The Osor Aquatorium: An Overview of Underwater Archaeological Research
Osorski akvatorij: pregled podvodnih arheoloških raziskav

Zrinka Ettinger Starčić
Lošinj Museum
e-mail: zrinka.ettinger@gmail.com
Igor Miholjek
Croatian Conservation Institute, Department for Underwater Archaeology
e-mail: imiholjek@hrz.hr

Abstract
In the Kvarner area and the Cres-Lošinj archipelago, Osor is the oldest and most significant island settlement, as well as the best-researched archaeologically. In addition to land-based archaeological surveys and research, ongoing since the late 19th century, the seabed of the entire island area has been systematically surveyed and studied. Particular attention has been given to the Osor seabed, due to the importance and value of the material culture originating from the settlement itself. This article presents all previous research conducted over the past 70 years, chronologically divided into two main periods: the first systematic research during the second half of the 20th century, and more recent systematic and protective research in the early decades of the 21st century. The results of these activities certainly complete the picture of the way and dynamics of life in this island centre throughout different historical periods, especially from the perspective of ancient seafaring, navigation, and Osor's role in established transport and economic communications.
Keywords: Cres-Lošinj, Osor, harbour, maritime trade route, underwater archaeological research

Izvleček
Na območju Kvarnerja in arhipelaga Cres-Lošinj je Osor najstarejše in najpomembnejše otoško naselje ter arheološko najbolje raziskano. Poleg kopenskih arheoloških pregledov in raziskav, ki potekajo že od konca 19. stoletja, je bilo sistematično raziskano tudi morsko dno celotnega območja otoka. Posebna pozornost je bila osorskemu morskem dnu namenjena zaradi pomena in vrednosti materialne kulture, ki izvira iz samega naselja. Članek povzema vse dosedanje raziskave, opravljene v zadnjih 70 letih, kronološko razdeljene v dve glavni obdobji: med prve, sistematične, raziskave v drugi polovici 20. stoletja in novejše, sistematične ter zaščitne, raziskave v zgodnjih desetletjih 21. stoletja. Rezultati teh aktivnosti zagotovo dopolnjujejo sliko načina in dinamike življenja v tem otoškem središču skozi različna zgodovinska obdobja, predvsem z vidika starodavnega pomorstva, navigacije in vloge Osorja v vzpostavljenih transportnih in gospodarskih povezavah.
Ključne besede: Cres-Lošinj, Osor, pristanišče, pomorska trgovska pot, podvodne arheološke raziskave

Introduction

Situated on the narrow isthmus connecting the islands of Cres and Lošinj, Osor is one of the most prominent historical settlements not only within the Cres-Lošinj archipelago but also throughout the entire Kvarner region and the northern Adriatic. It is justifiably considered the 'metropolis' of Kvarner and the safest city on the eastern Adriatic coast in early history (Blečić Kavur 2014; 2015, 15; Blečić Kavur and Kavur 2025).

https://doi.org/10.26493/2350-5443.13(2)139-151

Figure 1: Osor, View of the Town and the Old Port (photo: Sara Popović, 2023)

Osor is framed by the Kavanela (Cavanella) channel, which connects the Kvarner Gulf to the north with the Kvarnerić to the south (fig. 1). This sea strait, with its prevailing sea currents and winds, along with suitable coves on both sides, was crucial in shaping Osor into an essential, millennia-old port on the oldest transport routes that connected Northern and Central Europe with the Mediterranean during the late prehistoric period. Despite this wealth of evidence and the efforts of earlier researchers (e.g. Imamović 1979; Faber 1980; Stražičić 1995), direct and concrete evidence of a prehistoric port or infrastructure has not yet been documented. Their existence is only assumed and linked to later Roman structures.

The abundant material culture, mostly unearthed from necropolises, tombs, the settlement itself, and surrounding areas (Blečić Kavur 2015; 2021; 2025; Blečić Kavur and Kavur 2013; 2024a; 2025), testifies to Osor's prominent role on the island and its extensive cultural and economic networks. Additionally, a collection of items from underwater research significantly enhances our knowledge, understanding, and interpretation of life in Osor, particularly during the period of Roman rule (Ettinger Starčić 2012; 2013). At that time, the city flourished, gaining a city charter and becoming a municipium (*Municipium Apsorus*), probably under Augustus or Tiberius (Suić 2003, 64; Vrsalović 2011, 246). It not only maintained but also developed its status as an important port on the sea route from Salona to Aquileia, primarily due to favourable winds and sea currents (Zaninović 2005; cf. Orlić 1986; Jurišić 2000).

The significance and value of Osor's position on shipping routes, as well as the standard of living of its ancient inhabitants, are corroborated by numerous finds of material culture from earlier excavations of necropolises and tombs (Ettinger Starčić and Ćus-Rukonić 2015), as well as the most recent discoveries in the area of Preko mosta and along the road towards Nerezine (Janeš 2022; Perković Gjurašin 2022; cf. Blečić Kavur 2025; Blečić Kavur and Kavur 2024a).

