyard	Without courtyard			
Typology A	 Tenes lighthouse	 Cap Caxine lighthouse	 Habibas Island lighthouse	-	08
Typology B	 Cap Bougarouni lighthouse	 Djerda island lighthouse	 Cap Ivis’s lighthouse	 Cap Falcon lighthouse	07
Typology C	 Srigina island lighthouse	-	 Cap de Fer lighthouse	 Cherchell lighthouse	08

CASE STUDY: TIPAZA'S LIGHTHOUSE

Lighthouses in Algeria, 26, enhance the 1622 km coastal landscape adding an invaluable architectural, historical, and touristic heritage. These lighthouses, also known as sentinels of the sea (Balhi & Zebar, 2016, p. 10), watch over this maritime balcony, providing safety to navigators who sail the Mediterranean Sea and dock their cargoes in Algerian ports. They stand apart from one another with their distinctive towers and light range, unique architecture, and functional organization.

In order to highlight the architectural and structural value of Algerian lighthouses, we have chosen the Tipaza lighthouse as a case study. Based on a monographic study that involves, firstly, tracing the historical evolution of Tipaza's lighthouse within a comprehensive maritime signaling system; then analyzing the spatial context of the lighthouse in its immediate environment, identifying the spaces that constitute it to reveal its architectural wealth.

Tipaza is a city located on the Mediterranean coast of Algeria, approximately 70 km west of Algiers (Fig. 8). Situated on a peninsula between the Mediterranean

Sea and the Sahel Mountains, offering a picturesque landscape with beaches, steep cliffs, and stunning views of the sea. It has a coast of about 120 km long starting from the city of Douaouda to the east, up to the city of Damous to the west and about 20 km wide towards the south.

This city is also known for its rich historical and archaeological heritage (Fig. 9), which dates back to the Punic and Roman eras. It constitutes the remains of a port and trading center that was part of a large network of Roman colonies in the western Mediterranean. Tipaza is listed as a UNESCO World Heritage since 1982; the city bears exceptional witness to the Punic and Roman civilizations that have now disappeared,⁶ and the architectural and archeological remains of the Tipaza sites illustrate construction methods and architectural traditions that were peculiar to the ancient Maghreb. Integrated into their natural environment, these sites presents a morphological, urbanistic and architectural singularity that sets them apart from other ancient Mediterranean sites and make them unique.

Figure 8
Tipaza's Localization on the North of Algeria / Tipaza'nın Cezayir'in Kuzeyindeki Lokalizasyonu
(Municipality of Tipaza)



⁶ According to UNESCO criteria III and IV, file 193.

Figure 9

Tipaza's Archeological Heritage from Roman Period / *Tipaza'nın Roma Döneminden Kalma Arkeolojik Mirası* (L. Amroun, 2018)



Study Area of Tipaza's Lighthouse

The current location of the lighthouse is a foundation of Punic origin (Baradez, 1952, p. 23). They first installed a trading post around the 5th century B.C. The archaeological and historian Gsell⁷ argue that Tipaza derives its name from Phoenician signification, and remained unchanged for 2000 years. It means therefore stopover or place of passage (Salama, 2006, p. 531). The contemporary linguist consider, actually that Tipaza derives from the Berber word "Thafza" meaning "limestone rock" (Halouane, 2019; 2020, p. 110) according to inscription founded on the Tomb of Christian.

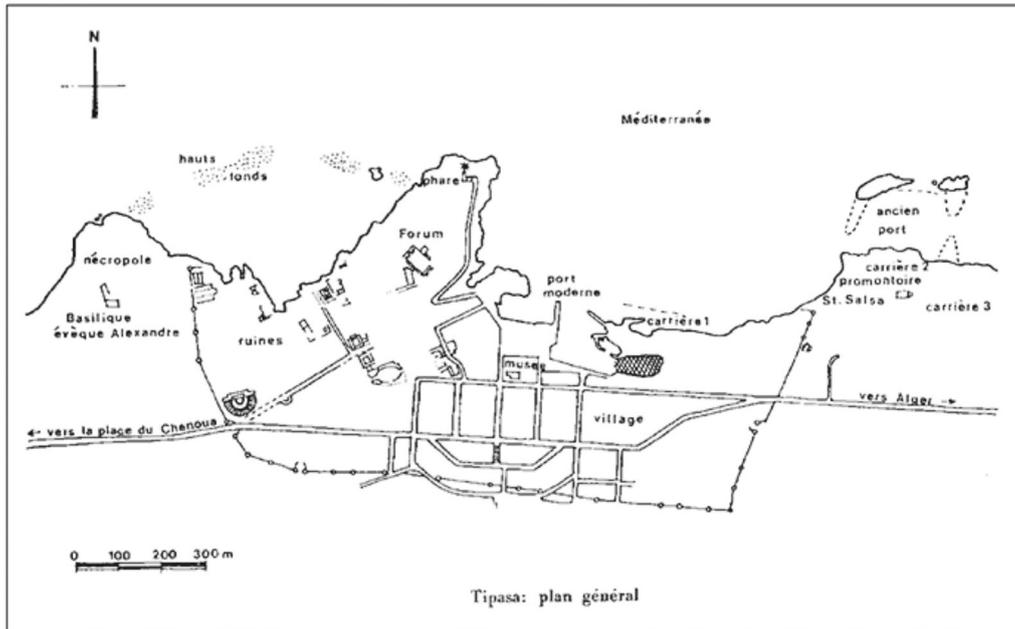
Like all the cities of Mediterranean basin, Tipaza became Roman at the end of the third Punic War and after the siege of Carthage in 146 B.C when Rome annexed Mauritania (Carayon, 2008, p. 188). It served as a significant port (Fig. 10) and enjoyed prosperity as a center for olive oil production, grain trade, and other commercial activities. Many Roman structures were built in Tipaza, including a theater, amphitheater, forum, baths, and villas (Salama, 2006, p. 531) a great symbol of know-how and mastery of construction techniques.

