

SHIPWRECKS OF THE GALLIPOLI CAMPAIGN AND PROTECTION OF MARINE BIODIVERSITY

Editor: M. İdil Öz

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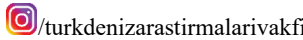
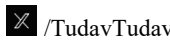
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“Those heroes that shed their blood and lost their lives...

You are now lying in the soil of a friendly country.

Therefore rest in peace.

**There is no difference between the Johnnies and the Mehmetts
to us where they lie side by side here in this country of ours...**

**You, the mothers who sent their sons from far away countries,
wipe away your tears;**

your sons are now lying in our bosom and are in peace.

**After having lost their lives on this land, they have become our
sons as well.”**

Mustafa Kemal ATATÜRK, 1934

A handwritten signature in black ink, reading 'K. Atatürk' with a stylized flourish at the end.

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FOREWORD

Underwater cultural heritage is one of the research topics of TUDAV and always in its radar.

The Çanakkale Strait (Dardanelles) and Aegean shores of Gallipoli Peninsula have several war wrecks and these wrecks are, in a way, “time capsules” for human history. The Gallipoli Historical Underwater Park is on UNESCO’s tentative list of World Heritage Sites. Large battlefields have resulted in rich underwater shipwrecks. However, marine biodiversity on and around these wrecks remain unknown. This book aims to fill this gap and look into biodiversity around the wrecks, highlighting the notion that most wrecks serve as natural reefs and become habitats for numerous species.

The protection of war heritage, wrecks and marine biodiversity is extremely important. It is already known that several threats are present in wreck sites, such as corrosion of the wrecks, unintentional anchorage, climate change and pollution. Divers visiting war wrecks in the Çanakkale Province should respect both marine life and wrecks. This protection is possible only with the work and caution of many people.

I thank Dr. M. İdil ÖZ very much for editing this book. I would also like to thank other colleagues who contributed to this book by writing a chapter. I am sure that this book will contribute to protecting marine life and war wrecks in the Çanakkale region.

At last but not least, TUDAV dedicates this book to the 100th Year of the Turkish Republic. We remember and pay our respect to the memories of all the martyrs of different countries who fought at sea and on land during the Gallipoli Campaign.

Prof. Dr. Bayram ÖZTÜRK
Head of the Turkish Marine Research Foundation

PREFACE

Being among the bloodiest battlefronts during World War 1, Gallipoli Peninsula and the Dardanelles (Çanakkale) province, witnessed an epic defence, a nation's struggle for life, and an extraordinary military strategy. The Dardanelles Naval Campaign and subsequently Gallipoli Land Campaign ended up with casualties of more than 500,000 on both sides. Starting with the naval operations in the Dardanelles Campaign, after 28 days of resistance against British, French, and Australian forces, 3 leading battleships, Bouvet (French), Irresistible (British) and Ocean (British) out of nearly 100 with various missions were hit and sunk while all the others withdrew on 18th of March 1915. During the successive land operations hundreds of marine vessels were sunk. Up to now 7 submarines, 4 battleships, 2 minesweepers, 1 cruiseship, 1 cargoship, and 6 landing crafts of Allies, and 1 gunboat, 1 cargoship, 2 cruiseships, 1 sailboat, 3 battleships of Turks were discovered in the depths between 3 m to 74 m in Turkish waters.

These shipwrecks, resting for 108 years, have been the temples, for commemorating one of the deadliest campaigns of WW1. The graves of thousands are now the sorrowful cultural heritage structures, serving people to feel the cold, bloodcurdling side of the great war.

On the other hand, a 108 years long accumulation of marine organisms all over the shipwrecks turn them into biodiversity hotspots. Like an oasis in the desert, they present a colourful life over the sandy bottoms. Performing as reefs, once deadly colossal war machines are now havens for hundreds of living organisms.

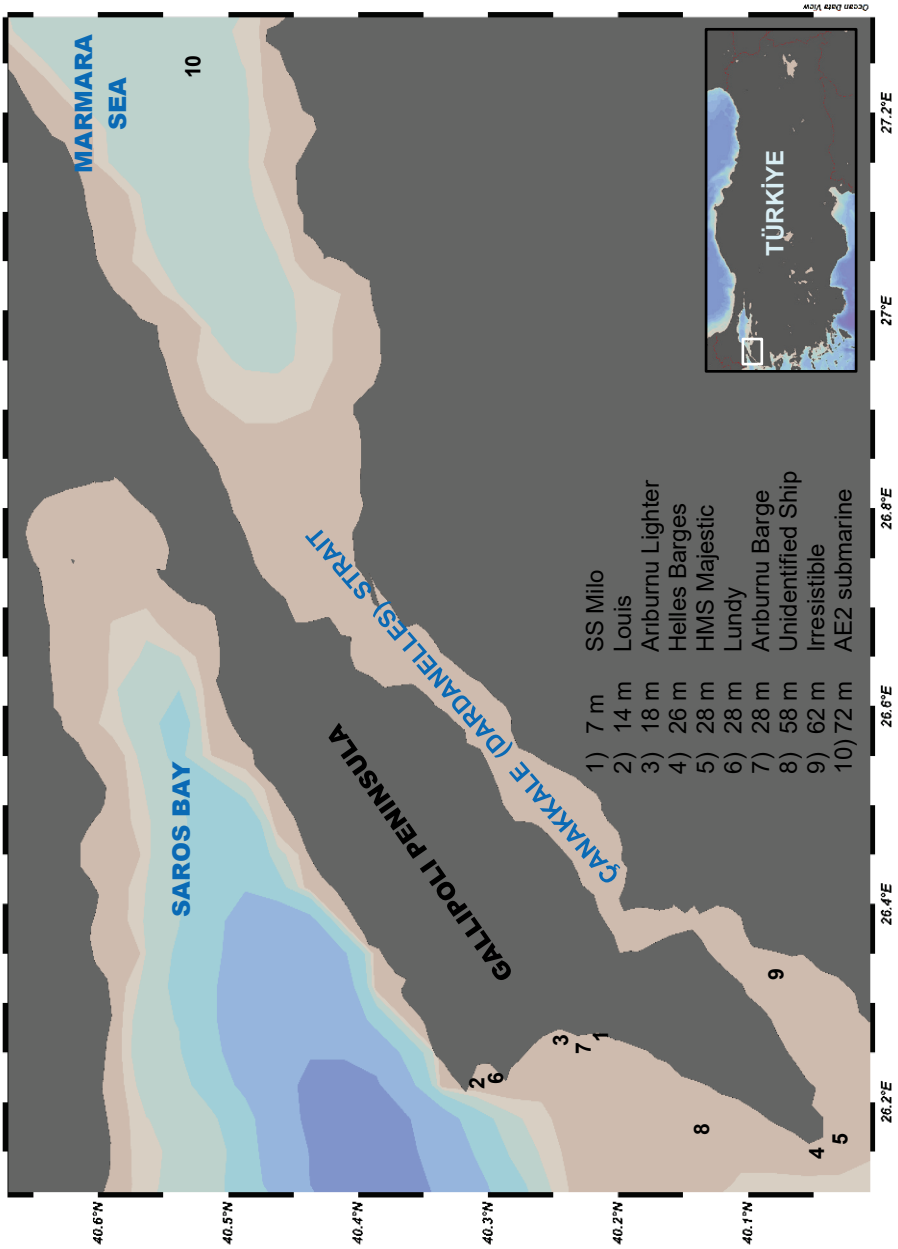
In terms of marine ecology, Çanakkale has always been important by its location on the route of many migrating species and due to its productive protected vicinity Saros Bay. However, the reefs formed in 108 years, now have their own stories at the background. Gallipoli Historic Underwater Park was established for people to see this unique blend of historical facts and natural beauties.

In the formation process of this book, we strive to gather multidisciplinary colleagues together. The shipwrecks of Gallipoli had been evaluated; as cultural heritages, as touristic destinations, as recreational and technical diving spots, from the military perspective, as obstacles causing ghost fishing, and finally as the marine sanctuaries. We are grateful to the colleagues for their contributions.

I'm thankful to Prof. Dr. Bayram Öztürk, head of Turkish Marine Research Foundation, for encouraging me to roll up my sleeves and organize the process; to Dr. Arda M. Tonay, for his contributions through the finalization, to İsmail Kaşdemir, head of the Directorate of Gallipoli Historical Site and Dr.Yusuf Kartal, historian in the Directorate of Gallipoli Historical Site, for their valuable cooperation, and BYEM Diving crew for their hospitality.

Dr. M. İdil ÖZ
Çanakkale Onsekiz Mart University

LOCATIONS OF THE SHIPWRECKS STUDIED IN THIS BOOK



HMS Majestic's historic actions and loss in Gallipoli Campaign

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Abstract

When World War 1 broke out, HMS Majestic, along with the rest of the squadron, was assigned to the Channel Fleet in the early stages of the war. In early 1915, she was reassigned to the Mediterranean for service in the Dardanelles Campaign. During this campaign, she participated in bombardments of Turkish forts and provided maritime support for the Allied amphibious landings at Gallipoli. Her duties in the operation may have concluded with the following action: On 27 May 1915, while stationed near Cape Helles, the rocky headland at the southwestern tip of the Gallipoli peninsula, and closer to Çanakkale Strait (formerly called Dardanelles), she was torpedoed by the German Navy's U-boat-21. The torpedo strike caused her to sink in shallow waters, resulting in the loss of 49 men.

Cape Helles witnessed heavy fighting between Ottoman Turkish and British troops during the initial landing of the Gallipoli campaign on April 24, 1915. After the landing, gunnery support for the amphibious operation and reinforcement efforts were provided by the British Naval Squadrons, including HMS Majestic, until the submarine attack brought her mission to an end.

Keywords: Battleships, Gallipoli Campaign, submarines at WW1, HMS Majestic

Formidable warships emerge at sea as a result of industrial revolutions

The era of industrial development brought various technological changes to war-making defence equipment, initially on land and later at sea. In the mid-19th century, naval ships were influenced by advancements such as “ships of the line”, “ironclads”, and “dreadnoughts (and pre-dreadnoughts)”, all of which were referred to as capital ships and later commonly known as battleships. This era came to an end with the emergence of forceful aircraft carriers in the middle of the Second World War.

HMS Majestic was a Majestic-class pre-dreadnought battleship of the Royal Navy commissioned in 1895. Pre-dreadnoughts continued the technical innovations of ironclads, with improvements made to their turrets, armour plate, steam engines, and the introduction of torpedo tubes over the years.

There was an earlier British Navy ship named *Majestic*, launched on 11 December 1785 at Deptford. This older HMS *Majestic* was a 74-gun third-rate ship of the line, serving successfully for around 31 years before being broken up in 1816 after running aground.

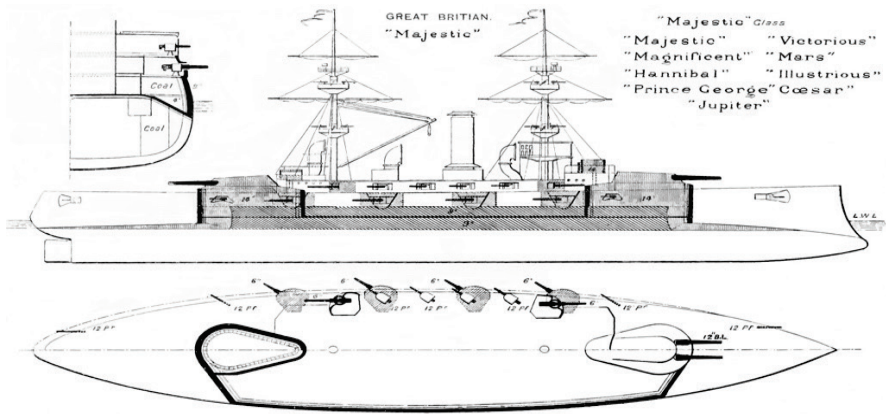


Figure 1. Majestic Class diagrams-Brassey 1902 By Sydney Walker Barnaby (Wikipedia contributors 2023)

Late HMS *Majestic* was the largest pre-dreadnought launched at the time and her specifications and configurations were as the following (Wikipedia contributors 2023):

Class and type:	Majestic-class pre-dreadnought battleship
Displacement:	16060 tons (16320 t)
Length:	421 ft (128 m)
Beam:	75 ft (23 m)
Draught:	27 ft (8.2 m)
Propulsion:	2 × 3 -cylinder triple expansion steam engines, twin screws
Speed:	16 knots (30 km/h; 18 mph)
Complement:	672

Armament	<ul style="list-style-type: none"> • 4 × BL 12 in (305 mm) guns • 12 × QF 6 in (152 mm) guns • 16 × 12 pounder (76 mm) guns • 12 × 3 pounder (47 mm) quick-firing guns • 5 × 18 in (457 mm) torpedo tubes
Armour	<ul style="list-style-type: none"> • Belt armour: 9 in (229 mm) • Deck: 2.5 to 4.5 in (64 to 114 mm) • Barbettes: 14 in (356 mm) • Conning tower: 14 inches

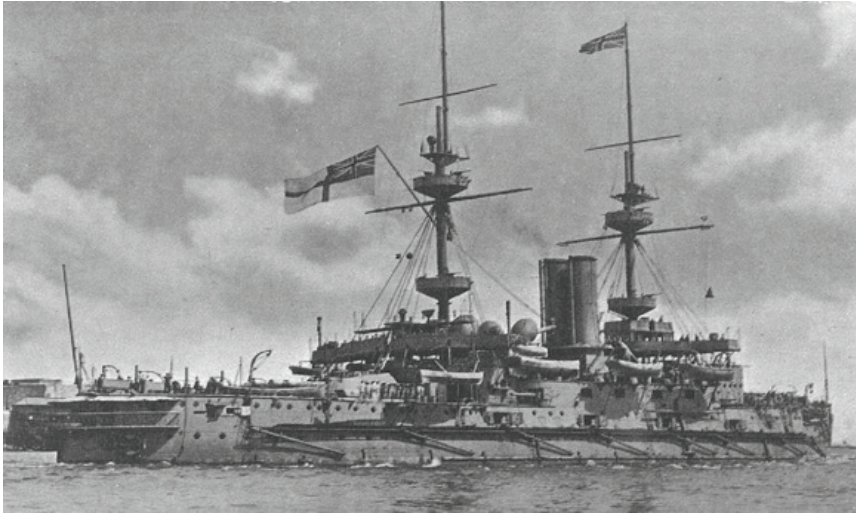


Figure 2. HMS Majestic (Majestic-class battleship) By royal Navy (Wikipedia contributors 2023)

She had served with the Channel Fleet until 1904, following which she was assigned to the Atlantic Fleet. In 1907, she was part of the British Home Fleet (From 1912 onwards, she was part of the 7th Battle Squadron).

Chronological assignments of HMS Majestic prior to Gallipoli

Majestic recommissioned at Portsmouth on 26 February 1907 to become flagship of the *Nore* Division in the new Home Fleet, stationed at the *Nore*. She began a refit later that year in which she received radio and new fire control systems. When the flag was transferred to another ship in January 1908, she became a private ship in the *Nore* Division. In June 1908, Majestic transferred to the Devonport Division of the Home Fleet, stationed at Devonport. Her refit was completed in 1909, and in March 1909 she transferred to the 3rd Division at Devonport, then in August 1910 to the 4th Division at Devonport, where she underwent another refit in 1911. In May 1912, Majestic became part of the 7th

Battle Squadron in the 3rd Fleet at Devonport. Upon the outbreak of World War I in August 1914, Majestic and the rest of the 7th Battle Squadron were assigned to the Channel Fleet. Majestic underwent a refit in August and September 1914, then covered the passage of the British Expeditionary Force to France in September 1914. She was detached from the 7th Battle Squadron from 3 October 1914 to 14 October 1914 to escort the first Canadian troop convoy. In December 1914 she became a unit of the Dover Patrol and combined with battleship Revenge to bombard German coastal artillery from off Nieuwpoort, Belgium, on 15 December 1914 (Wikipedia contributors 2023).

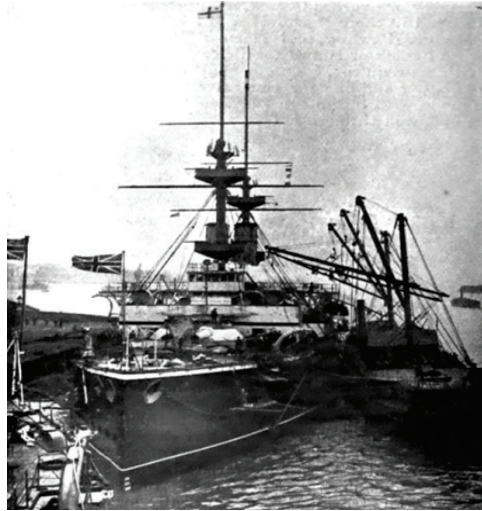


Figure 3. HMS Majestic (1895) (Wikipedia contributors 2023)



Figure 4. British battleship HMS Majestic leaving Mudros harbour during the Battle of Gallipoli, 1915. The War Illustrated, 12 June 1915. Photo by Ellis Ashmead-Bartlett (1881-1931) (Wikipedia contributors 2023)

Activities of HMS Majestic at Dardanelles Campaign

In February 1915, Majestic was assigned to participate in the upcoming Dardanelles Campaign to open the Turkish Straits, and she departed early that month under the command of Captain H. F. G. Talbot to join the Mediterranean Fleet. Upon arriving at Malta, she was fitted with what was termed “mine-catching” gear so that she could serve as a “mine-bumper”. She joined the Dardanelles force on 24 February 1915, and on 26 February 1915 departed Tenedos (now Bozcaada) to bombard the Ottoman Turkish inner forts at the Dardanelles that morning. On 26 February 1915, Majestic and battleships Albion and Triumph became the first Allied heavy ships to enter the Turkish Straits during the campaign, firing on the inner forts from 09:14 until 17:40 hours. Majestic took a hit below the waterline but was able to continue operations and patrolled the area again on 27 February 1915. She supported the early landings, shelling the forts from 11:25 until 16:45 hours on 1 March 1915 and again while patrolling on 3 March 1915. She arrived at Mudros on 8 March 1915 (Wikipedia contributors 2023).

On 9 March 1915, Majestic returned the entrance to the Dardanelles and bombarded Ottoman Turkish positions from 10:07 until 12:15 hours. She returned to Tenedos on 10 March 1915, patrolled off the Dardanelles again on 15 March 1915, and again returned to Tenedos on 16 March 1915. Majestic participated in the final attempt to force the straits by naval power alone on 18 March 1915. She opened fire on Fort 9 at 14:20 hours and also engaged Turkish field guns hidden in woods. She shelled Fort 9 until she ceased fire at 18:35; the fort meanwhile fired on the mortally damaged battleship Ocean. Majestic was hit four times, twice in her lower tops and twice on her forecastle and returned to Tenedos at 22:00 hours with one dead and some wounded crew members. Majestic returned to patrol duties on 22 March 1915. She shelled Turkish positions on 28 March 1915 from 09:50 to 10:15 and from 12:50 to 13:40 hours and again opened fire on 14 April at 14:58 hours. On 18 April, she fired on the abandoned British submarine E15 aground near Fort Dardanos, which was in danger of being captured; two picket boats, one from Majestic and one from Triumph, destroyed E15 with torpedoes, although the boat from Majestic was itself sunk by Turkish shore batteries while retiring. Majestic returned to Tenedos on 21 April 1915.

Final Actions of HMS Majestic at the Dardanelles, 27 May 1915

On 25 April 1915, Majestic was back in action, signalling London that Allied landings had begun at Gallipoli and supporting them with coastal bombardments until 19:15 hours. She brought 99 wounded troops aboard at 21:10 hours and recovered all her boats before anchoring off Gallipoli for the night. On 26 April 1915, she was back in action early, opening fire at 06:17 hours. On 27 April

1915 she exchanged fire with Turkish guns, with several Turkish shells achieving very near misses before both sides ceased firing at 11:30 hours. On 29 April 1915 she again was anchored off Gallipoli. *Majestic*, relieved *Triumph* as flagship of Admiral Nicholson, commanding the squadrons supporting the troops ashore off Cape Helles, on 25 May 1915.

End of HMS Majestic, a pre-dreadnought

On 27 May 1915, while stationed off W Beach at Cape Helles, *Majestic* became the third battleship to be torpedoed off the Gallipoli peninsula in two weeks. Around 06:45 hours, Commander Otto Hersing of the German submarine U-21 fired a single torpedo through the defensive screen of destroyers and anti-torpedo nets, striking *Majestic* and causing a huge explosion. The ship began to incline to port side and in nine minutes had capsized in 54 feet (16 m) of water, killing 49 sailors. Her masts hit the mud of the sea bottom, and her upturned hull remained visible for many months until it was finally submerged when her foremast collapsed during a storm.

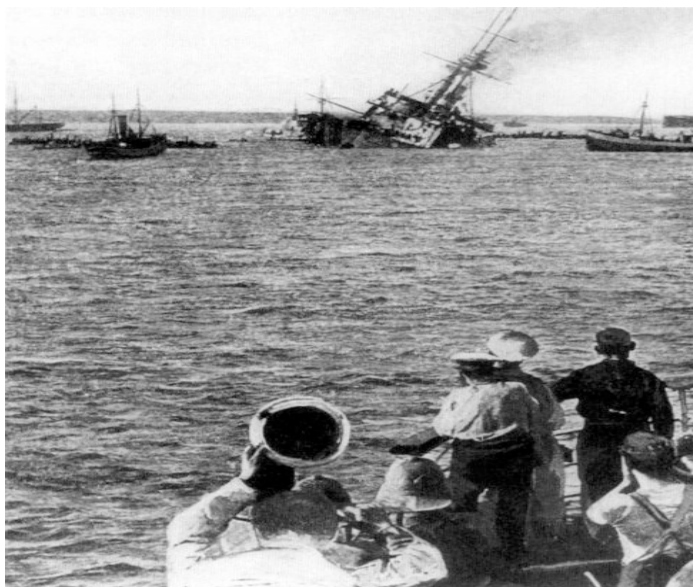


Figure 5. The last moments of British battleship HMS *Majestic*, showing the huge battleship three minutes after she had been torpedoed by the German submarine, U-21 off Cape Helles, Dardanelles, on 27 May 1915, about to turn completely over and sink (Wikipedia contributors 2023).

The *Majestic* was torpedoed off the Gallipoli Peninsula early in the morning of May 27th. In this impressive photograph the doomed vessel is seen, after receiving her deathblow, with her torpedo-nets out, and her crew scrambling

down her hull. Small craft are rushing to the rescue, and near her are larger vessels, powerless to help. On the British ship from which this photograph was taken, men are watching the tragic spectacle (Vintage Design Pics 2023).

In October 2021, Türkiye opened the Gallipoli Historic Underwater Park, an underwater museum off Çanakkale accessible to scuba divers. The park includes a number of wrecks from vessels sunk during the Dardanelles and Gallipoli campaigns, including Majestic and the battleship Triumph. The wreck of Majestic now lies at a depth of 24 m (79 ft), and it is largely intact (Dikmen Çalışkan 2021).

Other side of the coin

Otto Hersing who sunk HMS Majestic as the commanding officer of U-21 German submarines directed to Gallipoli war theatre

Submarines were relatively new assets in naval combats at the turn of the twentieth century and German Admiral Souchon made a request (Rudenno 2008) for their deployments to protect Dardanelles (now Çanakkale) Straits. After a couple of German UB/UC Type coastal submarine deployments (UB 4, 7, 8, 14; UC 13, 14, 15) eventually more ocean going capable German U-Boats were called in to the war theatre*. As such, following a meeting held in German ministry of navy/maritime affairs on March 17, 1915, which was attended by U-21 commanding officer Lieutenant (Kapitän-Leutnant) Otto Hersing who was also pioneer of sinking first warship, HMS Pathfinder, a cruiser lead ship of her class of two British scout cruisers and the first ship ever to be sunk by a self-propelled torpedo fired by submarine (U-21), on 05 September 1914 among other individual act of heroism with his crew on board U-21. The decision made that (Rudenno 2008) U-21 would be deployed to the Çanakkale Strait to attack enemy naval units by transiting through Gibraltar strait and transiting through west and central Mediterranean Sea, a highly risky navigational routes which had been under the British Navy Mediterranean Fleet control at the time.

U-21 (UB-21) assigned as capital ship killer from highly remote distant homeport

In the midst of World War I, the German U-boat U-21, under the command of Kapitän-Leutnant Hersing, embarked on an epic voyage from Germany to the eastern Mediterranean. Departing from Wilhelmshaven on 25 April, the U-boat

* Of the 373 German submarines that had been built, 178 were lost by enemy action. Of these, 40 were sunk by mines, 30 by depth charges, and 13 by Q-ships; 512 officers and 4894 enlisted men were killed.

charted a course round the northern coast of Scotland, setting its sights on the distant waters of the Mediterranean.

On 3 May, U-21 reached Cape Finisterre, where it was scheduled to rendezvous with a supply ship to replenish its fuel reserves. However, fate had other plans, as the fuel turned out to be contaminated. Undeterred, Kapitän-Leutnant Hersing made a daring decision to press forward, determined to carry out the mission despite the setback.

Navigating with precision and caution, the U-boat continued its journey southward. On 6 May, it executed a brilliant manoeuvre by passing through the Straits of Gibraltar undetected on the surface, hugging the African shore, and reaching an impressive top speed of 16 knots.

As news of U-21's presence spread, alarm bells rang in the vicinity of the Dardanelles in the northern Aegean Sea. Admiral de Robeck, in charge of the maritime operation including assignments of battleships anchored off the peninsula, received the urgent warning and immediately ordered a high state of alert. "Nets" were deployed to protect the warships, and all eyes were on high alert for the loitering threat of the German U-boat.

On the 11th of May, the U-21 was spotted and subjected to a barrage of ineffective shelling by French warships off the coast of Sicily. The elusive submarine managed to evade the attack, keeping its adversaries on edge, and proving its formidable capabilities.

Two days later, the U-21 contacted the Austro-Hungarian fleet, but by this time, the fuel situation had become critical. Of the 56 tons of fuel taken on in Wilhelmshaven, only a mere one and a half tons remained usable. The crew faced a crucial dilemma, aware that they had limited options for their return journey.

In the face of adversity, Kapitän-Leutnant Hersing and his crew weighed their options carefully. Despite the challenges and dwindling resources, they remained steadfast in their resolve to fulfil their mission. The perilous journey of U-21 through the treacherous waters of the Mediterranean had already become the stuff of legends, a testament to the courage and skill of its crew (Hickey 1995).

U-21's designation of enemy naval targets

As he approached the Dardanelles Hersing saw many tempting targets but exercised great self-control and let them pass, preferring to achieve total and

dramatic success by opening his score with the destruction of a capital ship. On the morning of 25 May, he first began attacking on HMS *Triumph*, which lay behind “torpedo nets” protected by destroyer patrols. The first attack failed and Hersing was detected. The troops ashore were treated to a novel spectacle as every warship in sight, other than those lying behind the illusory protection of their nets, began to manoeuvre wildly in an attempt to dodge any torpedoes fired at them. The impression was one of extreme nervousness on the part of the fleet.