Earlier scholarship held that Osor possessed a fully developed port infrastructure and a refurbished Kavanela canal during this period. It was long maintained that the town had three ports: in Bijar Bay, in the Old Port (Stara luka) by the Kavanela passage, and in Jaz Bay (Imamović 1979; Faber 1980; 1982). Today, however, it is difficult to envisage Jaz Bay as an operational harbour, as it is entirely silted up and buried. Furthermore, the existence of a channel linking it with Bijar Bay has not been scientifically con-

Figure 2: Locations of the Underwater Sites of Osor Mentioned in the Text (Google Earth; elaborated by Martina Blečić Kavur, 2025)

firmed and has, in fact, been convincingly rejected (fig. 2) (Doneus et al. 2015, 773; Miko et al. 2025).

The development and importance of Osor began to decline in the 15th century, when it ceased to be the administrative and episcopal seat of Cres and Lošinj. However, it did not disappear entirely; through various transformations, life at this location has continued to the present day (cf. Sušanj Protić 2015).

The strategic position of Osor, both within the archipelago and on the northern Adriatic shipping route, historically secured it a key role in maritime and economic networks. This has resulted in a rich cultural and architectural heritage that testifies to the civilisations which have shaped it for millennia. This paper presents all underwater archaeological research conducted since the late 1960s, from preliminary surveys and inspection to trial excavations and individual finds. Based on different approaches and methodologies, the research is divided into two periods. This structure allows the collected data to be organised chronologically through the history of the research, highlighting the value of the sites and the wealth of archaeological remains, from the ancient to the modern era.

Underwater Research in the Second Half of the 20th Century

The earliest records of underwater archaeological sites, particularly in the shallow waters along the Croatian coast, date back to the 16th century, with the first mention of an ancient shipwreck appearing in the 18th century. Individual efforts to protect underwater heritage began only in the mid-20th century, and from the 1970s onwards, they became part of a well-organised system (Radić Rossi 2012).

Several valuable finds have been discovered on the nearby seabed. Notably, one of the most important is a shipwreck from the early Imperial epoch near the island of Ilovik, which contained flattened Forlimpopoli-type amphorae and luxurious glass and bronze vessels (Orlić 1986; Ju-

rišić 2000, 65; Radić Rossi 2012, 292; Ettinger Starčić 2013, 26–30).

However, the most prominent discovery in the island group is undoubtedly the Hellenistic bronze statue of a young athlete (Apoxyomenos), found near the islet of Vele Orjule, next to the island of Lošinj, in 1996 (Ettinger Starčić 2013; Ettinger Starčić and Potrebica 2017). The absence of other finds directly associated with the statue makes it impossible to reliably date it or interpret the circumstances of its arrival on the seabed. Although it is considered the first and only discovery of such a significant artistic monument in Croatian waters (Radić Rossi 2012, 295), it is worth recalling the much earlier collection of individual finds of extremely valuable early Imperial sculpture in Osor itself, specifically in Jaz Bay (figs. 2–3) (e.g., Cambi 1982). For this reason, the seabed around Osor has been recognised as having exceptional potential for future research since the last century.

Despite this, and in contrast to the terrestrial archaeological research conducted in Osor for over 150 years, underwater exploration began remarkably late (Ettinger Starčić and Ćus-Rukonić 2015). The first survey of Osor's waters took place in 1971, conducted by Radmila Matejčić and Velika Ruševljan from the Maritime and History Museum of the Croatian Littoral Rijeka, in collaboration with the Republic Institute for the Protection of Cultural Monuments. Based on information from port authorities and local officials, the aim of the survey was to inspect all reported and known sites in Osor Bay (on the left bank). During that period, the underwater areas of Bijar Bay and the Old Port of Osor, as well as the bays of Radiboj, Pirac, and Golubljaj, and the capes of Maestro, Boko and Osor were surveyed (fig. 2) (Matejčić and Ruševljan 1971, 1–6; Matejčić 1976; Matejčić and Orlić 1982, 164). The surveyed sites were described in detail in a report, but the material culture remained mostly unpublished, except for the amphorae, which were soon systematised typologically and chronologically by Velika Ruševljan (1970).

It was not until 1979 that Dasen Vrsalović, in his doctoral dissertation – which remains a fundamental work on the eastern Adriatic seabed – classified the existing sites into four major categories: shipwrecks, scattered finds, isolated objects, and port facilities and finds alongside ancient architecture (Vrsalović 1979). This was followed by numerous inspection surveys of bays and capes in the waters near Osor. The sites were then mapped and interpreted several times by Marjan Orlić, who believed that such finds indicated the intensity of navigation and seafaring in this important geostrategic and transit area (Matejčić and Orlić 1982; Orlić 1986).