The choice of Tipaza's location is directly linked to geographical and strategic considerations, particularly the presence of a natural gulf that provides protection from the whims of the sea. This gulf, with its relatively calm and sheltered waters, was a crucial asset for establishing a port city. It not only secured ships from storms and strong sea currents but also facilitated maritime trade and exchanges.

This advantageous site offered ancient population direct access to the Mediterranean while ensuring a natural refuge from maritime dangers. The favourable conditions of the gulf thus played a key role in the economic development and prosperity of the city of Tipaza, which became an important trading hub during the Punic and Roman eras. It is likely for these reasons that the Romans chose to establish a colony and a port there, turning the city into a vital center for navigation and trade in the region (Boulinguez, 2022, p. 1).

In short, the location of Tipaza, thanks to this protective gulf, was a key factor in its development, making it a strategic point for the movement of goods and people while ensuring the safety of ships.

⁷ Gsell Stephen, archeological and historian, specialist on ancient Africa studies and Algeria during Roman domination. He wrote several book as: *l'Algérie dans l'Antiquité*.

Figure 10Tipaza's Schematic Plan of Roman Excavation / *Tipaza'nın Roma Dönemi Kazılarının Şematik Planı* (URL 6)

Historic of Tipaza's Lighthouse

In 1844, the lighthouse commission recognized the urgent need to reinforce maritime signaling along the Algerian coast and proposed the creation of a regional nautical commission. The commission of Tipaza, annexed to the neighboring city of Cherchell,⁸ included a captain of engineers, a naval lieutenant, and a civil engineer specializing in bridges and roadways.

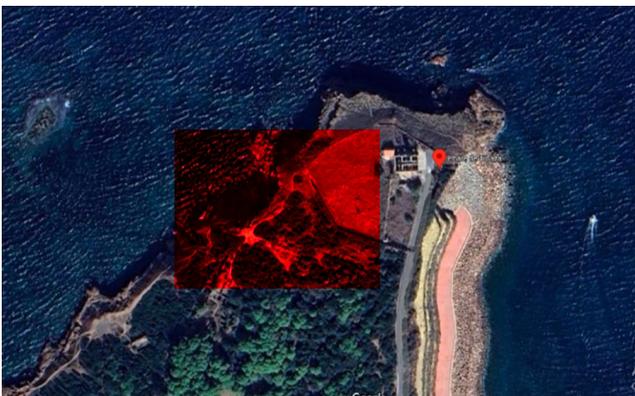
According to the navigator's report of sailing toward the south of France along the Balear islands, the commission was responsible for ensuring the safety on the coastline between Algiers and Cherchell. They ultimately recommended to signal the northeastern

corner of Joinville Island and the highest promontory of Tipaza region. Tipaza's lighthouse was to play a pivotal role, ensuring the connection between the lighthouses of Cape Caxine in Algiers and Cherchell, thus integrating the coastal signaling system into a broader network.

Erected on the top of Ras El Kelia (Fig. 11-12), 34 meters above the sea, the lighthouse is accessible by a 280 meters road from the harbor, enabling the keeper to be permanently connected to urban center. It was completed and operational on 1867, Tipaza's lighthouse boasted a luminous range of 18 nautical miles. The fixed green fourth-order light, primarily

Figure 11-12

Tipaza's Lighthouse Localization behind An Archeological Area (Google Maps Treated by the L. Amroun; 2024) / *Tipaza'nın Deniz Fenerinin Arkeolojik Bir Alanın Arkasındaki Lokalizasyonu* (Google Haritalar Yazar Tarafından İşlendi; L. Amroun, 2024)



⁸ Located at 30 kilometres in the west of Tipaza, Cherchell was the capital of Mauritanian Tangitan during the ancient period.

served to guide ships and secure maritime routes. Its position, at an elevated height, permitted to serve as a prominent landmark, distinctly visible among its surrounding, rising above the nearby ruins and natural landscape. This isolated structure on the top of Ras El Kelia, extends against a bright background, but the white color of the materials used for the facing of the quadrangular tower gives it the intended visibility at sea.

Strategically located on the Mediterranean coast, this lighthouse became more than a simple maritime marker it stands as a cultural symbol of the region’s long-standing relationship with the sea. Over the years, it has witnessed centuries of cultural exchange, acting as a beacon not only for ships but also as a reminder of the region’s Punic, Roman, and Berber heritage.

Typological Identification and Spatial Organization of Tipaza’s Lighthouse

In the bay, between two first-order lighthouses, there are points such as secondary capes, islands, reefs, and sandbanks whose location should interest the sailors. Lights of lighthouses are adjusted according to the distances they need to reach these locations. These lighthouses differ in their intensity: some of them can concentrate their beam within a very narrow angular space, while others are required to spread across the entire maritime horizon they light. The latter are called landing lighthouses (Allard, 1889, p. 125).

Tipaza’s lighthouse, classified as a fourth-order landing lighthouse (Fig. 13), is one such example. Its primary function is to provide broad illumination over the coastal waters, guiding ships safely as they approach the harbor. In addition to its technical role, Tipaza’s lighthouse is identified as a “fire-house,” a term used to describe lighthouses where the base of the structure includes living quarters. They were typically occupied by the lighthouse keeper and his family; responsible for maintaining the light and ensuring its continuous operation (Guigueno

Figure 13
Tipaza’s Lighthouse on the top of Ras El Kelia (Draw by the L. Amroun, 2023) / *Ras El Kelia’nın Tepesindeki Tipaza Deniz Feneri* (L. Amroun tarafından çizildi)