First target attacked: HMS *Triumph*

At 11:25 a.m. Hersing began his attack to a destroyer located him and forced him to go deep. He fired a bow torpedo as he dived, at a range of little more than 300 yards. Fitted with an ingenious “net-cutting device”, the torpedo scored a direct hit, clearly heard by the crew of U-21 as they went deep. Hersing was worried that even at 70 feet deep he would be seen in the clear waters of the Aegean, but at 2:20 p.m. he came up to periscope depth and could see no trace of his target. The occupants of a Turkish observation post high up on the Sari Bair (Saribayır) ridge had been fascinated spectators, with thousands of others, of the remarkable scene.

A German artillery officer recorded the event in his daily journal:

Towards noon I heard a dull explosion, upon which destroyers, fishing boats, etc rushed . . . to render assistance. On the other hand, all the capital ships at once steamed off under full speed. The sinking ship still fired a few rounds ... hitting, however, only one of the vessels nearby. Confusion reigned on board. I could clearly hear bugle signals, also loud commands. Boats were lowered and a good many things jettisoned. After a few minutes, the mighty ship capsized, coming to rest with her keel upside down. Twenty-one minutes later she disappeared in the sea bow first, leaving behind a tell-tale collection of debris.

Loss of HMS *Triumph* was witnessed.

Another witness of the loss of the HMS *Triumph* was the newspaper correspondent Ellis Ashmead-Bartlett, who was in the wardroom on board the flagship HMS *Swiftsure* when the explosion was clearly heard. All rushed on deck in time to see the stricken ship heel over and capsize. Rear-Admiral Stewart Nicholson, his officers and *Swiftsure*'s crew (another British navy combatant) stood to attention, bareheaded, as the *Triumph* went down. In the last few seconds engines and machinery broke loose; she vanished to the accompaniment of a great growling roar - like an old dog dying, many thought - amidst clouds of smoke and steam (Hickey 1995).

As if to conclude the rite of passage the admiral snapped his telescope shut, turned to his staff, and remarked, '*Gentlemen, the Triumph is gone.*' He then gave orders for his flag to be transferred to the *Majestic*, the oldest ship in the fleet, renowned more for her comfort than her residual fighting power.

The admiral, accompanied by his staff, well-stocked wine cellar, large quantities of luxury tinned foods and the fascinated Ashmead-Bartlett, went over to her that afternoon (Hickey 1995).

Loss of HMS Majestic

Early on the morning of 27 May, Ashmead-Bartlett was roused on deck, where like many others he had prudently gone to bed, by a mess steward who politely informed him that a torpedo had been seen approaching the ship. This was followed immediately by a great explosion; the ship jerked violently and began to list at once. It was soon clear that she was doomed. Many elderly reservists who had gone over the side could not swim and were crying piteously for help. A great surge of men carried Ashmead-Bartlett on to the torpedo net shelf where hundreds of officers and men were gathering. He jumped into the sea and was dragged aboard a boat from which he watched the battleship going down. There were 94 men in a boat designed to hold 30 and it was down to its gun whales. The ship was on its beam-ends in minutes, with men still clinging to her as hundreds more swam frantically away to avoid being sucked down. The admiral and his flag captain, Talbot, still wearing his monocle, were among the survivors. This was Hersing's second capital ship in forty-eight hours and the discomfiture of the fleet was complete (Hickey 1995).

HMS Majestic disappears: a tragic scene of a sinking warship

As with the highly public sinking of the *Triumph*, the end of the *Majestic* was watched by thousands of dismayed troops on shore. Able Seaman Joseph Murray, aged 17, was serving in the Hood battalion of the Royal Naval Division. On the morning of the 27th, with a number of his friends, he was swimming out to the *Majestic* to ask for some freshly baked bread - at that time not available on the peninsula. The swimmers were halfway to the ship when they felt a concussion in the water and saw that the battleship was heeling over. Everyone aboard seemed to be very calm and men were walking deliberately to where they could slip into the water and get clear. Soon she lay inverted, with a solitary figure walking up the keel, clutching a bundle. It turned out to be the ship's writer, who had rescued the purser's ledgers and was determined to keep them dry. As the keel slowly slipped below, he moved to the inverted bow and sat there awaiting rescue (Hickey 1995).



Figure 6. “The dramatic scene following the torpedoing of the battleship HMS Majestic off W beach on 27 May by UB21. Within minutes, every ship in the vicinity slipped anchor and made for open waters, as small boats hurried to pick up survivors. The merchantman in the foreground is already under way” (Hickey 1995).

The old but faithful ***Majestic*** [wrote Murray] ... *built in the 90s and considered obsolete when the war broke out, now lay upside down on the bottom of the Aegean ... We shall miss her protection. She was an inspiration to us all; how we cheered when her shells landed on Achi Baba... a few days ago there were ships everywhere; now the **Majestic** has gone, we feel as though the navy has deserted us.*

Although U-21's successes had been spectacular, they were brief. But political ramifications together with impact on the war theatre were huge...

In London, Churchill found it necessary to impress on Balfour (former Prime Minister, then first Lord of Admiralty) the absolute necessity of persisting with naval operations in the Dardanelles, reinforcing the anti-submarine measures already in hand but temporarily dispersing the fleet to Mudros (Mondros) and even the Suez Canal.

For the time being, argued Churchill, a much lower degree of naval gunfire support would have to be accepted by the army ashore, until the arrival of yet more elderly battleships and cruisers fitted with torpedo bulges, which could operate with merchant ships tied alongside to take the force of torpedo attacks. At least a hundred trawlers were now required, Churchill told Balfour, in order to lay a hundred miles of detector netting around the offshore anchorages.

Floatplanes would be needed to maintain constant aerial watch over the clear waters of the Aegean (Hickey 1995).

Conclusions

The Western Alliance has deployed nearly two hundred naval combatants and their supporting vessels outside of Çanakkale (then Dardanelles) Strait, but that formidable force failed to cross the strait by force as of March 18, 1915, and lost three capital ships (French Bouvet, HMS Ocean and HMS Irresistible) and had heavily damaged other four capital ships in between. Then their objective shifted to carry out an amphibious assault against Gallipoli peninsula to capture both side of the strait, which would enable them transiting through Çanakkale Strait to reach the Empire's capital city Istanbul (then Constantinople). Then on April 24, 1915, an amphibious assault launched with support of those formidable naval forces whose prime roles being ship-to-shore troops movement and naval gunfire support of landing units. HMS Majestic had been in composition of forces providing escort and naval gun-fire support to landing units. The ship had carried out the tasked role until U-21 of German Navy attacked by torpedo sinking first HMS Triumph and 48 hours later HMS Majestic. The consecutive loss of two capital ships let British and allied capital ships (big guns) left the war scene and they were replaced by smaller gunfire support vessels be it torpedo boats and destroyers. Germans on the other hand assigned five more submarines to the Ottoman coastal waters but their sinking rate had reduced drastically due to the counter measures and manoeuvrability of lighter and faster British combatants on the war scene.

Having said all that it has been always a sad in memories to commemorate those lost souls and sunken ships at sea hoping that history would not have to repeat itself in around that part of the geography.

Turks today proudly pronounce that Çanakkale (Dardanelles) Strait could not and will not be trespassed.

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Underwater cultural heritage: The case of Gallipoli Campaign shipwrecks

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Abstract

It is estimated that there are ten thousand wrecks, mostly sunken ships, from the First World War deep in the seas that cover two-thirds of the world. These shipwrecks are among the most valuable historical and cultural heritage resources from the past to the present and to the future. However; these shipwrecks, witnesses of the history of war, are under great threat due to both natural and human-induced destruction. To be able to protect cultural heritage items, the necessary awareness must first be developed and the legal infrastructure must be established. For this purpose, in 2001 the Convention on the Protection of Underwater Cultural Heritage was brought to the agenda at the conference, held under the leadership of UNESCO (United Nations Educational, Scientific and Cultural Organization). However, many states did not show determination to join the convention.

This study basically consists of three parts. In the introduction section, cultural heritage concept, which forms the essence of the study, is tried to be explained. In the second part; the concept, importance, and preserving of underwater cultural heritage is examined and the case of the Gallipoli Campaign shipwrecks is mentioned. In the conclusion, the importance of Çanakkale shipwrecks in terms of our cultural richness and tourism is discussed.

Keywords: Underwater cultural heritage, shipwrecks, Gallipoli, diving tourism

Introduction

Cultural Heritage (CH) concept can be defined in different ways. CH can generally be defined as an expression of the ways of living tangible or intangible values developed by a community and passed down from generation to generation (UNESCO Institute for Statistics 2009), including traditions, buildings, customs, practices, folklore, art objects, kitchen, believes, rituals, festivals, celebrations, artistic expressions, places, architecture, sites, monuments, and so on.

Terms of “cultural property”, “cultural landscapes”, and “cultural heritage” may be used as the same concepts.

Cultural landscapes are cultural properties and represent the “combined works of nature and of man” designated in Article 1-Operational Guidelines par. 47 of the Convention. They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Centre 2021; ICOMOS 2023).

In article 1 of the World Heritage Convention (WHC) that is concerning and preservation of the world cultural and natural heritage is an international agreement that was acknowledged by the General Conference of UNESCO in 1972; the following have been considered as “cultural heritage”:

- *monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science;*
- *groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science;*
- *sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view (World Heritage Centre 2021; ICOMOS 2023).*

United Nations Year for Cultural Heritage declared and celebrated in the 30th anniversary of the Convention in 2002. It was considered that, the Convention has proven to be a unique and important instrument for international co-operation in preservation of natural and cultural heritage of extraordinary universal value (UNESCO 2002).

On the other hand; the European Commission, which strives to bring member countries closer together, improve relations between them and reveal common European values, attaches great importance to CH, which is the common denominator of member countries.

CH of Europe is “a shared source of remembrance, understanding, identity, dialogue, cohesion and creativity. It encompasses a broad spectrum of resources

inherited from the past in all forms and aspects”. “CH can be tangible (castles, museums, works of art), intangible (songs, traditions, etc.), and digital (born-digital and digitised). It includes monuments, sites, landscapes, skills, practices, knowledge and expressions of human creativity. Collections conserved and managed by public and private bodies - such as museums, libraries and archives - and film heritage are also part of CH” (European Commission 2023a).

According to European Commission (2023b), CH enriches and adds meaning to the lives of people and societies. It enables the development of cultural and creative sectors. It plays an important role in creating and developing Europe’s social capital. Besides, it is also an important source of economic growth, employment creation and social harmony. It also offers the potential to revitalize urban and rural areas and promote sustainable tourism. In the European Union, over 300,000 people are employed in the CH sectors and 7.8 million jobs are indirectly linked to heritage (e.g. hospitality, interpretation and security) (European Commission 2023b).

Materials and Methods

The research method of this study, which is carried out within the conceptual framework, is based on archive and document analysis, which is one of the qualitative research methods. The study consists of basically three parts. In the introduction section, the concept of cultural heritage, which forms the essence of the study, is tried to be explained. In the second part; by examining the concept, elements and importance of underwater cultural heritage, Çanakkale shipwrecks are emphasized as an important example of our cultural heritage. In the last section, the importance of Çanakkale shipwrecks on our cultural life and tourism is discussed.

Underwater Cultural Heritage

Archaeological heritage exists not only on land but also under water (Ertek and Şahin 2021). A huge cultural heritage lies in the depths of oceans, seas, lakes and rivers around the world. These elements mostly arise from ships and cargo that were sunk in wars, sunk as a result of collisions, sunk as a result of natural events such as storms and tsunamis, or were lost for intentional reasons. Every shipwreck has its own unique story. Shipwrecks preserve unique, irreplaceable valuable information and richness from their periods (Smith and Couper 2003). Submerged cities, structures, monuments, sunken ships, valuable cargoes sunk with the ships, crashed planes, reefs formed by shipwrecks, other objects and their parts constitute the underwater archaeological and natural cultural environment over the years.

In the article 1 of the Convention on the Protection of the Underwater Cultural Heritage (UCH) which was held in Paris in 2001, for the purposes of the Convention UCH defined as;

“all traces of human existence having a cultural, historical or archaeological character which have been partially or totally under water, periodically or continuously, for at least 100 years such as:

- (i) sites, structures, buildings, artefacts and human remains, together with their archaeological and natural context;*
- (ii) vessels, aircraft, other vehicles or any part thereof, their cargo or other contents, together with their archaeological and natural context; and*
- (iii) objects of prehistoric character” (UNESCO 2001; Forrest 2002; Vinson 2008; Sarid 2017).*

According to the convention, ships, submarines and aircraft defined as UCH are warships, submarines and other ships or aircraft that are owned or operated by a government and were used solely for government non-commercial purposes at the time of their sinking (UNESCO 2001). Furthermore, the Convention defines a time period of at least 100 years for UCH objects to avoid ownership issues and conflict with ordinary salvage laws. The period defined for the age limit at which an object must be suitable for archaeological protection varies in many states (Panayotopoulos 2009; Sarid 2017).

In Article 2 “Objectives and general principles” the Convention aims to ensure and strengthen the protection of UCH and makes a call to governments "to preserve UCH for the benefit of humanity in conformity with the provisions of the Convention”, and warns them that “UCH shall not be commercially exploited” (UNESCO 2001; Forrest 2002; Ruiz 2011).

Importance and Value of Underwater Cultural Heritage

Seventy percent of the earth is covered with water, and many of humanity's CH lies under water. Oceans, seas, lakes and rivers contain many settlements, harbours, sacred sites and shipwrecks from the past that are under water today. These ruins, which have survived from past generations, have high CH values. They bear witness to thousands of years of history of world civilization (Federal Office of Culture of Switzerland 2023).

For centuries, commercial and military ships of various shapes and sizes have been traveling the oceans, seas, lakes and rivers all over the world, carrying goods and valuables for trade purposes and setting out to conquer other

countries. Some of these ships sank either due to storms, in maritime accidents or in wars, and their remains bearing the traces of the past are found buried under both fresh water and salt water almost all over the world. As many as three million shipwrecks are believed to be found today, some containing valuable items and materials. These ruins lying in sand or alluvium represent a great cultural and material wealth in terms of human history. These UCH, including shipwrecks, holds great historical, cultural, and educational value. These wrecks can provide valuable insights into past events, technology, and social structures. They can also serve as memorials to those who lost their lives during war or in other maritime disasters (Vinson 2008; Pearson and Thompson 2023; Zambri 2023).

However; underwater, not only ships and their cargo constitute the UCH, but also old and even ancient cities, settlements, bridges, monuments and other artifacts. All these remnants and materials bear traces of human existence of a cultural, historical or archaeological nature. Moreover, due to underwater conditions, such materials are often better preserved than above-ground archaeological remains, forming “time capsules” that allow current generations to look back and better understand the past. UCH, holds invaluable information for historians, archaeologists, and scientists to reconstruct past culture. At the same time, UCH is valuable for tourism, provided the tourism is soundly managed from an environmental and heritage resource perspective (Marciniak 2020; UN Environment 2010).

A shipwreck can have archaeological and historical value as it can provide vital evidence of the past. Each shipwreck has its own fascinating story that, when uncovered, can reveal vital clues about the past, such as people's communication and interaction with the seas. Each wreck reveals how civilized societies lived and changed in different ages. A shipwreck also shows the trade routes followed and the development of maritime technology. Locating a shipwreck, identifying its cargo, and examining the ship's structure can help archaeologists and scientists unravel some of the mysteries of history (Shirley 2022). UCH is the witness of our common memory for several millennia. The oceans, seas, lakes and rivers hide from view and protect under the surface a priceless heritage, largely unknown and underestimated. No one can protect what is unknown. According to the famous Captain Jacques-Yves Cousteau, "We love what we marvel at, and we protect what we love" (UNESCO 2023).

Threats and Protection of Underwater Cultural Heritage

Today, these underwater vestiges are threatened by looting and commercial exploitation, industrial and fishing trawling, coastal development, oil extraction activities in the seas, exploitation of natural resources and the seabed. These vestiges are also weakened by global warming, water acidification, mucilage

and other pollutants (UNESCO 2023). Technological developments have facilitated modern research and diving techniques and access to archaeological underwater remains. As on earth, it has led to the proliferation of illegal underwater treasure hunting. These archaeological and historical remains also face threats from opportunistic looting and industrial-scale salvaging, impacts from coastal development and deep-sea infrastructure, and damage caused by any other extractive industries (Vinson 2008; Pearson and Thompson 2023).

Since governments generally focus their efforts on the protection of tangible and intangible cultural heritage on land, they do not make sufficient efforts to protect the underwater heritage and do not adequately enact and implement protective legislation. The realization of the threat that unauthorized salvaging poses to UCH led to the establishment of an international framework aimed at its protection. The UNESCO Convention on the Protection of the UCH in the General Conference of the United Nations Educational, Scientific and Cultural Organization, meeting in Paris from 15 October to 3 November 2001, at its 31st session, acknowledging the importance of UCH as an integral part of the CH of humanity and a particularly important element in the history of peoples, nations, and their relations with each other concerning their common heritage. The Convention's main goal is to ensure that any interference with UCH meets internationally accepted archaeological standards (UNESCO 2001; Sarid 2017). The UNESCO Convention for the Protection of the UCH establishes many binding rules within the scope of international law regarding the discovery and protection of UCH and contributes to the prevention of significant plunder and commercial exploitation of this CH worldwide (Federal Office of Culture of Switzerland 2023).

The UCH Convention establishes a protection regime for UCH with respect to maritime zones designated by UNCLOS (United Nations Convention on the Law of the Sea). It greatly expands the legal protection of UCH by providing a comprehensive interpretation of UCH regardless of its location. The UCH Convention gives coastal states the right to prohibit or allow UCH activities within their Exclusive Economic Zone and continental shelf. The UCH Agreement does not govern the ownership of UCH. The agreement highlights the importance of capacity building, technology transfer and knowledge sharing regarding UCH, as well as raising awareness of the importance of UCH. By joining the UCH Convention, countries can ensure comprehensive protection of UCH on the following issues.

- (1) obtain the same level of UCH protection as land-based CH,
- (2) It can protect UCH from plunder and commercial exploitation,
- (3) Protection can be provided through a system of state cooperation.

(4) By acceding to the UCH Convention, the Parties undertake to protect UCH against plunder and commercial exploitation and to implement the provisions of the UCH Convention and the Rules annexed to it as internationally accepted guidelines for UCH protection (UN Environment 2010).

As Alfredo Pérez de Armiñán, UNESCO Assistant Director-General for Culture states, many warships, submarines and merchant ships sunk during the First World War constitute the last original traces of the war. Every sunken has a story to tell. This priceless UCH, which deserves our respect and protection, stands underwater as an impressive monument to the tragic events of war as well as the lives lost. Unfortunately, the UCH of the First World War has been greatly damaged by salvage, plunder and industrial activities in the last century. For many years, legal regulations for conservation have been inadequate and conservation awareness has not developed. The UCH of the First World War has begun to be addressed since 2014 within the scope of the UNESCO 2001 Convention for the Protection of the Underwater Cultural Heritage for UNESCO Member States that have ratified this international document. The UCH Convention will be very useful in protecting all shipwrecks that have been under the sea for more than a hundred years (Armiñán 2014).

Although UCH is often associated with wrecks from past centuries, other factors must be taken into account when determining whether a wreck is of historical value; including its uniqueness, its association to historical events, and/or its connection with historically important people. The wrecks from the First and the Second World Wars inevitably have historical value. They are unquestionably worth preserving because of their connection with historical events and wars those changed the world. Various states protect such wrecks under their domestic legislation. For example, the United Kingdom protects the First World War German fleet, under the Ancient Monuments and Archaeological Sites Act 1979, sunk off Scapa Flow, Scotland, on 21 June 1919 (Shirley 2022). As the years pass and there are no longer any eyewitnesses left to tell us about the dramatic events of the First and the Second World Wars, the discovery, preservation and sustainable use of underwater wrecks, which concretely reveal the traces of the Wars, becomes more and more important (Argyropoulos and Stratigea 2019).

Directorate of Gallipoli Historic Site, carries out important work to reveal, protect, restore, open to visitors and promote the war remnants on land and at sea in Çanakkale, which have great historical and cultural value. The Directorate was established by the “Law on the Establishment of Directorate of Gallipoli Historic Site” numbered 6546, published in the Official Gazette No. 29044 dated 28/06/2014. The purpose of establishing the Directorate is: “to regulate the issues regarding the preservation, protection, development, promotion and transfer to future generations of the historical, cultural and spiritual values and

natural texture of the Gallipoli Historical Area, where the Dardanelles Naval and Land Wars took place” (Directorate of Gallipoli Historic Site 2018)

Shipwrecks of Dardanelles Naval and Gallipoli Land Battles

A joint British and French naval operation was organized on March 18, 1915, to secure the sea route to Russia and to capture Istanbul, the capital of the Ottoman Empire, which entered the war on the side of Germany. Unable to cross the Dardanelles from the sea, the Allied forces launched a land operation on the Gallipoli Peninsula on April 25, 1915, with the participation of Australian and New Zealand troops (ANZAC). Many warships, ships providing logistics, and submarines were sunk during the Dardanelles Battle, which started with naval operations and continued with land operations. There are important sunken areas in Çanakkale due to the shipwrecks during and after the war (Argyropoulos and Stratigea 2019). The last major battle to capture Istanbul and the Dardanelles, which extends from the Mediterranean to Russia, ended in a major defeat for the British and French forces after months of the wars. In the 1915 Dardanelles Naval and Land Wars, which cost hundreds of thousands of human lives, their sacrifices enabled the formation of national consciousness in modern Türkiye, Australia and New Zealand.

There are hundreds of shipwrecks that emerged during the war in the coastal waters between the Dardanelles, Ertuğrul Bay, Anzac Bay and Suvla Bay. Gallipoli Historical Underwater Park is on the European side of the Dardanelles. It is one of the best-known dive sites for the First World War shipwrecks in the Mediterranean. Shallow water diving tours are organized to these wrecks. Since 1997, many efforts have been made to investigate and document shipwrecks with film or using 3D multibeam sonar imaging. Recently, within the scope of the ‘Under Gallipoli’ project, the Australian-Turkish joint team has been carrying out on-site research and preservation of some of the sunken ships (Argyropoulos and Stratigea 2019).



Figure 1. Wreck of the British destroyer Louis (photo courtesy of Çetin Kedioğlu)

Türkiye has cultural heritage values that very few countries can have, both on its land, on its shores, and in the depths of its seas (Figure 1) (Öztürk and Sarıkavak 2019). The Dardanelles Naval Battles are one of the most important naval battles in the world. It is not entirely correct to talk only about the debris inside the straits in the operations carried out to cross the Dardanelles. Naval battles were not limited to the unsuccessful attack on 18 March, when Allied forces lost many ships trying to pass through the straits. It should not be forgotten that the ANZAC landings and subsequent submarine attacks in the Sea of Marmara also resulted in a significant number of ship and submarine wrecks. Turkish submarines Atılay and Dumlupınar sank after the official end of the Dardanelles Operation. The Dumlupınar submarine fell victim to the Nagara Passage. It sank after colliding with a Swedish flagged ship off Cape Nara on 4 April 1953. Strong currents and other navigational hazards had been a nightmare for British and French submarines trying to enter and pass through the straits during the Gallipoli Wars. The French submarine Saphir and the British submarine E7 were lost while trying to pass Nara cape. Today, all three submarines are located very close to each other in the depths of Cape Nara. Turkish cruiser Midilli, Turkish submarine Atılay, Australian submarine AE2, French submarine Joule, Turkish gunboat Nur-ül Bahir, Turkish steamers Bosforus and Rehber, sailing ship Eleonora and Alçıtepe shipwrecks were found between 1993 and 2011 and were added to the list of previously identified shipwrecks (Kolay and Karakaş 2014).

The epic shipwrecks of Çanakkale, which tell many stories of the sea and land wars, are now part of the First World War themed underwater park. Gallipoli Historical Underwater Park, which is at the meeting point of the Aegean and Marmara seas, attracts the world's attention with its underwater treasures, has been open to visitors since 2021 and brings the underwater history to light (TGA

2023). This First World War - themed underwater park, hosts the epic shipwrecks of Çanakkale, where many stories and valuable objects are hidden in the depths. “Gallipoli Historical Underwater Park” takes divers on a journey into the depths of history at 14 different diving points, including 12 war wrecks and 2 natural reefs, including the British Royal Battleship ‘HMS Majestic’ (Figure 2), which was sunk off the coast of Seddülbahir Castle (TSSF 2021). SS Milo, Massena and Saghalien Shipwrecks, Maria Delle Vittorie and Vincenzo Florio Wrecks, Tuzla Web, HMS Louis, Arıburnu Lighter, H.M.S. Majestic, Helles Barges, Lundy (Figure 3), Arıburnu Barge, Küçükkemikli Barges, Mania Web, Bebek Reef, HMS Triumph remind stories of the war (Directorate of Gallipoli Historical Site 2023; Diving Go Türkiye 2023).



Figure 2. The British Royal Battleship HMS Majestic’s turret base (photo courtesy of Çetin Kedioğlu)

Some of the shipwrecks are only a few meters under the sea, while others are up to 80 meters deep in the Gallipoli Historical Underwater Park. “It’s like a time machine that takes you to 1915 and the First World War,” says scuba diver and documentary film maker Savaş Karakaş, who was one of the first to go underwater diving and examine the wrecks. Professional underwater photographer Ali Ethem Keskin uses the expression “It is a good opportunity for us to remember our past. I thought about the moment when they sank and you feel the stress of war” (Özerkan 2023).



Figure 3. Lundy, the 188 tons ship, built in 1908, lies in Suvla bay, at 28-30 m depth (photo courtesy of Çetin Kedioğlu)

Result and Discussion

Shipwrecks of the First World War, which were brought to diving tourism in 2021 with the initiatives of the Ministry of Culture and Tourism, the Directorate of Gallipoli Historical Site, constitute one of the world's leading diving destinations, offering local and foreign tourists diving opportunities in 14 different points. Referring to the features of the Gallipoli Historical Underwater Park, the head of the Directorate of Gallipoli Historical Site, İsmail Kaşdemir interviews "What distinguishes us from other diving spots in the world is that all of our shipwrecks have a story and have a reality in the historical process. In other words, those who dive here will enter a wonderful world and they will also travel into history" (Akay 2022a).

In the Gallipoli Historical Underwater Park, efforts continue to bring the shipwrecks into diving tourism, which are known to have sunk during World War I but whose locations and conditions have not yet been determined. Shipwrecks are important elements not only for culture and tourism but also for marine life. They serve as habitats and breeding areas for fish and other marine creatures (Figure 4). Researches continue to locate and unearth shipwrecks that have not yet been found but are known to exist.