Dasen Vrsalović categorised the shipwreck finds, placing the site at Boko Cape, west of Osor in Osor Bay and along the coast of the island of Lošinj, into the first category (fig. 2). Due to the abundance of fragments of amphorae, pottery, and roof tiles – a typical and common type of cargo – this was classified as a devastated shipwreck. The amphorae were identified as the Apulian type Lamboglia 2 and are dated to the 1st century BCE (Vrsalović 2011, 77; Orlić 1986, 6). As a significant and potential archaeological site, it was also inscribed in the Register of Cultural Goods of the Republic of Croatia (Z-48).

Vrsalović then included the discovery of multiple examples of the same Lamboglia 2 type amphorae and their fragments, which were explored in Radiboj Bay along the Kolo peninsula, on the island of Lošinj (fig. 2), in the category of so-called 'scattered finds'. Given the material culture found, he believed there was a possibility that shipwreck remains existed beneath the surface sand (Vrsalović 2011, 84; Orlić 1986, 6). This site was also entered in the Register of Cultural Goods of the Republic of Croatia as an underwater archaeological site (RRI-0309).

Under the category of isolated objects, several potential sites were listed in Osor Bay along the coast of the island of Lošinj. For example, the discovery of two early Byzantine amphorae of the Dressel 34 type, dating from the 6th century, was recorded near Maestro Cape (fig. 2). Further north, in Pirac Bay, late antique amphorae

Figure 3: Roman Imperial Portrait of Drusus the Younger (photo: Nadir Mavrović, 2017)

from the 4th and 5th centuries were documented, and in Golubljaj Bay, not far from Osor Cape itself, an amphora of North African origin from the 3rd century was found (fig. 2). Near Škojić at Osor Cape, a stone anchor was also recorded (fig. 2) (Vrsalović 2011, 87).

Port facilities and finds alongside ancient architecture were documented at the sites of Bijar Bay, northwest of Osor, and the Old Port of Osor (fig. 2). In Bijar Bay, numerous scattered objects were investigated, particularly pottery from both the ancient and medieval periods, as well as port infrastructure and various construction materials. This identified the location as a highly important site, and it was therefore inscribed in the Register of Cultural Goods of the Republic of Croatia (Z-77). The Old Port of Osor yielded the most finds, especially fragments of amphorae with various typological features, as well as bowls, plates, pots, platters, and lids, dating from antiquity to the 14th/15th century (Matejčić and Orlić 1982, 166–7). A large number of round wooden beams were also found, most likely posts (*palina*) used for mooring ships in the harbour (Vrsalović 2011, 89). Along with the site in Radiboj Bay, the Old Port was designated as one of the most promising areas in the Osor waters, with the intention of further systematic research (fig. 2) (Vrsalović 2011, 89).

The category of isolated or individual objects also includes three partially preserved Roman sculptures, discovered by chance by a trawler fisherman in Jaz Bay. These pieces are identified as Roman Imperial portraits depicting Octavian, Drusus the Younger, and a younger person, all dated to the 1st century BCE (figs. 2–3). These sculptures are considered exceptional examples in the eastern Adriatic coastal region (Cambi 1982, 85–98; 2002, 124).

Underwater Research in the 21st Century

During the late 1980s and 1990s, the attention of archaeologists was focused on other, more significant sites in the Cres-Lošinj seabed. However, after a break of several years, new underwater inspection surveys of the Osor waters were undertaken in 2008. These were conducted as part of the regular project Reconnaissance of Kvarner (2008–2012), led by Igor Miholjek from the Department for Underwater Archaeology of the Croatian Conservation Institute, in collaboration with the Lošinj Museum and the Special Police Diving Centre of the Ministry of the Interior of the Republic of Croatia from Mali Lošinj.

The project's goals were to assess the current state of known archaeological sites, determine their level of devastation, and create new documentation. Furthermore, the project aimed to conduct a comprehensive survey of potentially interesting locations, identify possible new sites, and verify information received from local fishermen, resulting in the investigation of 20 sites (Dugonjić 2010, 212; Ettinger Starčić 2012, 623–4). The project also planned the recovery of finds from endangered sites or those near the shore. All surveyed sites were documented, and the retrieved objects were registered and, after full processing, stored at the Lošinj Museum. Dur-

Figure 4: Osor, Old Port – Details of the Wooden Piles (photo: Robert Mosković, 2008)

Figure 5: Osor, Bijar Bay – Fragment of a Pluteus (photo: Robert Mosković, 2008)

ing this period, two locations in the waters of Osor were surveyed and investigated: Old Port and Bijar Bay (fig. 2).