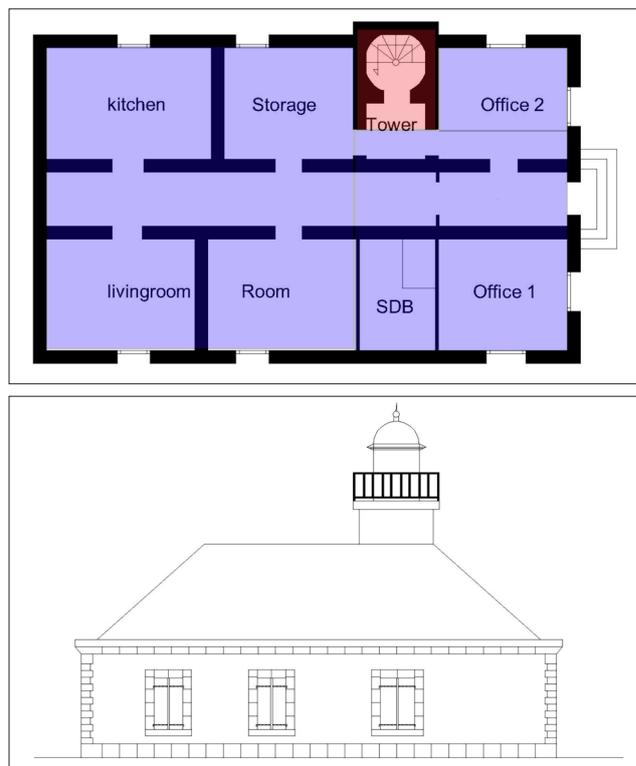


& Goven, 2013). The lighthouse keeper’s residence at the base of the tower highlights the close relationship between the lighthouse and the community it served.

The design of Tipaza’s lighthouse as a public utility building reflects a thoughtful approach that prioritizes both functionality and efficiency. In this context, satisfaction is derived from the material conveniences of the structure, which adhere to the principles of intelligent economy. This design philosophy emphasizes utility, rejecting superfluous features in favour of maximizing benefits while conserving resources (Reynaud, 1864, p. 155).

The lighthouse belong to typology A (Table 1), it is composed of two parts (Fig. 14-15): the lightning quadrangular tower and an adjacent building without an interior courtyard. The tower, which still stand, contain the lenticular system; the building is composed of the chamber for the lighting apparatus, storage facilities, keeper’s lodgings, and rooms reserved for the engineers responsible for the lighthouse’s maintenance and surveillance:

Figure 14-15
Tipaza’s Lighthouse Original Design (Draw by the L. Amroun, 2023) / *Tipaza’nın Deniz Feneri Özgün Tasarımı* (L. Amroun tarafından çizildi, 2023)



Tower and staircase in Tipaza’s Lighthouse:

The height assigned to a lighthouse tower depends on the range of the light and the elevation of the ground above sea level. When the ground is very high, the tower is given a height necessary to protect the lantern’s glass from ordinary acts of damage (Miller, 2010, p. 26). Located at 30 meters above sea level, the tower of Tipaza’s

lighthouse was erected on square plan; the shape works best for lower towers connected to accommodations and dependencies. It is semi-embedded on the center of north facing façade, and has a height of 10 meters above the ground floor and 2.6 meters wide.

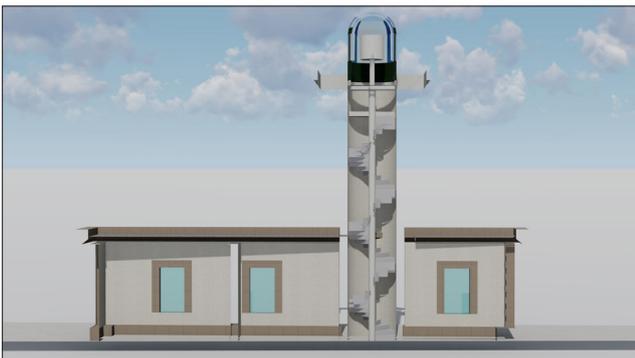
The lighthouse tower features a cylindrical interior structure (Fig. 16), with a diameter at least equal to that of the lantern, estimated to be approximately 1.60 meters. A staircase is articulated around a central core on one side, while on the other side, it is anchored into the wall of the tower. This architectural design enhance both the adhesion and the stability of the structure, while ensuring efficient vertical access to the service room. At this level, a second staircase is installed. Smaller, narrower and steeper, it optimizes the available space, allowing for the placement of equipment required for maintaining the lenticular system. This staircase provide direct access to the lantern chamber.

At the top of the tower is the chamber housing the lantern, it contain a heavy lenticular system, maintenance equipment, and, occasionally, a movable bed. The keeper is required to maintain this space in a clean and orderly manner to prevent any obstruction to the proper functioning of the rotating system. The lighting apparatus chamber is composed of a masonry base topped by the lantern, whose support are embedded into the upper courses of the structure. To minimize the intrusion of dust particles into the lantern, the entrance to the staircase leading to the chamber and the door at it bases are covered by protective drum. This door is located on the landing step, ensuring controlled access to the lantern chamber.

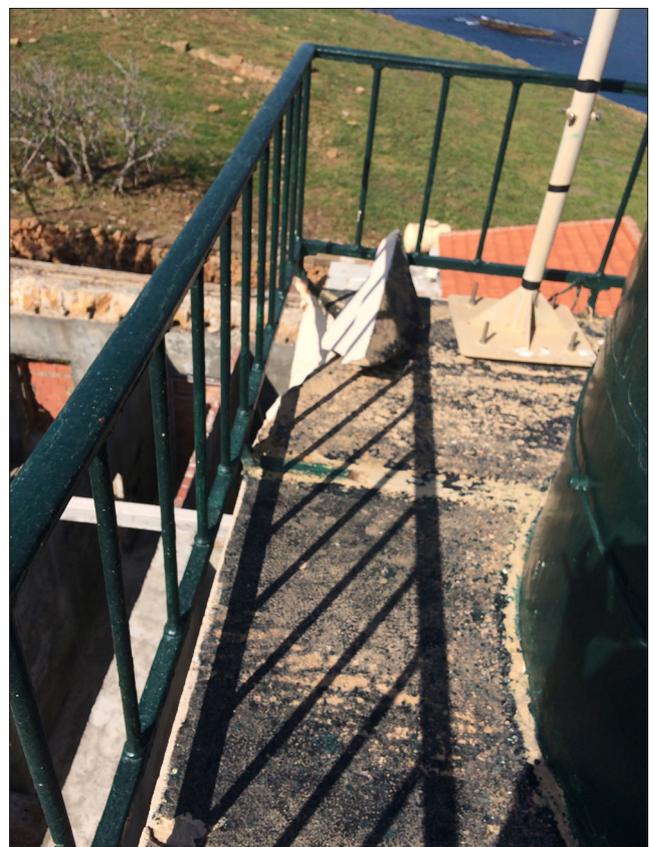
The lighthouse tower, a symbol of technical prowess and significant historical value, houses a lenticular apparatus designed by Sautter & Co workshops in 1865. Despite its limited width of 2.6 meters, every space is meticulously arranged, perfectly embodying the key of “less is more” and ensuring high-quality functionality that has endured for over a century.