Figure 4. Shipwrecks also serve as habitats and breeding areas for fish and other marine creatures (photo courtesy of Barış Özalp)

During these researches, HMS Hythe, one of the three British shipwrecks identified from historical sources and sought, was reached by underwater researcher Selçuk Kolay. In which research, the historians of the Historical Area Directorate also participated, it was determined that the 60-meter-long transport ship HMS Hythe, which sank on October 28, 1915, was found at a depth of 70 meters in the direction of Gökçeada Island, 6 miles off the coast of Seddülbahir village. Kaşdemir stated that with the discovery of HMS Hythe, another shipwreck has been added to the inventory. Kaşdemir emphasized that HMS Hythe, which sank after colliding with another ship while escaping from the fire of Turkish artillery, is one of the shipwrecks with a story, whose crew, captain and when it sank are known (Akay 2022b).

Researches continue to find the other two shipwrecks, a destroyer and a logistics ship. Making a statement on the subject, Kaşdemir says, “The Historical Underwater Park is rapidly progressing towards becoming one of the most important diving centres in the world. It has attracted great attention in the world and is highly anticipated by diving enthusiasts.” In a very short time, when the word ‘diving’ is mentioned in the world, one of the first places that will come to mind will be Çanakkale and Gallipoli Historical Underwater Park. Çanakkale will have a completely different place in terms of tourism destination. We want to take this place to the top league in diving in the world.

We aim to invite all diving enthusiasts to dive into history and take a journey through history. Because the nature and history of Çanakkale, both under the sea and above the sea, are excellent. It is the best preserved battlefield in the world. Our visitors are happy to be in Çanakkale.” Visitors also get new experiences in their holidays and take a journey through history by diving in the Historical Underwater Park and by visiting Gallipoli Battlefields (Akay 2022b).

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Sustainable diving tourism in Çanakkale and its economical responses

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Abstract

In recent years, there has been a significant shift in the expectations of tourists, which also changed the instinct and the desire to explore the unknown and has brought new trends in the tourism sector. Due to the increasing demand for curiosity and interest, the increase in investments in this special area has revealed a new type of tourism titled scuba diving tourism. Scuba diving tourism is a type of tourism that includes promotional, sportive, and educational dives for the purpose of seeing, photographing, and filming the fauna, flora, and archaeological cultural assets of the underwater world, as well as accommodation and hospitality services provided on the shore. Therefore, in addition to its inherent social, psychological, and physiological benefits for divers, scuba diving enhances the sustainable development of coastal society by producing economic benefits while improving marine conservation and environmental awareness. These benefits have attracted the attention of both communities and tourism operators over the years. According to a recent report, there are 967 marine tourism operators in Türkiye; 270 of them belong to underwater operators while 9 of them are located in Çanakkale. Owing to 14 sunken ships during World War (WW) 1, the Gallipoli Historic Underwater Park in Çanakkale has become the first underwater park under the theme of WW1. On the other hand, the rising number of recreational dives has also evoked sustainability concerns over the world. Accordingly, this study aims to portray sustainable diving tourism in Çanakkale within the context of wreck diving and its economic responses.

Keywords: Çanakkale, Dardanelles, scuba diving, sustainable diving, wreck diving.

Introduction

Being held with the participation of many participants such as national and international high-level representatives, local and foreign guests, press and media organs, Çanakkale hosts the 18 March Martyrs' Commemoration and Gallipoli Naval Victory Ceremonies every year. Anzac Day Commemoration Ceremonies are held in April every year with the participation of several visitors from Australia and New Zealand. High-level accessibility to tourism values such as Troy Museum, Troy Ancient City, and Assos Ancient City; availability of eating, drinking and accommodation alternatives, issues such as access to health services are considered as the strengths of the city.

On the other hand, the diving industry has witnessed visible growth and expansion over the past 50 years. Every year, several diving centres are opened around the world, and an extensive number of new diver candidates receive a diving badge at the end of the training they receive for recreational or professional purposes and join the world diver community. As a unique branch of tourism, scuba diving generates a large amount of revenue and assists local communities while encouraging conservation. Therefore, the diving industry is expected to grow with both research and development (R&D) studies and application areas (GMKA 2021).

Although its interactions between economy and society, environment and industry, governance, and scientific community is a highly complex issue, understanding its interactions is significant in terms of Marine Protected Areas (MPAs), in which dynamics between actors are multifaceted. The rising number of scuba diving activities has encouraged a large sum of investments in various products ranging from diving equipment shops to diving schools, retail to education, and growth in the number of diving charter businesses to recreational dives (Dimmock *et al.* 2013). Similar to all tourism industries, scuba diving tourism predicates its activities on the three well-known pillars of sustainability; environmental, economic, and social since its economic value depends on marine megafauna (Wongthong and Harvey 2014; Haddock-Fraser and Hampton 2012). For instance, being available in 119 countries, whale-watching tourism attracts approximately 13 million tourists annually, which generates over US\$2.1 billion (O'Connor *et al.* 2009). Therefore, prioritizing conservation is a key issue in order to sustain its enormous revenue potential and promote sustainable development (Mota and Frausto 2014; De Groot and Bush 2010). Accordingly, this study examines the development process of sustainable diving tourism in Çanakkale within the context of wreck diving and its economic responses.

Socio-Economic Benefits of Diving Tourism

Among the professional types of diving activities, the part that grows the market and creates the demand is recreational diving activities. The average time for diving training is 1 week. The candidate is supposed to come to the facility where diving training is given and stay during the training. Therefore, diving activities have a direct effect on the length of stay in a region. Besides, people who come for accommodation can also be directed to diving activities. Similarly, the historical, cultural, and natural values of a destination have a complementary effect on diving activities.

Marine megafauna has profound effects on the economic value of tourism. As an instance, being available in 119 countries, whale watching tourism attracts approximately 13 million participants over the year in which over US\$2.1

billion is generated involving income to both operators as well as businesses such as hotels, souvenirs, and restaurants (O'Connor *et al.* 2009).

As another striking instance, the small island states which are located in the Indo-Pacific region are often characterized by a relatively limited variety of economic opportunities (Scheyvens and Momsen 2008). And yet, their tropical locations, diversity of marine life along scenic beauty draw a great deal of attention as a holiday destination. That's how tourism has become a major source of revenue for these island states and progressively occupies an essential position in their economies (Ghina 2003; McElroy 2003).

In the fiscal year of 2009-2010, the total revenues generated by the tourism industry in Palau was estimated at approximately US\$144 million. The contribution of the diving industry was estimated at approximately US\$85 million, which was equal to 39% of the GDP (Anon 2010). The shark diving industry is asserted as being accounted for at least 8% of the GDP while the shark and ray diving industry reaches nearly US\$22.8 million annually in the Canary Islands (Vianna *et al.* 2011). The next session discusses the relationship between sustainability and sustainable development.

The Relationship between Sustainability and Sustainable Development

Emerging as a policy concept in the Brundtland Report, sustainability is fundamentally defined as a “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” (WCED 1987). The definition of the term raises a fundamental paradox of how economic advancement and progress would be maintained while the environment is being protected. Based upon that fundamental paradox, three pillars of sustainability are presented as environmental protection, economic, and social development (The UN 2002). As the literature on sustainability increases, the link between sustainability and economic development has been criticized by a vast number of scholars (Emas 2015).

When the previous studies in sustainability research are reviewed, directions and achievements especially within the last decade indicate substantial progress. Increasing theoretical and methodological strengths also initiate pioneering approaches in sustainability research in terms of theory, methodology, and implementation (Fondahl and Wilson 2016; Ford and Goldhar 2012; Reid *et al.* 2009). First and foremost, the co-production of knowledge is asserted as a prerequisite in terms of sustainability transformation. ‘Co-production’ is a joint process that entails collaboration between academics and partners such as governments, communities, or businesses. In addition, knowledge co-production includes six dimensions: gathering, integration, interpretation, communication,

dissemination, and application of knowledge, which are better suited to address complex challenges in sustainability governance (Petrov *et al.* 2016).

The discussions related to sustainability are grouped in Costanza and Patten (1995) 's study under three significant questions. As a sustainable system is associated with survival or persistence, the first question asks which system or subsystems persist. The second question is the continuation of the first one: for how long? And the last question is about the right time for the system/subsystem assessment. Sustainability assessment, as a significant process in which the implications of a purposive attempt at sustainability are evaluated, increasingly gains prominence in aiding sustainability (Pope *et al.* 2004). Since the systems possessing improper longevity balance hold potential to become either "brittle" if their parts resist too long not to get adaptive fast enough or "sustainable" enough to last, the longevity of the higher-level system is cut too short (Holling 1992).

Based upon three pillars, sustainable development also entails a threefold process. In order to implement sustainable development, the first step is to ensure a political system that encourages active participation in decision-making. The second step is to develop an economic system, which generates sustained surpluses. The last step is to build a social system, which delivers solutions to tensions resulting from disharmonious development. This process also recognizes human rights based on balanced life conditions in terms of economic, environmental, and social norms (Wydra and Pulzl 2013). However, there is still an urgent need for inter and transdisciplinary studies including new methodologies to assess the outcomes of sustainable development and improve the processes.

Emerging as a relatively new form of environmental governance, the adaptive governance framework is developed to coordinate resource management while coping with the complexity and the uncertainties of environmental change (Folke 2006). In recent years, environmental governance systems have been forced to be adaptive due to uncertainties caused by global environmental change and the risks associated with climate change, as well as different points of view to implement mandatory targets and timetables to deal with greenhouse gas emissions (Brunner and Lynch 2010; Keskitalo *et al.* 2010). Adaptive governance can be described as a type of governance that connects institutions, individuals, agencies, and organizations at multiple organizational levels. In this governance model, key individuals assume the leadership, elicit a vision, and build trust. Accordingly, adaptive governance literature mainly focuses on resilience, environmental governance, and social-ecological systems (Cumming *et al.* 2006). The next session further discusses the concept of sustainable diving tourism.

Sustainable Diving Tourism

The development of the tourism sector has accelerated a significant transformation of infrastructure and facilities. Tourism has emerged alongside scientific exploration and authority involvement. The relationship among industry, research, and government is defined as “a triple helix” by Etzkowitz (2003). According to this model, the collaboration of authorities and universities leads to innovation by means of their innovative roles. As environmental concerns have become part of industrial thinking, sustainable policies are suggested for tourism planning and development (McDonald 2009). Since it is widely perceived as a utilizer of common-pool resources through diverse stakeholders (Viken 2011), the environmental and societal impacts of tourism especially in fragile regions drawn more attention recently.

The majority of scuba diving tourism research has concentrated on two aspects primarily. The first one is the environmental aspect; in which the interaction between the underwater environment and scuba divers and its potential ecological impacts are examined (Haddock-Fraser and Hampton 2012; Dimmock and Musa 2015). The second aspect is sustainable development in regard to the environmental perceptions and willingness to contribute to the marine conservation of divers (Hillmer-Pegram 2014). On the other hand, the aforementioned aspects are not sufficient to portray the sustainability process of scuba diving tourism since sustainability research entails mixed methods of examination from various angles including multiple stakeholders by investigating several case studies (Hillmer-Pegram 2014).

Implementing sustainability goals in scuba diving tourism necessitates a number of initiatives ranging from quality service delivery to customers to environmental conservation in which the interactions between environmental, economic, and social systems and their impacts on the industry are studied holistically. In this process, challenges to the scuba diving industry such as rapidly changing technology, heightened environmental pressure from tourism, greater competitiveness within the industry, legislation and governance issues, market diversification, and competition with other industries ought to be examined in detail as well (Jentoft *et al.* 2012; Haddock-Fraser and Hampton 2012; Dimmock *et al.* 2013). The next session discusses wreck diving in Çanakkale.

Wreck Diving in Çanakkale and Its Economic Responses

The Çanakkale Strait, or Dardanelles with its historical name, is a strait and international waterway that separates the continents of Asia and Europe and connects the Aegean Sea and the Marmara Sea. In 2019, an underwater workshop was held in order to evaluate the underwater potential of the TR22 Level 2 Region, which covers Çanakkale and Balıkesir provinces, and also to determine the short and long-term goals of the region. The advantages and disadvantages of the region were analyzed within the framework of the opinions and suggestions of the participants in the workshop organized with the contributions of the relevant stakeholders under the coordination of the Southern Marmara Development Agency (GMKA 2019). The inclusion of Gallipoli WWI sites to the UNESCO World Heritage Tentative List in 2014 is expected to propel tourism activities in Çanakkale.

Çanakkale is listed among the prominent provinces of Türkiye in terms of the number of visitors it hosts throughout the year and offers various opportunities to entrepreneurs who plan to invest in different types of tourism. Graphic 1 presents the number of people who visited Çanakkale between the dates of 2015-2020.

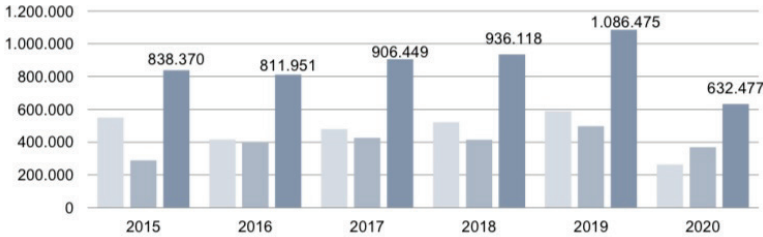


Figure 1. Visitors of Çanakkale Between the Years 2015-2020 (Republic of Türkiye Ministry of Culture and Tourism 2020)

According to a Pre-Feasibility Report prepared for scuba diving investment in Çanakkale (GMKA 2021), there are 967 marine tourism operators in Türkiye; 270 of them belong to underwater operators while 9 of them are located in Çanakkale. The Gallipoli Historical Underwater Park in Çanakkale has become the first underwater park under the theme of WWI owing to 14 sunken ships during WWI. The shipwrecks within the provincial borders of Çanakkale can be divided into three categories from a chronological perspective; ancient shipwrecks, shipwrecks belonging to WWI, and shipwrecks after WWI. Studies on shipwrecks mainly concentrate on WWI while there is a lack of information about ancient shipwrecks (Türkel and Gökdemir 2021).

The pre-Feasibility Report (RTMCT 2021) indicates that proximity to accommodation facilities is considered an important factor to be taken into

attention in determining the investment location. In the same report, it is predicted that the investment site cost will be around \$125,000 and the diving centre building construction cost will be around \$150,000 while the investment is expected to reach the breakeven point in the 22nd year. At this point, it is thought that it will be very important to determine the target audience as divers coming from abroad instead of local divers and to develop the diving centre customer portfolio in cooperation with foreign agencies. Thus, it will be possible to increase the diving centre revenues (GMKA 2021).

It is thought that the most important negative impact of the investment in terms of environmental sustainability would be related to the waste that may arise from diving activities. As a matter of fact, it is seen that environmental problems related to waste come to the forefront when the studies of diving tourism are examined. For instance, within the scope of a research conducted in the Kaş district of Antalya, it is stated that boats are meticulous about waste management, but difficulties are encountered when it comes to tourists (Yarmacı *et al.* 2017). Solid wastes can harm underwater creatures, especially because they descend both on the water's surface and under the water. Besides, similar concerns are discussed within the scope of different studies. Within the scope of another study conducted to evaluate the potential of diving tourism in Çanakkale and to raise awareness about diving tourism, it is stated that activities related to diving tourism may cause some negative effects on marine life, but these negative effects can be prevented by trained people (Mercan *et al.* 2021).

The establishment of the Battles of Gallipoli Historical Zone Administration in 2014 and the launch of the shipwreck diving project in 2017 has revived scuba diving tourism in Çanakkale. Being the best-preserved battle zone, Gallipoli Historic Underwater Park hosts 14 different diving points with 2 natural reefs and 12 battleship wrecks residing in 7 meters to 72 meters. SS Milo, Massena, Saghalien, Maria Delle Vittorie, and Vincenzo Florio wrecks are located close to the surface (7 meters) while Tuzla Web is located at 10 meters, and HMS Louis is at 13 meters. The deeper shipwrecks start with Arıburnu Lighter at 18 meters, H.M.S. Majestic at 23 meters, Helles Barges at 25 meters, Lundy at 27 meters, Arıburnu Barge at 25,8 meters, Küçükkemikli Barges and Mania Web at 30 meters. The deepest ones are Bebek Reef at 44 meters and HMS Triumph at 72 meters.¹

The SS Milo, which started its voyage as a cargo ship on September 9, 1865, was connected to the British Navy with the outbreak of WWI and sent to Çanakkale in 1915, and was used to transport cargo and soldiers during the expedition. The coastal area where the ANZAC parade ground is located today

¹ For more information please check Gallipoli Historical Underwater Park website: <https://www.divinggelibolu.com/homepage>

was used as a harbour in 1915 and a pier called William was built on the beach (Akingüç 2016). Massena, a Senegal Class passenger ship, was built in the 1890s as a pre-dreadnought battleship for the French Navy. She was named after Andrea Massena, one of the key actors of the French Revolution (Simigielski 1985). Located in Ertuğrul Cove, she keeps its form despite the loss of its superstructure. Located in the same Cove, Saghalién was also a Senegal Class passenger ship. She was built in 1879 and used as a rescue vessel for French citizens before the battle in Gallipoli in 1914. Bought and brought by the British Admiralty to Gallipoli in 1915, Vincenzo Florio was built in 1882 in Italy as a passenger/cargo steamship. Another Italian passenger ship, Maria Delle Vittorie means St. Mary of Victories in English. There is still a lack of information about the ship (www.divinggelibolu.com).

Previously known as *Diana Vernon* and *Worthing Belle*, the Tuzla Ferry was built in 1885 by Barclay, Curle & Co as a paddle steamer. She was sunk in 1915 by a British warship (www.paddleducks.co.uk). Another popular dive spot within Suvla Bay, close to the Büyükkemikli promontory, is the HMS Louis Destroyer. Resting on sandy, flat ground at 40°18.794'N, 26°13.562'E coordinates, the general condition of the shipwreck is bad unfortunately. On the afternoon of 30 October 1915, HMS Louis collided with a tow boat anchored in front of Suvla Bay (Kolay *et al.* 2013). The nearest port is 6.9 nautical miles from Kabatepe Port. The identity of the shipwreck, known as the "water purification ship" for many years, was determined after the source and archive research of the Australians during the Gallipoli Historic Underwater Park Project. The reason why it is considered a water treatment vessel is the four Yarrow brand marine-type steam boilers on it. The extensive destruction of the wreck makes it impossible to definitively explain the final cause of the sinking. Therefore, the official report of the Royal Navy is accepted (Wytykowski *et al.* 2011).

Being the largest pre-dreadnought of the period, HMS Majestic was a Majestic-class battleship of the Royal Navy. Launched on 31 January 1895, the Majestic weighed 16,060 tons. It was 128 meters long, 23 meters wide, and 8.2 meters high. She served in the Channel Fleet until 1904, after which she was assigned to the Atlantic Fleet. When WWI started, she joined the combined navy established for the Battle of Çanakkale. On 27 May 1915, she was sunk by the German submarine U-21 under the command of Otto Hersing (Burt 2013). Currently, she is a highly popular diving spot for international divers.

Lundy was built in 1908 as a trawler for whaling. In 1914, right after the beginning of WWI, she entered under the command of the British Ministry of War and took part in the Battle of Çanakkale in 1915 as a patrol boat. Lundy, which anchored in Suvla Bay in August 1915 when the Battles of Anafartalar was at its height, was exposed to the fire of Turkish coastal artillery while

loading ammunition from the middle part of the port of the British transport ship HM Kalyan on 16 August 1915 (Kolay *et al.* 2013).

Another famous diving spot belongs to a shipwreck sunk after WWI. Owned by Rederi AB company under the name SS Inger between 1932-1955, the cargo ship SS Captain Frangos was used by AB Baltic Lloyd Line Limited between 1955 and 1965 as SS Wanda. The last owner, Greek shipowner Nikolaos Frangos, named the ship after himself and she was used as Panama-flagged between 1965-1968. The SS Captain Frangos, under the command of Captain Panagiotopoulos, set off from Albania, loaded with asphalt, to go to Varna Port in Bulgaria, on February 19, 1968, and collided with a freighter named Dimos at a point between Kilitbahir Village and Havuzlar locality in the Dardanelles. The wreck of the SS Captain Frangos cargo ship is located at 40°07.957'N - 26°21.945'E coordinates and is 2.3 nautical miles from Çanakkale Port. The bow of the ship, which is in a reclined position to the port side, is 41 meters deep, 47 meters below the stern, and 28 meters deep in the belly. The wreck is in generally good condition and its popularity is increasing (Evcen *et al.* 2022).

Being a Swiftsure-class pre-dreadnought in the Royal Navy, HMS Triumph was originally known as Libertad and prepared for Chile but the project was transferred to the United Kingdom. Triumph was launched on January 15, 1903, and weighed 12,370 tons. She was 144.9 meters long, 21.7 meters wide, and 8.3 meters high. She served in the Channel Fleet and the Main Fleet before being appointed to the Mediterranean Fleet in 1909. In 1915, she joined the combined navy formed for the Dardanelles War. On 25 May 1915, she was sunk by the German submarine U-21 commanded by Otto Hersing (Burt 2013). Located at 72 meters, HMS Triumph particularly draws the attention of international technical divers.

The shipwreck inventory in Çanakkale, especially regarding the ancient wrecks and after WWI is open to updating. These wreck diving spots offer potential to place Çanakkale among the best wreck diving locations all around the world. Conclusion and suggestions are given in the next session.

Discussion and Conclusion

In recent years, efforts to bring underwater cultural heritage to tourism in Çanakkale have gained momentum. Being an upper-scale project of the Gallipoli Historical Site Presidency of the Gallipoli Wars, the H.M.S Majestic, Massena and Saghalien Shipwrecks, Helles Barges, Maria Delle Vittorie and Vincenzo Florio Shipwrecks, Ariburnu Lighter, Küçükkemikli Barges, Ariburnu Barge, Lundy, HMS Louis, SS Milo and HMS Triumph wrecks become prominent among the diving spots of the WWI themed Gallipoli Historical

Underwater Park. Besides, other famous wreck diving spots such as Captain Frangos draws significant attention.

In terms of diving tourism, there are studies carried out in the academic field together with research carried out in the public sphere. As an instance, within the scope of a study aiming to create a route for shipwrecks that do not require technical diving, it is seen that four different routes have been proposed for the shipwrecks detected in and around the Dardanelles Strait (Türkel and Gökdemir 2021). It is concluded that the studies carried out in both public and academic fields will contribute to the transformation of Çanakkale into a centre of attraction in terms of diving tourism. Herein, it is evaluated that the factor of proximity to the areas where the shipwrecks are dense can be considered as a reason for preference in terms of choosing the site of establishment. On the other hand, only 9 underwater operators are not sufficient to place Çanakkale among to best wreck diving locations. These investments ought to be planned collaboratively from an inclusive governance perspective.

It is also concluded that there are several measures to be taken which range from environmental governance and engagement in planning to social responsibility, education, and training to enhance sustainability and ensure sustainable development of diving tourism in Çanakkale, Albeit the heterogeneity of issues, sustainable development goals can be achieved once the authorities adopt the adaptive governance framework while conducting their activities.

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Ghost fishing over the shipwrecks of Gallipoli Campaign (Çanakkale, Türkiye)

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Abstract

The phenomenon of ghost fishing, characterized by the persistent capture of marine organisms by lost or abandoned fishing gear, poses a significant threat to underwater cultural heritage, particularly around historic shipwrecks. This study focused on the ghost fishing and its impact on shipwrecks in the Gallipoli Campaign during World War I in Çanakkale, Türkiye. Underwater surveys were carried out between July and September 2023. The research explores the entanglement of fishing gear around these shipwrecks, assessing its ecological consequences on marine life and the structural integrity of the shipwrecks. The study also emphasizes the need for comprehensive documentation, monitoring, and management strategies to mitigate the adverse effects of ghost fishing on both biodiversity and historical artifacts. Recommendations include establishing monitoring programs, involving local communities, raising awareness, implementing regulations, and organizing underwater cleanup events.

Keywords: Ghost fishing, shipwrecks, underwater cultural heritage, marine conservation

Introduction

Ghost fishing, a term established by Breen (1990), is influenced by the introduction of highly durable fishing gear crafted from nonbiodegradable synthetic materials. This phenomenon, indirectly impacting fishing stocks, describes the persistence of lost or abandoned fishing gear that remains in a functional position (Angiolillo 2019). These gears may persistently capture and harm a broad spectrum of organisms over an extended period (Matsuoka *et al.* 2005; Brown and Macfadyen 2007; Galgani *et al.* 2015). While some prey might escape, those ensnared in these traps and pots face death by starvation or become bait, attracting new victims (Kühn *et al.* 2015). Many papers have reported that the lost fishing gear remained fishing for a while longer (Fowler 1987; Kaiser *et al.* 1996; Ayaz *et al.* 2004, 2006, 2010; Matsuoka *et al.* 2005;

Macfadyen *et al.* 2009; Uhlmann and Broadhurst 2015). The duration for which lost fishing gear continues to entangle organisms varies significantly, depending on location, gear size, and structure, increasing the risks of entanglement (Erzini 1997; Matsuoka *et al.* 2005; Erzini *et al.* 2008). Heavily colonized lost fishing gear undergoes alterations in weight, mesh size visibility, and catch efficiency (Erzini 1997). In deeper waters, ghost fishing appears to persist for longer periods, as fouling takes more time (Breen 1990). The extent of fouling may indicate the age of lost gear (Saldanha *et al.* 2003), with the most encrusted items presumed to be of older origin. However, debris may exhibit species-specific variations in fouling organism abundance, depending on material, geography, depth, and season (Saldanha *et al.* 2003). Due to the extremely slow degradation of nylon, lost gears may endure for a decade (Thompson *et al.* 2004; Barnes *et al.* 2009; Watters *et al.* 2010). During this time, they accumulate on the sea bottom, altering the surrounding benthic habitat, covering wide portions of settled communities, and impeding the recolonization of various large organisms (Saldanha *et al.* 2003; Galgani *et al.* 2015).

Ghost fishing gear encompasses fishing gear that has been abandoned, lost, or otherwise discarded, much of which frequently remains unnoticed. Ghost fishing gear stands out as the most lethal type of marine plastic due to its indiscriminate capture of wildlife, ensnaring marine mammals, seabirds, sea turtles, and sharks, leading them to a gradual and agonizing demise caused by exhaustion and suffocation. Furthermore, critical marine habitats like coral reefs suffer damage from ghost fishing gear. Moreover, it contributes to the depletion of economically significant fish populations, jeopardizing the overall sustainability of fisheries and impacting communities reliant on fish for sustenance and livelihoods.