The location of Osor Port, specifically at the pier near the bridge, has been known since the 1970s due to a reported discovery of a monoxylon (dugout canoe). Given the context and previous research, this area was categorised as containing port facilities and finds associated with ancient architecture. As another monoxylon is already part of the permanent collection at the Osor Archaeological Collection, this report appeared plausible. A test excavation with four trenches was conducted. Although fragments of modern-era pottery and considerable recent waste from boats and the shore were found, the anticipated monoxylon was not documented. However, at the end of the pier, eight

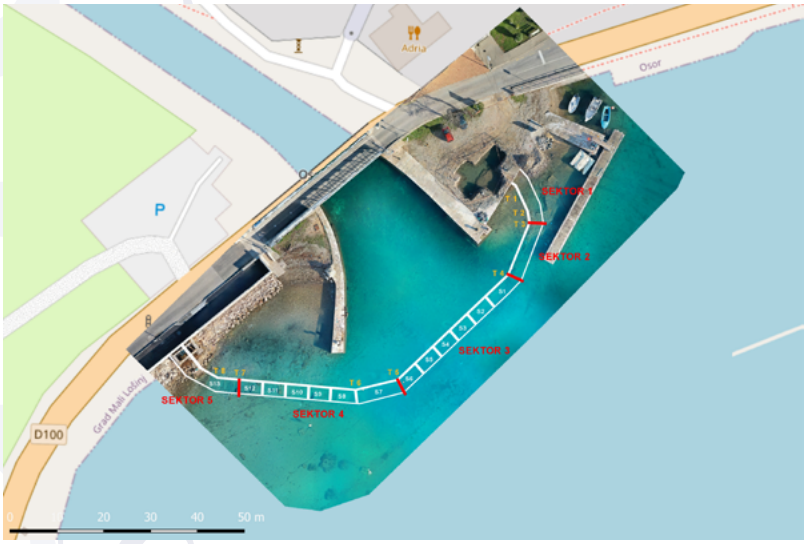

Figure 6: Osor, Old Port – Layout of The Archaeological Excavation with Marked Sectors and Trenches (sectors – red; archaeological trenches – white; reference points – yellow) (made by Sara Popović and Denis Jakopović, 2023)

wooden piles were recorded (fig. 4). These likely date from the Venetian period and were used for mooring ships (Dugonjić 2010, 218–9; Ettinger Starčić 2012, 625).

The entire area to the north, from Osor and its medieval walls to Bijar Bay, was also surveyed, as it had been in the 1970s. The presence of a large quantity of archaeological and building material was confirmed, including fragments of various types of amphorae, pottery, tegulae, imbrices, and stoppers from different periods, ranging from antiquity to the modern era. An exceptional find was a fragment of stone sculpture, dated to the 9th century, which was most likely part of a pluteus (a low stone screen) from an Osor church (fig. 5) (Dugonjić 2010, 218; Ettinger Starčić 2012, 625).

In 2014, another amphora was discovered at the entrance to Osor Bay on the Lošinj side. During a rescue excavation led by Zrinka Ettinger Starčić of the Lošinj Museum, a complete Lamboglia 2-type amphora was found at a depth of 11.7 metres. However, due to the circumstances of its discovery, it was not possible to determine its original site, and the amphora was therefore classified under Vrsalović's category of isolated or individual objects and is now kept in the Osor Archaeological Collection.

The most recent underwater rescue excavations in the waters of Osor took place in 2023, as part of two projects: the Nerezine Linear Construction Agglomeration and the route for a new 110 kV underwater cable from Cres to Lošinj. Two different locations in Osor Port were investigated: the first by the Department for Underwater Archaeology of the Croatian Conservation Institute from Zagreb, and the second by the ARS NAUTICA Institute for Maritime Heritage and the University of Zadar.

At the first location, directly in front of the entrance to the Kavanela channel, a trench was excavated measuring 107 m long, 3 m wide, and up to 4 m deep (fig. 2; 6). The excavation area was divided into five sectors. On the Cres side of the trench (sectors 1 and 2), around ten wooden piles were found in sector 2, which had been used to secure the stone embankment. Along the coast of the island of Lošinj (sectors 4 and 5), approximately thirty wooden piles were discovered in sector 4, which had secured the muddy and sandy Lošinj coastline, in contrast to the rocky Cres side (fig. 6). This difference is due to the stronger sea currents on the Cres side, which prevent as much sediment from being deposited as along the Lošinj stretch. As this is a shipping channel with strong currents, it has been established that the canal is mechanically cleaned and

Figure 7: Osor, Old Port – Archaeological Excavation in Sector 3 (photo: Jerko Macura, 2023)

deepened to a depth of 4 m at regular intervals. Given these conditions and the dredging, more precise cultural layers could not be defined.