Figure 16

The Section on Tower Staircase of Tipaza's Lighthouse (Draw by L. Amroun, 2024) / *Tipaza'nın Deniz Fenerinin Kule Merdivenindeki Bölüm* (L. Amroun tarafından çizildi, 2023)



Figures 17-18
Balustrade of the Tower / *Kulenin Korkulukları* (L. Amroun, 2018)



Another small door is installed in the lenticular chamber. It leads to a cantilevered platform surrounding the tower, constructed with solid slabs held in place by stone side brackets, which are securely fixed to the construction with bronze pins. This platform allows for necessary repairs to the glass dome protecting the lantern and ensure a thorough and regular cleaning to maintain the proper functioning of the lighthouse. Above, a galvanized iron balustrade (Fig. 17-18) is added over the platform's cornice, enhancing the aesthetic and character of the building.

At the base of the tower, Tipaza's lighthouse is equipped with a storage room for oil, designed to be insulated from external temperature fluctuations. This room contains also wicks, crystal chimneys, spare part, and various essential tools for the proper functioning of the lighthouse. A well-organized storage system is crucial to ensure the longevity of supplies and the efficiency of the service.

The Housing Facilities in Tipaza's Lighthouse

Tipaza's lighthouse is manned by one keeper, a married man who resides on-site with his family. This arrangement offers the advantage of improving the keeper's well-being, avoiding the feeling of isolation in a remote location, which can be away from urban population, and ensuring that he can be assisted when needed in his duties by his wife or child (Fichou, 2005, p. 9).

Originally, the main building of the lighthouse (Fig. 14), was designed as a single floor with a height of 4.50 meters, a rectangular ground plan measuring 10.50 x 16.70 m² and a hipped roof. It can be divided in two parts: the private house and the offices, the two are separate with a door to preserve the family's privacy.

At the entrance of the building, two offices are localized. The first one is designated for the lighthouse keeper, providing direct access to the tower and serving to keep archives of the different operations carried out, mainly the roof repairs and the cleaning of the lenticular apparatus. The second office serves as reception area for visitors and sea travellers passing through the city of Tipaza. This place is richly decorated to honour their guest. In the past, this office also functioned as accommodation for an assistant lighthouse keeper or staff from the lighthouses commission who came to provide the guardian with the necessary supplies and maintenance tools (Guigueno & Goven, 2013). A visitor's book is maintained here to register the number of person who stopped at the lighthouse.

The second part of the building is the residential area, consisting on two rooms; one of which is equipped with fireplace. These rooms are located near the lighthouse tower, allowing the keeper to view the light directly from his window, eliminating the need to expose himself to harsh weather conditions immediately upon leaving his

bed. The kitchen is situated at the rear of the building, benefiting from wind protection and featuring a secondary access to a small vegetable garden.

The arrangement of spaces at Tipaza's lighthouse adheres to the architectural standards of lighthouse design, while distinguishing itself through the separation between residential and functional areas, thus safeguarding the privacy of the keeper's family life.

Aesthetic and Structural Identification of Tipaza's Lighthouse

The Treaty of Architecture published by Reynaud classifies lighthouses as buildings of public utility (Reynaud, 1867, p.403), declaring, we "no longer admit as much richness of ornamentation". Established in general far from urban construction, on the borders of the territory, they must be conceived with all the simplicity that it includes. Yet, they still benefit of a monumental character (Puppi, 2012, p. 3).

This statement aligns with the principles of 19th century architecture, a style that emphasizes the perfection of lines, and the simplicity of decoration against the high ornamentation of Late Baroque and Rococo (Fig. 19) (Tando & Bano, 2023, p. 57096).

The base of the lighthouse is highlighted by the use of ashlar masonry, contributing to enhancing its visual presence and ensuring its structural stability. The chosen ashlar masonry, selected for its aesthetic qualities and durability, adds a historical dimension to the overall architectural ensemble.