Artificial reefs are deliberately positioned benthic structures, crafted from natural or man-made materials, with the aim of protecting, enhancing, or restoring components of marine ecosystems (Seaman and Lindberg 2009). Modern applications of artificial reefs encompass improving the effectiveness of artisanal, commercial, and recreational fisheries, generating new biomass in fisheries and aquaculture, enhancing opportunities for underwater recreation and ecotourism, preserving and rejuvenating coastal habitats and biodiversity, and advancing research. In recent decades, certain artisanal fishing communities have adopted more contemporary designs of artificial reefs, deploying them on larger scales. This response is, in part, a reaction to the damage inflicted on habitats and fisheries due to coastal land-use practices and more intensive fishing methods, such as trawling (Seaman and Lindberg 2009). Nevertheless, fishing equipment like gillnets and longlines employed in the vicinity of these shipwrecks gets shredded by the sharp metal structures of the ships, getting entangled and remaining stuck on the wrecks. Subsequently, these fishing tools persist in their activities around the shipwrecks.

As exploration and surveys in deep coastal waters expand, shipwreck sites are frequently discovered to be heavily entangled in fishing nets or broken and scattered by trawl doors and weights (Kingsley 2010; Brennan *et al.* 2012, 2013). Historic and ancient shipwrecks are both irreplaceable cultural sites and features of the modern seabed that serve as important artificial reef habitats (Walker *et al.* 2007). Efforts to protect such sites from mobile fishing gear activities have been minimal; even some of the marine protected areas (MPAs) that have been established still allow commercial fishing (U.S. Dept. of Commerce *et al.* 2010). One of the primary obstacles hindering proper assessment, protection, and management of these underwater cultural resources, however, is sparse documentation of the damage inflicted on wreck sites and the adjoining seabed. The problem is especially acute considering the limited accessibility of deep water to most researchers and resource managers (Brennan and Ballard 2014). The essential component lacking in this area of research is the thorough documentation of threatened and damaged sites by means of return visits and repeated surveys.

In addition to working toward appropriate management of underwater cultural heritage (UCH), a more comprehensive understanding of mobile fishing gear damage to shipwrecks is imperative for protecting sites targeted for their commercial value. The UNESCO Convention on the Protection of the Underwater Cultural Heritage of 2001 stipulates that in situ preservation of cultural sites should be considered as the first option for management (UNESCO 2001; Maarleveld 2011). However, the threat that trawl activities present to many shipwreck sites has been used by salvage companies, such as Odyssey Marine Exploration, to justify the commercial salvage and sale of valuable materials from wreck sites for profit (Kingsley 2010; Pringle 2013).

The destructive effects of mobile fishing gear towed along the seabed have long been a topic of concern for benthic ecologists (Jones 1992; Collie *et al.* 2000; National Research Council (NRC) 2002; Puig *et al.* 2012). However, in this chapter, we will focus on the ghost fishing over the shipwrecks sank during the Gallipoli Campaign of World War 1 (WW1).

Material and Methods

Study Area

The Gallipoli Historical Zone Administration, established in 2014, has a mission to safeguard the site of the Battle of Gallipoli and promote awareness of the battles for future generations (Anonymous 2023). Recognized as the best-preserved battle zone, it has been included in the UNESCO World Heritage Tentative List. The conservation efforts extend beyond land, as demonstrated by the Gallipoli Historical Underwater Park Project initiated in 2017. This project

aims to locate and unveil the sunken ships from the Battle of Gallipoli, making them accessible to visitors following protective measures. The project serves as an ongoing initiative to raise awareness about the Battles of Gallipoli. Simultaneously, advanced digital technologies have been employed to locate and document shipwrecks in the Çanakkale Strait and the Aegean Sea dating back to World War I. This comprehensive underwater research project is dedicated to preserving the shipwrecks from the Battle of Gallipoli for future generations. It also involves the identification and conservation of submerged ships from the Gallipoli Campaign, with the goal of enhancing awareness and accessibility to these historically significant sites. The project provides diving opportunities to explore 12 war wrecks and 2 natural reefs, offering a unique and immersive experience to witness the history of the war.

Shipwrecks Surveyed in the Study

Eight shipwrecks in the Gallipoli Historical Underwater Park were surveyed during the underwater surveys (Figure 1). The name, location and depth information of shipwrecks are given in Table 1.

Table 1. Shipwrecks surveyed in the study

Shipwrecks	Type	Location	Depth (m)
Louis	Destroyer	Suvla Bay	13
Lundy	Minesweeper	Suvla Bay	27
Küçükkemikli Barges	Barge	Küçükkemikli	30
Ariburnu Lighter	Lighter	Küçükkemikli	18
Ariburnu Barge	Barge	Anzak Cove	28.5
SS Milo	Steam-powered passenger ship	Anzak Cove	5-7
Helles Barges	Barge	Seddülbahir	25
HMS Majestic	Battleship	Seddülbahir	18-23

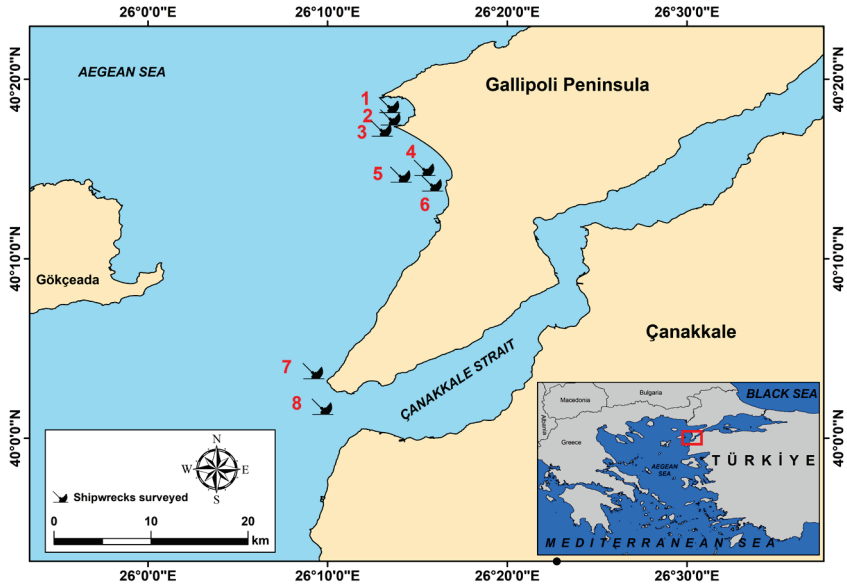


Figure 1. Location map of the shipwrecks in the study (1: HMS Louis, 2: Lundy, 3: Küçükkemikli Barges, 4: Arıburnu Lighter, 5: Arıburnu Barge, 6: SS Milo, 7: Helles Barges, 8: HMS Majestic)

Results and Discussion

Eight shipwrecks in the Gallipoli Historical Underwater Park were surveyed during the underwater surveys and ghost gears were recorded. During the underwater surveys, longlines were observed as ghost gears over ‘Lundy’ (Figure 2).

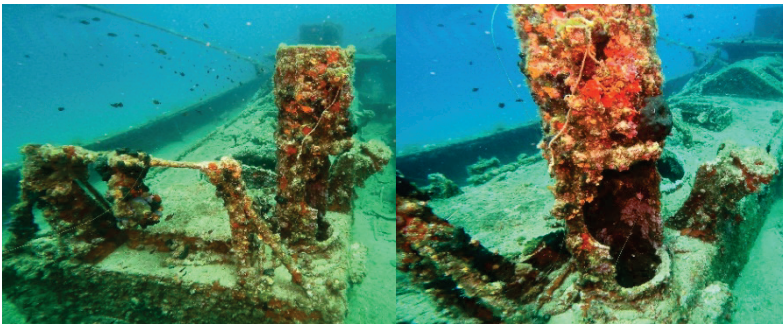


Figure 2. Longlines were observed as ghost gears over ‘Lundy’ shipwreck

In another survey, trawl nets and ropes were observed around the Ariburnu Barge located at 28.5 m depth in Anzak Cove (Figure 3).

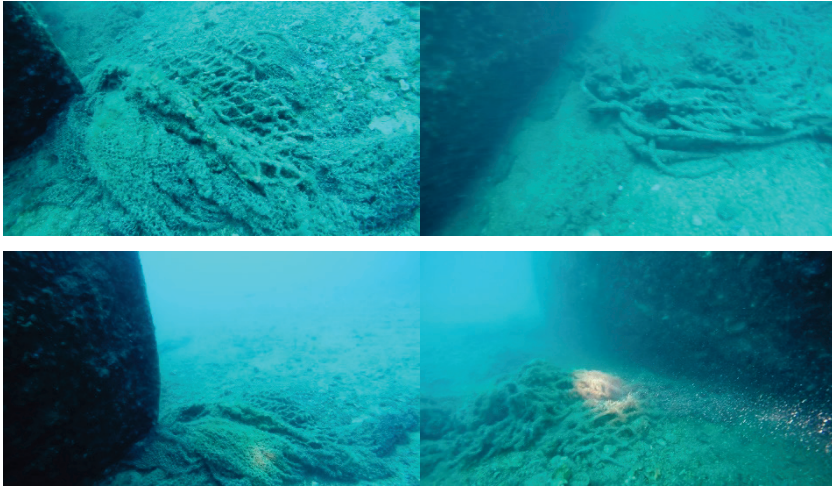


Figure 3. Trawl nets and ropes around the ‘Ariburnu Barge’ shipwreck

Fishing lines and ropes were observed over the ‘Ariburnu Lighter’ shipwreck in Küçükkemikli (Figure 4). Considering the citizen science and local knowledge, it is known that fishing lines, locally known as thick longlines, are used to catch *Dentex dentex*, *Sparus aurata*, *Scorpaena scrofa* species in the region. These species were observed during the SCUBA diving surveys (Figure 5). Shipwrecks serve as artificial reefs and enhance the biodiversity. As a matter of fact, the ghost gears observed during the underwater surveys continued to fish and increase the biodiversity around the shipwrecks.

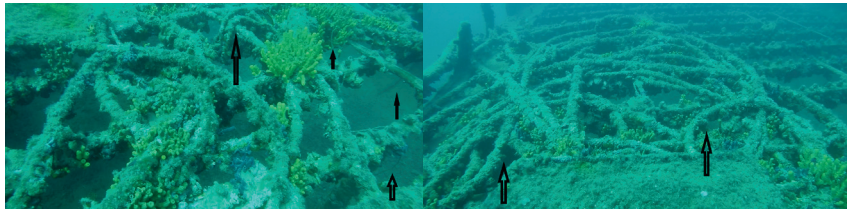


Figure 4. Fishing lines and ropes over ‘Ariburnu Lighter’ shipwreck

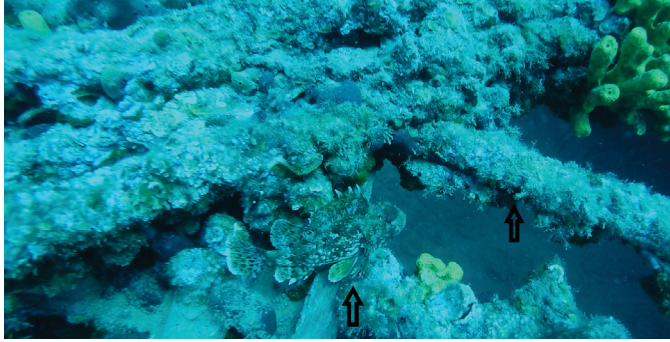


Figure 5. *Scorpaena maderensis* (left arrow) and ropes (right arrow) over the shipwrecks of ‘Küçükkemikli Cape Barges’

Although the broken/shattered ropes create a visually bad appearance around the shipwreck, it is noteworthy that the sponges settled on these ropes and created a new habitat (Figure 4, Figure 5). It is also recommended to make a plan for sessile organisms that settled on derelict fishing gear over the shipwrecks. Scientific researchers, decision-makers and policymakers should carry out joint studies and determine appropriate policies to protect or clean these organisms from shipwrecks, taking into account their ecological niches and ecological services.

Another important problem is the negative effects of the anchors and chains used to anchor diving boats carrying divers to be deployed close to the shipwrecks. This was encountered during underwater surveys while diving into the shipwreck SS Milo in Anzak Cove (Figure 6). During the underwater surveys carried out at different times, it was determined that a previously anchored chain was seen on the shipwreck and was subsequently removed from this area. Additionally, a broken mooring rope of a diving boat was observed on the shipwrecks. Therefore, making legal regulations on this issue is considered to be one of the most important issues.

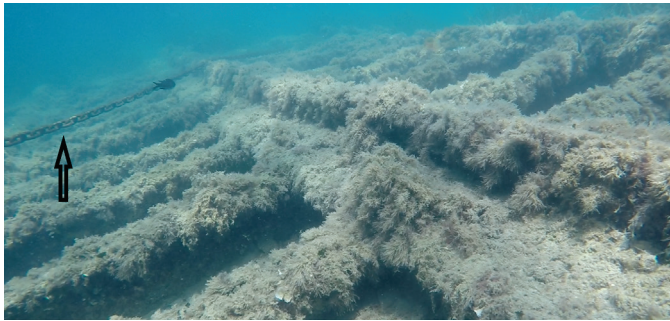


Figure 6. Anchoring chain over ‘SS Milo’ shipwreck



Figure 7. A broken mooring rope of a diving boat

This study reveals that although the areas where shipwrecks are located are known, shipwreck areas are actively used by small-scale fishermen and commercial fishermen. Since the shipwrecks serve as artificial reefs and attract commercially important fish species, fishermen's interest in these regions and shipwrecks increases. Therefore, collecting nets, fishing lines or other materials that cause ghost fishing from shipwreck sites will make significant contributions to the protection of biodiversity and will prevent divers diving in shipwrecks from getting caught or experiencing some negative accidents.

Abandoned, lost, and discarded fishing gear (ALDFG), often referred to as derelict fishing gear, has become an increasing issue, with significant amounts detected in oceans. This presents challenges for marine conservation and management (Gilman 2015; Gilman *et al.* 2021). Various forms of fishing gear persist in fishing activities even when abandoned, lost, or discarded (Do and Armstrong 2023). This phenomenon, known as ghost fishing, occurs with both passive and active fishing gear (Richardson *et al.* 2019, 2021). Evaluating the impact of ALDFG is complicated by the diverse exposure times and catch efficiencies associated with different types of fishing gear, such as nets, lines, traps, and pots. Moreover, it's important to note that not all ALDFG sustain fish capture, and there may be other significant adverse impacts that should not be disregarded (Macfadyen *et al.* 2009). Various factors contribute to the occurrence of ALDFG, with gear characteristics exerting a substantial influence on the likelihood of fishing gear loss (Wilcox *et al.* 2013). Additionally, adverse weather conditions, interactions with wildlife, defective or damaged gear, discards, or operator errors also play a role (Richardson *et al.* 2021). As fishing gear technology has advanced, fishing grounds have expanded, and traditional gears have shifted to synthetic materials offering greater resilience, reduced cost, increased breaking strength, and improved durability. Consequently, over time, the quantity, impacts, and distribution of ALDFG in the oceans have significantly risen (Macfadyen *et al.* 2009; Gilman 2015). The existence of ALDFG can lead to extensive plastic pollution in the marine trophic chain, adverse effects on marine

animal welfare and ecosystems, as well as negative influences on socioeconomic conditions (Wilcox *et al.* 2015; Gilman 2015).

Ghost fishing refers to the phenomenon where abandoned or lost fishing gear, such as nets and lines, continues to catch and kill marine life even when no fishermen are actively using the gear. This often occurs around shipwrecks, where fishing gear can become entangled with the submerged structures. The ghost fishing process begins when the fishing gear is lost or discarded and becomes ensnared on the sharp edges and protruding parts of the shipwrecks.

The impact of ghost fishing on shipwrecks is twofold. Firstly, the fishing gear, now unattended and entangled, continues to capture and entrap marine organisms. This results in unintended bycatch, including fish, crustaceans, and other marine species. The trapped animals face a grim fate, as they are unable to escape from the ensnared gear, leading to a cycle of death and further entanglement. This not only poses a threat to the affected marine life but also disrupts the natural balance of the underwater ecosystem surrounding the shipwrecks. Secondly, the persistence of ghost fishing around shipwrecks contributes to the deterioration of the wrecks themselves. The entangled fishing gear, often made of durable materials like nylon and plastics, can cause physical damage to the shipwrecks over time. The constant rubbing and tension from the ghost gear can corrode and weaken the submerged structures, accelerating their decay. This poses a threat to the historical and archaeological value of the shipwrecks, as well as the marine life that may have made the wrecks their habitat.

Efforts to mitigate the impact of ghost fishing around shipwrecks involve regular monitoring and removal of abandoned fishing gear. Divers and conservation organizations often engage in cleanup operations to free entangled marine life and remove the ghost gear. Additionally, raising awareness about the consequences of abandoned fishing gear and promoting responsible fishing practices are crucial steps in preventing ghost fishing and safeguarding both marine ecosystems and underwater cultural heritage.

Effective management of historic shipwrecks requires considering available management alternatives and selecting the alternative that will provide the highest net benefit to society. To make reasonable decisions, shipwreck managers must consider all current and potential uses (and non-uses) of historic shipwrecks (Kaoru and Hoagland 1994). Interaction between local fishermen and divers, and outreach programs will enhance efficiency and productivity of shipwreck.

Recommendations

The Gallipoli Campaign shipwrecks, like many other underwater sites, are faced with ghost fishing. Therefore, the decision makers and stakeholders may consider the following measures to mitigate the negative impacts:

- Establishing a monitoring program to regularly assess the condition of the shipwrecks
- Involving local communities and diving groups in monitoring efforts
- Raising awareness among fishermen, divers, and the general public about the impact of ghost fishing on marine ecosystems and historic shipwrecks
- Installing marker buoys around the shipwrecks to indicate their location to passing vessels
- Advocating for and support the implementation of regulations that address ghost fishing, such as proper disposal of fishing gear and penalties for illegal dumping.
- Developing strategies for the recovery and removal of ghost gear from the shipwrecks
- Designating specific areas around the shipwrecks as exclusion zones where fishing activities are prohibited
- Organizing regular underwater cleanup events involving trained divers to remove any ghost fishing gear found around the shipwrecks
- Investing in research and technology to develop innovative solutions for the detection and removal of ghost gear from underwater sites
- Collaborating with international organizations and neighbouring countries to address the issue of ghost fishing on a broader scale.

Successful mitigation of ghost fishing requires a combination of regulatory measures, community involvement, education, and ongoing monitoring and cleanup efforts. Implementing a holistic approach can help protect both the marine environment and the historical significance of shipwrecks like those from the Gallipoli Campaign.

In addition to the measures mentioned above, the measures specifically recommended to be taken by divers and the relevant public institutions/organizations are listed below:

- The rules to be followed regarding diving boats should be determined and implemented
- Diving boats should not be moored to shipwrecks in order to prevent them from drifting, shifting or deforming
- The diving boat should be allowed to anchor at least 10 m away from the wreck, and its anchors or ropes should be removed from shipwrecks
- Garbage should not be thrown into the sea from the diving boat

- Any living creature or material (belonging to the shipwreck) should not be allowed to be taken from the shipwrecks, and physical intervention should be avoided
- Foreign divers should be allowed to dive one-on-one with a diver guide
- All dives should be systematically monitored and divers should not be allowed to interfere with any shipwrecks
- Divers should be encouraged to stay away from ghost gears
- Precautions should be taken to avoid divers coming into physical contact with ghost gears and a comprehensive briefing on this matter should be conducted
- Ghost gears on shipwrecks should be cleaned systematically (every year, once a year, twice a year).

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Marine invertebrate fauna (Porifera, Anthozoa) and biodiversity status on the historically important wreck sites of HMS Majestic and Helles Barges (Northern Aegean coast of Türkiye)

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Abstract

In this study, the sponge and Anthozoa fauna on the shipwreck sites (Majestic, Helles Barges), was studied. A total of 24 sponge species and 5 anthozoan were identified, 1 of which *Pseudosuberites sulphureus* is reported for the first time from the North Aegean coasts of Türkiye.

Keyword: Sponges, Porifera, Cnidaria, Anthozoa, eastern Mediterranean

Introduction

Wreck habitats underwater represent one of the highest species-rich areas in marine environment. Considered biodiversity hotspots (UNESCO 2023; Hamdan *et al.* 2021; Lengkeek *et al.* 2013), these areas also play a crucial role in attracting a variety of marine life around them. With the feature of an artificial reef site, shipwrecks enable various fish and invertebrates to attach hard surfaces, hide in the inner parts and avoid their predators. Over long periods, these structures gain significant species diversity. Due to these factors, biodiversity in shipwrecks is mostly much higher than in other marine areas (Jensen *et al.* 2000). Many sponge species and corals, in particular, need hard substrata to settle for their sustainable life (Ricardo *et al.* 2017; Bertolino *et al.* 2019). Although sponges are slow to reproduce in new habitats due to various requirements (substrate quality, food particles, light, current regime), they can often emerge in later stages of community succession (Carballo *et al.* 1996; Boaventura *et al.* 2006; Walker *et al.* 2007). In this respect, facies areas of sponges and corals have an important place among the species richness of shipwrecks (Walker *et al.* 2007).

Wreck sites are also accepted as ecologically and biologically valuable marine areas in the latest conventional meetings on biological diversity regarding global recommendations for sustainable resources in ecosystems (SBSTTA 2023; NCCOS 2023). New research showed that wrecks as artificial habitat-featured host more fish than those in natural reef sites (Paxton *et al.* 2020). Further studies of long-term monitoring comparing the status of species richness reveal the highest rate of marine life around the artificial wreck sites just as impressive as that of measuring around the natural reefs (Lee *et al.* 2023). The historical significance of shipwrecks is also another focus of interest in research issues. A project recently launched in the Çanakkale Strait aiming to introduce the underwater cultural heritage of war wrecks and their regulation in the diving community is a multipurpose example (Türkmenoğlu and Kocabaş 2021).

A total of over 250.000 wrecks, some still unknown, are estimated in the ocean and seas, 15.000 of which are thought to have been sunk during war times, according to the Global Maritime Wrecks Database, a relatively small portion of which have been investigated for archaeological or biological purposes (UNESCO 2002; NOAA 2016; Gorvett 2023). In the United Kingdom, as indicated in the UNESCO Conventions on the Protection of the Underwater Cultural Heritage, the wreck sites of battleships are accepted as heritage assets and thus are sustainably being protected and evaluated for other formal issues. The most known wreck areas, much of them naturally sunk, close to the European countries and around the North Atlantic, where wreck sites have been largely documented, are given in Ireland, Scotland, and the Dutch continental shelf in the North Sea. It is informed that over 18.000 wrecks around the Irish sea, 497 of which were reported in detail in INFOMAR shipwreck inventory, with the new discoveries of 4000 wrecks in the Western Europe Basin and in Celtic Sea (GSI 2023). Spectacularly, over 20.000 wrecks are known around the waters of Scotland, which is a highly valuable issue in the country regarding its underwater cultural heritage (Crawford and Moir 2023). The Dutch continental shelf contains over 10.000 wrecks according to Jager (2013) that are both archeologically and commemoratively important. Victorian coasts around the English channel is also another underwater heritage with over 650 shipwrecks including submarines, steamships and ferries (Heritage 2012). There are over 8000 wreck sites around Australia's coastlines, which are under formal protection according to the Underwater Cultural Heritage Act 2018 (DCCEEW 2021).

Thousands of sunken vessels are present (4% of the world's shipwrecks) at the bottom of the Mediterranean Sea (Sprovieri *et al.* 2013). Sessile epifauna growing on shipwrecks have globally been the subject of various studies since the 1960s (Wendt *et al.* 1989; Gabriele *et al.* 1999; Amaral *et al.* 2000). One of the most important reasons why shipwreck fauna is rarely studied, especially in the deep sea, is due to technical problems. (Massin *et al.* 2002; Reiswig 2018).

Regarding the benefits of wrecks in the marine environment, the main sectors (heritage, nature conservation, commemoration, international interests, recreation, fishing) raising the importance of these sites were presented in recent works (Firth 2018). Forming wreck sites artificially and using the naturally-sunk ones for the economy are also among the common understandings of Blue Growth due to their benefits for fishery richness, conservation, marine tourism, biotechnology, research and education. To date, natural wreck sites and intentionally formed artificial reefs have been evaluated by many countries for environmental and economic purposes. Advanced management planning and sustainable usage may be addressed in recent investigations (Minelli *et al.* 2021).

There is a limited background concerning marine biology and biodiversity research on wrecks. Recent investigations show that the artificial coral reef communities on sunken vessels support scientists in monitoring environmental changes by comparing the natural reefs with long-term population dynamic studies (Lee *et al.* 2023). In the wreck site of SS Lusitania located on Bellows Rock off Cape Town, South Africa, the status of high biodiversity (sponge, coral, tunicate, lobsters) was reported by Southwood (2011). Another study focusing on 16 sponge species revealed basic demographical data supported by 3D photogrammetry methods from the Tibetts shipwreck in the Caribbean Sea (Olinger *et al.* 2019). Among the wreck sites (HMAS Perth-Australia, SS Yongala-Australia, SMS Karlsruhe-Greece, USS Liberty-Indonesia, Fujikawa Maru-Micronesia, SS President Coolidge-Vanuatu, USS Oriskany-USA, SS Thistlegorm-Egypt, HMS Hermes-Sri Lanka), some served as having abundant and diverse coral existence represent the most attractive artificial coral reef spots for divers in the world (Ferreira 2023). In the study performed by Jimenez *et al.* (2017) focusing on epibenthic community structure around the wreck sites in the Eastern Mediterranean region, it was found that the benthic cover of corals on shipwrecks was the highest among other groups of marine biota.

There are a limited number of studies on the benthic biodiversity of shipwrecks in the Mediterranean (Gravina *et al.* 2021). While some of these studies (Costa 2016; Jimenez *et al.* 2016; Meyer *et al.* 2017) focus on the ships that sank within 100 years, with others mainly regarding the fauna of archaeological remains (Ricci and Bartolini 2005; Davidde *et al.* 2017; Ricci *et al.* 2019).

The Turkish seas have a broad underwater heritage, especially around the Turkish Straits System (Çanakkale Strait, İstanbul Strait, Marmara Sea). During wartime, many ships were sunk in the waters of the Gallipoli Peninsula and in the Çanakkale Strait (Dardanelles), which holds the largest number of ships sunk due to natural causes in Türkiye. To date, wreck sites in the Turkish straits have been limitedly documented. Cekan (2003), known as the former pioneering underwater documentary filmmaker of Türkiye, was the first person who took

an underwater video of TCG Dumlupınar submarine during their joint expedition carried out in the Çanakkale Strait (Nara Cape), formally supported by Çanakkale Onsekiz Mart University Fisheries Faculty (Bilim-1 Research Vessel) and ATV news. In the following years, several Ottoman battleship wrecks (Ceyhun, Kios, Rehber, Halep, Eleanora, Mesudiye) and some other submarines sunk during World War I (Saphire, Mariotte, Joule) were first investigated throughout the Çanakkale strait by the scientific diving team of COMU under a running project owned by the Çanakkale Naval Command (Özalp 2007). Regarding commemorative purposes, Dumlupınar the submarine, which is memorably accepted as an underwater martyrdom in the Turkish seas, has been a subject of two underwater documentary films named “Dumlupınar: Final Say Long Live the Homeland” (Karakaş 2003) and “Dumlupınar Last Dive” (Akça 2014). In recent years, marine surveys aiming to discover unknown wrecks around the Gallipoli peninsula, Çanakkale Strait and the associated regions (Bozcaada, Gökçeada-North Aegean Sea) have increased. According to the latest literature, several new wreck sites informing some valuable historical data were reported for the first time from the area (Kolay 2015, 2017, 2022).