During the preparation of the documentation, multiple complementary methods were employed using modern digital technologies. The proposed route plan for the future water supply pipeline, provided by the infrastructure works contractor, was integrated in a GIS environment with airborne laser scanning data. These data also included seabed coverage (courtesy of the Ludwig Boltzmann Institute, Vienna), enabling a more detailed understanding of the seabed topography within the study area. For photographic and graphic documentation, the excavation area was subsequently surveyed from the air using an unmanned aerial vehicle (UAV). A total of 867 aerial photographs and 24 reference points, whose spatial positions were recorded using a total station, were used to generate the model and orthophotographs. Geodetic measurements of the reference points were conducted using GNSS. The same reference points used for georeferencing the aerial model were also employed to reference the models of underwater-recorded archaeological excavation trenches. The 3D model of the archaeological trenches was produced from 2,409 photographs. Photogrammetric 3D models and orthophotographs were generated using dedicated software, while all resulting georeferenced datasets were integrated and overlaid in QGIS, where the graphic documentation was also produced (Popović 2023).

The greatest number of archaeological finds were discovered in sector 3, located just in front of the canal but connected to Osor's infrastructure (fig. 7). In this 320 m² area, over 200 objects were found that could be typologically and stylistically defined and chronologically dated. These included pottery and container from various historical eras, ranging from the Hellenistic period to the Venetian Republic and up to the 19th century.

The pottery is divided into several categories: coarse prehistoric and Hellenistic ceramics, fine Roman ceramics and amphorae, and a small portion of glazed modern-era pottery produced in northern Italy. Other finds include Roman oil lamps, modern-era smoking pipes, and fragments of unidentified objects.

Quantitatively, the largest number of finds comprised amphorae and their parts, especially stoppers, which were made on a wheel and in a mould. These included, for example, necks of the Portorecanati/Unije type, bifid handles of Dressel 2-4 type amphorae, globular ribbed bodies of Late Roman 1 type amphorae, and fragments

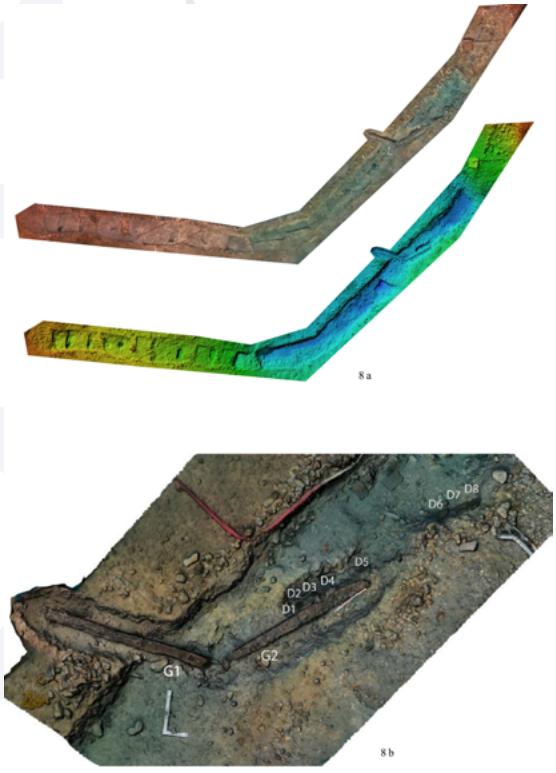

Figure 8: Osor, Old Port – a) DEM Model and Orthophoto of the Archaeological Excavation (made by Jerko Macura; processed by Sara Popović, 2023); b) 3D Model with DesignatIons of Wooden Elements (G – beam; D – wooden planks) (made by Anton Divić, 2023)

of North African and Spatheon-type amphorae (Miholjek 2024).

The largest portion of fine pottery consists of imported Hellenistic ceramics, which can be categorised into several types and styles, including *Gnathia* ware, black-glazed, and Hellenistic relief pottery. All these examples are attributed to tableware for serving and drinking liquids, such as drinking cups, bowls, and plates, and are dated from the late 4th to the 1st century BCE, corresponding to the end of the Iron Age and the beginning of Roman era in Osor (Blečić Kavur and Kavur 2024b; cf. Blečić Kavur 2015).

During the subsequent Augustan and early Tiberian periods, the finest tableware was imported, as in other significant economic and military strongholds of the Roman Empire. Examples of thin-walled pottery and both smooth and relief *terra sigillata* from the early Roman period had already been found in Osor, and recent surveys of the Osor channel have confirmed this. Fragments of bowls, plates, cups, and jugs, some bearing stamps and decorations, were collected. Despite the unclear stratigraphy, this is the first instance of such material culture being found within a defined archaeological context, and it represents the largest number of finds to date from the Osor seabed and its surrounding area (Blečić Kavur and Kavur 2024b).

In addition to these finds, two large wooden beams were discovered during the excavation in Sector 3 (fig. 8). They measured 4 metres in length with a cross-section of 30 × 30 cm and were oriented in the direction of the tide. The beams were reinforced with vertically placed planks and yellow clay, which was not found elsewhere at the site. Given their dimensions, they were very likely installed to direct the sea currents in the canal and to secure the Lošinj side of the coast. Samples from the beams and piles were taken for further analysis to determine the age of the wood, which could provide more information about the periods when these elements were installed and used. Although preserved stratigraphic layers are lacking, the quantity, quality, and diversity of the material culture confirm the long-term, continuous use of this area as a port and its significance within the social dynamics of Osor over the centuries (Miholjek 2024) (figs. 6–8).