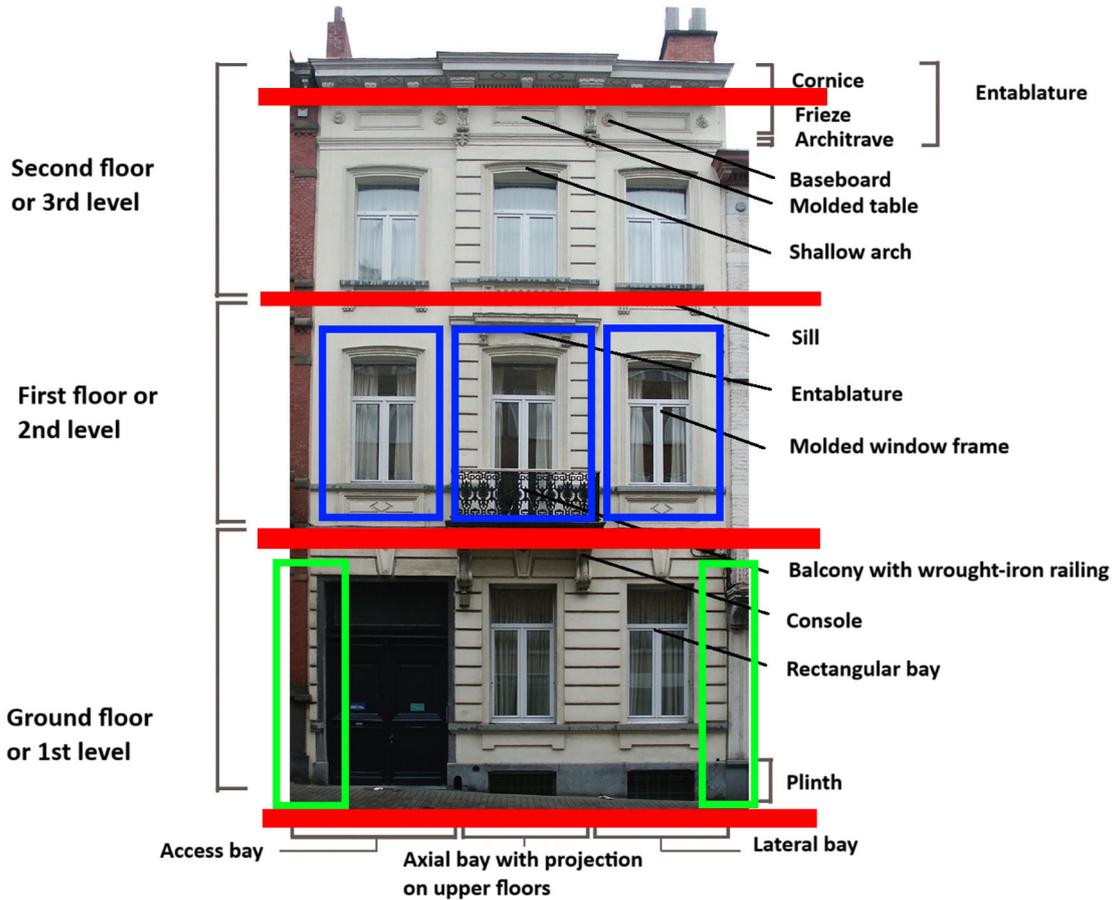
The terrace perimeter, projecting on all four facades, is accentuated by a cornice, providing an elegant finish to the structure. This cornice, aside from its aesthetic role, also serves a practical function by directing rainwater away from the building, thus contributing to its preservation.

A striking similarity (Fig. 20) with the architectural pattern is evident in the use of rectangular windows with a flat stone frame. These openings are functional for light circulation and carry symbolic and artistic connotations, thereby contributing to the overall aesthetic of the lighthouse.

Continuous stone bands, extending from windowsills, add an additional layer of architectural detail. These linear elements play a role in visually harmonizing the facade and reinforcing the coherence of the design.

Under the windows, the sills take the form of flush tables, offering a smooth visual transition between the openings and the rest of the structure. This feature can also be interpreted as a decorative element, emphasizing the attention to detail in the lighthouse's design.

Figure 19
An Example of A Neo Classic Elevation / *Neoklasik Bir Cephe Örneği* (URL 7)



The Tipaza lighthouse’s east-to-west orientation serves both the comfort of its residents and the protection of the structures, which are regularly exposed to sea humidity. Another important consideration was to provide the building with large windows (Fig. 21), facing away from the dominant winds and allowing sunlight to naturally ventilate living areas.

Concerning structural identification, it should be mentioned that the lighthouse commission declared:

Encouraging Algeria’s engineers to gather essential elements for establishing programs that will form the foundation for drafting final projects. Subsequently, urging them to adopt a system of construction that is both simple and economical, while ensuring nothing essential

Figure 20
Draw of Tipaza’s Lighthouse Elevation / *Tipaza'nın Deniz Feneri Cephe Çizimi* (L. Amroun, 2023)

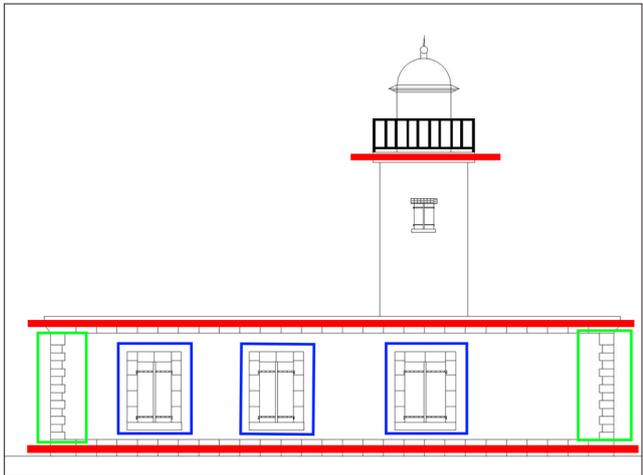


Figure 21
The Arrangement of Windows on Façade / *Cephede Pencerelerin Düzenlenmesi* (L. Amroun, 2018)



for strength is overlooked, and incorporating elements conducive to proper maintenance and preservation of lighting apparatus. (Circular from France’s archive consulted on march 2023).

In Algeria during the 19th century, buildings were primarily constructed using rubble stone due to several benefits it provided: the material was readily available near construction sites, it was cost-effective, and the construction process was straightforward. Tipaza’s lighthouse follows a similar construction approach. Most of these adjacent buildings were erected with masonry stonewalls (Sanchez’Beitia et al., 2020, p. 6) involving a mix of dressed stones and rubble stones (Fig. 22-23). Dressed stones are used for the foundation, framing (windows and doors), and cornerstones.

The front-facing rubble stonewall of Tipaza’s lighthouse has a base that’s approximately 60 cm thick where it rests on the ground. This width gradually decreases as it goes higher. The rubble stones are stacked in a way to minimize gaps, and rock fragments are inserted to secure the blocks together. The smoother and flatter sides of the blocks are positioned on the exterior of the walls, which are the visible parts known as “facing” (Beuret, 2023).