Formerly, although research mainly on the final physical conditions of battleships at their sunken locations in the Turkish Straits System were revealed in the recent studies (Özalp 2010), data is still very scarce in relation to the investigations on marine life and biodiversity around the wreck sites. According to Özalp *et al.* (2017) 6 taxons involved 5 coral species were evaluated within a preliminary study aiming to search three shipwrecks in the Çanakkale Strait. In the latest research performed by Evcen *et al.* (2022) a total of 29 sponge species were reported, 25 of which were new for the region.

This study aimed to reveal for the first time the habitat structures in two shipwreck sites by comparing the diversity, cover percentage, and species composition of scleractinian coral and sponge communities in each shipwreck.

Materials and Methods

Scientific dives were made at two shipwreck sites located at the interconnection of the North Aegean Sea and the entrance point of the Çanakkale Strait (Dardanelles) between September 2023 and October 2023 (Figure 1). The substratum around the shipwreck’s survey area (Seddülbahir) is characterized by a gravelly-sandy bottom and there is a limited occurrence of seagrass beds of *Posidonia oceanica* among rocky substrates in the upper infralittoral zone on the shore coastline. The overall area of shipwrecks was first manta-towed with underwater scooters and at each shipwreck, random photo samples were taken on the horizontal and vertical walls in the semi-dark and dark areas of the shipwrecks, inner parts included, using a Canon G16 camera with a close- and wide-angle. Additionally, to confirm the taxonomic identity of the samples,

small pieces of encrusted sponges and a small number of coral individuals were taken from the wrecks. The World Porifera Database was used for the determination of the sponge samples in the current study (Van Soest *et al.* 2014). The scleractinian species presented here were taxonomically identified according to Zibrowius (1980) and examined under a binocular microscope in Water Quality Laboratory, the faculty of Marine Science and Technology, Çanakkale Onsekiz Mart University.

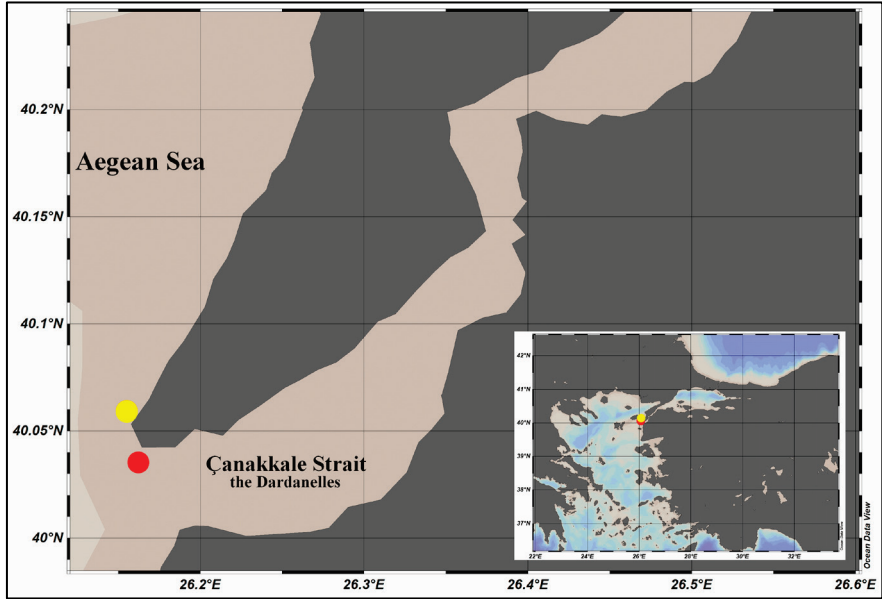


Figure 1. Map of the area surveyed showing the locations of the shipwrecks examined (Red: HMS Majestic, Yellow: Helles Barges).

Result and Discussion

This study showed that shipwrecks in the Northern Aegean Sea varied in light intensity even at this early stage and were colonized by different groups of animals. However the number of species reported here is not representative of the true diversity of the wrecks, as cryptic species were not considered. In the studied shipwreck sites (Majestic, Helles Barges), a total of 24 sponge species were identified, one of which, *Pseudosuberites sulphureus* is reported for the first time from the North Aegean coasts of Türkiye. Among the anthozoan species observed in the area, *Hoplania durotrix* was first reported from the wreck site ecosystems of the Turkish Seas, although its distributional character and facies ecology in the Çanakkale Strait have not yet been published in detail.

There are striking differences in terms of sponge and coral species diversity in the two shipwreck areas where research was conducted. Among the wrecks examined, the sponge species diversity at the Helles Barge wreck site is higher, with the most abundant encrusting sponges, *Geodia cydonium* and *Spirastrella cunctatrix*, that basically preferred the horizontal surfaces of wrecksite (Table 1, Figure 2, 3, 4). *G. cydonium*, with some individuals over 33 cm height in diameter, was observed as massively distributed on lighting surfaces of Helles Barge. The colonial scleractinian coral *Hoplangia durotrix* has the most extensive existence on the dimlylit parts associated with coralligenous facies of Majestic wreck site.

One of the key differences that makes Majestic Shipwreck significant and ecologically fragile is that it also forms a living area for the endangered coral species *Cladocora caespitosa* around the site. At some locations on the wreck site, especially on the ship's funnel and other lighted surfaces that are shallower than the wreck's existing point, *C. caespitosa* shows a patchy-reef character with only four colonies.

The solitary coral *Caryophyllia (Caryophyllia) inornata* is commonly occurring on the dark parts of both wreck sites, with the difference that it is spreading over coralligenous communities on Majestic wrecks, while the species is broadly found around the deep sea oyster *Neopycnodonte cochlear* facies on Helles Barges. *N. cochlear* was abundantly recorded on the dark sides of the mentioned wreck site above, whereas the well-lighted sides of the Majestic wreck site are mostly represented by dense algae facies (Figure 5).

According to the Barcelona and Bern Conventions, five species are recognized as endangered or threatened species. These are the sponges *Aplysina cavernicola*, *Geodia cydonium*, *Sarcotragus foetidus*, *Spongia (Spongia) lamella*, and the Anthozoa *Cladocora caespitosa*. They were abundant and commonly found in the wrecks, except for *Spongia (Spongia) lamella*, which was rare.

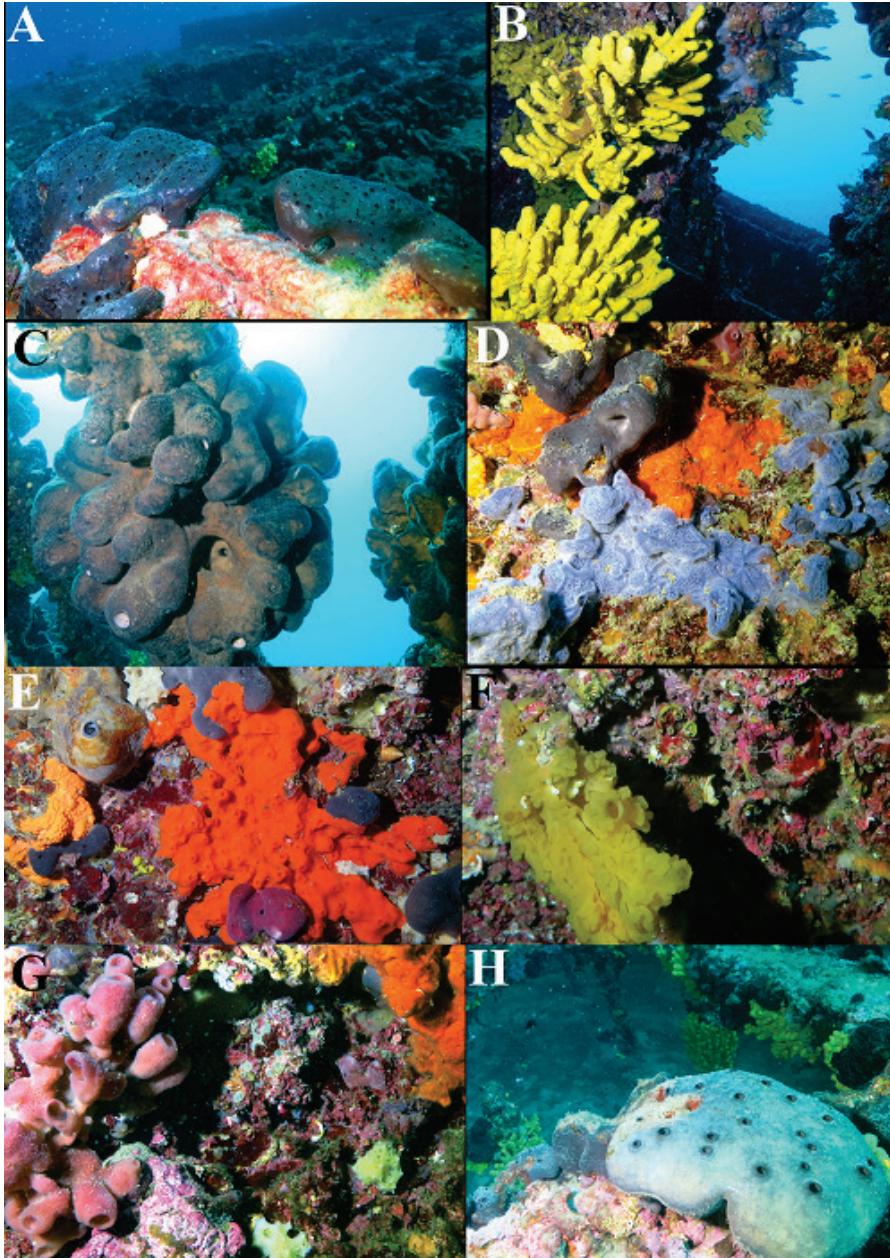


Figure 2. Some sponge species from the wrecksite of Helles Barge. A: *Spongia* (*Spongia*) *lamella*, B: *Aplysina cavernicola*, C: *Geodia cydonium*, D: *Phorbas tenacior* (in blue color), E: *Haliclona* (*Halichoelona*) *fulva* (in red color) F., *Oscarella lobularis* G. *Haliclona* (*Reniera*) *mediterranea*, H. *Ircinia oros* (North Aegean Sea coasts of Türkiye).

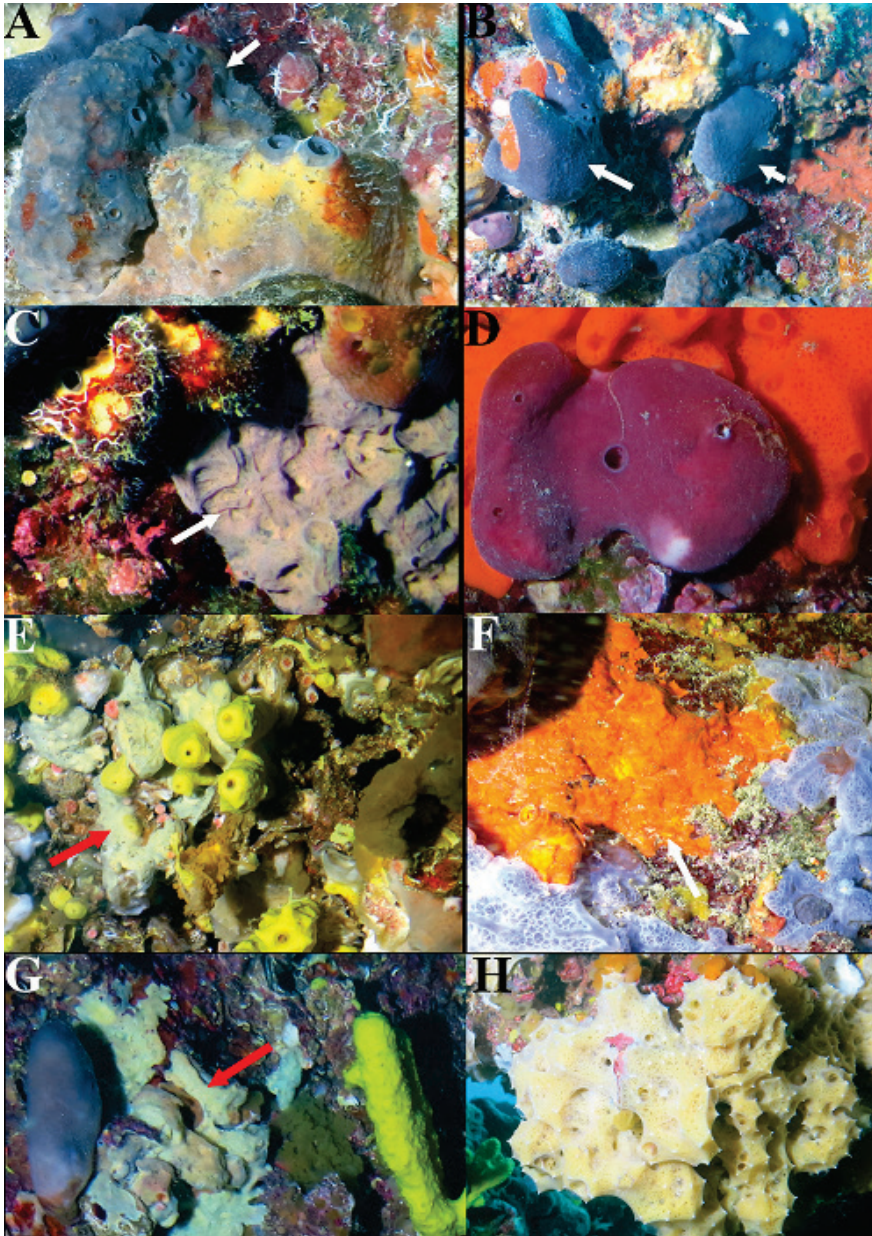


Figure 3. Some sponge species from, Helles Barge continuing. A. *Sarcotragus foetidus*, B. *Sarcotragus spinosulus*, C. *Hexadella racovitza*, D. *Petrosia (Petrosia) ficiformis*, E-G. *Pseudosuberites sulphureus*, F. *Spirastrella cunctarix*, H. *Dysidea avara* (North Aegean Sea coasts of Türkiye).

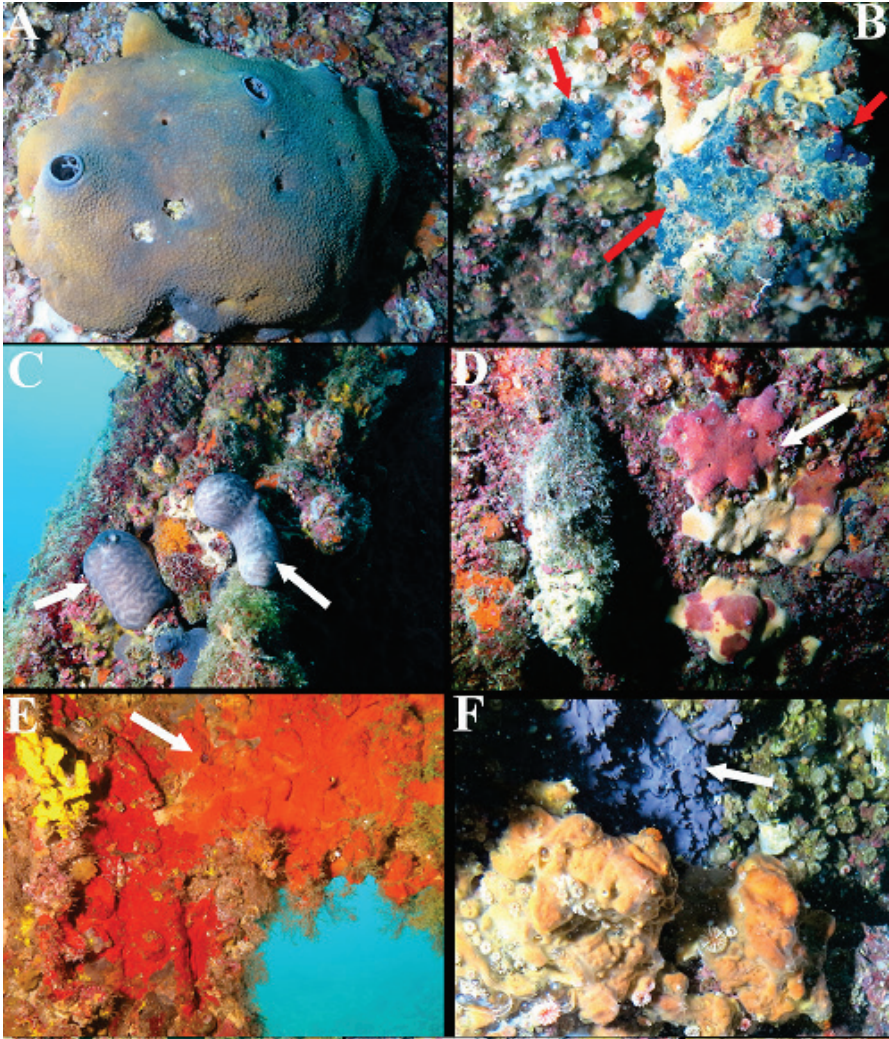


Figure 4. Some sponge species observed on the Majestic wreck. A: *Ircinia oros*, B: *Terpios gelatinosus*, C: *Chondrosia reniformis*, D: *Ircinia variabilis*, E: *Crambe crambe*, F: *Hexadella racovitzai* (North Aegean Sea coasts of Türkiye).

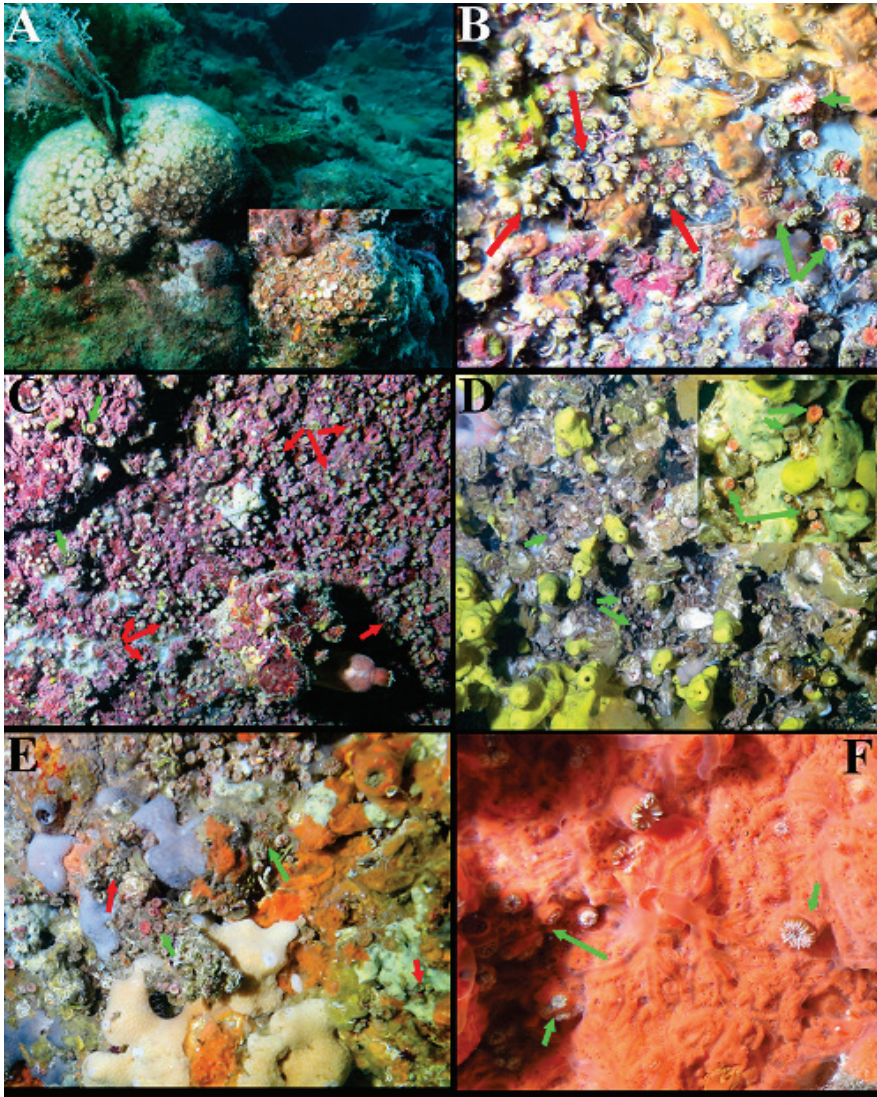


Figure 5. Coral species recorded at the Majestic and Helles Barge wreck sites. A. *Cladocora caespitosa*, B. *Hoplangia durotrix* (red), *Caryophyllia* (*Caryophyllia*) *inornata* (green)-Helles Barge, C. *H. durotrix* (red), *C. inornata* (green)-Majestic, Dense occurrence of *H. durotrix* associated to coralligenous facies (>90%-quadrat: 20cm*20cm), D. Occurrence of *C. inornata* among facies of *Neopycnodonte cochlear*-Helles Barge, E. *H. durotrix* (red), *C. inornata* (green)-Majestic among sponge facies-Majestic, F. Occurrence of *C. inornata* on sponge facies of *Crambe crambe* (North Aegean Sea coasts of Türkiye).

Table 1. Recorded species and their abundance at the wreck sites.

	MAJESTIC	HELLES BARGE
Depth	17-24 m	26-28 m
PORIFERA		
<i>Agelas oroides</i> (Schmidt, 1864)	*	*
<i>Aplysina cavernicola</i> (Vacelet, 1959)	*	*
<i>Aplysilla sulfurea</i> Schulze, 1878	*	-
<i>Chondrosia reniformis</i> Nardo, 1847	-	*
<i>Crambe crambe</i> (Schmidt, 1862)	-	*
<i>Dysidea avara</i> (Schmidt, 1862)	*	*
<i>Geodia cydonium</i> (Linnaeus, 1767)	-	*
<i>Haliclona (Halichoclona) fulva</i> (Topsent, 1893)	-	*
<i>Haliclona (Reniera) mediterranea</i> Griessinger, 1971	-	*
<i>Hexadella racovitzai</i> Topsent, 1896	*	-
<i>Ircinia oros</i> (Schmidt, 1864)	*	*
<i>Ircinia variabilis</i> (Schmidt, 1862)	-	*
<i>Oscarella lobularis</i> (Schmidt, 1862)	*	*
<i>Petrosia (Petrosia) ficiformis</i> (Poiret, 1789)	*	*
<i>Pseudosuberites sulphureus</i> (Bowerbank, 1866)		-
<i>Phorbas tenacior</i> (Topsent, 1925)	-	*
<i>Phorbas plumosus</i> (Montagu, 1814)		
<i>Pleraplysilla spinifera</i> (Schulze, 1879)	-	*
<i>Protosuberites denhartogi</i> van Soest & de Kluijver, 2003	*	-
<i>Sarcotragus foetidus</i> Schmidt, 1862	-	*
<i>Sarcotragus spinosulus</i> Schmidt, 1862	-	*
<i>Spirastrella cunctatrix</i> Schmidt, 1868	*	-
<i>Spongia (Spongia) lamella</i> (Schulze, 1879)	-	*
<i>Terpios gelatinosus</i> (Bowerbank, 1866)	*	-
CNIDARIA		
<i>Caryophyllia (Caryophyllia) inornata</i> (Duncan, 1878)	*	*
<i>Caryophyllia (Caryophyllia) smithii</i> Stokes & Broderip, 1828	*	*
<i>Balanophyllia europaea</i> (Risso, 1827)	*	-
<i>Hoplangia durotrix</i> Gosse, 1860	*	*
<i>Cladocora caespitosa</i> (Linnaeus, 1767)	*	-

(■ <10 individuals; ■ 10-30 individuals; ■ 40-50 individuals; ■ 60-100 individuals; ■ >100 individuals).

(■ <10 individuals; ■ 10-30 individuals; ■ 40-50 individuals; ■ 60-100 individuals; ■ >100 individuals).

The Turkish Seas host numerous shipwrecks with their high historical value and memorial importance. However, there are a limited number of studies on marine biology and biodiversity around the wreck sites in the Turkish Seas. There is some research focused on searching for fish diversity around the artificial wrecks. Acarlı *et al.* (2020) in their study found 28 species belonging 19 families from a wreck site in Gökçeada island. In former studies, some benthic communities (5 anthozoans, 2 echinoderms, 1 tunicate, 33 fish, 31 algae) associated with three shipwrecks in the Çanakkale strait were reported by Özalp *et al.* (2017) within a preliminary biodiversity survey. Regarding sessile faunal facies in the Turkish Straits system, Evcen *et al.* (2022) revealed 29 sponge species from the wreck site of Captain Frangos in the Çanakkale Strait.

Although ten sponge species found on the wreck site of Captain Frangos were given from the Çanakkale Strait as the first records as representatives for the Sea of Marmara in Evcen *et al.* (2022), it should be accepted as the new findings for the strait's character only, since in fact the strait is not essentially represented by the Marmara sea, but instead, a mixing marine habitat with two-layered water system (upper: Black Sea waters through Marmara Sea, lower: Mediterranean waters through the Aegean Sea).

The results obtained in this study also point out the need for comprehensive research to determine the spatial-temporal changes and functional characteristics of benthic species communities on shipwrecks. However, more intensive sampling is needed to distinguish ecological patterns and have a comparable study among the wreck sites around the region.

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Current condition of the Dardanelles Campaign shipwrecks from a diver's point of view and technical diving requirements

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Abstract

Dive surveys were carried out to the Irresistible, AE2 submarine, HMS Majestic, Lundy, SS Milo, Louis, Arıburnu Barge, Arıburnu Lighter, Helles Barges and the Unknown shipwreck, all belonging to the Allied Powers, which sank around the Gallipoli Peninsula during the Dardanelles Campaign of the World War I. Providing a preliminary information and recommendations for divers of any purpose were aimed, together with the comparison of the original and current conditions of ships, diving plans in consideration with sea and weather conditions and what to see from a perspective of marine biodiversity.

Keywords: Dardanelles, Gallipoli, shipwreck, scuba diving, technical diving

Introduction

Dardanelles Campaign also known as the Gallipoli Campaign was one of the most violent battles of World War I, both at sea and on land, Turks and the Allies suffered many losses. The most advanced battleships of those years encountered an unexpected resistance. Some were sunk by land artillery, some by mines, and some by allied German submarines.

Çanakkale as being one of the important historical and cultural tourism attraction sites in Türkiye, has a great diving tourism potential through the sunken ship wrecks during and after the World War I (Türkel and Gökdemir 2021). Diving to see these wrecks that have been lying on the seabed for more than a century, helps to sense how brutal the Battle of Gallipoli was. Giant battleships that took lives in the past have now become life-giving and protective habitats for nature.