The second excavation was carried out southeast of the previous location, in a section approaching the modern-day coast of Jaz Bay. This survey of the future 110 kV Cres-Lošinj underwater cable route was led by Irena Radić Rossi (2023) (fig. 2). Due to the previous data and finds, as described earlier, there were high expectations for this area. However, it yielded significantly poorer results compared to the first location in front of the Osor strait. A surface inspection of the seabed revealed modern waste and scattered finds along the entire route of the future cable and in the bay itself. Fragments of

pottery were observed along the route, broadly dating from antiquity to the modern era.

During the excavation, material culture was only found in two trenches and consisted of small fragments of modern-era pottery. In trench 14, a certain amount of rounded pottery fragments and pebbles were found, suggesting the existence of a beach at some point in time. The majority of the finds were fragments of ceramic and glass vessels from various periods, which hold no significant scientific or artistic value, as they were discarded from the shore or from boats into the shallow sea (Radić Rossi 2023).

Conclusion

Underwater archaeological research and survey in the Osor aquatorium have been conducted for more than 70 years, though not always with the same intensity, purpose, or objectives. The aim of the initial inspection and field surveys was to document as many potential sites as possible and to record them in legal proceedings to protect them from possible deliberate or further devastation. The collected material culture mostly relates to periods from antiquity to the modern era, among which the presumed shipwreck near Radiboj Bay, harbour infrastructure, and individual finds of early imperial sculpture are particularly noteworthy.

In recent decades, archaeological research in the Kvarner area has been carried out systematically, both as part of an inspection project and through protective, smaller-scale interventions on selected routes. Significant archaeological heritage, as well as new circumstances related to changes in the marine environment, have been documented, especially in the area of Osor Old Port. Older data have also been revised, the state of individual locations and sites has been analysed, and perspectives for further research have been defined. Viewed as a whole and in a broader context, this research significantly complements existing knowledge based solely on the results of land-based research. Material evidence of intense maritime activities confirms the important role of Osor in the social and economic development of the region, highlighting its strategic position, prominent maritime and intermediary function, and the continuity of its settlement. The results of the research not only expand the understanding of ancient maritime routes and trade patterns, but also provide relevant insights into the daily lives of sailors and the local population throughout Osor's thousand-year history.

Acknowledgements

The authors would like to thank their dear colleagues for their support and assistance in collecting data, which has significantly contributed to the quality of this paper: Martina Blečić Kavur, Boris Kavur, Nives Doneus, Michael Doneus, Sara Popović, Irena Radić Rossi, and Neno Starčić. As part of the *Osor beyond the myth* project (N6-0292), the pottery and vases from the excavations of the Osor Port are currently being processed and will be published.

References

Blečić Kavur, M. 2014. *Get the Balance Right! Osor in Balance of European Cultures and Civilizations in the Last Centuries BC.* University of Primorska Press.

Blečić Kavur, M. 2015. *Povezanost perspektive: Osor u kulturnim kontaktima mlađeg željeznog doba = A Coherence of Perspective: Osor in Cultural Contacts during the Late Iron Age.* University of Primorska Press and Lošinjski muzej.

Blečić Kavur, M. 2021. 'Kvarner in the Early Iron Age of the Northern Adriatic.' *Arheološki vestnik* 72:57–74.

Blečić Kavur, M. 2025. 'The Emergence of the Iron Age on Osor through Representative Material Culture.' *Studia universitatis hereditati* 13 (2): 63–91.

Blečić Kavur, M., and B. Kavur. 2013. 'The Amphora from Osor.' *Hortus Artium Medievalium* 19:351–56.

Blečić Kavur, M., and B. Kavur. 2024a. 'Death in Osor: Rituals and Practices of Prehistoric Burials.' *Studia universitatis hereditati* 12 (1): 13–34.

Blečić Kavur, M., and B. Kavur. 2024b. 'Preliminarna analiza nalaza keramičkih posuda i ulomaka.' In *Izvještaj o provedenom zaštitnom podvodnom arheološkom istraživanju u sklopu programa Linijske građevine aglomeracije Nerezine, 23. siječanj–13. ožujak 2023. godine,* edited by I. Miholjek. Hrvatski restauratorski zavod.

Blečić Kavur, M., and B. Kavur. 2025. 'Osor, Insularity and Its Surroundings: The Creation of a Regional Identity Caught between the Global Economy and Local Subsistence.' In *The Unclassical Balkans: Ancient Societies and Cultures of the Balkan Peninsula beside the Graeco-Roman World,* edited by F. Milivojević, V. Sarakinski, and J. Tzvetkova. Filozofski fakultet Skopje.