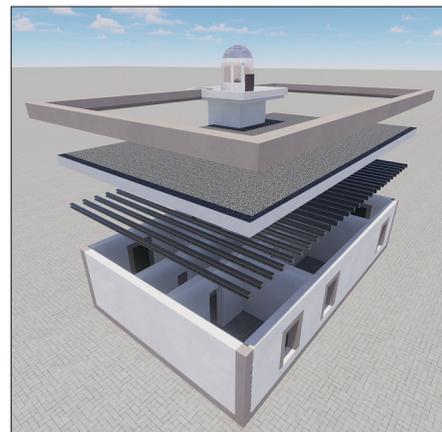
The interior is filled with various materials such as stones or discarded pieces from stone cutting, known as “filling.” Transverse stones are placed periodically to

reinforce the structure. When these stones go through the full thickness of the wall, they are called “headers” and “stretchers.” The entire structure is bound together by an ample amount of lime mortar.

The floor was made with metal beams (Fig. 24-26), which were supported by the inner setback of the wall. Between those beams, plaster elements (augets) are set and plaster joist (lambourdes) support the floorboards (Cardoso et al., 2018, p. 17).

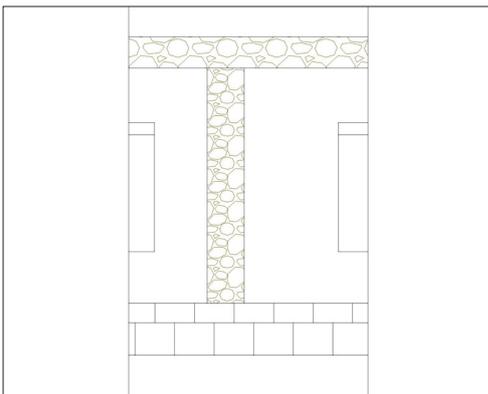
Figures 24-26

The 3D Simulation for Visualizing the Structural Element of Tipaza’s Lighthouse / *Tipaza Deniz Fenerinin Yapısal Elemanlarını Görselleştirmek için 3D Simülasyonlar* (L. Amroun, 2024)



Figures 22-23

The Use of Rubble and Regular Stone / *Moloz ve Düzenli Taş Kullanımı* (L. Amroun, 2018)



Figures 27-28

The Use of Rubble and Lime Mortar / *Moloz ve Kireç Harcı Kullanımı* (L. Amroun, 2018)



The dimensions of the tower and the thickness of the masonry, are carefully calculated because of the type of equipment the lighthouse must carry.

The quadrangular tower of Tipaza's lighthouse, follows the same construction approach as the rubble stonewalls (Fig. 27-28), reinforced with dressed stone at the corners. Inside the tower, which has a circular interior, the walls and primary steps are constructed using dressed stones, guaranteeing the strength of the entire structure.

Thick renders, usually 2 to 3 well-compacted mortar layer, were found with decreased thickness to the surface. The binding system was based in hydrated lime, while aggregates were also from natural origin (Sanchez-Beitia et al., 2020, p. 4).

Current State of Tipaza's Lighthouse

Protected Areas are among the most vulnerable targets of the effects of climate change, as they are decisive components of the conservation toolbox (Craciun & Garjoaba, 2022, p. 11). It is known that environmental actions like temperature fluctuations, winds and seismic vibration have an influence on the behavior of masonry heritage buildings, such as towers (Pena et al., 2021, p. 1), and lighthouses (Fig. 29). The damage could become irreversible. If more chemical factors are added like corrosion, moisture penetration and intense attack by soluble salt (through salt spray and capillarity absorption) (Papayani & Pachta, 2013, p. 3).

In recent years, Tipaza's lighthouse suffers damages that threaten its structural integrity and operational functionality. The challenges it encounters are not merely aesthetic; they significantly affect the lighthouse's stability and longevity. The table below (Table 2) outlines the various disorders impacting Tipaza's lighthouse, highlighting the urgency of intervention to preserve this vital maritime landmark.

Among the most pressing issues are environmental factors such as erosion and weathering, which have accelerated the degradation of the lighthouse's materials. The corrosive effects of saltwater compromise the integrity of metallic components and weaken the masonry, leading to cracks and structural failures.

Further complicating these challenges are biological factors, including the growth of moss and other vegetation on the lighthouse's surface. While they may seem innocuous, such growth can retain moisture, exacerbating the deterioration of the underlying materials.

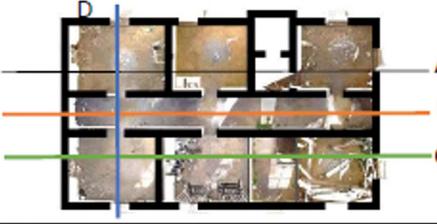
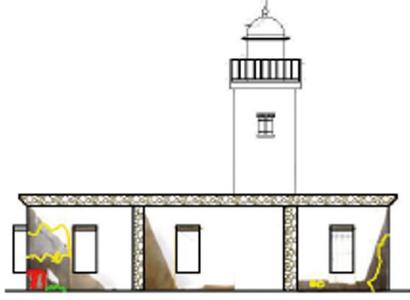
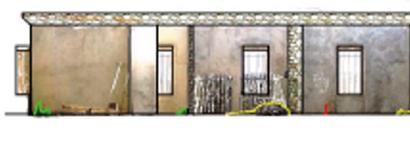
The National Office of Maritime Signaling, responsible for the facility, has been overseeing refurbishment and renovation efforts since 2002. These initiatives include renewing interior plaster to eliminate mold, improving the terrace's waterproofing to prevent water infiltration, and repairing the drainage pipes for rainwater runoff.

Figure 29

The Effect of Humidity on Tipaza's Lighthouse / *Tipaza'nın Deniz Feneri Üzerinde Nemin Etkisi* (L. Amroun, 2018)



Table 2
Disorder of Tipaza’s Lighthouse / *Tipaza'nın Deniz Fenerinin Malzeme Bozulmaları* (L. Amroun, 2024)

Description	localisation	Disorder identification
The whole edifice is abandoned, because of the collapsed roof. It is used to store various materiel building.		The collapsed roof cause destabilization of the entire structure.
The section A: represent the identification of disorder inside the kitchen, the storage room and the 1 st office		Exfoliation, cracking, crumbling of the wall. Corrosion of old iron rod used in the kitchen. Presence of weeds on the wall.
Section B: on the corridor of the lighthouse		Cracking and crumbling wall caused by the introduction of electricity badly. Vegetation on the long
Section c: identification of disorder inside the living room, the room and the 2 nd office		Cracking and crumbling wall. Vegetation on the long. Use of concrete
Section D: represent the obstruction of ancient door and windows.		Use of incompatible materiel.