The shipwrecks were like hidden treasures known only by historians, academicians and a few enthusiasts. In order to reveal these treasures to meet people from all around the world, "Gallipoli Historical Underwater Park

Project” was initiated by the Directorate of Gallipoli Historical Site in 2017. The project aimed to identify and conserve the shipwrecks while presenting them to visitors in accordance with protection measures. In the first place, among many more, the most accessible 12 shipwrecks and 2 natural reefs have been chosen to be protected and opened to visitors under the administration of the Directorate of Gallipoli Historical Site.

Here in this study, we aimed to present 10 shipwrecks with the stories starting from their last days to present, the safe ways to reach them by means of scuba diving and the beauties to be seen on and around them. Since 3 of these wrecks lie at the depths out of the limits of recreational diving, technical diving requirements, the safest routes and dive profiles were offered.

Materials and Methods

The study has two different methods; one is included in the procedures of sportive scuba diving, the other is the technical diving applied out of the limits of sportive diving. Recreational scuba diving surveys were conducted for HMS Majestic, Lundy, SS Milo, Louis, Arıburnu Barge, Arıburnu Lighter and Helles Barges by both authors and three other colleagues, during the summer season of 2023, while technical dives were conducted for Irresistible, AE2 and the Unknown wreck, by only the first author, in different years. For recreational dives, a commercial diving boat was hired with the support of the Directorate of Gallipoli Historical Site. Technical dives were organized by the first author’s personal efforts. All dives were recorded with an underwater video camera system, GoPro hero10 and 30000 lumen light system mounted on the handle. Images were captured from the videos.

The ships are listed in the order of their dates of sinking; starting from the oldest, except for the last 4, which 3 of them are barges and 1 is the so called unknown wreck.

IRRESISTIBLE

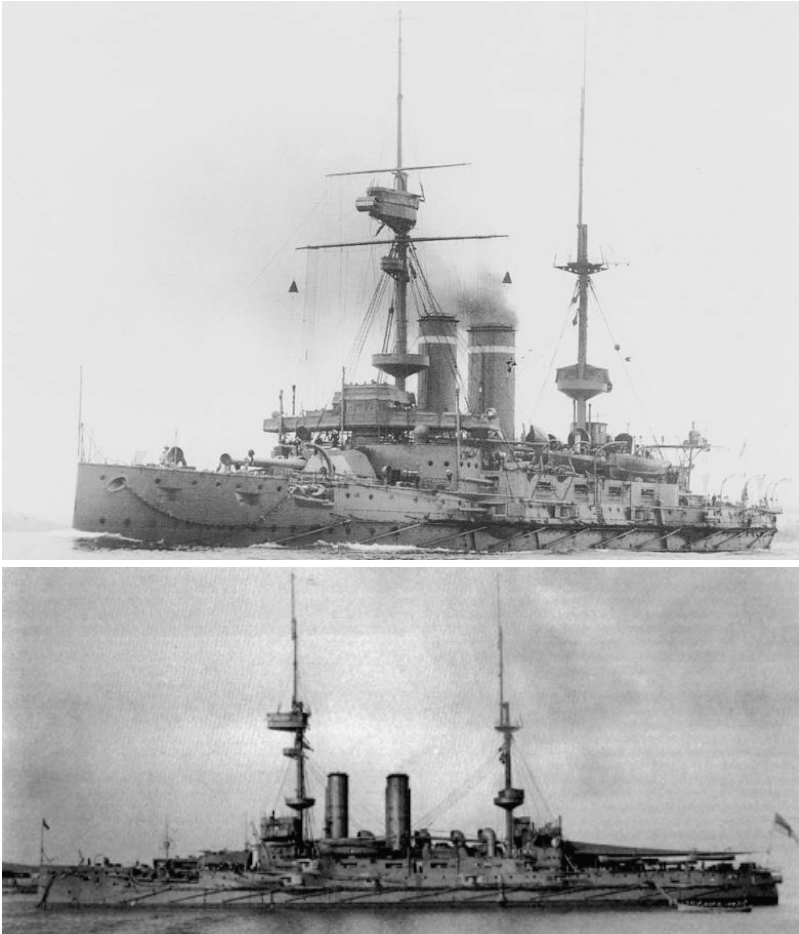


Figure 1. Formidable class pre-dreadnought battleship Irresistible (Liman 2023)

Irresistible was assigned to bombard the forts and batteries along the Dardanelles Strait. On the 1st of February 1915, she arrived at the Aegean Sea entrance of the strait and served as the flagship of the British Royal Navy until March 1915.

She was similar in appearance to its predecessor, the Majestic and Canopus classes (Figure 1), with 125.30 m length, 22.86 m beam, 7.92 m draught and 15.805 tons displacement.

Armament: 40 caliber 12 inches (300 mm), 40 caliber 6 inches (150 mm).

Complement: 711 (peacetime), 780 (wartime)

Irresistible, together with the other ships of Allied Naval Fleet, attempted to cross the Dardanelles many times but could not pass the narrowest part of the strait, Kilitbahir. After the attacks, ships were manoeuvring in the wide areas of the strait, Erenköy (İntepe) Bay and Dardanos fronts, to return back. At first, Irresistible was hit by Anadolu Hamidiye battery then the explosion of a mine that had been laid by the minelayer Nusrat, caused her to incline on starboard. She was also hit on the conning tower by a howitzer shell and another mine blew up under her starboard engine room. There were 200 casualties. After nearly a two hours long struggle on the surface, she was abandoned, the remaining crew were rescued by Destroyer Wear and another British battleship, Ocean. On 18th March 1915, at about 19:30 she sunk. She is now buried upside down at 63 m deep (Kolay *et al.* 2015).

Top point of the wreck is at 49 m, the deepest part is at 63 m depths (40°04.438 N, 26°20.441 E). The cannons on the side boards can be recognized (Figure 3). There are two large cracks at the stern and at the bow (Figure 4). These cracks were opened as a result of the use of dynamite within the scope of “Removing and Selling the Wrecks of Ships Sunk in Çanakkale”. Precious metals, together with shafts and propellers were all taken.

In order to dive to Irresistible, within the scope of technical diving procedures, divers need to have technical diving certificates (e.g. Trimix) and dives should be carried out under the leadership of a diver guide (Figure 2).

Dive plan report				

Bühlmann zh-116 A, GF 30/85				
Max depth: 63 m OC Dive				
Altitude: 0 meters - Salinity: 35 ppt				
Water density: 1025.97				
63m, 15min, TX 17/45 OC Tank#1, Gas weight: 4.4 Kg. (24 l./230b/5520 l.)				
Deco gases list:				
EAN 50, @22 meters, Tank#2, Gas weight: 2.2 Kg. (7 l./230b/1610 l.)				
Projected decompression:				
DEPTH	GAS TYPE	PRESSURE	TIME	RUN

63m	TX 17/45	151 Bars	11'	15'
27m	TX 17/45	148 Bars	1'	20'
24m	TX 17/45	145 Bars	1'	21'
21m	EAN50	221 Bars	1'	22'
18m	EAN50	213 Bars	1'	23'
15m	EAN50	206 Bars	1'	24'
12m	EAN50	193 Bars	2'	26'
9m	EAN50	177 Bars	3'	29'
6m	EAN50	154 Bars	5'	34'
3m	EAN50	109 Bars	12'	46'
0m	EAN50	109 Bars		47'
Start ONS: 0,0% - OTU's: 0,0				
Final ONS: 14,7% - OTU's: 38,7				
GAS CONSUMPTION LIST:				
No	GAS TYPE	CONS	Δ WEIGHT	RESID.

1	TX 17/45 OC	2036 l. (- 1.6 Kg.)		145
2	EAN50 OC	849 l. (- 1.1 Kg.)		109
TOTAL USED GAS WEIGHT: (- 2.8 Kg.)				
First leading compartment: C03827				
Last leading compartment: C0883				
PastoDecoD 5.0.0 Andr				
82m00m00m00m				

Figure 2. A dive profile sample for Irresistible

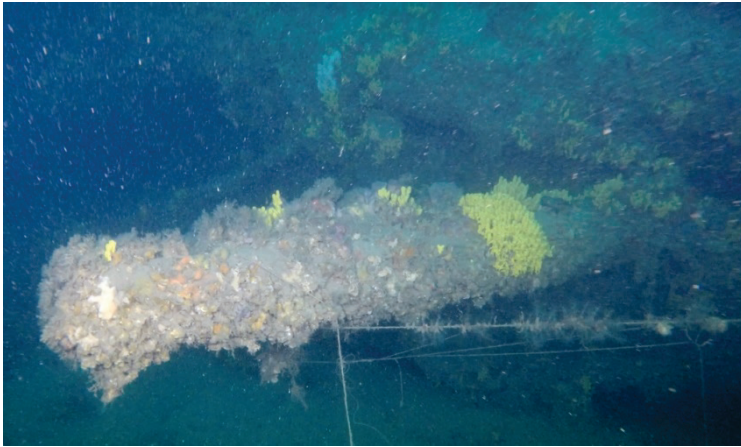


Figure 3. A cannon on the side board of Irresistible



Figure 4. One of the cracks opened by the dynamites used to dismantle the wrecks

During southwest winds, visibility may be poor due to the shifts in direction of surface and bottom currents.

AE2 SUBMARINE

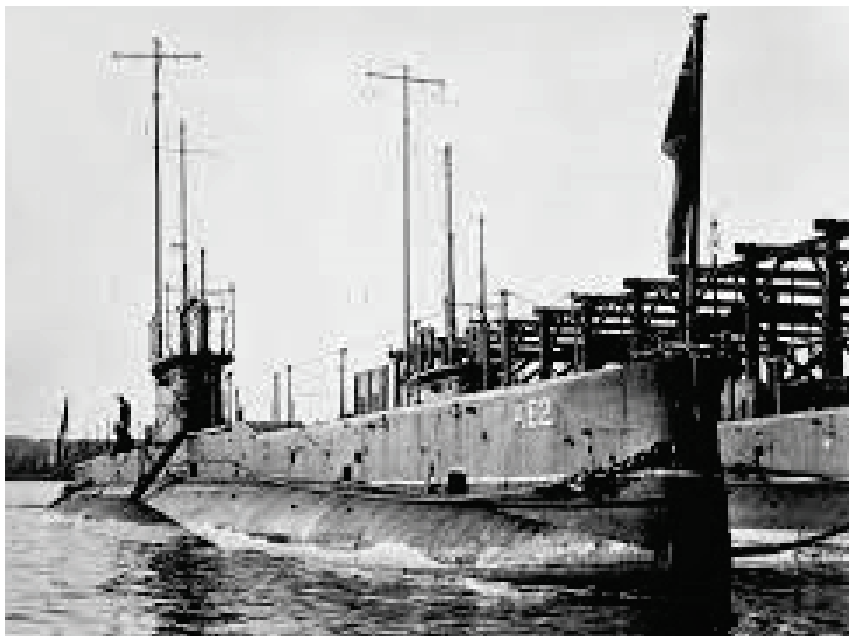


Figure 5. AE class (E class, Group 1) submarine HMAS AE2 (AWM 2023)

AE2, the first submarine in history to pass the Dardanelles Strait and reach the Sea of Marmara was a British made, E-class submarine ordered by Australia for a better coastal safety. She was the most high-tech, largest, and fastest of her time. However, her mission to head to İstanbul and block the transportation of supplies to the Gallipoli fronts ended up on 30 April 1915, when hit near the engine room, by the Turkish torpedo boat, Sultanhisar. Her commander, Lieutenant Henry Hugh Gordon Dacre Stoker made a decision to surrender, while sending his ship to the depths of Marmara Sea by opening the ballast valves in order to avoid the Turks to capture her.

AE2 is now resting at 72 m depth off Karaburun (40°32.696 N, 27°16.173 E). Its wreck stands tall on the silty/muddy sediments that easily causes turbidity and makes it even harder to get a clear vision at that depth. When reached to the wreck, first thing realized is the open hatch of the sail (Figure 7).

The fauna over the wreck (Figure 7) is quite different from the other shallower wreck sites. There are various soft corals, sponges and large sized starfishes. The water temperature was 15°C in August, so dry suits must be preferred. Due to its location near the entrance of Dardanelles Strait, strong surface current towards may be challenging depending mainly on the season.

Diving to AE2, technical diver competency is required. Prior to diving, it is mandatory to make proper preparations and be accompanied by a diver guide who knows the area well. The bottom gas trimix mixture must be adjusted to this depth and deco gases nitrox and pure oxygen cylinders and emergency procedures must be ready to use. A large diving boat is necessary for technical diving equipment and it must be adequate to interfere in emergency response (Figure6).

Dive plan report				

Bühlmann zh-116 A, GF 30/85				
Max depth: 70 m OC Dive				
Altitude: 0 meters - Salinity: 35 ppt				
Water density: 1025.97				
70m, 15min, TX 16/47 OC Tank#1, Gas weight: 4.3 Kg. (24 l./230b/5520 l.)				

Deco gases list:				

EAN 50, @22 meters, Tank#2, Gas weight: 2.2 Kg. (7 l./230b/1610 l.)				

Projected decompression:				

DEPTH	GAS TYPE	PRESSURE	TIME	RUN

70m	TX 16/47	142 Bars	11'	15'
33m	TX 16/47	138 Bars	1'	20'
30m	TX 16/47	135 Bars	1'	21'
27m	TX 16/47	132 Bars	1'	22'
24m	TX 16/47	129 Bars	1'	23'
21m	EAN50	221 Bars	1'	24'
18m	EAN50	205 Bars	2'	26'
15m	EAN50	191 Bars	2'	28'
12m	EAN50	178 Bars	2'	30'
9m	EAN50	156 Bars	4'	34'
6m	EAN50	124 Bars	7'	41'
3m	EAN50	68 Bars	15'	56'
0m	EAN50	68 Bars		57'

Start CNS:	0,0%	- OTU's:	0,0	
Final CNS:	17,8%	- OTU's:	46,4	

GAS CONSUMPTION LIST:				

No	GAS TYPE	CONS	Δ WEIGHT	RESID.
1	TX 16/47 OC	2419 l.	(- 1.9 Kg.)	129
2	EAN50 OC	1137 l.	(- 1.5 Kg.)	68

TOTAL USED GAS WEIGHT: (- 3.4 Kg.)				

First leading compartment: C02833				
Last leading compartment : C0983				

PastoDeco 5.0.0 Andri				

Figure 6. A dive profile sample for Irresistible

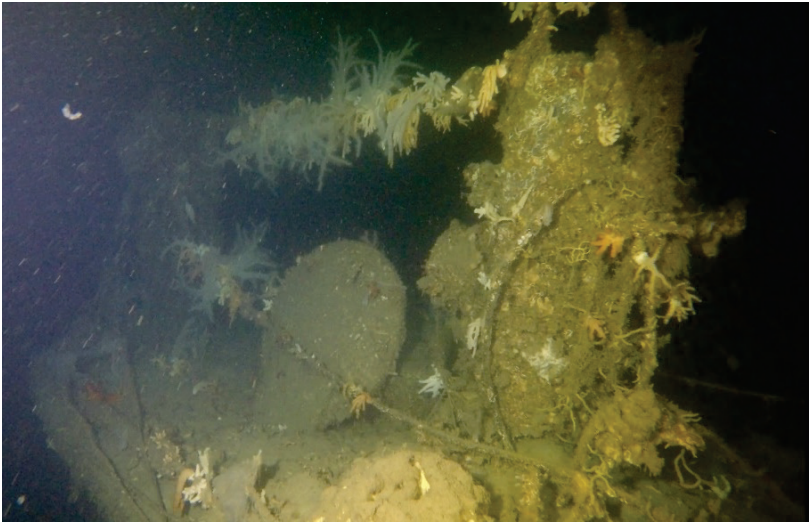


Figure 7. The open hatch and the extraordinary fauna of AE2

HMS MAJESTIC

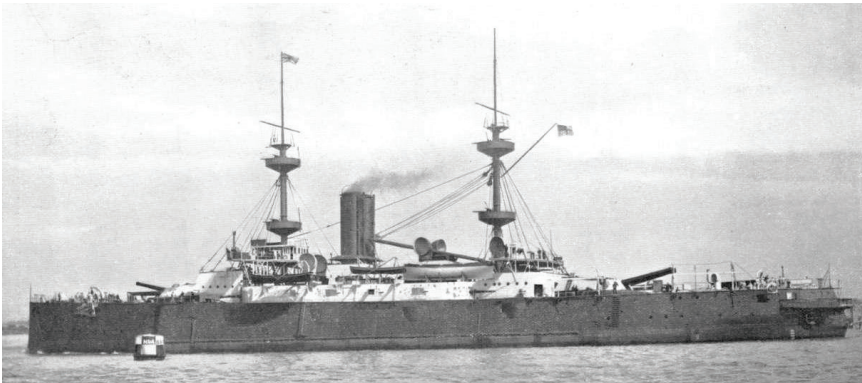
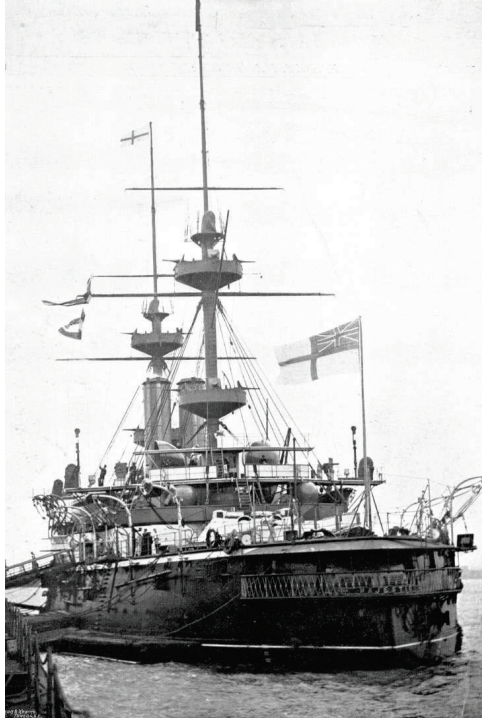


Figure 8. Majestic-class battleship HMS Majestic (Liman 2023)

Despite the oppositions of Churchill in the first place, regarding the ship is too old for a battle, he was convinced by the officials and HMS Majestic was assigned to the Dardanelles Campaign on 1st February 1915. She arrived at the Dardanelles strait on 25 February and served for the British Royal Navy until May 1915.

Her Majesty's Shipping (HMS) Majestic was one of the largest ships of that period (Figure 8), weighing 16,060 tons, being 118,87 m long, 22,86 m wide, 8,23 m high and capable of a speed of 16.5 knots. Two BL 12-inch Mk VIII guns with two forward 12 turrets (Figure 9) 4 with 12-gun machine, 12 with 6-gun machine, 16 with 12-gun pdr machine, 12 with 3-gun pdr machine, 2 maxim. She was a ship with heavy armament, having 2 2-pdr boat machine guns and 5 torpedo tubes.

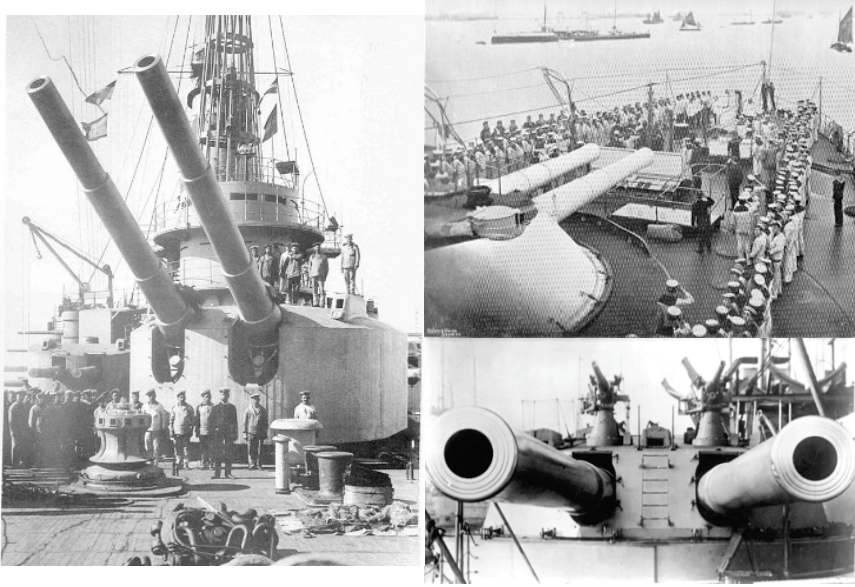


Figure 9. Heavy armament of HMS Majestic (Liman 2023;Adelante 2023)

HMS Majestic's tragic end is told in detail, in the first chapter of this book. She now rests in eternity at a depth of 24 m, off Seddülbahir Mehmetçik Lighthouse of the Gallipoli Peninsula (40° 02.647 N, 26° 09.909 E).

However, the ship could not maintain its integrity. It was dismantled within the scope of the legal regulation regarding the salvage of the wreckage of ships sunk in Turkish territorial waters and the collection and sale of war scrap and materials. Its huge cannons, many of its cannonballs, its deck and valuable parts were cut off, sent to Istanbul and sold. In addition, some of the remaining parts were taken by scrap dealers and fishers of the period. Even this plunder and the time passed through, it is possible to recognize the locations of the cannons, the cannonballs, turrets places, a part of the wheelhouse, and the steel cables (Figure 10).

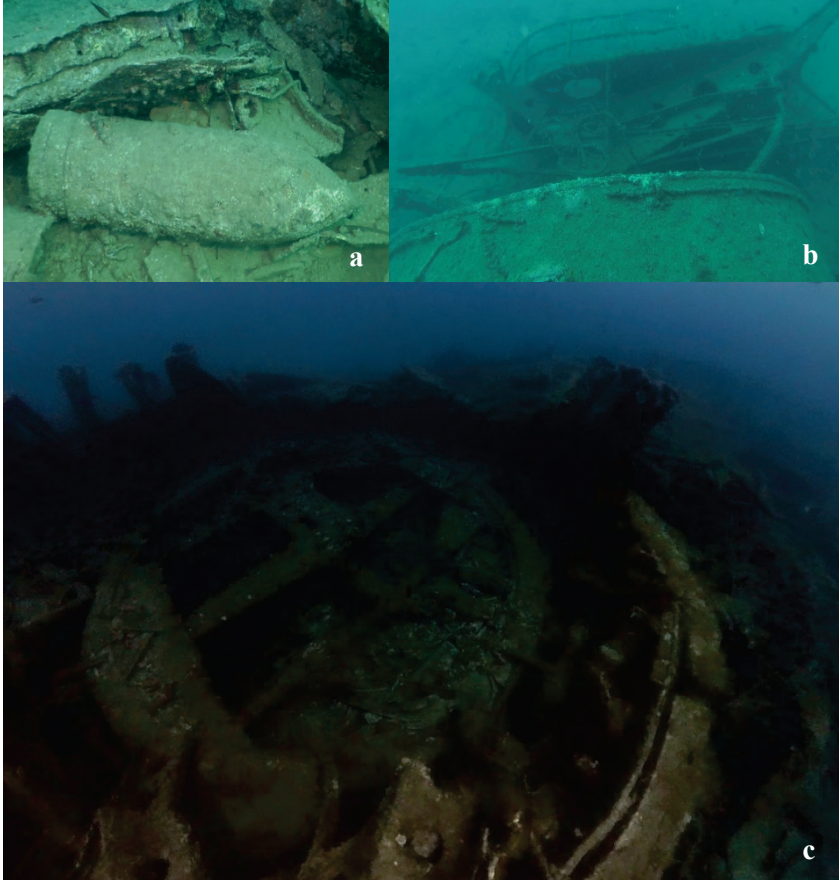


Figure 10. a) A cannonball, **b)** the wheelhouse remains and **c)** a turret base of HMS Majestic

HMS Majestic wreck is within the limits of sportive diving; this will appeal to those who are involved in many diving sports. In order to dive, it is necessary to take one of the diving tours serving in Çanakkale. It is possible to reach Mehmetçik Lighthouse by road, but a boat is needed from the pier of the lighthouse to the wreck location.

The sea current on and around the shipwreck can be strong from time to time, and since it is open to southwest winds, it is crucial to make plans prior to dives and to take guidance. While the surface water temperature is 23°C in August, it may decrease to 17°C due to the thermocline (crystal) layer at the bottom.

LUNDY

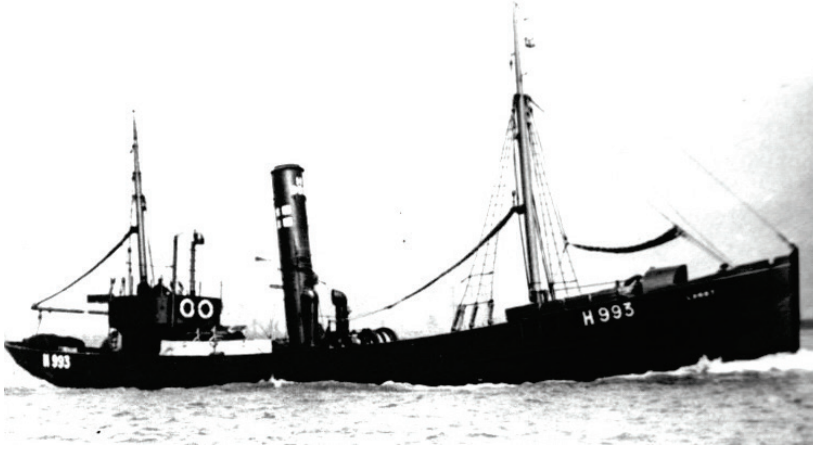


Figure 11. Minesweeper trawler Lundy (Kolay *et al.* 2015)

Lundy, a pre-war fishing ship, was built in Beverley with a length of 33.68 m and a width of 6.55 m (Figure 11). For the World War 1, on May 1915, she was converted into a minesweeper. During the battles were at their higher intense in Anafartalar region, she took on a minesweeping mission and moored off Suvla Bay. On 16 August 1915, Lundy sank after smashing her stern into the propeller of a cargo ship, Kalyan (Kolay *et al.* 2015).

Lundy's wreck is lying at 28 m depth in Suvla (Anafartalar) bay of the Gallipoli Peninsula, between the Büyükkemikli and Küçükkemikli capes, 6.2 nautical miles from Kabatepe port (40°17.872 N, 26°12.913 E). Lundy maintains a straight silhouette. (Figure 12) It has parts such as the anchor and windlass at the bow, the windlass and machinery in the middle, and the propeller at the stern. (Cover photo and Figure 12) The surrounding area is sandy and underwater visibility is around 20 m.



Figure 12. Lundy sits straight on the sandy bottom with the windlasses and machinery

Lundy is within the limits of sportive diving. The average sea water temperature in August is around 16 °C. It is open to north-east winds coming from Suvla Bay, there may be a wavy sea surface depending on the winds. It serves as one of the richest biodiversity spots among the Dardanelles Shipwrecks (Figure 13).