Cambi, N. 1982. 'Tri carska portreta iz Osora.' *Izdanja Hrvatskog arheološkog društva* 7:85–98.

Cambi, N. 2002. *Antika*. Povijest umjetnosti u Hrvatskoj, knj. 2. Ljevak.

Doneus, N., M. Doneus, and Z. Ettinger Starčić. 2017. 'The Ancient City of Osor, Northern Adriatic, in Integrated Archaeological Prospection.' *Hortus Artium Medievalium* 23 (2): 761–75.

Dugonjić, P. 2010. 'Rezultati rekognosciranja podmorskih pozicija na području Kvarnera 2008. i 2009. godine.' *Izdanja Hrvatskog arheološkog društva* 26:209–23.

Ettinger Starčić, Z. 2012. 'Rekognosciranje lošinjsko-creskog podmorja. Rezultati sustavnog pregleda od 2008. do 2011. godine.' *Histria Antiqua* 21:623–31.

Ettinger Starčić, Z. 2013. *Underwater Archaeological Sites of the Lošinj Archipelago: The Results of a Systematic Survey from 2008 to 2011.* Lošinjski muzej.

Ettinger Starčić, Z., and J. Ćus-Rukonić. 2015. 'Pregled povijesti arheoloških istraživanja na cresko-lošinjskom arhipelagu u posljednjih stotinjak godina.' *Izdanja Hrvatskog arheološkog društva* 30:9–18.

Ettinger Starčić, Z., and H. Potrebica. 2017. 'Apoxyomenos – Underwater Cultural Heritage and Museum in the Service of the Local Community and Tourism.' *Studia universitatis hereditati* 5 (1): 49–53.

Faber, A. 1980. 'Osor–Apsorus iz aspekta antičkog pomorstva.' *Diadora* 9:289–311.

Faber, A. 1982. 'Počeci urbanizacije na otocima sjevernog Jadrana.' *Izdanja Hrvatskog arheološkog društva* 7:61–78.

Imamović, E. 1979. *Povijesno-arheološki vodič po Osoru*. DES.

Janeš, A. 2022. 'Zaštitna arheološka istraživanja na trasi državne ceste DC 100 u Osoru (dionica Osor–Nerezine): u tijeku.' Hrvatski restauratorski zavod, 4 April. https://www.hrz.hr/aktualno/novosti-i-obavijesti/zastitna-arheoloska-istrazivanja-na-trasi-drzavne-ceste-dc-100-u-osoru-dionica-osor-nerezine-u-tijeku/.

Jurišić, M. 2000. *Ancient Shipwrecks of the Adriatic: Maritime Transport during the First and Second Centuries AD*. Archaeopress.

Matejčić, R. 1976. 'Petnaest godina hidroarheoloških istraživanja u Kvarneru.' *Pomorski zbornik* 14:345–61.

Matejčić, R., and M. Orlić. 1982. 'Rezultati prve faze hidroarheoloških istraživanja u cresko-lošinjskim vodama.' *Izdanja Hrvatskog arheološkog društva* 7:161–9.

Matejčić, R., and V. Ruševljan. 1971. *Izvještaj o rekognosciranju u vodama otoka Cresa i Lošinja*. Pomorski i povijesni muzej Hrvatskog primorja.

Miholjek, I. 2024. *Izvještaj o provedenom zaštitnom podvodnom arheološkom istraživanju u sklopu programa Linijske građevine aglomeracije Nerezine, 23. siječanj–13. ožujak 2023. godine.* Hrvatski restauratorski zavod.

Miko, S., N. Doneus, D. Brunović, et al. 2025. 'Dip Your Finger in the Sea … Geoarchaeological View on Coastal Setting and Maritime Accessibility of the Coastal Town of Osor, Northern Adriatic.' *Studia universitatis hereditati* 13 (2): 13–40.

Orlić, M. 1986. *Antički brod kod otoka Ilovika*. Republički zavod za zaštitu spomenika kulture.

Perković Gjurašin, E. 2022. 'Konzerviranje i restauriranje arheoloških nalaza iz antičke nekropole u Osoru.' Hrvatski restauratorski zavod, 13 June. https://www.hrz.hr/aktualno/novosti-i-obavijesti/konzerviranje-i-restauriranje-arheoloskih-nalaza-iz-anticke-nekropole-u-osoru/

Popović, S. 2023. *Izvješće o provedenoj izradi i obradi fotografske i nacrtne dokumentacije za potrebe zaštitnih podvodnih arheoloških istraživanja, otok Lošinj, linijske građevine aglomeracije Nerezine.* Arheoprojekt.

Radić Rossi, I. 2012. 'Underwater Cultural Heritage and Maritime Archaeology in Croatia: An Overview.' *European Journal of Archaeology* 15 (2): 285–308.

Radić Rossi, I. 2023. 'Stručno izvješće o zaštitnom podmorskom arheološkom istraživanju u Osorskoj luci, na trasi novog podmorskog kabela 110 kV Cres–Lošinj.' Institut za pomorsku baštinu Ars Nautica.