Unfortunately, these refurbishment efforts were insufficient to keep the lighthouse of Tipaza in good condition. A few years later, the roof collapsed (Fig. 30) leaving the interior walls exposed and causing the destabilization of the entire structure. It is worth noting that the roof, constructed with steel beams, plays a role in reinforcing the strength of the walls, thus establishing a balance.

The use of incompatible repair materials such as cement and concrete that workers used in the refecton of the lighthouse, induced intense exfoliation, cracking and crumbling due to the difference of their physic-mechanical and chemical characteristics (Fig. 31-32) (Papayani & Pachta, 2013, p. 3).

This situation arises big concerns especially because the lighthouse is still in function and the lack of regular maintenance by lighthouse keepers might stop its usage, despite their continuous presence.

Considering a 19th century building in a maritime setting, these interventions can potentially accelerate its deterioration. Lacking experts in historic preservation and appropriate conservation methods, well-intentioned but misguided efforts may inadvertently harm the structure rather than safeguard it.

The National Office of Maritime Signaling can only provide small interventions. In the case of the Tipaza lighthouse, the urgency was to ensure its stability after the destruction of its roof-terrace by proposing a system of reinforcement the load-bearing walls through buttresses, as well as suggesting a temporary metal roof to protect the interior of the building.

In a subsequent phase, it is essential to undertake wall stripping to remove the cement mortar applied during the renovation work and replace it with hydraulic lime mortar, a material that is in harmony with the rubble used in the lighthouse’s construction. These forms of intervention represent the initial restoration steps that can only be completed with a proper preliminary diagnosis.

Figure 30

View from the Tower of Tipaza's Lighthouse / *Tipaza'nın Deniz Feneri Kulesinden Görünüm* (L. Amroun, 2018)

**Figures 31-32**

Incompatible Materials Used on it / *Üzerinde Kullanılan Uyumsuz Malzemeler* (L. Amroun, 2018)



It is important to note that the Tipaza lighthouse is located within an archaeological site classified by UNESCO since 1982. Situated in a natural environment near Chenoua Mount, the lighthouse possesses significant heritage potential that contributes to the development of Tipaza's maritime heritage. In this context, the coordination of various political entities (Ministry of culture, National Office of Signaling System and local authority) is essential to safeguard and promote the lighthouse within the wider framework of cultural and touristic development.

DISCUSSION OF RESULT

Over the centuries, coastal areas have been shaped by natural processes as well as by the utilization of the maritime environment by local communities. Algeria, with its 1622 km coastline, has undergone a significant transformation of its maritime landscape. The historical evolution process has demonstrated the existence of a rich typological variety from east to west, dating back from Phoenician presence to the present day.

The cultural heritage present in the provinces along the Algerian coast have been documented by the Ministry of Culture, whose main missions include ensuring the conservation and valorization of the major works of Algerian cultural heritage, promoting the development of practices inherent to their (re)appropriation, and making them accessible to the widest audience. The preservation and protection of the natural and cultural resources of the Algerian coastline should involve the creation of marine and protected coastal areas (Nguyen et al., 2020, p. 145).

According to this work, we propose to include the lighthouses of Algeria, which play an important role in enhancing the coastal landscape. Through this approach, they can be recognized as significant elements of the maritime landscape and benefiting an adequate support to safeguard this heritage.

As demonstrated on the case of Tipaza's lighthouse, the building dispose of a high historical value with a unique character in its organization. Firstly, it has a functional aspect in terms of managing the lighthouse and the well-being of its occupants. Additionally, it possesses an aesthetic character, even though the political context of the 19th century requiring economy and simplicity in the design of public utility buildings. The Tipaza's lighthouse integrates perfectly its immediate environment. The rational and balanced use of ornamentation has given rise to a harmonious building that enhances the coastal landscape of the city Tipaza.

Despite the richness of the architectural attributes that Tipaza's lighthouse possesses, the building has not been classified as maritime heritage. This is due to its

administrative affiliation with the National Office of Maritime Signaling, which continues to operate the building regularly regardless of its construction status being as high risk.

This legal gap can be addressed by considering Tipaza's lighthouse as an inseparable component of the coastal landscape. Its location within an ancient Roman city and its proximity to a Phoenician burial, although classified as a site of historical monument and protected since 1982, does not encompass Tipaza's lighthouse, even though it is part of the surrounding area to be considered (Situating at a distance of less than 200 meters). The heritage code recommends that the surroundings area defined by all built or non-built structures, classified by extension and participating in a visibility relationship with the historic monument, within the boundaries of a protection zone with a minimum distance of 200 meters (Touil & Messaoud, 2005, p. 71). They will be afforded the same protection.

This situation is attributed to the non-recognition of lighthouses as historical monuments and the absence of policies for the preservation and usage of coastal cultural heritage in Algeria. This affiliation as a historical monument will enable Tipaza's lighthouse to benefit from appropriate financial support and be handled by a group of specialists in the restoration and conservation of cultural assets. At the beginning of their work specialist will be charged to establish a diagnosis and determine emergency measures to halt the lighthouse's deterioration. They will establish an action plan and an appropriate restoration strategy, ensuring its proper execution.

This analysis carried out on the Tipaza lighthouse can be extended to all 23 lighthouses in Algeria.

Based on the key objectives of the Med-Phare program, which aims to implement a multidisciplinary scientific methodology to gather various policies influencing coastal regions, realized through planning and programming for the management of resources and coastal space; we will strive to establish guidelines to achieve it on Algeria's lighthouses.