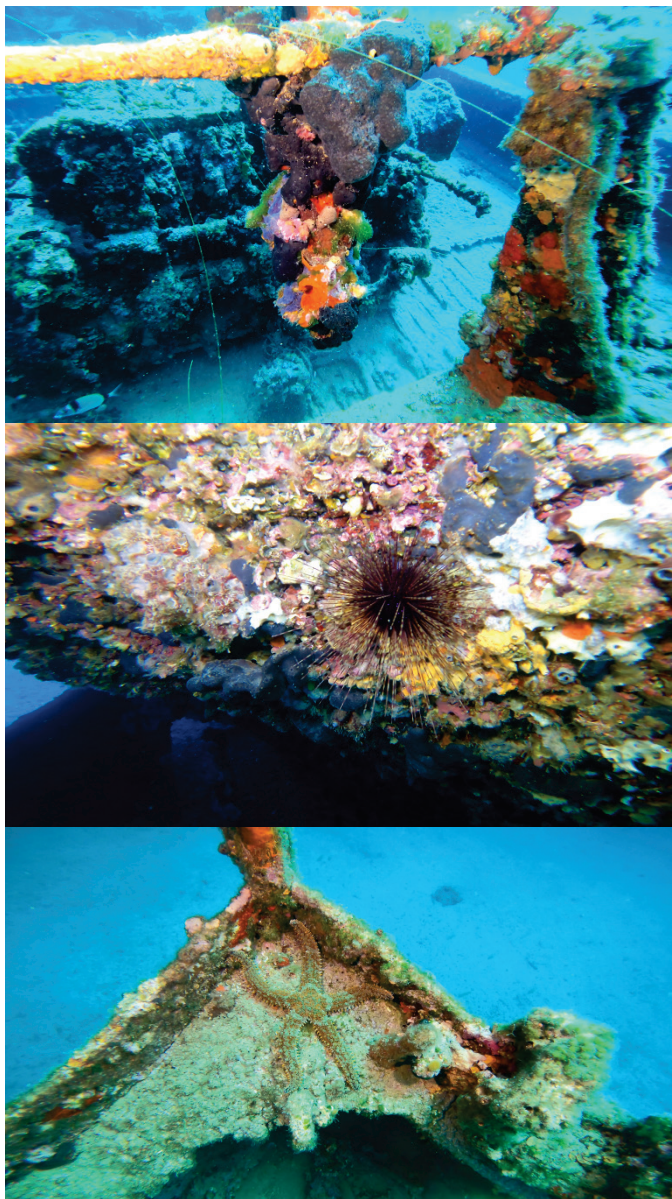


Figure 13. The rich biodiversity all over the Lundy's wreck (continued on the next page)

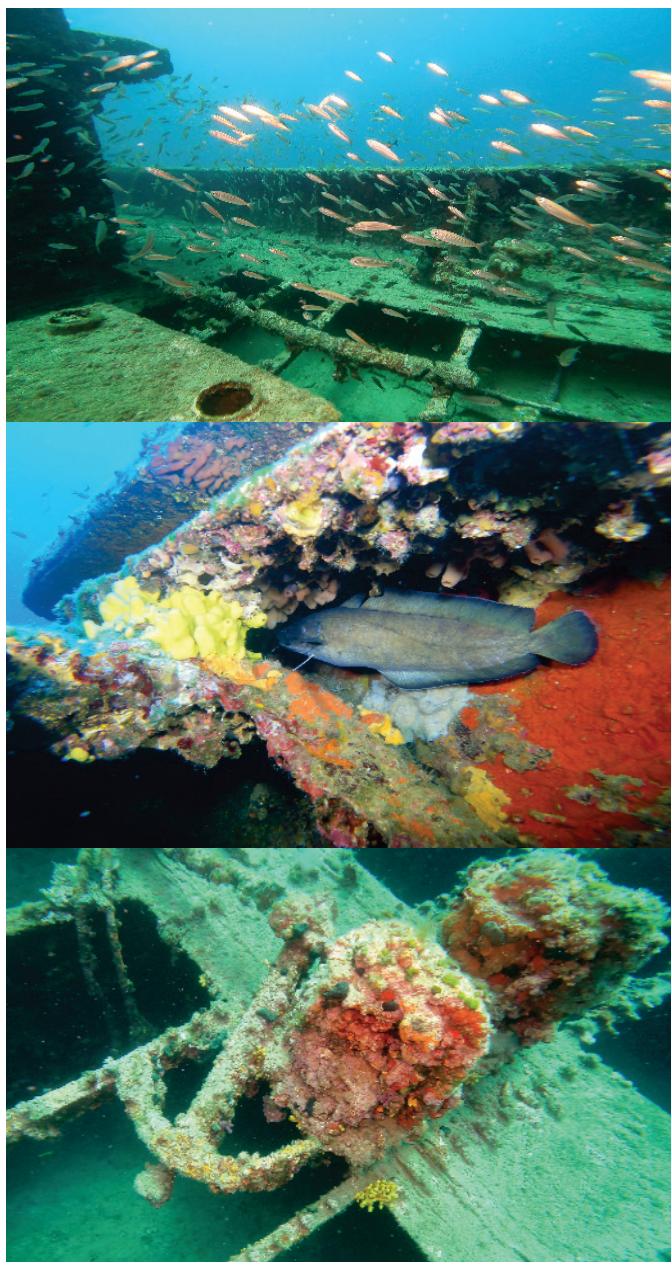


Figure 13 continued. The rich biodiversity all over Lundy's wreck

SS MILO



Figure 14. SS Milo and the temporary pier (Liman 2023)

SS Milo, a cargo steamer with a length of 73.3 m and width of 8.9 m was released to serve in World War 1, and was dispatched to the Dardanelles. After being a vessel for transporting supplies, on 26 October 1915 she had the most interesting duty, which she would assume all throughout the course of the Gallipoli Campaign. SS Milo had been filled with concrete to serve as a breakwater and defend Arıburnu Harbour and the ships against harsh weather. Then a small pier had been constructed between Milo and the land, finally the electricity generated on SS Milo is used to lighten the beach (Figure 14). She was broken up and sunk after the war.

SS Milo's wreck is lying at a maximum depth of 5 m in Anzac Bay, Arıburnu, Gallipoli Peninsula (40°14.610 N, 26°16.586 E). Its distance to the shore is 139 m. Only the hull section is remained, other parts were removed by scrap dealers and were disintegrated over time as it could not withstand the sea and weather conditions.

SS Milo is in the shallows; the shipwreck is clearly visible from the surface. It is the ideal depth for beginner divers and snorkelers. The ship's hull and frames are clearly visible. The surrounding area is sandy and visibility is around 20-30 m. Since the seawater temperature in August is around 23°C, shorty suits can also be suitable for diving. The location of shipwreck is a sheltered place in Anzac Bay so there is no current. The prevailing wind is northerly, but the wreck is close to the shore, so it is not much affected by weather and sea conditions. Snorkelers and scuba divers encounter a rich biodiversity on and around the wreck. The site is covered by a healthy and dense sea-grass meadow.

Starting the dive from the ship's shore side, from the south, the ship's frames and sea grasses will be the first things to be recognized (Figure 15) When reached to the middle part, conger eels and brown meagers can be observed under the hull, an underwater flashlight is necessary. As you proceed towards the stern, it is possible to see the remaining parts of the pier and the wreck (Figure 15). When you move to the starboard side of the shipwreck, the side of the ship and its frames are standing at full length.



Figure 15. Dense and healthy patches of sea grasses in and around SS Milo wreck and the remains of its frames

LOUIS

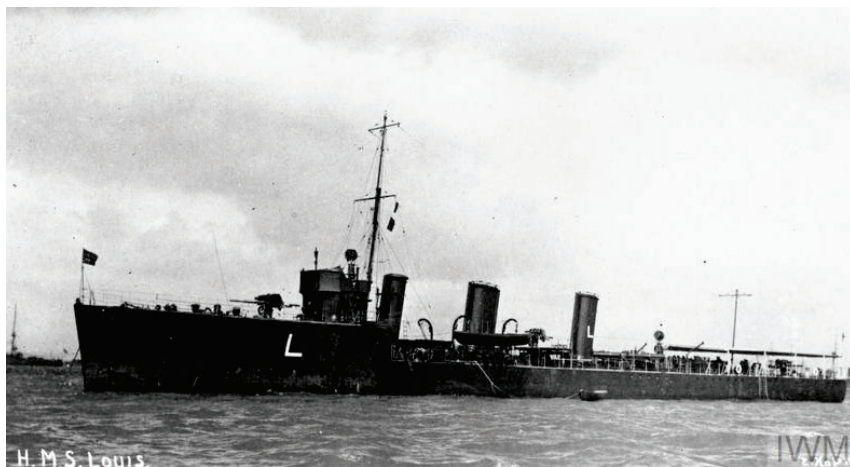


Figure 16. Laforey-class destroyer Louis © IWM Q 75138

On 30 October 1915, Louis Destroyer (Figure 16) arrived at Suvla Bay, on the same day in the evening she collided with a tugboat due to harsh weather conditions. After 5 days long salvage efforts, Louis was abandoned on 4 November 1915. She is now lying parallel to the shore at a depth of 18 m in Suvla Bay (Anafartalar Port), south of Büyükkemikli Cape, Gallipoli Peninsula, (40°18.815 N, 26°13.559 E).

Louis was a 81,9 m long, 8,4 m wide destroyer with a hull of steel and equipped by 4 Yarrow boilers along with the shafts and steam turbines. After the war, some parts of the Louis shipwreck were removed by scrap dealers and some of it was disintegrated over time as it could not withstand the sea and weather conditions. The remaining bow of the ship and the Yarrow boilers are completely recognizable (Figure 17).

The wreck site is approachable only by boat. It is 30.3 miles from Çanakkale center and 7 miles from Kabatepe port.

Wreck is in shallow water and can be seen from the surface when the sea is calm and clear. It is at the ideal depth for those new to diving. Underwater visibility is between 15-25 m. The surface water temperature is about 23°C in August; however it may decrease due to the thermocline (crystal) layer at the bottom. To protect from the sudden change in water temperature, full suits are required for diving. Since the location of the wreck is the south of Büyükkemikli Cape in Suvla Bay and it is close to the shore, it is not affected much by sea and wind conditions. Currents can be experienced from time to time.

THE HELLES BARGES



Figure 19. Barges were used to carry port construction materials, ammunition and other supplies, along with the troops (Kolay *et al.* 2015, © IWM)

After the disastrous defeat at the Naval Battle of Dardanelles Campaign, the landings were targeted as the second base of the Campaign. On 24 April 1915, a large group of cargo ships and other vessels were set out from Bozcaada to Gallipoli Peninsula, to transport troops and supplies (Figure 19). On the next day, soldiers of the landing craft approached the land but immediately encountered fire from Turkish artillery. According to Kolay *et al.* (2015), the two barges are thought to be sunk at that time.

The barges' wrecks are resting off Gelibolu Peninsula, in Tekke Bay (W beach) (40°02.969 N, 26°09.807 E). They are located one behind the other, one at 28 m depth and the other is at 26 m depth. Both maintain their silhouettes. They are close to each other and their distance between is approximately 30 m. Their distance from the coast is about 1625 nautical miles. The dimensions of the barges are; smaller one 18 m long, 5.8 m wide; bigger one 23.5 m long and 6,6 m wide. Both their frameworks are made of steel, the rest wooden decks have all been rotted away. Although the place where they are sunk is slightly inclined, they remain straight.

The surrounding area is sandy and visibility is within 20 m. While the sea water surface temperature is around 23°C in August, the water temperature may decrease due to the thermocline (crystal) layer at the bottom. Barges' location is open to currents from time to time. The prevailing wind is northerly and the

wrecks are not close to the shore, so diving must be planned in accordance with the weather and sea conditions. A marine vessel is necessary to reach the site.

The wreck's anchor on the starboard is recognizable. On the bow of the pier, the materials it used brought ashore during the wars can be seen. Even if the barges are small in size, the biodiversity is quite rich. While the top is covered with a variety of sponges, it is possible to see creatures such as conger eels, forkbeards, seabreams and lobsters under the hull (Figure 20). An underwater flashlight is necessary.



Figure 20. Helles Barges present a colourful and rich biodiversity

ARIBURNU LIGHTER – MULE BARGE

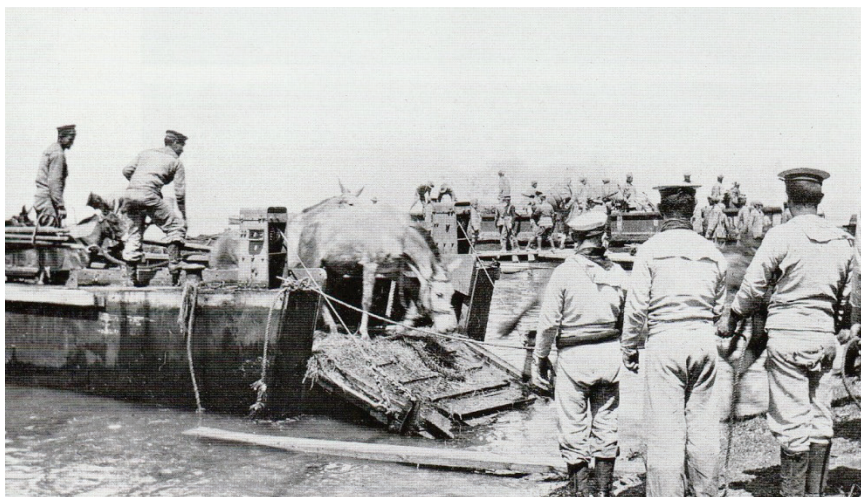


Figure 21. These vessels were also used for transportation of animals (Kolay *et al.* 2015, © IWM)

Ariburnu Lighter, which is thought to have been sunk by the British during their withdrawal from Ariburnu, is 11.40 m long, 3.45 m wide, and 1.30 m high at the gunwales. These vessels, with a steel framework, are also called ‘mule barges’ since the presence of an access ramp in the fore of the vessel that is used to ease the transportation of the supplies and animals (mules, donkeys, horses) (Figure 21). Its wreck is approximately 0.7 nautical miles away from the shore and its lies at 18 m depth (40°15.647 N, 26°20.693 E).

A boat is necessary to reach the dive site. Average surface water temperature in August is 23°C, however the bottom temperature is 18°C due to the thermocline (crystal) layer. Divers should prefer a full suit. There is almost no current and the wreck sits on flat ground. It is surrounded by *Posidonia oceanica* meadows and, over and around the wreck the biodiversity is quiet rich. Sea slugs, seabreams, scorpion fishes, conger eel, and colourful sponges can be seen (Figure 23). The wreck site is within the sportive diving limits and it is appropriate for intermediate level divers. Although it was able to preserve its structure as much as possible -that the access ramp and the gunwales help to imagine the total silhouette- due to a boat’s careless anchoring the starboard of the hull was torn apart (Figure 22).



Figure 22. The broken starboard and the rope that caused the hull to torn apart (top right)

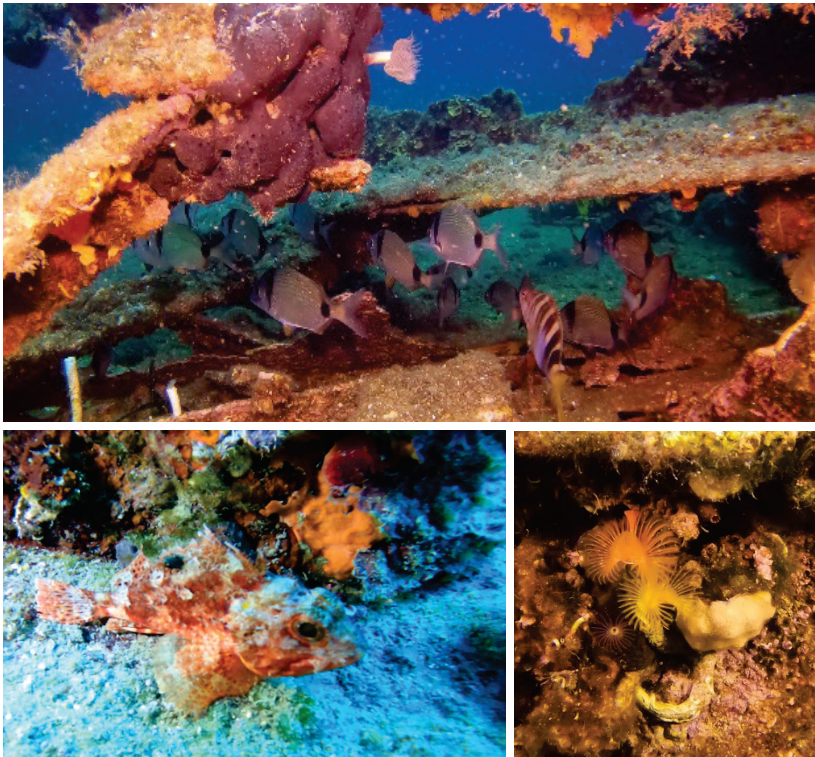


Figure 23. The rich biodiversity on and around the Ariburnu Lighter (Mule Barge)

ARIBURNU BARGE

This is another auxiliary vessel used to transport supplies and animals. It has been found at 28 m depths, off Ariburnu region (40°14.816 N, 26°15.407 E). Wooden parts are completely rotten but 17.4 m long and 6.25 m wide structure stands tall on the sandy bottom.

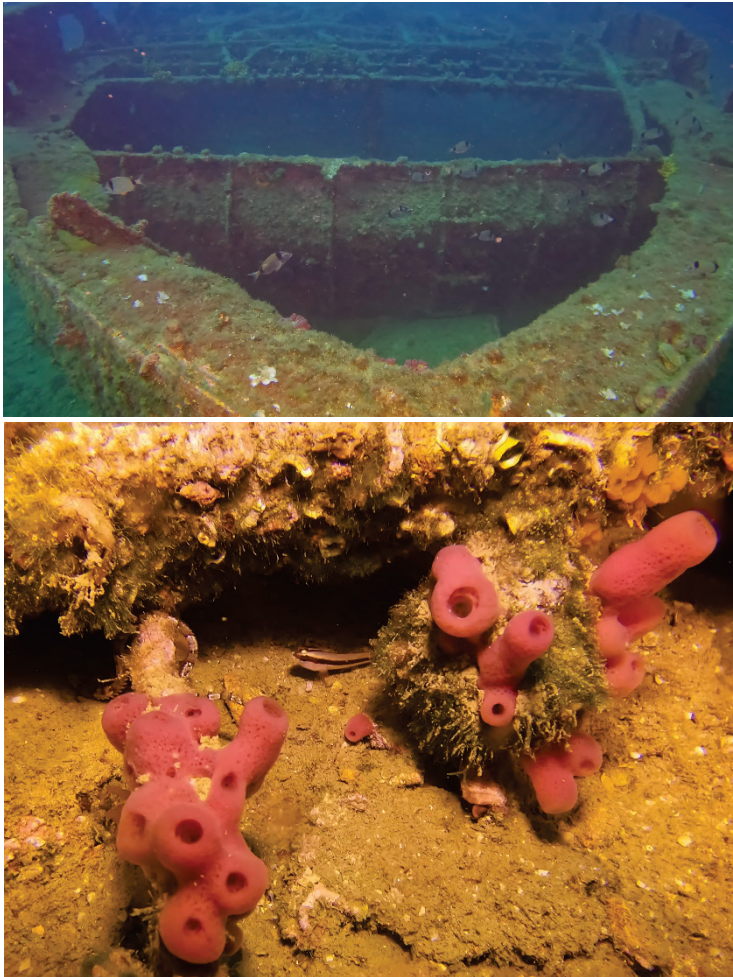


Figure 24. Both inside and the outside of the boat are rich in biodiversity, hosting various kinds of creatures

UNKNOWN WRECK

This unidentified shipwreck is discovered 0.7 nautical miles away from the Alçitepe-Saritepe coast, at a depth of 58 m. It is 17 miles from Çanakkale, 7.4 miles from Kabatepe port, and 4.7 miles from Seddülbahir port (40°05.943 N, 26°11.158 E).

This wreck's identity has not been determined yet. It is 46.3 m long and 7.2 m wide. Considering the structure and dimensions of this single-shaft and steam-powered ship, it can be considered as an offshore fishing ship used by the British as a minesweeper (Kolay *et al.* 2015). The shipwreck is well preserved due to the depth. The uppermost part of the wreck is at 49 m, the deepest point is at 58 m. It lies completely flat on its hull (Figure 25). Thanks to the clear waters of the Aegean Sea, the silhouette is visible in the first 20 meters. Two warehouses are open in the middle and front parts. At the stern, the engine and propeller and shaft are intact. The rudder and its equipment can also be seen. It is one of the shipwrecks that have a rich biodiversity. There are various sponges, barber fish, moray eels and seabreams (Figure 25). As it is offshore, there may be currents from time to time. In August, the water temperature at the bottom is around 16°C. There are ghost nets at the bow and at the port bow (Figure 26).

In order to dive to AE2, within the scope of technical diving procedures, divers need to have technical diving certificates and dives should be carried out under the leadership of a diver guide. A large diving boat is necessary for technical diving equipment and it must be adequate to interfere in emergency response.



Figure 25. The marine biodiversity on the Unknown Wreck.



Figure 26. Marine biodiversity and ghost fishing on the Unknown Wreck

Dive plan report				

Bühlmann zh-116 A, GF 30/85				
Max depth: 60 m OC Dive				
Altitude: 0 meters - Salinity: 35 ppt				
Water density: 1025.97				
60m, 15min, TX 18/40 OC Tank#1, Gas weight: 4.7 Kg. (24 l./230b/5520 l.)				
Deco gases list:				
EAN 50, @22 meters, Tank#2, Gas weight: 2.2 Kg. (7 l./230b/1610 l.)				
Projected decompression:				

DEPTH	GAS TYPE	PRESSURE	TIME	RUN

60m	TX 18/40	149 Bars	12'	15'
27m	TX 18/40	146 Bars	1'	20'
24m	TX 18/40	143 Bars	1'	21'
21m	EAN50	221 Bars	1'	22'
18m	EAN50	213 Bars	1'	23'
15m	EAN50	206 Bars	1'	24'
12m	EAN50	193 Bars	2'	26'
9m	EAN50	177 Bars	3'	29'
6m	EAN50	158 Bars	4'	33'
3m	EAN50	117 Bars	11'	44'
0m	EAN50	117 Bars		45'
Start CNS: 0,0% - OTU's: 0,0				
Final CNS: 15,4% - OTU's: 40,1				
GAS CONSUMPTION LIST:				

No	GAS TYPE	CONS	Δ WEIGHT	RESID.

1	TX 18/40 OC	2090 l.	(- 1.8 Kg.)	143
2	EAN50 OC	790 l.	(- 1.1 Kg.)	117
TOTAL USED GAS WEIGHT:				
(- 2.8 Kg.)				
First leading compartment: C03@21				
Last leading compartment : C08@3				
PastoDeco® 5.0.0 Andr				
Bühmann zh-116 A				

Figure 27. A dive profile sample for the Unknown Wreck

Discussion

For divers all over the world exploring a sunken ship is a thrilling and unique experience and the most iconic wrecks are those submerged in history and tragedy. No matter how precious the diving experience is, it is not possible to get into a completely different state of mood when faced with the remaining parts of a battleship under the water. It is literally like touching the history and experiencing those moments. We as the residents of Çanakkale are privileged to be able to easily reach and experience these mixed emotions. No matter how strong those feelings are, finally and unfortunately there is very little information on the historical diving sites of ours. The one and most comprehensive study is Kolay *et al.* (2015) that almost every author in this book had already cited. Kolay *et al.* (2015) using the modern underwater imaging technology gathered a unique information about 33 shipwrecks and explained them in detail with images of theirs and through the collections of museums from all over the world. The stories behind those ships were also expressed thoroughly, shedding light on how the course of history has changed. The starting of Gallipoli Historical Underwater Park Project is another development to be appreciated. We believe there will be more to come as initiatives studying for the same purpose.

On the other hand, studies on technical diving are also very scarce in national literature (Mirasoğlu and Aktaş 2020). It is mainly restricted to only medical analysis, which is also expressed Mirasoğlu and Aktaş (2020) as inadequate. Regarding the increase in massive structural projects, technical dives are thought to get more importance and studies would be crucial to be done.

Acknowledgement

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Macrofloral and macrofaunal biodiversity on the shipwrecks of the Gallipoli Campaign - Life on the deadliest battleships

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Abstract

A total of 127 macro organisms; 17 floral and 110 faunal, were identified by means of in situ observations on 7 of the Gallipoli Campaign shipwrecks. Twenty species have economical value and four species were determined to have been in IUCN List of Threatened Species on different levels. Protection measures should be taken not only for the sunken ships but also for the marine life growing on them.

Keywords: Marine biodiversity, underwater visual identification, Gallipoli Campaign, shipwrecks

Introduction

The Gallipoli Campaign shipwrecks serve as valuable historical artifacts and windows into the past, linking us to our national heritage. These submerged relics hold immense historical value, shedding light on past battles and heroic stories, offering scientists and historians a unique perspective. Moreover, these sunken ships and war artifacts have an ecological importance as artificial reefs that foster marine biodiversity. They are the artificial features those form the biogeographic patterns of macroorganisms (Hamdan *et al.* 2021). According to Meyer-Kaiser *et al.* (2017) the presence of shipwrecks as island-like systems on the sea floor shapes the biogeographic distribution of macroorganisms. These shipwrecks, once symbols of tragedy, have emerged as crucial contributors to marine biodiversity, as artificial reefs and islands of biological diversity (Svane and Petersen 2001; Perkol-Finkel *et al.* 2005).

Çanakkale province has always been rich in marine biodiversity due to its location on the route of two layered currents, consisting of oxygen-rich, nutrient-poor Mediterranean Sea, and the opposite, oxygen-poor, nutrient-rich Black Sea waters. In accordance, Saros Bay, is just around the corner, which is considered to be one of the most productive water bodies in the Aegean Sea, thus declared as a marine protected area in 2010.

The favour of their location, together with their appealing effect on marine species, make it just inevitable that the Gallipoli Campaign shipwrecks would have evolved into biodiversity hotspots.

Hence, an in situ research has been conducted to explore the marine biodiversity on and around the Gallipoli Campaign shipwrecks. A preliminary checklist of the macroorganisms is aimed to be prepared for these wreck sites.

Materials and Methods

Study area

Gallipoli Peninsula, the battlefields of the World War 1, have been under the administration of The Directorate of Gallipoli Historical Site, since 2014. In 2017, the Directorate initiated Gallipoli Historical Underwater Park project, which included 12 shipwrecks lying between 7 meters to 72 meters, together with 2 natural reefs. In this study, 7 wrecks residing in the sportive diving limits were observed.