Ruševljan, V. 1970. 'Tipologija kvarnerskih amfora.' *Diadora* 5:161–70.

Stražičić, N. 1995. 'Prilog poznavanju geografskih osnova lokacije, funkcije i razvoja Osora.' *Otočki ljetopis Cres-Lošinj* 9:74–88.

Suić, M. 2003. *Antički grad na istočnom Jadranu.* 2nd ed. Golden Marketing.

Sušanj Protić, T. 2015. 'O urbanizmu Osora nakon 1450. godine.' *Ars Adriatica* 5:95–114.

Vrsalović, D. 1979. 'Arheološka istraživanja u podmorju istočnog Jadrana.' PhD diss., Sveučilište u Zagrebu.

Vrsalović, D. 2011. *Arheološka istraživanja u podmorju istočnog Jadrana: prilog poznavanju trgovačkih plovnih putova i gospodarskih prilika na Jadranu u antici*. Književni krug and Arheološki muzej u Splitu.

Zaninović, M. 2005. 'Apsorus i Crexa na jadranskom putu.' *Senjski zbornik* 32:5–24.

Summary

Within the Kvarner area and the Cres–Lošinj archipelago, Osor is the oldest and most important island settlement, as well as the most thoroughly investigated archaeological site. Systematic archaeological research has been conducted continuously since the late 19th century, encompassing both terrestrial and underwater surveys across the entire island area. Particular attention has been given to the seabed around Osor due to the significance and value of the material culture associated with the settlement.

This paper summarises all research carried out over the past seventy years, divided into two main periods: the first systematic investigations in the second half of the 20th century, and the more recent systematic and rescue excavations in the early 21st century. Through inspection and field surveys, numerous potential sites were documented and incorporated into protection procedures, to prevent further intentional or unintentional damage. The collected material mainly relates to periods from Antiquity to the Modern Era, with particularly notable finds including a presumed shipwreck site in Radiboj Bay, harbour infrastructure, and Early Imperial sculptures.

In recent decades, archaeological research in the Kvarner area has been conducted systematically, both through large-scale surveys and smaller-scale rescue excavations. Significant archaeological heritage has been documented in the Osor harbour area, along with new evidence of environmental changes in the marine setting. Earlier data have been re-evaluated, the condition of individual sites reassessed, and perspectives for further research defined. In a broader context, these investigations substantially complement previous knowledge based solely on terrestrial research. Material evidence of intensive maritime activity confirms Osor's key role in the social and economic development of the region, highlighting its strategic position, strong maritime and intermediary function, and continuity of settlement. The results not only deepen our understanding of ancient sea routes and trade networks but also provide valuable insights into the everyday life of sailors and local inhabitants throughout Osor's millennia-long history.

Povzetek

Na območju Kvarnerja in znotraj creško-lošinjskega arhipelaga Osor predstavlja najstarejše in najpomembnejše otoško naselje, ki je hkrati najtemeljiteje arheološko raziskano. Sistematične raziskave potekajo neprekinjeno od konca 19. stoletja in

vključujejo kopenske ter podvodne preglede celotnega področja. Posebna pozornost je bila namenjena osorskemu podmorju zaradi izjemnega pomena materialne kulture, povezane z naseljem.

Prispevek povzema vsa dosedanja raziskovanja zadnjih 70 let, razdeljena v dve obdobji: med prva, sistematična, v drugi polovici 20. stoletja ter novejša, zaščitna in dokumentacijska, v 21. stoletju. Z rekognosciranji in s terenskimi pregledi je bilo evidentiranih več potencialnih najdišč, ki so bila vključena v postopke varstva, da bi se preprečile nadaljnje namerne ali nenamerne poškodbe. Gradivo se večinoma nanaša na obdobje od antike do novega veka, med katerim izstopajo brodolomsko najdišče v zalivu Radiboj, pristaniška infrastruktura in najdbe zgodnjecesarskih skulptur.

V zadnjih desetletjih so raziskave prinesle pomembne podatke o osorskem pristanišču, zlasti o arheološki dediščini in spremembah morskega okolja. Revidirani so bili starejši podatki, analizirano stanje na posameznih lokacijah ter opredeljene smernice za nadaljnje raziskave. Celostna obravnava rezultatov bistveno dopolnjuje spoznanja, pridobljena z izključno kopenskimi raziskavami. Dokazi o intenzivnih pomorskih dejavnostih potrjujejo ključno vlogo Osorja v družbenem in gospodarskem razvoju regije, njegov strateški položaj ter kontinuiteto poselitve. Rezultati poglabljajo razumevanje antičnih pomorskih poti in trgovinskih vzorcev ter osvetljujejo vsakdanjik pomorcev in lokalnega prebivalstva skozi tisočletno zgodovino mesta.