In this context, the lighthouse enhancement project will involve the National Maritime Signaling Office as the main administrator in collaboration with the Ministry of Culture, responsible for implementing the management policy in a historically valuable environment, as well as the Ministry of the Environment, responsible for managing natural heritage.

The main activities of the project include creating a database of catalogued lighthouses in Algeria, as done for the Tipaza's lighthouse (Fig. 33), implementing enhancement approaches and actions for building

rehabilitation and improved accessibility, as well as widely communicating the current significance of maritime built heritage.

The heritage enhancement is the starting point of the reflection and should be proposed considering, emergency measures to preserve the buildings while maintaining the identity of the structure (materials, typology, architecture, geometry...) and its natural environment. It is also important to be able to maintain maritime signaling activity and even preserve its memory. Thus, it is necessary to:

- Extend the use of existing equipment.
- Plan and attempt to integrate existing equipment with new technology, when possible.
- Replace railings, exterior coverings, roofs, door and window frames with modern materials, keeping the design and style as close as possible to the original elements.

Particular attention should be also given to the immediate natural environment as very often-important biodiversity surrounds lighthouses due to their strategic location. One example is the Habibas Islands, which are part of the ASPIM (Specially Protected Areas of Mediterranean Importance). The islands are rich in significant natural heritage, both fauna and flora and associated with the presence of the Habibas

Figure 33

Example of Database Apply to Tipaza's Lighthouse / *Tipaza'nın Deniz Fenerine Uygulanan Veritabanı Örneği* (L. Amroun, 2024)

Localisation
Area: Ras El Kalia
Municipality: Tipaza
Town: Tipaza
Geographic coordinates: 36°35'58" N, 0°6'43" E
Accessibility and utility:
The access to the Tipaza lighthouse is via a narrow and winding road along the Ras El Kalia massif, where vehicles navigate with difficulty before reaching the entrance gate, forming a dead end.
Historical data :
Date of construction : 1864, date of inauguration : 1865
1861: programme to improve the signalling system, fixed green light.
Date of main work :
1881 : 18 November, lighting with vegetable oil should be substituted for mineral oil.
1883 : constant level lamp, small spout, mineral oil
1889 : request to expropriate an area around the building.
1905 : programme to electrify Algeria's lighthouses.
1954 : electrification with a 500w- 110V lamp, luminous range increased from 8 to 14 miles
1956 : transformation into a white light with regular occultation 3sec by 1sec. Luminous range of 18 miles.
Legal analysis :
Planning regulations and building protection status: unclassified
Previous owner: department of Algiers, Department of Bridges and Roads, Commission of Lighthouses Paris.
Actual owner : National Maritime Signalling Office
Administrator: National Maritime Signalling Office, signature of a post-independence partnership in 1963 for the refurbishment and monitoring work.
Brief architectural analyse:
Dimensional data of the building:
General size: 11.7m
Focal length: 11.7m
Light range: 18milles.
Architectural typology: square tower
Annexes and other building:
An RDV Main building with terrace and basement cellar, it consists of 3 bedrooms and a store. The basement, excavated under the northern part, contains a cellar for oil and a cistern.
State of conservation:
There are cracks and mould on the elevations, and the collapse of the roof is endangering the interior of the building and destabilising its load-bearing structure

Island lighthouse, built in 1870. This heritage component should be addressed by the same Med-Phare program, to ensure its preservation and enhancement.

CONCLUSION

The Mediterranean Sea is one of the world's priority conservation areas because of its relatively large number of endemic species (Maccarone et al., 2014, p. 325) and valuable landscape. The integration of lighthouses into valorisation projects, such as those carried out along the French coast, offers promising solutions for the preservation, restoration, and promotion of these significant elements of maritime heritage. The program is based on the identification of lighthouses and the establishment of an architectural inventory that highlights their intrinsic values, including their visual appearance, landscape integration and stylistic components. As a result of this initiative, no fewer than 90 lighthouses have been classified.

Fostering collaboration among various stakeholders, as achieved in Greece through the EC-Pharos project, demonstrates a successful heritage policy rooted in a holistic approach. This initiative, led by the University of Thessaloniki and the Greek Ministry of Culture, is supported by legal instrument that facilitate lighthouse conservation. In the Algerian context, a similar approach could be developed by the National Maritime Signalling Office, in collaboration with the Ministry of Culture, and the Ministry of the Environment. Such a strategy would ensure the effectiveness of conservation efforts, while taking into account the surrounding natural environment.

The evolution of Algeria's coastal landscape throughout history is evidenced by the presence of various remnants dating from antiquity and the Middle age, which attest to the richness of its maritime heritage. Algeria's lighthouses, equally as priceless as those in France, are emblematic element. Protecting these structures is not only essential for appreciating the historical narratives of maritime activities, but also for understanding the evolution of coastal landscapes. As we strive to safeguard these lighthouses, we simultaneously enrich our cultural heritage and promote awareness of the intricate relationship between human activities and the marine ecosystem.

Based on the model developed in the Med-Phares project, which aim to promote and support the development of these unique maritime entities, we focus on Tipaza lighthouse as a case study. The absence of written historical archives highlights the urgent need for fieldwork in the preservation of maritime heritage. On-site investigations are essential, as they provide valuable data on the structural and architectural integrity of these monuments, while preserving tangible evidence of their

historical significance. Without timely intervention, the continued deterioration of these structures risks not only the loss of a physical asset but also the erosion of an important segment of the region's maritime and cultural history. Lighthouse, as Tipaza's one, serves as a crucial indicator of the historical development of maritime routes, trade networks, and navigational practices. They play a pivotal role in reconstructing the past and their destruction would represent an irreversible loss of a key element of our collective memory, hindering our understanding of the evolution of coastal infrastructure in the Mediterranean.

Globally, many lighthouses around the world that are no longer used for maritime signalling are being repurposed into museums, hotels, and restaurants, taking advantage of the landscape value they offer. What will become of Algeria's lighthouses if we allow them to continue degrading and deteriorating? An immediate action must be applicable to ensure their preservation and sustainable reuse, safeguarding their role as enduring symbols of maritime heritage.

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