Method

Scientific dive surveys were conducted for SS Milo, Louis, Arıburnu Lighter, Helles Barges, HMS Majestic, Lundy, and Arıburnu Barge, during the summer season of 2023. A commercial diving boat was hired with the support of the Directorate of Gallipoli Historical Site. All dives were recorded with an underwater video camera system, GoPro hero10 and 30000 lumen light system mounted on the handle. Images were mostly captured from the videos. In order to reach the highest possible number of individuals, and regarding the bubbles of divers cause to scare away especially the fish species, the first dive and video record of the site was made by a rebreather equipment, which does not allow the exhale bubbles outside the tank. A full record around the wreck is taken by the first diver. Following it, the divers with cameras and writing boards get in the water to gather the detailed information about the biodiversity of the site.

Visual identification was used to constitute the species list. In order to detect the organisms properly, catalogues, those formerly prepared according to the checklists of the region, including the underwater photographs and the distinctive features of the species were studied prior to each dive. No samples were taken in accordance with the protection measures of the wreck sites. The notes and the images taken were examined by all the divers together, after getting back to the land. Papers on the checklists (Bilecenoğlu *et al.* 2014; Çınar *et al.* 2014; Öztoprak *et al.* 2014; Öztürk *et al.* 2014; Topaloğlu and Evcen 2014) and scientifically approved online web sites, WoRMS (2023), AlgaeBase (2023) and FishBase (2023) were consulted for identifications.

Table 1. List of the identified marine species
Conservation status according to IUCN List of Threatened Species
(VU: Vulnerable, EN: Endangered, CR: Critically endangered)
Economical value (*: as souvenir, **: as food, ***: as high priced food)

FLORA	FAUNA	FAUNA	FAUNA
Phaeophyceae	BRYOZOA	TELEOSTEI	TELEOSTEI
<i>Cystoseira compressa</i>	Bryozoa (spp.)	Congridae	Mullidae
<i>Dictyota dichotoma</i>	<i>Bugula</i> sp.	<i>Conger conger</i>	<i>Mullus surmuletus</i> **
<i>Gongolaria barbata</i>	MOLLUSCA	Phycidae	Pomacentridae
<i>Padina pavonica</i>	Bivalvia	<i>Phycis phycis</i> **	<i>Chromis chromis</i>
Rhodophyta	<i>Ostrea</i> sp.	Scorpaenidae	Labridae
Corallinaceae sp.	<i>Pinna nobilis</i> (CR)	<i>Scorpaena maderensis</i>	<i>Coris julis</i>
<i>Lithophyllum</i> sp.	Gastropoda	<i>Scorpaena notata</i>	<i>Ctenolabrus rupestris</i>
<i>Mesophyllum</i> sp.	<i>Cerithium vulgatum</i>	<i>Scorpaena scrofa</i> **	<i>Labrus merula</i> **
<i>Peyssonnelia</i> sp.	<i>Hexaplex trunculus</i>	Serranidae	<i>Labrus mixtus</i>
Chlorophyta	<i>Monoplex parthenopeus</i>	<i>Serranus cabrilla</i>	<i>Labrus viridis</i> (VU)
<i>Acetabularia acetabulum</i>	Nudibranchia	<i>Serranus scriba</i>	<i>Symphodus cinereus</i>
<i>Anadyomene</i> cf. <i>stellata</i>	Nudibranchia sp.	<i>Epinephelus marginatus</i> ***	<i>Symphodus mediterraneus</i>
<i>Codium bursa</i>	<i>Cratena peregrina</i>	Apogonidae	<i>Symphodus melanocercus</i>
<i>Codium</i> cf. <i>fragile</i>	<i>Felimare orsinii</i>	<i>Apogon imberbis</i>	<i>Symphodus ocellatus</i>
<i>Codium</i> cf. <i>tomentosum</i>	<i>Flabellina affinis</i>	Carangidae	<i>Symphodus roissali</i>
<i>Codium</i> cf. <i>spongiosum</i>	<i>Flabellina babai</i>	<i>Seriola dumerili</i> ***	<i>Symphodus rostratus</i>
<i>Flabellia petiolata</i>	<i>Peltodoris atromaculata</i>	Sparidae	<i>Symphodus tinca</i>
<i>Halimeda tuna</i>	Cephalopoda	<i>Boops boops</i> **	Tripterygiidae
MAGNOLIOPSIDA	<i>Sepia</i> sp. ***	<i>Diplodus annularis</i>	<i>Trypterygion delaisi</i>
<i>Posidonia oceanica</i>	CRUSTACEA	<i>Diplodus sargus</i> ***	<i>Trypterygion melanurus</i>
FAUNA	<i>Chthamalus</i> sp.	<i>Diplodus puntazzo</i> **	Blenniidae
PORIFERA	<i>Galathea strigosa</i>	<i>Diplodus vulgaris</i> ***	<i>Blennius ocellaris</i>
<i>Agelas oroides</i>	<i>Stenopus spinosus</i>	<i>Oblada melanura</i> **	<i>Parablennius gattorugine</i>
<i>Aplysina aerophoba</i>	<i>Maja</i> sp.	<i>Sarpa salpa</i> **	<i>Parablennius rouxi</i>
<i>Aplysina cavernicola</i>	ECHINODERMATA	<i>Sparus aurata</i> ***	Gobiidae
<i>Axinella polypoides</i>	Asteroidea	<i>Spicara maena</i> **	<i>Gobius auratus</i>
<i>Chondrilla nucula</i>	<i>Marthasterias glacialis</i>	<i>Spicara smaris</i> **	<i>Gobius bucchichi</i>
<i>Chondrosia reniformis</i>	Ophiuroidea	<i>Spondylisoma cantharus</i> **	<i>Gobius cruentatus</i>
<i>Crambe crambe</i>	<i>Ophioderma longicaudum</i>	Sciaenidae	<i>Gobius niger</i>
<i>Dysidea avara</i>	Echinoidea	<i>Sciaena umbra</i> ** (VU)	<i>Gobius vittatus</i>
<i>Geodia cydonium</i>	<i>Arbacia lixula</i>		<i>Thorogobius ephippiatus</i>
<i>Haliclona fulva</i>	<i>Paracentrotus lividus</i>		
<i>Haliclona mediterranea</i>	<i>Sphaerechinus granularis</i>		
<i>Hexadella racovitzai</i>	<i>Centrostephanus longispinus</i>		
<i>Ircinia oros</i>	Holothuroidea		
<i>Ircinia variabilis</i>	Holothuroidea (spp.)		
<i>Oscarella lobularis</i>	<i>Holothuria tubulosa</i> **		
<i>Petrosia ficiformis</i>	ASCIDIACEA		
<i>Phorbast tenacior</i>	<i>Aplidium</i> sp.		
<i>Sarcotragus foetidus</i>	<i>Clavelina dellavallei</i>		
<i>Sarcotragus spinosulus</i>	<i>Halocynthia papillosa</i>		
<i>Spirastrella cunctatrix</i>	<i>Microcosmus</i> sp.		
<i>Spongia lamella</i> *	<i>Polycarpa pomaria</i>		
<i>Terpios gelatinosus</i>			
CNIDARIA			
Hydrozoa (spp.)			
Anthozoa			
<i>Caryophyllia inornata</i>			
<i>Caryophyllia smithii</i>			
<i>Balanophyllia europaea</i>			
<i>Hoplangia durotrix</i>			
<i>Cladocora caespitosa</i> (EN)			
POLYCHAETA			
<i>Protula tubularia</i>			
<i>Sabella pavonina</i>			
<i>Serpula vermicularis</i>			

Results and Discussion

A total of 127, 17 floral, 110 faunal species were identified for the 7 wreck sites. Among these, 47 were fish species, of which 12 were members of Labridae and 11 were members of Sparidae families. Only 12 algae species, where 4 of it has been described as confirmation needed, and 4 coralligenous genus from Rhodophyta, have been listed. This restricted number of algae species is due to the lack of an algae expert among the colleagues, this study conducted with, so only the ones with sharp distinctive characteristics and the ones very well known from authors' previous studies were taken into consideration (Table 1).

Observations

Apart from the national spirit, mostly, the first thing noticed and got attracted to is the beautiful, colourful sponges and coralligenous habitat on and all around the shipwrecks. However, sponges and corals on two of the shipwrecks of Gallipoli Campaign have been explained in detail, in previous chapter, so mainly fish biodiversity will be focused on in this chapter.

In a similar biodiversity assessment study conducted on three shipwrecks of Çanakkale Strait, Özalp *et al.* (2017), have given a list of 32 fish species which 21 of them are mutual. The difference in the total number of fish species is thought to depend on the dynamics of water masses on and around the wrecks which affect the settlement of cryptic fish species. Among the list we built up, the number of cryptic fishes is 11, while Özalp *et al.* (2017) is only three. So it can be expressed that strong current of Çanakkale Strait, makes the life harder for cryptic fish species.

Chromis chromis (damselfish), *Diplodus vulgaris* (two-banded sea bream) and *Coris julis* (Mediterranean rainbow wrasse) were the most abundant ones those have been encountered at every site. *Sciaena umbra* (brown meagre), *Conger conger* (European conger) and *Phycis phycis* (forkbeard) were also among the dominant species observed hiding under the hulls and in inner cavities. While *Scorpaena* spp. (scorpionfishes), *Serranus* spp. (combers) and Labridae species (wrasses) prefer to be alone or in groups of two, *Chromis chromis*, *Boops boops* (bogue), *Oblada melanura* (saddled seabream) and *Spicara* spp. (picarels) were usually seen constituting large shoals. During its foraging behavior, *Mullus surmuletus* (surmullet) was accompanied by *D. vulgaris* and *C. julis*, those try to eliminate the disadvantages of being beardless on a sandy substratum. A group of seven *Seriola dumerili* (greater amberjack) juveniles were encountered wandering around, while waiting at a deco-stop after the dive at Arıburnu Barge (Figure 1). This behaviour was mentioned in FishBase as “...small juveniles associate with floating plants or debris in oceanic and offshore waters, they form small schools or solitary” with refer to Fischer *et al.* (1990). Another species with a high commercial value, *Epinephelus marginatus* (dusky grouper)

was came across at the site of HMS Majestic. These both encounters occurred only for once.



Figure 1. *S. dumerili* and *P. nobilis* juveniles

Marine environment features many diverse habitats including those dominated by seagrasses, algae and coralligenous species, each have their own type of residents. It has been observed that the shipwrecks' boards, hulls and all broken jagged parts constitute such habitats for cryptic species especially. Bohnsack *et al.* (1991) reported that the reason carnivorous species intend to dominate around marine artificial habitats is the presence of cryptic species as preys. Wrecks, such suitable for hiding, due to their complex and indented structure, are not only home to small fish, but also to small crustaceans, gastropods, echinoderms, arthropods, etc. which may have caused increased pressure of carnivores. Complying with these statements, one species of Cephalopoda, *Sepia* sp. was seen swimming near the Louis wreck, however, its tentacles were all eaten. It is thought to have been in a fight for life with *C. conger*, another resident of the same wreck. Paxton *et al.* (2020), who conducted comparative field surveys on thirty artificial and natural reefs, showed that large reef-associated predators were more dense on artificial than natural reefs and it was associated with higher densities of transient predators (e.g. jacks, mackerel, barracuda, sharks) on artificial reefs, but not of resident predators (e.g., grouper, snapper). In our short-term study, only two resident predator species *C. conger* and *E. marginatus* have been encountered. With another longer-term future study, this number probably increase and the findings of Paxton *et al.* (2020) can be examined.

In and around the interior parts and also under the hauls, cavities serve as shelters for nocturnal species, as well as, small holes and corners serve as shelters for small, cryptic species. On sandy substratum wide cavities under the hulls created by Sparidae species are observed as another peculiar feature of the wreck habitats. Many Labridae species have also been observed wandering around algae growing flat, open areas and feeding on arthropods and worms in small ranges. Sea slugs as well were seen feeding on Hydroid polyps. In other words, this complex structure of wrecks creating feeding areas as well as shelters, are like the roadside flavour stops and roadside hotels.

The location where Arburnu Lighter lies has a considerably richer biodiversity. Quite a healthy *Posidonia* meadow with leaf lengths reaching up to 1.5 m was

observed surrounding the Lighter. The presence of a dense meadow leads the place to be a nursery area of many species. Regarding the sustainability of the ecosystem, the high number of observed juveniles of a variety of species provide a healthy system. Although it is based only on observations, the breeding behaviour of *C. chromis* and in accordance presence of their blue juveniles reveal the existence of a breeding area, as well. A juvenile of *Pinna nobilis* (fan mussel) that has been in the Critically Endangered status of Red List of IUCN was seen on a sandy bottom in the vicinity of Helles Barges (Figure 1).

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AE2 and its destiny in the Marmara Sea

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Abstract

AE2 was the first submarine in history that penetrated the Marmara Sea during the Gallipoli Campaign in 1915. Later, the submarine was detected, surrendered to the Sultanhisar gunboat off Karabiga and sank to the sea bottom. The wreck is under protection as cultural heritage. According to the Fisheries Circular, it is protected since 2006 against any kind of physical damage, which can be made by bottom fisheries.

This wreck is a common cultural heritage of Türkiye and Australia and is in need of protection for the next generation. Long-term monitoring is needed for any kind of damage on the submarine wreck. Little information is known in Türkiye about AE2 so it can be displayed in the Gallipoli Historical Museum and an outreach programme can be started in educational institutions.

Keywords: AE2, Gallipoli Campaign, Fishing, Marmara Sea, Cultural Heritage Protection

AE2 was one of the British made submarines. It was the first submarine that penetrated the Marmara Sea during the Dardanelles Campaign in 1915. This submarine belonged to Australian Navy, with Captain Henry Stoker. British submarines were successful in sinking some 50000 tons of shipping including small crafts and restricting the transportation of troops and supplies to the front in Gallipoli (Kolay 2022). As an enemy submarine, AE2 was detected by the Sultanhisar gunboat and sank to 72 m depth, in Karaburun near Karabiga, on 30 April 1915 (Kolay *et al.* 2013). Later, through meticulous and intensive diving operations, the submarine was discovered by Mr. Selçuk Kolay in 1998 (Smith and Özdaş 2015).

That was a significant challenge for experts of cultural heritage, marine scientists and even naval engineers because it was the first submarine wreck found belonging to World War I and there were bad memories related to the war. According to Dülger (1947), the submarine engine was targeted, later it was sunk and the crew was arrested by the Sultanhisar gunboat. This information was based on the interview with Major Ali Rıza who was the

captain of Sultanhisar. However, Captain Stoker's explanation was different (Brenchley and Brenchley 2003).

After long years of silence, discussion started about how to protect the AE2, whether to leave it where it sank, or to transfer it to the Gallipoli Museum, or even to transport it to Australia. These issues were discussed by several experts in Istanbul during a meeting in 2004, organized by TINA (2004). Needless to say, this submarine wreck was found in Turkish waters and the responsibility to protect also lies on the relevant authorities in the Turkish government.

Meanwhile, Australia made a replica of AE2 and displayed it in the Western Australian Maritime Museum (Figure 1). However, there was some wrong information in the explanation for AE2 and the author sent a letter after visiting the museum while returning from Antarctica in 2015. In response to that letter, Directorate of the museum sent the author a letter shown in Figure 2.

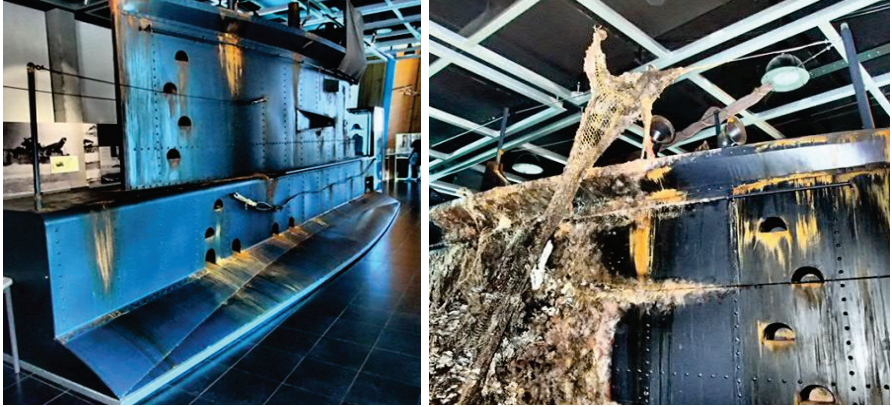


Figure 1. A replica of AE2 at Western Australian Maritime Museum (© Öztürk 2015)



9 April 2015

Prof. Dr. Bayram Öztürk
İstanbul Üniversitesi
Su Ürünleri Fakültesi
Ordu Cad. No: 200
Laleli-İstanbul 34130

Dear Prof. Dr. Öztürk

Re: Customer Comment Form – Welcome Walls 11th March 2015

Thank you for your detailed letter and comment form of 11th March 2015.

There was some artistic license taken by the exhibition preparers because no specification of the concretion was available. If you would send us copies of your papers to correct our errors we will be most grateful.

This year we have funds to revise the text and I will ensure that the full story of the Sultanhızzar is told.

Yours sincerely

Dr Ian D. MacLeod, Executive Director | Fremantle Museums & Collections
Western Australian Maritime Museum | A-Shed, Victoria Quay
Peter Hughes Drive | Fremantle WA 6160
P: 9431 8364 | E: ian.macleod@museum.wa.gov.au
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Figure 2. A letter from Western Australian Museum about AE2.

The AE2 wreck is located near Karabiga, which is known traditionally as a fishing ground, mainly for shrimp beam trawling (Figure 3).

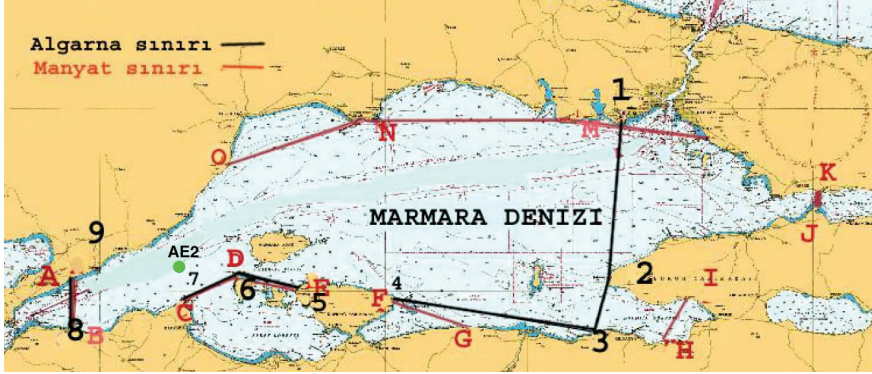


Figure 3. Shrimp trawling (black line) is allowed in the Marmara Sea below 50 meters (Official Gazette 2006). The area off Zone 7 is close to the AE-2 wreck (green dot).

In 2006, Turkish Marine Research Foundation (TUDAV) applied to the Ministry of Agriculture and Forestry to close off the area around AE2 against fishing activities. The request was accepted in 2006 and fisheries operations in the wreck zone have been banned with the Fisheries Circular No. 37/1 (Official Gazette 2006; TÜDAV 2023). The decision is on all kinds of fisheries activities. Nevertheless, ghost fishing is still a threat and needs to be monitored by relevant experts. In fact, a buoy is already deployed to the area but still, illegal attempts may be possible and management of the fisheries is an important issue for local fisheries cooperatives and coast guards.

AE2 is part of the war history and cultural heritage shared between Türkiye and Australia without discussion, thus it must be protected with stringent measures. Underwater cultural heritage has both historical and archaeological value for both nations. There have been several discussions about protection measures for this priceless asset. Ms. Emine Gülizar Emecan, a former member of the National Assembly of Türkiye, has also been concerned about this extraordinary wreck and raised a parliamentary question about it to the Ministry of Culture and Tourism at the Grand National Assembly of Türkiye on 17 September 2021 with a reference number of 35849-51360 (Figure 4). She also asked two major questions about the present situation of the wreck and the intention for displaying at Çanakkale or Gallipoli.



T.B.M.M.
CUMHURİYET HALK PARTİSİ
Onay Sayısı: 35849
Tarih: 17 Eylül 2021



Emine Gülizar EMECAN
İstanbul Milletvekili
Plan ve Bütçe Komisyonu Üyesi

51360

TÜRKİYE BÜYÜK MİLLET MECLİSİ BAŞKANLIĞINA

Aşağıdaki sorularımın Kültür ve Turizm Bakanı Sayın Mehmet Nuri Ersoy tarafından yazılı olarak cevaplandırılmasını saygılarımla arz ederim.

Emine Gülizar EMECAN
İstanbul Milletvekili

Çanakkale Valiliği, Türk Silahlı Kuvvetleri (TSK) ve Güney Marmara Kalkınma Ajansı (GMKA) ile ortak olarak **Çanakkale Savaşları** sırasında yaşanan mücadele sırasında **batan gemilerin dalış turizm**ine açılması için bir çalışma başlatılmıştır. Avustralya Donanmasına ait olan AE2 denizaltısı da 1. Dünya Savaşı sırasında Marmara denizine girmiş, Sultanhisar botu tarafından batırılmıştır. Batık halen Marmara Denzinde Karabiga açıklarında 78 metre derinliktedir.

Bu çerçevede;

- 1-) AE2 Denizaltısının şu andaki durumu nedir?
- 2-) Üike turizmne katkı sunmak amacıyla batığın çıkarılarak Çanakkale veya Gelibolu'da sergilenmesi için yapılan herhangi bir çalışma var mıdır?

Figure 4. A letter by Ms. Emine Gülizar Emecan to the Ministry of Culture and Tourism about AE-2.

Later, the Ministry of Culture and Tourism replied to this inquiry and informed that some studies already started on the wreck (Figure 5).

İSTANBUL MİLLETVEKİLİ SAYIN EMİNE GÜLİZAR EMECAN'IN 7/51360 ESAS SAYILI SORU ÖNERGESİNE BAKANLIĞIMIZCA HAZIRLANAN CEVAP

Bakanlığımız (Çanakkale Savaşları Gelibolu Tarihi Alan Başkanlığı)'ca;

İngiliz Henry Stoker komutasındaki Avustralya Kraliyet Donanmasına ait AE2 Denizaltısı Binbaşı Ali Rıza komutasındaki Sultanhisar'ın torpido botu tarafından Karabiga açıklarında teslim alınmıştır. Esir alınmaları esnasında AE2 personelinin su alan kapakları açması sonucu gemi batmıştır.

AE2 Denizaltı Batığının, Türkiye Sualtı Arkeolojisi Vakfı (TINA) tarafından Haziran 1998' de Karabiga'da Karaburun'un 4 mil kuzeyinde 72 m derinlikte sağlam bir şekilde olduğu tespit edilmiştir. AE2 Denizaltı Batığı'nda Dışişleri Bakanlığı ve Genelkurmay Başkanlığı izniyle belgeleme çalışmaları gerçekleştirilmiştir.

1998, 2014 ve 2020' de Denizaltı'nın durumu belgelenmiştir. Ayrıca Avustralya ile yapılan ortak çalışma ile belgeseli yapılmıştır.

Bakanlığımız (Tanıtma Genel Müdürlüğü)'ca;

Çanakkale Savaşları'nın yaşandığı Tarihi Gelibolu Yarımadası'nda, batan yabancı savaş gemilerinin envanterinin oluşturulmasıyla ortaya çıkacak "Gelibolu Tarihi Sualtı Parkı" 1. Dünya Savaşı temalı ilk sualtı parkı olarak 2 Ekim 2021 tarihinde dalış turizmine açılmıştır.

Ülke turizmine katkı sunmak amacıyla Bakanlığımız ve Türkiye Turizm Tanıtım ve Geliştirme Ajansı (TGA) desteği ile tanıtım çalışmaları gerçekleştirilmiştir. 2 Ekim 2021 tarihinde düzenlenen açılış ve tanıtım etkinliğine, ulusal tanıtımı yanında uluslararası tanıtımını üst düzeyde sağlamak için kendi spor dalında tanınmış olan yabancı dalış profesyonelleri ve yine dalış ve batık dalış sektörüne özel yabancı basın mensupları davet edilmiştir. Farklı ülkelerde "Gelibolu Tarihi Sualtı Parkı" açılışı ile ilgili birçok haber ve sosyal medya paylaşımı gerçekleştirilmiştir.

TGA tarafından uluslararası önemli dalış merkezlerinden birisi olması için tanıtım stratejisine "Gelibolu Tarihi Dalış Parkı" eklenmiştir ve www.goturkiye.com internet adresinde Çanakkale'ye ve dalış turizmine özel sayfalar yayına alınmıştır. Ayrıca, "goturkiye" sosyal medya hesaplarında Çanakkale'ye ve dalış turizmine yönelik paylaşımlar devam etmektedir.

1 / 2

Çanakkale ve Gelibolu tarih, kültür ve dalış turizmi açısından önemli bir potansiyele sahip olması açısından dünyada tanıtılması son derece önemlidir. Bakanlık ve Türkiye Turizm Tanıtım ve Geliştirme Ajansı (TGA) olarak ülke turizmine katkı sağlaması yönünde çalışmalar sürdürülecektir.

Figure 5. A letter by Ministry of Culture and Tourism replying to Ms. Emine Gülizar Emecan's questions about AE2

After this communication, the AE2 wreck gained special importance even in Turkish parliamentary history because there is no other example of such a wreck becoming a topic of discussion in the parliament. For the moment, this initiative has resulted in a very positive impact for the preservation of AE2 by getting attention of the public.

Meanwhile, protection of marine biodiversity in the entire Sea of Marmara is a crucial matter. There was a massive mucilage phenomenon in the Marmara Sea and adjacent area in 2021 mainly due to eutrophication. This initiated the designation of Specially Protected Area status for the entire Sea of Marmara in 2021. This sea has interesting peculiarity because of two layered flow regime. Ecosystem of the Marmara Sea and Turkish Straits System depends on water exchange between the Black Sea and Aegean Sea.

As a conclusion, making a biodiversity and habitat mapping of the wreck zone is also important to better understand ecological change and species diversity in the area as these can affect the condition of the wreck. Pollution sources should also be monitored for the area. Besides, invasive alien species, illegal and unreported fishing and climate change should be included in the agenda for future regular monitoring. In terms of marine biodiversity, during the survey carried out in 2023, some octocoral species and colonies of corals were observed (Figures 6 and 7). In Figure 6, however, a fishing rope is shown on the wreck, which implies ghost fishing with an abandoned fishing gear.



Figure 6. Octocorals attaching to AE2 with a fishing rope hanging alongside. This photo was taken during the 2023 survey.



Figure 7. An octocoral population on AE-2 and Ghost fishing nets (© Ç. Kedioğlu)

Cathodic protection of the submarine was carried out several times by Mr. Ian MacLeod, an Australian metallurgist and corrosion scientist from the Western Australian Maritime Museum. However, for the scientific examination of the wreck and analysis of results, Turkish experts should also work on the cathodic protection of the submarine and a joint work plan should be organized by Australia and Türkiye.

Finally, the founder of modern Türkiye and the hero of the Dardanelles, Mustafa Kemal Atatürk said, “Unless a nation’s life faces peril, war is murder.”

It is important to remember that all wars are a tragedy as in the song “And the Band Played Waltzing Matilda”.

Acknowledgement

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